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AIAC
Associazione Italiana Aritmologia e Cardiostimolazione

ABSTRACT BOOK

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COMUNICAZIONI ORALI

SESSIONI NON ACCREDITATE ECM

COMUNICAZIONI ORALI 01

GIOVEDI' 21 SETTEMBRE

SALA BIANCA

17:00-18:00

SESSIONE DI COMUNICAZIONI ORALI: SCOMPENSO CARDIACO

Moderatori: M. Luzi (Macerata-MC), M. Fantinel (Feltre-BL)

CO.01.01

PREDITTORI DI CARDIOMIOPATIA INDOTTA DA PACING IN PAZIENTI AFFETTI DA CAD

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Background: Chronic right ventricular (RV) pacing has been known to predispose to LV dysfunction. Few data exist about the predictors of LV dysfunction in paced patients, above all in CAD disease. This study was designed to follow up patients with previous myocardial infarction (MI) and RV pacing to look for development of pacing-induced cardiomyopathy (PiCMP) and identify its predictors, drawing comparison between apical vs non-apical RV pacing sites.

Methods: Three hundred fourteen patients undergoing ventricular implants were enrolled and followed up. At implantation EF was preserved. Baseline clinical and instrumental parameters were recorded. Patients were divided on the basis of ACS diagnosis (STEMI vs NSTEMI/UA) and scar evidence. The patients were followed up at 24-36 months with estimation of LVEF and pacemaker interrogation at regular visits. Pacemaker-induced cardiomyopathy (PiCMP) was defined as a fall in ejection fraction of 20% as compared to the baseline LVEF. Patients developing PiCMP were compared to other patients to identify predictors.

Results: The mean age of study population was 69.8 years, 65.2% being males. 42% and 58% patients underwent VVIR and DDDR pacemaker implantation, respectively. Patients with history of right heart failure or chronic pulmonary heart were excluded. PiCMP developed in 28 patients (8.9%) over a mean follow-up of 12.5 months. After multivariate analysis, burden of ventricular pacing > 60% [HR 3.66, p = 0.004], interventricular dyssynchrony (aortopulmonary ejection delay > 40 msec) [HR 2.54, p = 0.002] and scar evidence [HR 3.12, p = 0.005] were identified as predictors for PiCMP in patients undergoing chronic RV pacing. On referring to the effects of RV pacing site (apical vs non-apical), no differences were noted about incidence of PiCMP [HR 1.44, p = 0.353) in this categories, a major incidence of PICS was noted in the group of patients with apicale pacing and scar evidence [HR 1.77, p = 0.041]. No differences in other categories.

Conclusions: Incidence of PiCMP with RV pacing was found to be 8.9% over a mean follow-up of 24 months. Burden of right ventricular pacing, interventricular dyssynchrony and scar evidence could be considered as predictors for the development of PiCMP in CAD patients. The incidence of PiCMP could be higher in CAD patients with scar evidence and apical ventricular pacing.

CO.01.02

USO DELLA RISONANZA MAGNETICA CARDIACA E DEL DEFIBRILLATORE INDOSSABILE PER INDIVIDUARE PAZIENTI A BASSO RISCHIO DI EVENTI ARITMICI: ESPERIENZA DI UN SINGOLO CENTRO

G. Solarino, J. Del Meglio, L. Nesti, A. Lilli, A. Tognarelli, V. Della Tommasina, A. Christou, F. De Caro, M.L. Canale, L. Marracci, M. Pardini, R. Poddighe, E. Ferrali, G. Casolo
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Introduzione: Nel nostro Centro i pazienti affetti da SCC di nuova diagnosi e FEVSx ridotta sono stati sottoposti a RM per determinare la presenza ed estensione di delayed enhancement (DE) o di aree cicatriziali. A questi pazienti è stato consegnato il defibrillatore indossabile (WCD) come monitoraggio e terapia antiaritmica temporanea nell'intervallo dalla dimissione al follow up a tre mesi. È stato effettuato successivo FU a 6 e 12 mesi.

Metodi: Dal maggio 2016 al dicembre 2022 sono stati dimessi 109 pz consecutivi (89 M; età media 65,4aa±9,6aa) con ridotta FE (28,5%±7,3%) in OMT, con WCD e sono stati e sono stati inseriti in follow up clinico. E' stata acquisita anatomia coronarica in 108 pz: assenza di ats coronarica (42pz); ats non significativa (34pz); ATS significativa (32pz). 1 pz non ha eseguito angiografia per tireotossicosi. La RM è stata effettuata in 86pz (EDV 124,5 ± 32,8 ml/mq; Massa 98,2± 23,7 g/mq, FEvsx RM 26,5% ±7,9). E' stato effettuato FU a 3 mesi in tutti i pazienti; a 6 mesi in 102pz e a 12 mesi in 89pz.

Risultati: La RM ha individuato 51pz con pattern tipo midwall e in 13 pz di questi coesisteva pattern ischemico regionale; 23pz con segni di ischemia regionale; 16 pz senza segni di DE. Durante il follow up 75pz (69%) hanno recuperato la funzione contrattile a 3 mesi (FEvsx post 41,6±8,0%) e sono usciti dall'indicazione all'ICD. 26 pz sono stati impianti con ICD (24,1%). Questi pz presentavano alla RM volumi assoluti e indicizzati superiori (p 0,016; p 0,0064) e maggior presenza di pattern ischemico (p 0,05). Il WCD è stato portato in modo continuativo da tutti i pz con buona compliance per 2.8±1.4 mesi (range 1÷10), per 23,1 ore/die; sono state correttamente riconosciute 3 TVNS; si sono verificati 2 shock inappropriati su FA. A 6 e 12 mesi nella popolazione con recupero della FE si è verificata 1 FV; 1 recidiva di scompenso cardiaco. Nella popolazione con ICD a 6 mesi si è verificato 1 shock inappropriato su FA e 1 shock su FV; a 12 mesi 1 shock su FV, 1 ATP su TVS. In entrambe le popolazioni si è assistito ad un ulteriore recupero della FE.

Conclusioni: La RM è risultata utile ad individuare pazienti a basso rischio di eventi nonostante la compromissione della LVEF. La ridotta estensione di DE è legata ad un basso rischio di eventi aritmici a 6 e 12 mesi e è legata ad una più alta probabilità di recupero della LVEF indipendentemente dall'eziologia. Le dimensioni volumetriche calcolate alla MRI risultano inversamente correlate al recupero della LVEF. Il WCD rappresenta una sicurezza aggiuntiva con ottima compliance nei pz che ancora non hanno chiare indicazioni all'ICD definitivo.

CO.01.03

THE ROLE OF SACUBITRIL/VALSARTAN AND GLIFLOZINS IN HEART FAILURE WITH REDUCED EJECTION FRACTION AFTER CARDIAC RESYNCHRONIZATION THERAPY

D. Faccenda, C. Fonderico, A. Salucci, A. Marrese, G. Comparone, L. Cocchiara, V. Pergola, L. Addeo, B. Napolitano, G. Ammirati, M. Muoio, T. Strisciuglio, A. Rapacciuolo
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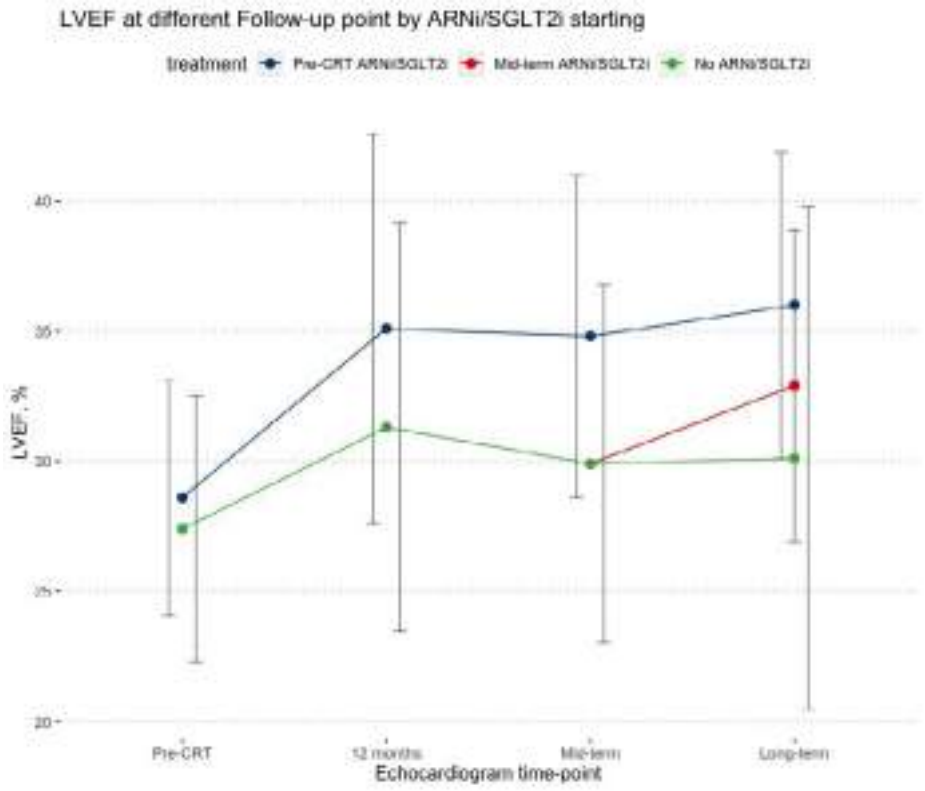
Background: Heart failure with reduced ejection fraction (HFrEF) is associated in about one third of patients with abnormal conduction of the cardiac electrical impulse, resulting in asynchronous activation of the ventricles and worsening of cardiac pump function. Cardiac resynchronization therapy via biventricular pacing (CRT) has demonstrated improvement in cardiac mechanical function. The pharmacological treatment of HFrEF with sacubitril/valsartan (ARNi) and glyphozines (iSGLT2) have been shown to significantly reduce mortality.

Purpose: The objective of our study was 1) to evaluate the effect of therapy with ARNi and iSGLT2 on the recovery of left ventricular ejection fraction (LVEF %) in a population affected by HFrEF and with CRT 2) to evaluate whether there are any differences in terms of improvement in LVEF among patients who introduced these drugs into therapy before CRT implantation and those who introduced them after.

Methods: This single-center retrospective study analyzed patients with HFrEF and CRTD. These patients in our center undergo regular follow-up with cardiology visit, ECG and echocardiography every 6 months. We analyzed clinical features, drug therapy, and echocardiographic data including LVEF. Patients were considered responders they had an increase in LVEF >/=5% or a decrease in end-systolic volume of 15% at 6 months. The data analysis was performed with the R software.

Results: 258 patients were included, 202 males (78%) with a mean age of 69.4 years, and 67.4% of them with ischemic HFrEF. Diabetes mellitus (68%), dyslipidemia (87%) and arterial hypertension (73%) were the most frequent comorbidities. Fifty-two percent of patients (133) were CRT responders and there was no difference in the proportion of responders between patients receiving ARNi and/or iSGLT2 therapy and those without (55% vs 47%; p=ns). The mean increase of LVEF was also similar between the two groups (+7.7% vs +10.3%; p=ns). In the group of patients taking ARNi or iSGLT2, no significant differences were found between patients taking these drugs already before CRT compared to those who started after.

Conclusions: In this population, HFrEF patients with CRT, therapy with ARNi or iSGLT2 does not affect the response to CRT.



CO.01.04

A POSSIBLE EASY WAY TO PREDICT RESPONSE TO CARDIAC RESYNCHRONIZATION THERAPY: THE ROLE OF QRS INDEX

C. Madaudo [1], G. Coppola [1], A. Prezioso [1], E. Bonnì [2], G. Novo [1], V. Sucato [1], G. Ciaramitaro [1], A.R. Galassi [1], E. Corrado [1]
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Background: Some studies have evaluated the role of QRS duration (QRSd) as predictor of response to Cardiac Resynchronization Therapy (CRT). However, their results are still not entirely clear. The goal of our study was to determine the correlation between the relative change in QRS narrowing index (QI) compared to clinical outcome and prognosis in patients who underwent CRT implantation.

Methods: We collected clinical and echocardiographic data of 115 patients in whome a CRT device was implanted in accordance with current guidelines. QRS duration before and after CRT implantation and QI were measured.

Results: After 6 months, a significant improvement in all echocardiographic parameters was detected. QI was correlated to reverse remodelling (r = +0.19; 95% CI: 0.006 to 0.35, p = 0,049). The value of QI that predicted best LV reverse remodelling after 6 months of CRT was 12.25% (sensitivity = 65,5%, specificity = 75%, area under the curve = 0.737, p = 0,001). Independent predictors of QI are sex, serum creatinine and eGFR measured at baseline and LVEF pre-CRT performed by echocardiography.
We observed an betterment in their HF clinical composite score and NYHA class at 12 months.
We have also investigated the clinical outcomes and the possible sex differences related to QI.

Conclusions: Patients with a larger QI after CRT initiation showed greater echocardiographic reverse remodelling and better outcome from death or cardiovascular hospitalization. QI seems to be an easy-to- measure variable that could be used or evaluated to predict CRT response but further studies are needed.

CO.01.05

MITRAL REGURGITATION LEADING TO HEART FAILURE IMPROVED BY UPGRADE FROM CONVENTIONAL RV STIMULATION TO LBBAP

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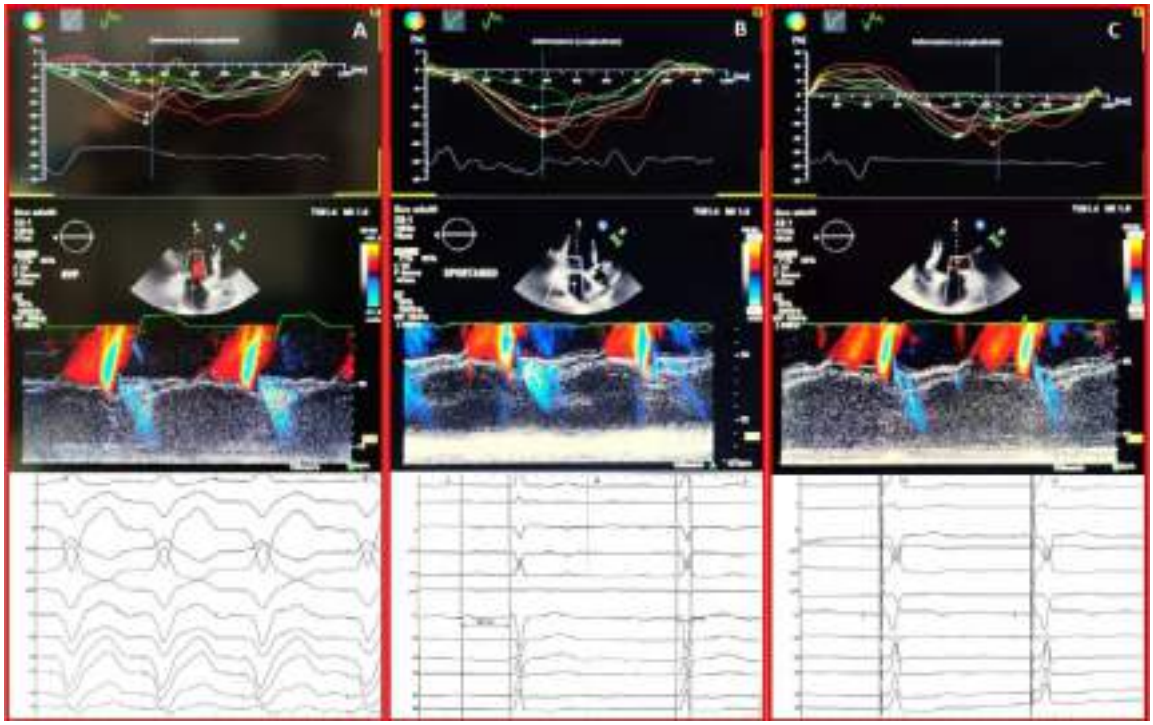
Mitral regurgitation (MR) may worse congestive heart failure (HF), especially in patients affected by moderate-severe left ventricular systolic disfunction. This could be further increased by conventional endocardial right ventricular (RV) pacing due to induced wide QRS and intraventricular dyssynchrony. On the other hand, MR could be also worsened by I degree atrio-ventricular block due to diastolic regurgitation despite a narrow QRS without intra-ventricular dyssynchrony. According to latest international guidelines, a new implant or an upgrade to cardiac resynchronization therapy (CRT) is recommended only in presence of left ventricular ejection fraction (LVEF) <40% (1). However, the beneficial effects of upgrading to CRT in this kind of patient is considered a current gap in evidence needing further documentation (1). In this contest, conduction system pacing (CSP) is considered only as an alternative to conventional endocardial RV pacing, and it is not mentioned for an upgrade to CRT by current guidelines (1) despite it has been recently proposed by some investigators (2, 3). Our case highlights the potential benefit on MR and intra-ventricular dyssynchrony reduction of upgrade from conventional RV pacing to left bundle branch area pacing (LBBAP).

An 82 years male affected by post-ischemic cardiomyopathy with moderate systolic dysfunction (LVEF 44%) and undergone conventional dual chamber pacemaker (PM) two years previously due to paroxysmal atrio-ventricular block, was admitted in our Division due to congestive HF in June 2022. No progression of coronary disease was discovered by angiography and severe MR was documented by echocardiography acutely during stimulated ventricular activation with wide QRS (180 ms) (Panel A). At the discharge, PM was reprogrammed with minimal ventricular pacing algorithm to reduce the ventricular stimulation obtaining narrow QRS (94 ms) after a long PR interval (320 ms) (Panel B). During the follow-up, the patient maintained good hemodynamic compensation but remained in New York Heart Association (NYHA) class II–III and the echocardiography showed the persistence of moderate MR (Panel B). In January 2023 patient underwent upgrade to CRT with LBBAP obtaining atrio-ventricular and the intra-ventricular dyssynchrony correction (PR 120 ms, QRS 94 ms) and MR reduction to mild degree (Panel C).

Before discharge, we performed strain and color M-mode evaluation of the three potential PM programming: conventional RV pacing with short PR interval and wide QRS (Panel A); spontaneous rhythm with long PR interval and narrow QRS (Panel B); LBBAP with short PR interval and narrow QRS (Panel C). Strain analysis clarify intraventricular dyssynchrony only during conventional RV stimulation. Color M-mode highlight moderate proto-mesosystolic MR during conventional RV stimulation and moderate telediastolic and protosystolic MR during spontaneous rhythm, while only a mild prosystolic MR could be observed during LBBAP due to the atrio-ventricular and intra-ventricular synchronization obtained.

In conclusion, the CSP obtained by LBBAP could be a safe and feasible upgrading option in patient with moderate LVEF reduction and poor NYHA functional class due to mitral regurgitation which may be worsened by atrio-ventricular and/or intra-ventricular dyssynchrony.



CO.01.06

CRITICITÀ NELLA GESTIONE DEL PAZIENTE CON SCOMPENSO CARDIACO SINTOMATICO, TRA TERAPIA MEDICA OTTIMALE E TRATTAMENTO AVANZATO: DUE SURVEY ITALIANE

A. Spadotto [1], M. Ziacchi [1], S. Ghio [2], M. Pellegrino [3], D. Masarone [4], M. Merlo [5], D. Stolfo [5], M.M. Caracciolo [6], C. Inserra [7], F. Ammirati [8], M. Ciccarelli [9], F. Colivicchi [10], S. Bianchi [11], G. Patti [12], F. Oliva [13], G. Arcidiacono [14], M. Biffi [1], G. Sinagra [5]

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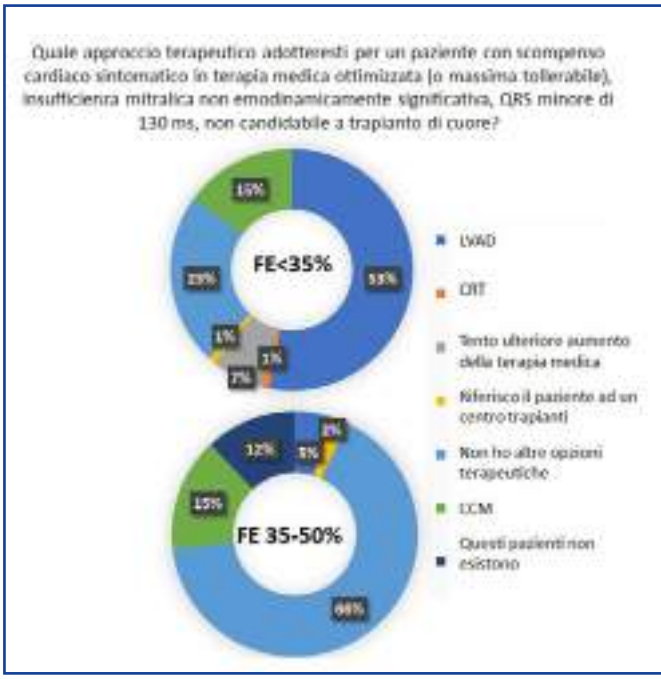
Background: In Europa si stima che più di 10 milioni di persone siano affette da scompenso cardiaco, tuttavia, tale numero è destinato a crescere a causa dell'evoluzione demografica in atto nei paesi europei e in particolare in Italia, in cui si assiste ad un progressivo invecchiamento della popolazione. Nuove terapie sono state recentemente introdotte nella pratica clinica con buoni risultati, ma la prognosi per un'alta percentuale di pazienti rimane sfavorevole, con un alto tasso di mortalità e un'importante limitazione della qualità di vita e della capacità funzionale.

Obiettivo: L'obiettivo di questo studio è quello di indagare attraverso due survey quali siano le attuali esigenze e criticità nella gestione dello scompenso cardiaco secondo i medici italiani e avere una spaccato delle caratteristiche dei pazienti seguiti presso gli ambulatori dedicati allo scompenso cardiaco in Italia. In particolare, è stato valutato quale ruolo potrebbe giocare in questo scenario l'introduzione di nuove opzioni terapeutiche, come la modulazione della contrattilità cardiaca (CCM).

Metodi: Una survey di 20 domande sulla gestione dello scompenso cardiaco aperta a tutti i medici che operano in centri italiani coinvolti nella cura dello scompenso cardiaco è stata pubblicata sul sito cardioinfo da novembre 2021 a febbraio 2022. Una seconda survey è stata inviata ad un campione di centri ad elevato volume dedicati allo scompenso. Agli ambulatori dedicati allo scompenso partecipanti è stato chiesto di registrare il numero di pazienti che hanno effettuato un accesso durante un periodo di 4 settimane e di compilare un sondaggio di 19 voci riguardanti alcune caratteristiche di questi pazienti.

Risultati: Un totale di 105 medici (77% cardiologi) e 14 centri dedicati allo scompenso cardiaco hanno preso parte ai sondaggi. Nonostante il 94% dei pazienti con scompenso esegua un follow-up clinico regolare ogni 3-6 mesi, in circa un terzo dei casi la terapia medica attualmente disponibile non è considerata sufficiente nell'ottenere una stabilizzazione del paziente con scompenso cardiaco. Il 23% dei medici ritiene di non avere sufficienti opzioni di trattamento nei pazienti sintomatici con frazione di eiezione ridotta e questa percentuale sale al 66% nei pazienti senza frazione di eiezione ridotta (Figura 1). Il 15 % dei medici che hanno risposto alla survey ritengono che CCM sia un'opzione da considerare nei pazienti che rimangono sintomatici nonostante una terapia medica ottimizzata. Secondo gli attuali criteri della Food and Drug Administration, nella coorte di pazienti indirizzati ai centri per lo scompenso cardiaco circa il 3% dei pazienti è idoneo per l'impianto di CCM (2 pazienti al mese per centro).



Conclusioni: Le due survey confermano la significativa attenzione rivolta alla gestione dello scompenso cardiaco negli ospedali italiani. Nonostante le valutazioni cliniche regolari un numero non trascurabile di pazienti rimane sintomatico e presenta una ridotta qualità di vita. Solo una percentuale relativamente piccola della popolazione di pazienti con scompenso cardiaco risulta attualmente candidabile a CCM, tuttavia tale numero diventa considerevole alla luce del progressivo aumento di prevalenza della patologia.

COMUNICAZIONI ORALI 02

GIOVEDI' 21 SETTEMBRE

SALA ROSSA 2

17:00-18:00

SESSIONE DI COMUNICAZIONI ORALI: TECNOLOGIA ED INNOVAZIONE

Moderatori: M. Matta (Torino), F. De Sensi (Grosseto)

CO.02.01

NEW INSIGHT IN EPICARDIAL ABLATIONS: 3D-PRINTED ADDITIVE MANUFACTURING AS INTRA-PROCEDURAL DIAGNOSTIC AND OPERATIVE TOOL

C. Monaco [1], L. Pannone [1], D.G. Della Rocca [1], A. Del Monte [1], A. Bisignani [1], V. Miraglia [1], G.B. Chierchia [1], M. La Meir [2], C. De Asmundis [1]
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Aims: The feasibility of 3D printed additive manufacturings (AMs) as peri-procedural tools has already been established. In order to extend their use to intra-procedural tools for surgical or electrophysiology procedures, AMs must be able to convey specific data from cardiac imaging and to come into contact with both biological tissue and energy sources. The aim of our study was to simulate the conditions of an epicardial open chest/mini-thoracotomic ablation in which an AM is used as a "bridge" to integrate data obtained with cardiac imaging for intra-procedural guidance. An in vitro model was developed to test the following hypotheses: 1) Different types of biocompatible materials already on the market do not alter their physical properties after common sterilisation systems and can therefore be introduced into a sterile field; 2) the use of AM tools during procedures involving the use of energy sources do not affect the spread of the lesion and temperature in the biological tissue underneath the AM; 3) the application of energy sources currently used in intra-operatory field, such as cryothermal (CRYO) energy or radiofrequency (RF), does not damage the AM and AM tool does not release particles on the underlying tissue.

Methods and Results: A resin (MED625FLX) and a urethane thermoplastic elastomer (TPU) were chosen as materials for AMs, printed in a variety of thicknesses and configurations. Geometry test was conducted to compare the properties of materials before and after sterilization. In-vitro test was carried out in a wet lab to validate the safety related to propagation of energy underneath the material during application of power sources; three different sources (cryothermal, bipolar radiofrequency, unipolar radiofrequency) were tested. The release of debris derived from the AM on the biological tissue was verified both with electron microscopy and Raman spectroscopy. Geometries below 1 mm and above 2.5 mm did not pass the test after sterilization for both materials. A total of 100 energy applications were delivered during in-vitro testing. Temperature was kept constant. The type of material used for the AM, the energy-type delivered and the factorial combination of distance/material and distance/energy-type had a significant p-value for temperature changes on the tissue underneath the AM (Temperature*Material p=0,003; Temperature*Energy p<0,001; Temperature*Material*Position p=0,02; Temperature*Position*Energy p<0,001). Post-hoc test using Dunn's procedure showed significant p-values for distance (Temperature*Position p<.001) and energy-type erogated (Temperature*Energy*Cryo-biRF p<.001; Temperature*Energy*Cryo-uniRF p<.001; Temperature*Energy*biRF-uniRF p<.001), while there were no significant differences of temperature in relation to AM thickness and material. Raman spectroscopy on biological tissues revealed that no AM particles >1 micron were released.

Conclusions: The use of AMs in intra-operative cardiac procedures may be feasible and safe, and it can be employed as a reliable integration of cardiological imaging into tangible localisation of certain specific structures or pathological substrates.

CO.02.02

SIMULTANEOUS SUBCUTANEOUS IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR AND LEADLESS PACEMAKER IMPLANTATION FOR PATIENTS AT HIGH RISK OF INFECTION

G.M. Calvagna, G. Conti, R. Milluzzo, S. Felis
UOC di Cardiologia ARNAS Garibaldi Centro, Catania, ITALY

Background: The subcutaneous implantable cardioverter defibrillator (S-ICD) may be preferred to transvenous systems in ICD candidates with high infectious risk or limited vascular access. Similarly, guidelines recommend considering leadless pacemakers (LPs) when no upper extremity venous access exists or when risk of device infection is particularly high. In this analysis we describe the simultaneous S-ICD and LP implantation performed in patients at high risk of infection who required both pacing and ICD therapy.

Methods: The study cohort consisted of patients who were referred to our institution owing to ICD infection or for first ICD implantation in presence of high-risk factors of infection.

Results: From 2018 to 2022, 13 patients (age 71±12years, 100% male, ejection fraction 33±10%) were referred to our institution owing to ICD infection (n=11) or for first ICD implantation in presence of high-risk factors of infection (n=2). In the case of infected ICD, the extraction was attempted by means of gentle traction or using a mechanical dilatation technique. Complete lead removal was achieved in 10 patients, while a lead fragment remained in the body in one patient. No complications were reported. Persistence of pacing and ICD indications was confirmed, and re-implantation was delayed until symptoms and signs of infection were resolved with antibiotic therapy, according to the current guideline. In all patients the devices were implanted during the same procedure. The implantation of the S-ICD was performed after the LP, to allow the verification of the adequacy of S-ICD sensing through surface ECG screening with the morphology tool. The screening was performed during inhibited and ventricular pacing, and at least one suitable vector was identified in all patients. After implantation, sensing from the primary vector was programmed in 10 patients, from the secondary vector in 2, and from the alternative vector in 1. Defibrillation testing was effective in all cases (programmed shock output 65 J). No double-counting by the S-ICD during ventricular pacing or undersensing of ventricular tachyarrhythmias were observed. The postoperative period was uneventful in all patients. During a median follow-up of 35 [25th-75th percentile: 25-45] months no complications or infections were reported. The mean ventricular pacing percentage was 7%, and a single inappropriate shock episode due to myopotential interference was reported and solved by reprogramming the sensing vector.

Conclusion: Our analysis confirms that an LP can be implanted in conjunction with an S-ICD during a single procedure in patients who are at high risk of infection and with both pacing and ICD therapy indications.

CO.02.03

A REFERRAL CENTER EXPERIENCE WITH CEREBRAL PROTECTION DEVICES: CHALLENGING CARDIAC THROMBUS IN THE EP LAB

A. Preda [1], J. Berg [2], P. Mazzone [3]
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[2] *Division of Cardiology, Cantonal Hospital of Aarau, 5001 Aarau, Switzerland, Aarau, SWITZERLAND*
[3] *ASST Grande Ospedale Metropolitano Niguarda, Milano, ITALY*

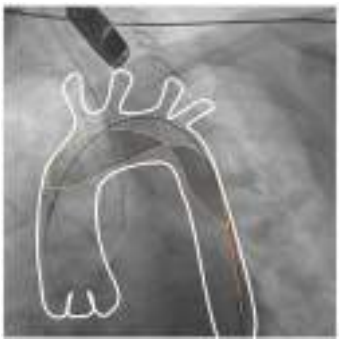
Background: Cerebral protection devices (CPD) are designed to prevent cardioembolic stroke and most evidence that exists relates to TAVR procedures. There are missing data on the benefits of CPD in patients that are considered high risk for stroke undergoing cardiac procedures like left atrial appendage (LAA) closure or catheter ablation of ventricular tachycardia (VT) when cardiac thrombus is present.

Purpose: This work aimed to examine the feasibility and safety of the routine use of CPD in patients with cardiac thrombus undergoing interventions in the electrophysiology (EP) lab of a large referral center.

Methods: The CPD was placed under fluoroscopic guidance in all procedures in the beginning of the intervention. Two different CPDs were used according to the physician's discretion: (1) a capture device consisting of two filters for the brachiocephalic and left common carotid arteries placed over a 6F sheath from a radial artery; or (2) a deflection device covering all three supra-aortic vessels placed over an 8F femoral sheath. Retrospective periprocedural and safety data were obtained from procedural reports and discharge letters. Long-term safety data were obtained by clinical follow-up in our institution and telephone consultations.

Results: We identified 30 consecutive patients in our EP lab who underwent interventions (21 LAA closure, 9 VT ablation) with placement of a CPD due to cardiac thrombus. Mean age was 70 ± 10 years and 73% were male, while mean LVEF was 40 ± 14%. The location of the cardiac thrombus was the LAA in all 21 patients (100%) undergoing LAA-closure, whereas, in the 9 patients undergoing VT ablation, thrombus was present in the LAA in 5 cases (56%), left ventricle (n = 3, 33%) and aortic arch (n = 1, 11%). The capture device was used in 19 out of 30 (63%) and the deflection device in 11 out of 30 cases (37%). There were no periprocedural strokes or transitory ischemic attacks (TIA). CPD-related complications comprised the vascular access and were as follows: two cases of pseudoaneurysm of the femoral artery not requiring surgery (7%), 1 hematoma at the arterial puncture site (3%) and 1 venous thrombosis (3%) resolved by warfarin. At long-term follow-up, 1 TIA and 2 non-cardiovascular deaths occurred, with a mean follow-up time of 660 days.

Conclusions: Placement of a cerebral protection device prior to LAA closure or VT ablation in patients with cardiac thrombus proved feasible, but possible vascular complications needed to be taken into account. A benefit in periprocedural stroke prevention for these interventions seemed plausible but has yet to be proven in larger and randomized trials.



CO.02.04

LEADLESS PACEMAKER VERSUS TRANSVENOUS PACEMAKER: L'ALTERNATIVA MIGLIORE PER IL PAZIENTE POST-ESTRATTO

A. Dentico [1], A. Ferrieri [1], T. Altieri [1], F.M. Carretta [2], C. D'Agostino [1], D.M. Carretta [1]
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[2] *Università Campus Bio-Medico di Roma, Roma, ITALY*

Introduzione: Con l'aumentare delle complicanze associate all'impianto di pacemaker e defibrillatori, è aumentato il numero di pazienti che vanno incontro ad estrazione transvenosa di elettrocateteri in seguito ad infezione degli stessi. Questo studio si pone l'obiettivo di confrontare il follow-up e di valutare l'incidenza di reinfezione tra i pazienti post-estratti reimpiantati con leadless pacemaker ed i pazienti post-estratti reimpiantati con device transvenoso.

Materiali e Metodi: Da dicembre 2016 ad ottobre 2022 nel nostro centro 163 pazienti sono stati sottoposti ad estrazione di elettrocateteri. Di questi pazienti, 24 sono stati successivamente reimpiantati con un leadless pacemaker, mentre 52 con un device tradizionale. In 11 sono invece stati reimpiantati con S-ICD, 3 con un loop recorder; 73 sono i pazienti che, al contrario, dopo rivalutazione cardiologica, o non hanno reimpiantato un nuovo device o sono stati reindirizzati presso il centro di primo impianto. Per ogni paziente è stata valutata l'efficacia del device reimpiantato, la comparsa di eventuali complicanze minori o maggiori, il ripresentarsi di eventuali recidive di infezione.

Risultati: Nei 24 pazienti post-estratti sottoposti a reimpianto con leadless pacemaker in nessun caso si è manifestata una recidiva di infezione e/o complicanze associate al device. Nei 52 pazienti post-estratti reimpiantati con device tradizionale, in solo 1 caso si è manifestata una recidiva di infezione (tasso del 0,02%). Se analizziamo meglio quest'ultima classe, vediamo come alcuni di questi in passato avessero già subìto una revisione di tasca o un'estrazione del dispositivo di primo impianto. Un buon numero sono poi i pazienti con elettrocateteri abbandonati presso altro centro e con infezione del nuovo dispositivo.

Conclusioni: L'impianto di leadless PM in pazienti post-estratti, laddove abbiamo pazienti eleggibili ad impianto di tale dispositivo, si è dimostrato una scelta efficace nel ridurre le recidive di reinfezione rispetto alla popolazione di pazienti reimpiantati con device transvenoso. Tuttavia, se consideriamo il basso tasso di reinfezione nei reimpiantati con transvenoso, si può dire che quando si effettua una buona preparazione del paziente ed una corretta profilassi all'impianto, le recidive di infezione sono basse anche se si decide di reimpiantare un device tradizionale.

CO.02.05

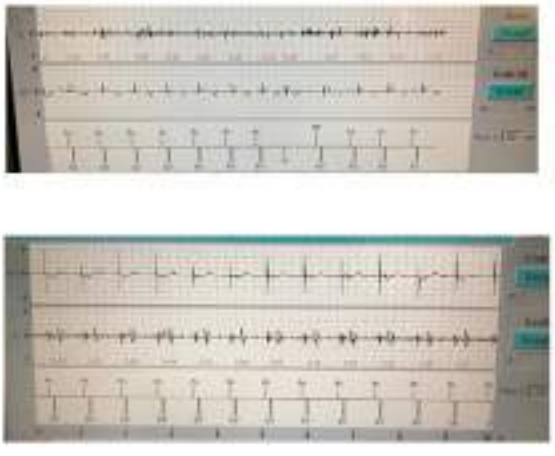
SONR SIGNAL AMPLITUDE IN SELECTING THE OPTIMAL LV PACING VECTOR IN CRT DEVICES IMPLANTATIONS

M. Porfirio
Ospedale San Salvatore, L'Aquila, ITALY

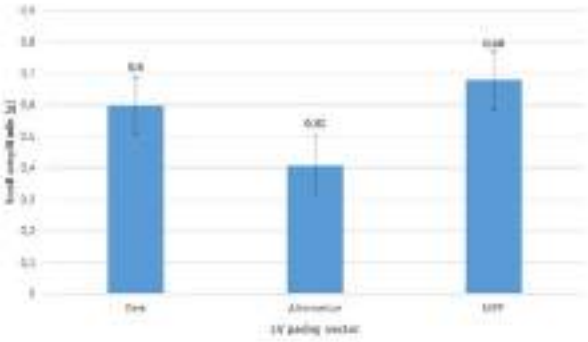
Introduction: Contractility sensor embedded in a dedicated atrial lead (Sonrtip, Microport CRM) has been widely used and found to be effective in automatically optimizing atrioventricular (AV) and interventricular (VV) delays in Cardiac Resynchronization Therapy (CRT), while increasing CRT response and reducing heart failure (HF) hospitalizations. At the same time, selection of the optimal left ventricular (LV) pacing vector in CRT devices implantations is often challenging and widely based on a capture threshold or QRS shortening method. We present our experience in exploiting SonR signal beyond its intended use, in order to select the optimal LV pacing vector during CRT devices implantations.

Methods: SonR signal is a contractility measure available in a dedicated atrial lead, whose value can be visualized during a normal in-hospital follow-up (FU). Its amplitude depends on several factors and it is proportional to patient cardiac contractility. Once a week, this signal is used by the device in order to optimize AV and VV delays, both at exercise and at rest.
We tested this signal during SonR-CRT devices implanted in our center from January 2022 to February 2023, in order to select optimal LV pacing vector in quadripolar leads: if at least two LV vectors were found optimal in terms of both capture threshold and QRS shortening, SonR test was run for few seconds and for both configurations. SonR amplitude was displayed on the programmer screen beat by beat and its mean was calculated: the optimal LV configuration finally programmed was the one showing the highest mean SonR amplitude. If activating Multipoint Pacing (MPP) with the considered vectors a higher mean signal amplitude was found, MPP was permanently programmed.
We analyzed 42 de-novo SonR-CRT implantations: among them, 28 had at least two possible LV pacing configurations in terms of acceptable threshold and QRS shortening. We ran acute device measurements of SonR signal in the operating room for 10 seconds and the SonR amplitudes displayed on the programmer screen were considered.
Interestingly, the SonR signal amplitude of the selected configurations was found at 0.60 ± 0.09 g, significantly different ($p<0.05$) from the alternative configuration, whose value was found at 0.41 ± 0.08 g. Besides, activation of MPP with the combination of the considered configurations always resulted in an even higher SonR signal amplitude, at 0.68 ± 0.1 g.
Although ours was a manual and acute method, this could open the way towards an automatic algorithm which proposes the optimal LV pacing vector, including the possible activation of MPP, among all the possible combinations based on the highest SonR signal amplitude value. Interestingly, possible additional clinical benefit could be explored in terms of CRT response selecting such a pacing vector exploiting SonR signal.

Conclusions: SonR signal amplitude is a versatile measure of cardiac contractility with the use of a dedicated atrial lead. Its use beyond the AV and VV delay optimization, for example for the selection of the optimal LV pacing vector in CRT devices, could introduce new automaticity and benefits in CRT recipients.



Examples of acute SonR signal measurements with two different LV pacing vectors



Comparison of mean SonR signal value among best, alternative and MPP pacing configuration

CO.02.06

REMOTE SUPPORT DURING CARDIAC IMPLANTABLE ELECTRICAL DEVICE FOLLOW-UP: PRELIMINARY EXPERIENCE IN CLINICAL PRACTICE

V. Bianchi [1], D. Pecora [2], C. Caputo [3], V. Tavoletta [1], C. La Greca [2], M. Ferraro [3], E. Attena [1], S. Zanchi [2], S. Nardi [3], S. Valsecchi [4], M. Lovecchio [4], A. D'Onofrio [1]

[1] *AORN - Ospedale Dei Colli - P.O. Monaldi, Napoli, ITALY*

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[4] *Boston Scientific Italia, Milano, ITALY*

Background: Industry employed allied professionals (IEAPs) traditionally provide technical assistance to physicians during cardiac implantable electrical device (CIED) implantation, programming, troubleshooting, and follow-up, by operating the programmers under the supervision of the physician. The Heart Connect™ application is a data-sharing system intended to provide physicians with the means to establish an online meeting and share the display of the LATITUDE™ Programmer (Boston Scientific) with IEAPs in a remote location.

Purpose: We describe the preliminary experience of remote IEAP support during CIED follow-up in clinical practice.

Methods: The Heart Connect™ software was downloaded on the programmer and network connection was established and tested using both Wi-Fi and a 4G cellular adapter at 3 Italian medical centers. External headset and webcam have been connected to the programmer. After system setup, the staff was trained on how to use the application, and online meetings were established with IEAPs of the Remote Clinical Support team during consecutive CIED follow-up visits. Data and users' feedback were collected on the training provided, the quality of the remote connection, the support at each meeting.

Results: All the professionals trained in the use of the system judged the information received to be clear and adequate, and felt confident in using the system. Online meetings were established during 34 follow-up visits (12 pacemakers and CRT-P, 13 single- or dual-chamber ICD, 9 CRT-D). The remote connection was successfully established in all cases. In all cases the communication remained stable for the entire duration of the visit, except for 2 cases (connected via 4G) in which a loss of connection occurred (not restored in 1 case). The sound and video quality during two-way communication were rated good or excellent in 31 (91%) cases. The mean duration of the online meeting was 7±3 minutes. Routine CIED checks were performed during the visits: battery status, pacing and sensing thresholds, impedances, current rhythm diagnosis, arrhythmias detected and therapies delivered, device counters and review of programmed parameters, alerts and clinical diagnostics. Programming changes were done during 7 (21%) visits: pacing and sensing parameters, tachycardia detection and therapies. The remote support allowed to successfully complete the visit in 33 (97%) cases, without requiring additional medical or technical support. In all these cases, the support was judged to be equally effective compared to the on-site support, without causing delays or organizational difficulties.

Conclusions: Remote support during CIED follow-up using Heart Connect™ seems feasible, effective and well accepted. Additional tests are ongoing to demonstrate the potential usefulness of this solution in standard clinical practice, and in the context of restrictions on access to healthcare facilities due to COVID-19 pandemic.

COMUNICAZIONI ORALI 03

GIOVEDI' 21 SETTEMBRE

SALA ROSSA 1

17:00-18:00

SESSIONE DI COMUNICAZIONI ORALI: ARITMIE 1

Moderatori: S. Bricoli (Piacenza), M. Viscusi (Caserta)

CO.03.01
RISULTATI A LUNGO TERMINE DELLA DENERVAZIONE SIMPATICA CARDIACA PER ARITMIE VENTRICOLARI REFRATTARIE NELLE CARDIOMIOPATIE

V. Dusi [1], L. Pugliese [2], F. Guerrera [3], E. Baldi [4], A. Sanzo [4], A. Vicentini [4], S. Savastano [4], A. Greco [4], R. Camporotondo [4], S. Frea [5], F. Ferraris [5], M. Anselmino [1], M. Driussi [6], L. Leoni [7], M. Grimaldi [8], M. Imazio [6], M. Tritto [9], C. Raineri [5], R. Rordorf [4], G.M. De Ferrari [1]

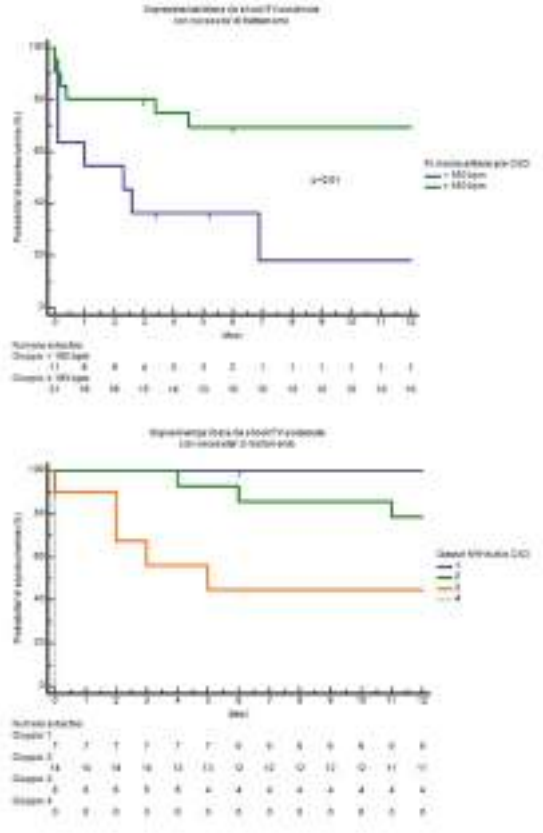
[1] *Dipartimento di Scienze Mediche, Cardiologia, Università di Torino, Torino, ITALY*
[2] *Chirurgia Generale, Fondazione IRCCS Policlinico San Matteo, Pavia, ITALY*
[3] *Divisione di Chirurgia Toracica, Dipartimento toracico e cardiovascolare, Città della Salute e della Scienza, Torino, ITALY*
[4] *Dipartimento di Cardiologia, Fondazione IRCCS Policlinico San Matteo, Pavia, ITALY*
[5] *Divisione di Cardiologia, Dipartimento toracico e cardiovascolare, Città della Salute e della Scienza, Torino, ITALY*
[6] *Dipartimento Cardiotoracico, Ospedale Santa Maria della Misericordia, Udine, ITALY*
[7] *Clinica Cardiologica, Dipartimento di Scienze Cardiache, Toraciche, Vascolari e Sanità Pubblica, Facoltà di Medicina, Padova, ITALY*
[8] *Ospedale Generale Regionale F. Miulli, UOC Cardiologia, Acquaviva delle Fonti, ITALY*
[9] *Ospedale Mater Domini, Castellanza, ITALY*

Introduzione: La denervazione simpatica cardiaca (CSD) è stata proposta per il trattamento delle tachicardie ventricolari (TV) refrattarie in pazienti (pz) con cardiomiopatia (CMP). Gli esiti a lungo termine ed i predittori di recidive sono ancora poco definiti.

Obiettivo: Descrivere la nostra esperienza multicentrica italiana (registro CUT-VT) di CSD in pz con CMP e TV refrattarie.

Metodi: 32 pz sono stati sottoposti a CSD sinistra (LCSD, n=4) o bilaterale (BCSD, n=28); tutti sono stati trattati con chirurgia toracoscopica, 8 con tecnica robotica. La ragione principale (3/4 casi, 75%) per eseguire LCSD invece di BCSD è stata la bradicardia sinusale in portatori di ICD monocamerale.

Risultati: l'84% dei pz erano maschi, l'età media era 55±16 anni e l' FE media 32±12%; la maggior parte (n=26, 81%) aveva una CMP non ischemica (di cui 3 con CMP ipertrofica e 3 con cardiolaminopatia), il 34% una classe NYHA >2. Tutti tranne uno (97%) erano portatori di ICD, 11 di CRT-D. Le principali indicazioni per CSD erano TV polimorfe/rapide (Fc>200 bpm) nel 56% dei pz e TV monomorfe nel resto. Esclusi 5 pz (15%) con pregressa tireotossicosi, la maggior parte era in trattamento con amiodarone (n=20, 63%) o con sotalolo (n=3, 9%) ed il 53% era stato sottoposto ad almeno una ablazione (o tentativo di ablazione) transcatetere delle TV prima della CSD, di cui il 47% anche con accesso epicardico e il 29% con substrato settale. Il follow-up mediano (FU) dopo CSD è stato di 19 mesi (IQR 6-48 mesi). Non ci sono state complicanze maggiori. Dodici pz (38%) sono o deceduti (n=9, 25%), principalmente per scompenso cardiaco, o sottoposti a trapianto cardiaco (n=3, 9%); un solo paziente (3%) è deceduto per tempesta aritmica refrattaria. Dopo CSD, la percentuale di pz con tempesta aritmica (ES) è diminuita dal 78% al 40% (p<0,01), quella di pz con shock appropriati dell'ICD dal 100% al 62%. Il beneficio antiaritmico è stato ancora più pronunciato tra i 26 che hanno ricevuto BCSD: l'incidenza di ES è diminuita dall'85% al 39% (p<0,01), quella di shock dal 100% al 54% (p<0,01), mentre non si e' osservato alcun cambiamento significativo nei pochi pazienti sottoposti a LCSD. La mediana di shock dell' ICD si è ridotta da 6 (IQR 3–16) nei 6 mesi prima della CSD a 0 (IQR 0–2) nei 6 mesi successivi (p=0,001): il 69% dei pz ha sperimentato una riduzione degli shock >75%, l'81% una riduzione > 50%. All'analisi di sopravvivenza univariata (figura), una classe NYHA >2, TV con Fc < 180 bpm e una FE < 25% correlavano con recidive.



Conclusioni: La nostra casistica di CSD nelle CMP rappresenta la più grande riportata in Europa e quella con il FU più lungo. Il verificarsi di ES è stato quasi dimezzato dalla CSD e la maggior parte dei pz ha avuto una riduzione degli shock dell' ICD a 6 mesi superiore al 75%. I pz con migliore classe funzionale, migliore FE e TV più veloci hanno beneficiato maggiormente della CSD, suggerendo l'opportunità di un riferimento precoce di questi pazienti.

CO.03.02
SICUREZZA ED EFFICACIA DELL'ABLAZIONE VERY HIGH-POWER SHORT-DURATION TEMPERATURA CONTROLLATA PER IL TRATTAMENTO DELLA FIBRILLAZIONE ATRIALE PERSISTENTE

G. Volpato [1], P. Compagnucci [1,2], L. Cipolletta [1], Q. Parisi [1], Y. Valeri [1,2], L. Luciani [1,2], L. D'Angelo [1,2], F. Campanelli [1,2], F. Guerra [1,2], M. Casella [1,2], A. Dello Russo [1,2]
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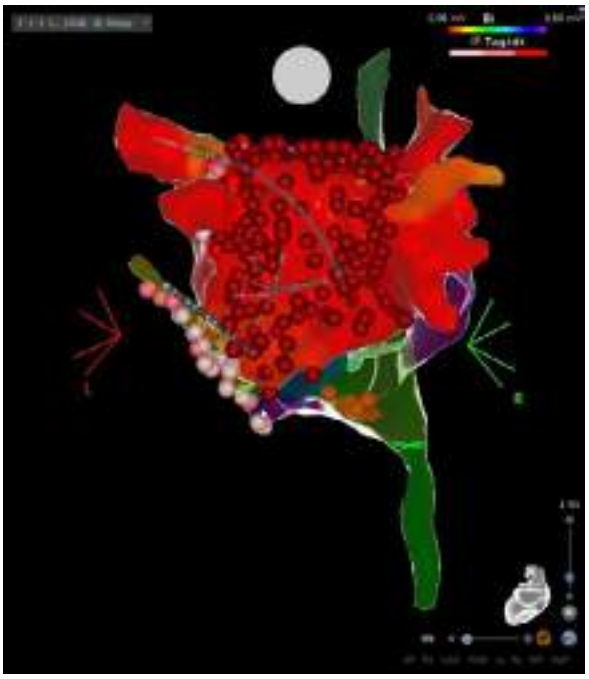
Background: I meccanismi che sostengono la fibrillazione atriale (FA) persistente rimangono poco conosciuti: a causa di alterazioni strutturali dell'atrio sinistro, l'isolamento delle sole vene polmonari si è rivelato inefficace. Sono stati quindi ricercati nuovi target di ablazione come la parete posteriore, il seno coronarico e l'appendice atriale sinistra. Recentemente è stato approvato un nuovo catetere (QDOT Micro) che può potenzialmente aumentare la sicurezza e l'efficacia della procedura: è collegato a un nuovo generatore RF che consente un'ablazione a temperatura controllata riducendo la potenza e aumentando l'irrigazione con l'aumento della temperatura del tessuto e permette di erogare potenze fino a 90 W per pochi secondi (vHP-SD).

Obiettivi: Valutare sicurezza ed efficacia dell'ablazione vHP-SD della parete posteriore per i pazienti con FA persistente

Metodi: Abbiamo arruolato 41 pazienti trattati con ablazione transcatetere della FA persistente. In tutti i pazienti è stato eseguito isolamento delle vene polmonari. E' stata successivamente eseguita in ritmo sinusale mappa di substrato della parete posteriore dell'atrio sinistro e sono stati eliminati potenziali patologici con RF 90 W per 4 sec di durata (vHP-SD). Nel primo paziente trattato, durante l'erogazione dei RF nella parete posteriore è stata eseguita contestualmente un'esofagoscopia con lo scopo di verificare gli effetti a livello esofageo della ablazione vHP-SD.
Le recidive di FA, flutter atriale e tachicardia atriale sono state individuate con follow up ambulatoriali, ECG a 12 derivazioni e ECG dinamico Holter.

Risultati: I pazienti trattati hanno un'età media di 63±10 anni, 31 (78%) sono maschi. Le dimensioni dell'atrio misurano mediamente 44.5 ± 17 ml/m2. 36 (89%) pazienti non erano mai stati sottoposti a ablazione transcatetere. Il tempo di procedura totale è risultato essere di 74 ± 9 minuti, il tempo di fluoroscopia di 8 ± 5 minuti. L'isolamento delle vene polmonari e l'isolamento della parete posteriore è stato raggiunto nel 100% dei pazienti. Non si sono registrate complicanze quali fistola atrio-esofagea, paralisi del nervo frenico, versamento pericardico e/o tamponamento cardiaco, stenosi delle vene polmonari o fistola artero-venosa. 32 (78%) pazienti sono liberi da recidive aritmiche dopo 9 mesi di follow up medio.

Conclusioni: I risultati hanno dimostrato la fattibilità clinica e la sicurezza dell'ablazione vHPSD della parete posteriore per FA persistente, con l'utilizzo di questo nuovo catetere temperatura controllato, senza complicanze intraprocedurali e periprocedurali al follow-up. Questa resta comunque un'esperienza di un singolo centro in un ristretto gruppo di pazienti. Studi che coinvolgono un maggior numero di pazienti e con un follow up a lungo termine sono necessari per poter trarre conclusioni certe.



CO.03.03
ONE-YEAR OUTCOMES IN PATIENTS UNDERGOING VERY HIGH-POWER SHORT-DURATION ABLATION FOR ATRIAL FIBRILLATION

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Aims: The very high-power short-duration (vHPSD) temperature-controlled ablation (vHPSD) improves the efficiency of pulmonary vein isolation (PVI) procedures.
We evaluated the procedural and 12-months outcomes in atrial fibrillation (AF) patients undergoing PVI by means of vHPSD ablation. In patients with AF or atrial tachy-arrythmia (AT) recurrence undergoing a redo procedure the durability of the PVI was investigated.

Methods: Consecutive paroxysmal/persistent AF patients undergoing PVI with the vHPSD ablation strategy (90 W, for 4 s) were enrolled. The rate of PVI, first pass isolation, acute reconnection, and procedural complications were evaluated. Follow-up examinations and EKG were scheduled at 1,6, and 12 months. In case of AF/AT recurrence, patients underwent a redo procedure.

Results: Overall, 163 AF patients (29 persistent and 134 paroxysmal) were enrolled. The PVI was reached in 100% of patients (88% at first pass). The rate of acute reconnection was 2%. The radiofrequency, fluoroscopy and procedural times were respectively 5,5±1 min, 9±1 min and 75±20 min. No death, tamponade nor steam pops occurred, however 5 patients had vascular complications. The 12-months freedom from AF/AT recurrence was 86% in both paroxysmal and persistent patients. Overall, 9 patients underwent a redo procedure, and in 4 all veins were still isolated, whereas in 5 pulmonary vein reconnections were found. The PVI durability was 83%. No overt clinical complications were observed in the follow-up.

Conclusions: The vHPSD ablation represents an effective and safe ablation strategy to achieve PVI. The 12-months follow-up showed high freedom from AF/AT recurrence and a good safety profile.

CO.03.04

PERI-PROCEDURAL ANESTHESIA AND PATIENT PAIN EXPERIENCE IN PULMONARY VEIN ISOLATION BY MEANS OF VERY HIGH POWER SHORT DURATION RADIOFREQUENCY ABLATION

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Background: Very high-power short-duration (vHPSD) temperature-controlled radiofrequency ablation (vHPSD) may reduce ablation times and improve patient tolerability, permitting pulmonary vein (PV) isolation under mild conscious sedation.

Purpose: Evaluate the anesthetic drugs use and patients 'pain experience during vHPSD PV isolation.

Methods: Thirty-three consecutive patients, with paroxysmal atrial fibrillation (AF), treated with QDot Micro catheter and vHPSD (90 w for 4 s) (vHPSD Group), were compared with the last 33 consecutive patients, with paroxysmal AF, treated with a surround flow contact force-sensing catheter guided by the ablation index (450 W anterior at 50 W, 330 posterior at 40 W) (AI Group). Anesthetic drugs (midazolam and fentanyl) use were compared as well as pain experience, measured using a 0-10 scale.

Results: All PVs were isolated. PV isolation ablation time in the vHPSD Group (5.9±1.4 min) was shorter than in the AI Group (25±11 min, p<0.001). Pain experience was significantly lower in vHPSD group (4.5±2 vs 6.6±1.8, p< 0.001). No patients required general anesthesia; fentanyl use was required in 4 vHPSD Group patients vs 25 AI Group patients (p<0.001). A lower dose of midazolam was required in vHPSD Group (2.3±1.2 mg vs 3.6±1.7 mg, p < 0.001).

Conclusions: vHPSD radiofrequency ablation for PVI can be performed under conscious sedation using only benzodiazepine in most of patients without compromising patient pain experience.

CO.03.05

CATHETER RADIOFREQUENCY ABLATION OF PERSISTENT ATRIAL FIBRILLATION: EFFICACY OF VERY-HIGH-POWER-SHORT-DURATION VERSUS LOW-POWER-LONG-DURATION

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Background: Catheter ablation (CA) for persistent AF (PerAF) is showing encouraging clinical outcomes. QDOT Micro catheter (Biosense Webster), combining contact force sensing and ablation index (AI), delivers very-high-power-short-duration (vHPSD) radiofrequency (RF) ablation energy. HPSD technique seems to be more effective and safer than the standard low-power-long-duration (LPLD) one performed by the Thermocool Smarttouch catheter (Biosense Webster).

Objective: To compare the AF recurrence's rate in PerAF patients undergoing catheter ablation with vHPSD and LPLD techniques.

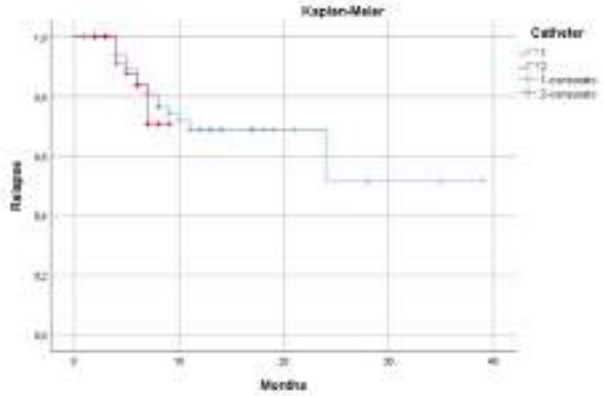
Methods: We conducted a retrospective study including 145 patients admitted to our centre for PerFA and treated with PVI and extra-pulmonary foci CA. Patients were divided into two groups based on the ablation technique (45 vHPSD: age 64±10.59, male 34; 100 LPLD: age 62±10.27, male 84). The vHPSD technique was performed using the QMOD protocol (50 W) with AI target 500 in the anterior pulmonary veins (PVs) and with QMOD+ protocol (90 W, 4sec) in the rear PVs and wall. The inter-lesional distance used in the front segments was 3-4 mm versus 5-6 mm for the posterior ones. In the LPLD technique, left atrial lesions were performed by AI guided RF energy ablation. The AI was respectively 500 for anterior PVs, and 400 for the rear ones. The inter-lesional distance was 5-6 mm in the front and rear segments. PVI was achieved in all patients. Depending on voltage map and intracavitary signals, homogenization of the back wall and isolation of extra-pulmonary foci was performed by operator advise. AF recurrence was evaluated by the reporting of ECG, Holter cardiac monitor 24 h and telephone interview.

Results: No statistically significant differences were found in clinical features and history. A significant decrease in total procedural time and total radiofrequency time was reported in vHPSD group. Despite this, no difference was reported in total fluoroscopy time. At the follow-up patients undergoing vHPSD showed a lower rate of AF recurrence, but this result wasn't statistically significant (n=7, 15.5% vs n=19, 19%; p=0.599).

Conclusions: Limited to the retrospective nature of the study, CA of PerAF with vHPSD doesn't reduce AF recurrence compared to LPLD technique. By lowering procedural and RF time, vHPSD reduces the potential RF thermal adverse events. To definitively establish the efficacy of CA with vHPSD in PerAF a longer follow-up and further clinical studies are needed.

	QDOT	SM	P VALUE
AGE	64 (10.59)	62 (10.27)	P=0.557
MALE GENDER	34 (75.5%)	84 (84%)	p=0.227
LVEF (%)	53.98 (8.35)	52.55 (10.53)	P=0.423
LAVI (mL/m²)	43.27 (14.44)	41.90 (12.73)	P=0.569
FA RE DO	8 (17%)	12 (12%)	P=0.351
AAD	41 (91.1%)	88 (88%)	P=0.580
CHA_2DS_2-VASC	2.31 (1.62)	2 (1.38)	P=0.240
PROCEDURAL TIME (min)	104.40 (21.51)	188.83 (30.38)	P<0.001
RF TIME (min)	18.04 (3.30)	71.05 (5.27)	P<0.001
FLUOROSCOPY TIME (min)	17.12 (10.12)	20.29 (11.40)	P=0.085

Table 1 - Value are counts, mean (standard deviation). LVEF = Left Ventricular Ejection Fraction; LAVI = Left Atrial Volume Indexed; AAD = antiarrhythmic drugs; RF = Radiofrequency



CO.03.06
DUAL 1:2 TACHYCARDIA: A RARE AND SMOOTHLY UNSEEN CAUSE OF CARDIOMYOPHATHY

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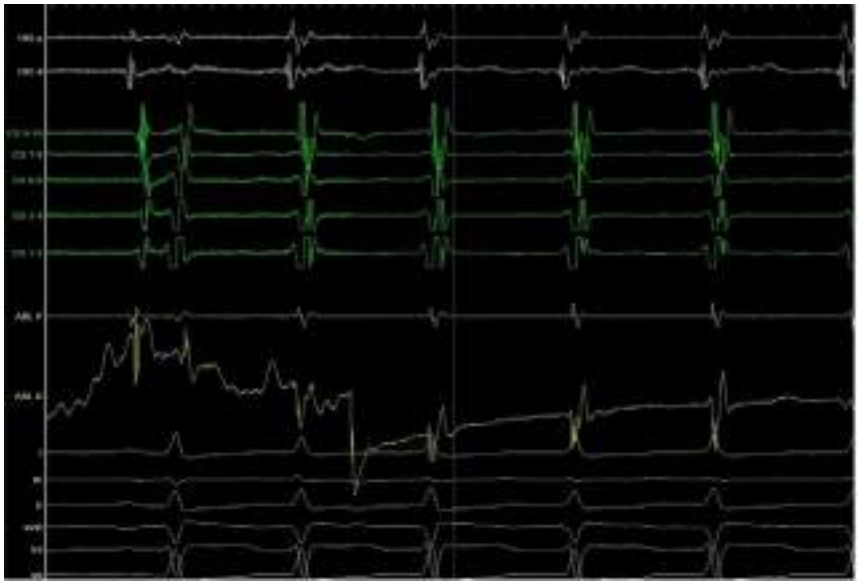
Introduction: Dual atrioventricular nodal non-reentrant tachycardia (DAVNNT), otherwise known as "double fire" tachycardia, is a rare phenomenon in which an atrial beat conduct down both the slow (SP) and the fast (FP) pathway, creating two consecutive ventricular beats. It might work as trigger for narrow complex tachycardia.

Case Report: A 57-years old woman was referred to our center due to a new onset tachycardia induced cardiomyopathy (TIC), with a mildly reduced ejection fraction. The patient had an incessant asymptomatic narrow QRS tachycardia, diagnosed incidentally during a minor gynecologic surgery and interrupted by adenosine administration.
Therefore, she underwent an electrophysiological study; the tachycardia was induced, triggered by the "2 for 1 phenomenon". The first atrial beat activates simultaneously dual atrioventricular nodal conduction through fast and slow pathway, leading to two ventricular beats. Then, the second ventricular beat induces an echo beat retro-activating the atrium and leading to atrioventricular node slow-fast reentry tachycardia. The patient underwent successful radiofrequency ablation of the SP. At follow-up, she remained asymptomatic and improved the left ventricular systolic function.



Conclusion: DAVNNT is a rare phenomenon whose differential diagnosis includes atrial bigeminy with P-waves masked by the T-waves, junctional bigeminy, atrioventricular nodal re-entrant tachycardia with 2:1 retrograde block. It is also commonly mistaken for atrial fibrillation.
TIC due to supraventricular arrythmias is quite rare but it would be more frequent in DAVNNT because it's often misdiagnosed or simply not recognized.

In conclusion, correct diagnosis is crucial to achieve the right treatment in DAVNNT.

COMUNICAZIONI ORALI 04

GIOVEDI' 21 SETTEMBRE

SALA MAGENTA B

17:00-18:00

SESSIONE DI COMUNICAZIONI ORALI: DEVICE 1

Moderatori: L. Mancini (Bari), A. Talarico (Cosenza)

CO.04.01

CARDIOMIOPATIA IPERTROFICA ED ELEGGIBILITÀ A IMPIANTO DI DEFIBRILLATORE SOTTOCUTANEO: A VOLTE NON È PER SEMPRE. CASO CLINICO, RIFLESSIONI E PROSPETTIVE FUTURE

L. Avolio, P. Zappulla, D. Dugo, M.T. Cannizzaro, M. Lo Presti, N. Valenti, G. Sollano, M. Marsala, F. Barreca, J. Milazzo, G.P. Pruiti, F. Platania, V. Calvi, A.A. Di Grazia

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In pazienti affetti da cardiomiopatia ipertrofica (HCM), il tasso di superamento dello screening preimpianto di un defibrillatore sottocutaneo risulta inferiore rispetto a quello della popolazione generale. Ciò è dovuto alle alterazioni strutturali della patologia che, ripercuotendosi sull'attività elettrica del cuore, alterano sia i segnali sia dell'ECG di superficie, sia dei vettori di sensing analizzati in fase di screening. Il nostro caso clinico riguarda un giovane uomo affetto da HCM ad alto rischio di SCD che nel 2015, all'età di 27 anni, ha impiantato un S-ICD in prevenzione primaria. Da allora è stato sottoposto a periodici controlli del device, risultati nei primi cinque anni nella norma. Nel 2020 e nel 2021 sono stati registrati due episodi di oversening, di cui uno con erogazione di shock inappropriato; contestualmente veniva ottimizzata la configurazione di sensing. Per malfunzionamento dell'elettrocatetere, l'S-ICD è stato espiantato a fine 2022 con indicazione a reimpianto di nuovo dispositivo. Il paziente è stato quindi sottoposto a test di screening, questa volta fallito per basso rapporto R/T e insufficiente ampiezza dell'onda R. Ci siamo interrogati sui motivi che hanno portato nel tempo alla perdita di eleggibilità verso l'impianto di un S-ICD, formulando due ipotesi. La prima ipotesi riguardava la differente modalità con cui il test di screening è stato effettuato nelle due occasioni (manuale nel 2015, automatico nel 2017) ed è stata scartata una volta eseguito il test manuale sui vettori rilevati nel 2022 con esito negativo. La seconda ipotesi nasceva dall'idea che l'evoluzione della patologia, provocando un ulteriore sovvertimento della struttura miocardica e della sua attività elettrica, ha compromesso la qualità dei vettori di sensing analizzati. Nel 2015 la RMN cardiaca descriveva un quadro di severa ipertrofia asimmetrica settale con associata degenerazione fibrotica delle pareti libere, soprattutto laterale ed inferiore. Nel 2022 l'esame attestava un ulteriore ispessimento del setto (32mm vs28mm) che appariva maggiormente fibrotico, un ulteriore calo della frazione di eiezione (dal 41% al 27%) e un'ulteriore evoluzione fibrotica delle pareti laterali e inferiori, più assottigliate e con quota di metaplasia adiposa di nuova insorgenza. Dai dati di correlazione disponibili in letteratura, le alterazioni strutturali hanno spiegato le nuove modifiche elettrocardiografiche, soprattutto in termini di frammentazione e di decremento del picco del QRS (con conseguente decremento del rapporto QRS/T), della morfologia delle onde T e della maggiore dispersione del tratto QT.

	Picco del QRS (mV)			Onda T (mV)			Rapporto QRS/T			JTpc (msec)		
	2022	2015	Rapporto	2022	2015	Rapporto	2022	2015	Rapporto	2022	2015	Differenza
dI	6	8	0,75	1	0,5	2	6	16	0,375	225	200	25
dII	3	4	0,75	2,5	2	1,25	1,2	2	0,6	225	200	25
dIII	2	3	0,67	2	2	1	1	1,5	0,67	245	200	45
aVR	5	5	1	1,5	1	1,5	3,3	5	0,66	245	200	45
aVL	4	5	0,8	1	1	1	4	5	0,8	205	200	5
aVF	2	3	0,67	2	3	0,67	1	1	1	225	200	25
V1	12	16	0,75	3	1	3	4	16	0,25	225	200	25
V2	17	26	0,65	5	2	2,5	3,4	13	0,26	245	220	25
V3	14	40	0,35	3	2	1,5	4,7	20	0,235	245	240	5
V4	8	27	0,3	1	10	0,1	8	2,7	3	225	200	25
V5	4	18	0,22	2	8	0,25	2	2,25	0,89	225	220	5
V6	4	13	0,31	2	3	0,67	2	4,3	0,47	245	220	25

Tabella 1. Sintesi e confronto delle caratteristiche elettrocardiografiche tra i tracciati del 2015 e del 2022 in termini di: ampiezza del picco del QRS e dell'onda T, rapporto tra QRS e T, intervallo tra punto J e picco dell'onda T (JTpc) corretto secondo formula proposta da Hnatkova et al. (doi: 10.1038/s41598-019-51491-4)

Tali modifiche, interessando quasi tutte le derivazioni, sono espressione di un peggioramento generalizzato dell'attività elettrica e quindi non possono non manifestarsi anche a livello dei vettori del test di screening. D'altra parte, le osservazioni scaturite dal confronto degli ECG coincidono con i motivi del fallimento del secondo screening. Concludendo, il fallimento del secondo screening è stato dovuto all'evoluzione della patologia. Soprattutto in assenza di dati in letteratura, è difficile predire il mantenimento di buoni vettori di sensing nel tempo. Tuttavia, sulla base della nostra esperienza, crediamo che tale eventualità debba essere considerata in fase di screening, soprattutto in pazienti con severe alterazioni strutturali, indicative di forme con fenotipi più aggressivi e a rischio di una più rapida evoluzione.

CO.04.02

INCIDENTAL FINDINGS AT FDG PET/CT SCAN IN CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICE CARRIERS: THE UNEXPET/TC STUDY

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Background: The use of positron emission tomography with F-18 fluorodeoxyglucose (FDG-PET/CT) for cardiovascular implantable electronic device (CIED) infection is of utmost importance, since it can confirm CIED infection by highlighting hotspots and provides information about the infection extent. However, asymptomatic patients with incidental FDG uptake on CIED are challenging. The primary objective of this observational study was to assess the diagnostic role of FDG-PET/CT in CIED patients with FDG uptake independently of CIED infection suspicion. The secondary objective was to identify qualitative and semiquantitative predictors of CIED infection.

Material and methods: From 2017 to 2019, all FDG-PET/CT scans from CIED patients with a CIED infection suspicion or asymptomatic (e.g.., scans for oncologic reasons) were included. Four expert nuclear medicine physicians blindly reviewed the scans with regard to the presence of FDG uptake in the pocket and/or in the extracardiac part of the leads, according to visual analysis and by reporting standardized uptake values (SUV), liver and blood pool target-to-background ratios (TBR), metabolic tumor volume (MTV). Up to 6 -months follow up after PET/CT scan was performed for eventual CIED extraction, as an infection consequence.

Results: Overall, 320 FDG-PET/CT scans were included. Median patient age was 74 (33-94) years, 2 219 (68.4%) patients were male. According to visual analysis, 122 (38.1%) scans resulted positive around the pocket and/or the extracardiac part of the leads; overall, sensitivity (Sens) and specificity (Spec) were 92% and 70%, respectively. According to the original reports, 65 (20.3%) scans reported suspicious uptakes around the pocket or the extracardiac part of the leads; overall, Sens and Spec provided by original reports were 88% and 82%, respectively. We identified these cut-off criteria as predictors of CIED extraction: TARGET SUVmax (i.e., the hottest spot in the lead or in the pocket)> 2.60 (Sens 71%, Spec 89%); LIVER-TARGET SUVmax (i.e., TARGET SUVmax/Liver TBR): > 1.3 (Sens 68%, Spec 89%). All these values also demonstrated to be excellent predictors of CIED infection at 6-months after PET/CT scan (p<0,001).

Conclusion: FDG-PET/CT incidental findings around the pocket or the extracardiac part of the leads in asymptomatic CIED patients are common, and sometimes may be related to subtle CIED infection. By introducing high-specific SUV cut-off values, a considerable impact on patient management is expected.

CO.04.03

EFFETTI ACUTI DELLA CCM (CARDIAC CONTRACTILITY MODULATION) MISURATI ATTRAVERSO UN NUOVO DEVICE DI MONITORAGGIO EMODINAMICO NON INVASIVO (NICAS)

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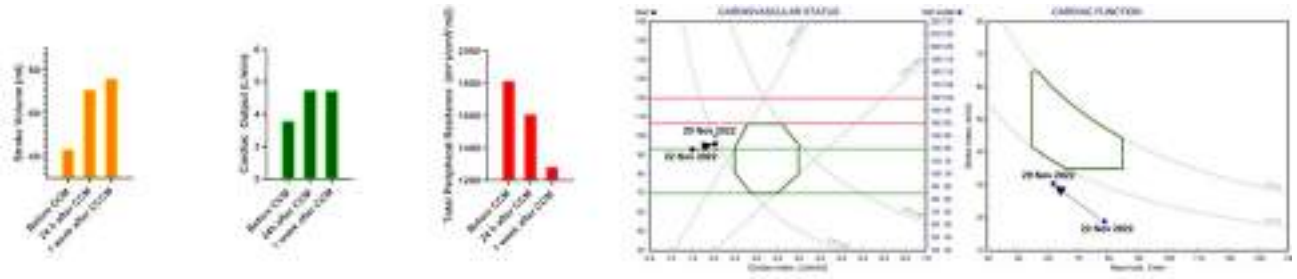
Introduzione: La terapia CCM rappresenta una potente arma terapeutica nei pazienti con insufficienza cardiaca a frazione di eiezione (EF) compresa tra il 25% e il 50%, in III e IV classe funzionale NYHA nonostante terapia medica ottimizzata . La CCM determina un miglioramento dei sintomi legati allo scompenso cardiaco (dispnea ed astenia) e conseguentemente della qualità di vita. I trials clinici randomizzati condotti con la CCM hanno dimostrato un miglioramento statisticamente significativo della EF, del consumo d'ossigeno e della distanza coperta nel test del cammino in sei minuti. Tali effetti solitamente si verificano dopo almeno sei mesi dall'impianto. Pertanto, abbiamo deciso di valutare gli effetti acuti della terapia CCM su un paziente obeso con diagnosi di scompenso cardiaco cronico congestizio utilizzando un sistema di monitoraggio emodinamico non invasivo basato sulla bioimpedenziometria, il NICaS.

Descrizione del caso: Uomo di 57 anni con grave obesità (BMI 47,75), affetto da cardiomiopatia dilatativa primitiva, già portatore di defibrillatore transvenoso impiantato per scompenso cardiaco cronico e grave riduzione della funzione ventricolare sinistra (HFrEF), fibrillazione atriale permanente e diabete mellito, in terapia domiciliare con sacubitril/valsartan 49/51mg, empaglifozin 10mg, spironolattone 50mg, bisoprololo7,5 mg, furosemide 375mg. Già ricoverato ripetutamente nel nostro reparto per riacutizzazioni di scompenso, a fine novembre 2022 si ricoverava nuovamente per ulteriore recidiva di scompenso. Considerando la persistenza dei sintomi e i multipli ricoveri, nonostante l'OMT, abbiamo deciso di impiantare un dispositivo CCM. Inoltre, abbiamo applicato il NICaS, attraverso il semplice posizionamento dei sensori sugli arti superiori del paziente, 24 ore prima, sette giorni dopo e un mese dopo l'impianto. Ogni misurazione emodinamica della bioimpedenza è stata ripetuta sette volte dal sistema con un valore medio finale visualizzato per ciascun parametro.

Risultati: Prima di erogare la terapia CCM, le misurazioni effettuate dal NICaS hanno confermato l'instabilità emodinamica del paziente mostrando bassi valori di stroke volume (SV= 44 ml) e gittata cardiaca (CO = 3,79 L / min) nonché un notevole aumento delle resistenze periferiche totali (TPRI = 1964 dn*s/cm5). Ventiquattro ore dopo l'impianto, il paziente riferiva la scomparsa della dispnea notturna con un miglioramento della qualità sonno. Il miglioramento dei sintomi è stato confermato dalle misurazioni ad una settimana dall'impianto (Fig. 1). Infatti, SV e CO sono aumentati rispettivamente a 71 ml e 4,74 L/min come anche la TPRI è scesa a 1620 dn * s / cm5. Infine, le misurazioni ad un mese dall'impianto hanno confermato il miglioramento clinico (riduzione della dispnea e dell'astenia) con una SV di 76,3 ml, CO di 4,73 L/min e TPRI di 1285.

Conclusioni: Abbiamo utilizzato, per la prima volta, un sistema di misurazione di parametri emodinamici non invasiva (NICaS) per valutare gli effetti immediati della terapia CCM su un paziente obeso affetto da grave HFrEF. Le misurazioni hanno confermato il miglioramento clinico soggettivo riferito dal paziente, permettendoci di dimostrare come gli effetti del CCM iniziano già una settimana dopo l'impianto. Il NICaS potrebbe rappresentare in futuro uno strumento molto utile, poiché di facile applicazione e interpretazione, per il monitoraggio domiciliare e ambulatoriale dei pazienti con scompenso cardiaco.



CO.04.04

EFFECT OF RATE-ADAPTIVE PACING IN CARDIAC RESYNCHRONIZATION THERAPY: A RANDOMIZED CROSS-OVER STUDY VERSUS VDD PACING MODE

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[2] *Ospedale Santa Maria del Carmine, Rovereto, ITALY*
[3] *Ospedale F. Tappeiner, Merano, ITALY*
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Background: Device-based heart failure (HF) therapy consists of cardiac resynchronization therapy (CRT). Current clinical practice is to implant an atrial lead with sense and pace function in CRT recipients who are in sinus rhythm. Default device programming is rate-adaptive DDD (DDDR) mode with a base rate of 60 beats-per-minute (bpm). It is unclear whether atrial pacing with minimal heart rate at 60 bpm helps to improve functional capacity compared to atrial-tracking pacing in HF patients.

Purpose: We designed a randomized, cross-over, single-blind, multicenter study to compare the DDDR and VVD pacing mode in terms of functional capacity (primary endpoint); as well as patients' quality of life and echocardiographic parameters (secondary endpoints).

Methods: Sinus rhythm patients were randomized to 6-month operation periods of either DDDR mode with a base rate of 60 bpm or VDD mode with a base rate of 30 bpm before CRT implantation and crossed over after a 6-month period. Patients underwent six-minute walking test (6MWT), Minnesota living with heart failure questionnaire (MLHFQ), and echocardiographic assessment at baseline and after each operation period. Due to the crossover study design, primary and secondary endpoints were analyzed with generalized linear mixed-models having variables of interest as response, treatment (i.e., device programming), variable of interest at baseline, period and sequence as fixed effects, and patient as random effects.

Results: A total of 26 patients (77% male, median age 73 years [interquartile range: 68 to 77]) who underwent CRT implantation at three Italian sites were enrolled. Three patients were excluded due to unsuccessful left ventricular (LV) lead positioning and 23 patients were randomized. All of them reached the crossover visit; expect one patient who was explanted early due to device infection. Finally, 19 patients had a regular study end. The reasons for premature termination were death (n= 2) and withdrawal of consent (n= 1). The proportion of CRT responders, defined as a decrease in LV end-systolic volume of >15% and/or absolute increase of 5% in the LV ejection fraction were 72.7% (16/22) and 78.9% (15/19) at 6 and 12 months, respectively.
The main result of the study is that device programming was not significantly associated with the distance walked at 6MWT (DDDR 448 m [370-538], VDD 428 m [360-535], p=0.71, Figure 1). The carryover effect was also not significant (p=0.17), while the period effect (estimate 33.2, SE 14.3, p=0.03) and the distance at baseline (estimate 0.84, SE 0.14, p<0.01) were positively correlated with the distance walked at follow-up. The total score of the MLHFQ and the echocardiographic parameters were also similar between DDDR and VDD pacing mode.

Conclusions: Rate-adaptive pacing (DDDR) did not improve functional capacity, echocardiographic response, and quality of life compared to VDD pacing mode at a low base rate in HF patients in sinus rhythm CRT recipients.

CO.04.05

BIVENTRICULAR OR CONDUCTION SYSTEM PACING FOR CARDIAC RESYNCHRONIZATION THERAPY: A STRATEGY FOR CARDIAC RESYNCHRONIZATION BASED ON A HYBRID APPROACH

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Background: Cardiac resynchronization therapy (CRT) is usually performed with biventricular pacing (BiVP), but recently conduction system pacing (CSP) has been proposed as an alternative in case of BiVP failure. However, further evidence is needed to determine when CSP should be used in lieu of BiVP to improve clinical benefit. The aim of this study was to assess the clinical benefit of a treatment algorithm based on interventricular conduction delays (IVCD) to choose between BiVP or CSP.

Methods: Consecutive patients presenting at our Institution from January 2018 to December 2020 with an indication to CRT were prospectively enrolled in the study group (delays-guided resynchronization group, DRG). IVCD were measured after left ventricle (LV) lead positioning in a lateral or posterior-lateral cardiac vein, when feasible, using endocavitary electrogram. Treatment algorithm based on IVCD was used to decide whether to leave LV lead to perform BiVP or pull it out and perform CSP (see Figure 1). Outcomes from the DRG group were compared to a historical cohort of CRT patients (resynchronization standard guide group, SRG). The primary endpoint was a composite of cardiovascular death, HF hospitalizations and urgent unplanned clinic visits because of worsening HF symptoms or remote monitoring fluid management alarms at 1 year after the date of intervention. Secondary endpoints were echocardiographic response to CRT and an improvement in NYHA class at 1 year follow-up.

Results: Study population consisted in 292 patients, of which 160 (54.8%) in the DRG and 132 (45.2%) in the SRG. In the DRG 41 of 160 patients underwent CSP based on treatment algorithm (25.6%).
The primary endpoint was significantly reduced in the DRG (35/160, 21.8%) compared to SRG (48/132, 36.4%) (hazard ratio (HR): 1.72; 95% confidence interval (CI): 1.12-2.65;p=0.013). (See Figure 2 and Figure 3)
With regard to secondary outcomes: a) the percentage of echocardiographic responders in the DRG was greater compared to the SRG (77.5% vs 63.6%; p<0.01); b) the mean post-resynchronization NYHA class was lower in the DRG respect to the SRG (1.3 ± 0.5 vs 2.3 ± 0.6; p<0.01). At multivariate analysis, only DRG was predictive of improvement of NYHA class after CRT (HR: 0.6, 95% CI: 0.3-0.9, p<0.01).

Conclusion: A treatment algorithm based on IVCD shifted 1 patient every 4 from BiVP to CSP, with consequent reduction in cardiovascular deaths, HF hospitalizations or HF event after implantation. Therefore, its application could be useful to determine whether to perform BiVP or CSP in CRT candidates.

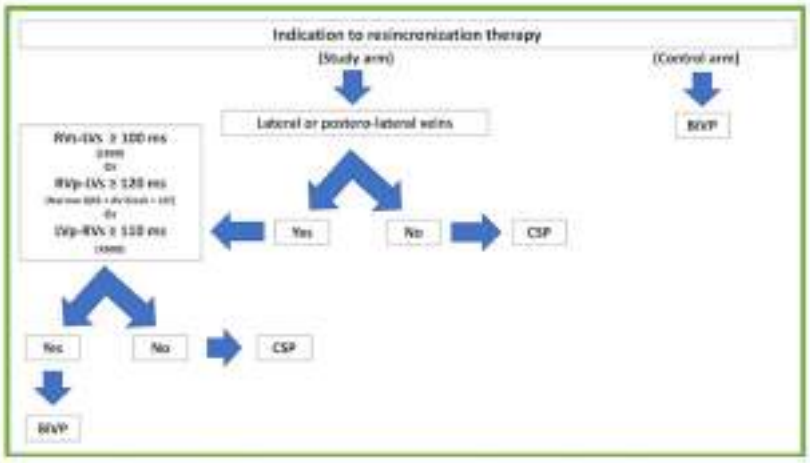

Figure 1: Treatment algorithm

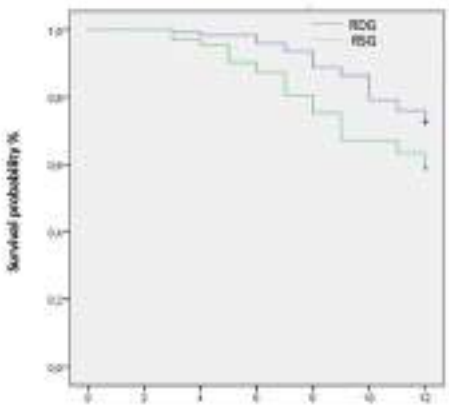

Figure 2: Kaplan Meyer Curves for primary outcome

Endpoints	DRG (n=160)	SRG (n=132)	p-values
Composite outcome			
Cardiovascular death (n°%)			
HF hospitalizations (n°%)			
Urgent clinic visit (n°%)			
Echocardiographic Responders (n°%)			

Figure 3: Table of Primary and secondary outcomes

CO.04.06

EFFICACIA E SICUREZZA DELL'ESPIANTO DEI DISPOSITIVI CARDIACI ELETTRONICI IMPIANTABILI (CIEDS) - ESPERIENZA DI UN SINGOLO CENTRO

M. Marsala, D. Dugo, P. Zappulla, F. Platania, P. Pruiti, M. Lo Presti, G. Sollano, N. Valenti, L. Avolio, F. Barreca , J. Milazzo, V. Calvi, A. Di Grazia

Azienda Ospedaliera Universitaria G. Rodolico - San Marco, Catania, ITALY

Background: nelle ultime decadi, c'è stato un sostanziale incremento del numero e della complessità degli impianti di CIEDs, come risultato di un'estensione dell'indicazione e di un continuo invecchiamento della popolazione generale. In questo contesto, è stato evidenziato un progressivo aumento dell'incidenza annuale delle infezioni correlate ai dispositivi impiantabili con conseguente necessità di ricorrere alla procedura di estrazione. Nel nostro lavoro, abbiamo valutato la sicurezza e l'efficacia di tale procedura, analizzando i dati relativi agli interventi condotti presso il nostro centro, nel decennio 2010-2022.

Methods and results: è stata condotta un'analisi sui dati relativi ad una popolazione di 326 pazienti, considerando le caratteristiche presenti al basale (età, comorbidità, esami ematochimici) nonché le informazioni ricavate in sede procedurale (tecnica di estrazione, tempistiche procedurali, successo completo / successo parziale / insuccesso, eventi avversi) e quelle acquisite mediante apposito follow-up telefonico post-dimissione (morte, cause di morte, nuove ospedalizzazioni). La nostra esperienza conferma l'efficacia di questa procedura con percentuali di successo completo di 89,6%, parziale di 5,7% e di insuccesso del 4,7%. Sono state riportate 41 (10,1%) complicanze periprocedurali minori, facilmente gestibili e reversibili (versamenti pericardici non emodinamicamente significativi ed ematomi a livello della tasca di impianto). Per quanto concerne la mortalità, quella intraoperatoria è stata dello 0,24% (relativa ad un singolo caso di decesso per tamponamento cardiaco), dato in linea con la letteratura; quella a 30 giorni è stata dell'1,5% (6 pazienti deceduti durante il primo mese post-procedura), dato in linea con la letteratura; invece, la mortalità complessiva al follow-up (durata media 74,4 mesi) è stata del 16%, risultando superiore a quella rilevata in altri lavori, sebbene vada sottolineato che la nostra esperienza è relativa ad un campione di dimensioni maggiori e ad un follow-up di durata superiore rispetto a quella degli studi di riferimento. Infine, il 69,9% dei pazienti, intervistati telefonicamente, ha riferito uno stato di benessere, il 9,9% ricorrenti episodi di cardiopalmo, il 4,9% episodi lipotimici, il 3,6% dispnea e facile affaticamento.

Conclusions: la nostra esperienza dimostra come l'estrazione intravascolare dell'elettrocatetere è un metodo sicuro ed efficace, con un rapporto rischio beneficio accettabile e con risultati positivi a lungo termine nella maggior parte dei pazienti, previa tempestiva identificazione delle complicanze minori e maggiori.

COMUNICAZIONI ORALI 05

GIOVEDI' 21 SETTEMBRE

AUDITORIUM

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: GENETICA IN ARTIMOLOGIA

Moderatori: G. Di Stolfo (S. Giovanni Rotondo-FG), F. Vitali (Ferrara)

CO.05.01

CORRELAZIONE GENOTIPO-FENOTIPO E RISCHIO ARITMICO IN PORTATORI DI VARIANTI A CARICO DEL GENE RBM20: UNA CASISTICA ITALIANA

R. Manai [1], V. Dusi [1], F. Angelini [2], S. Pidello [2], P. Bocchino [2], G. Gallone [1], G. Gobello [1], A. Saglietto [1], D. Castagno [1], A. Faggiano [3], M. Calcagnino [4], S. Paganini [5], S. Carugo [3], M. Anselmino [1], C. Giustetto [1], G.M. Brach Del Prever [1], V. Bracciama [6], S. Deaglio [1], G.M. De Ferrari [1], C. Raineri [2]

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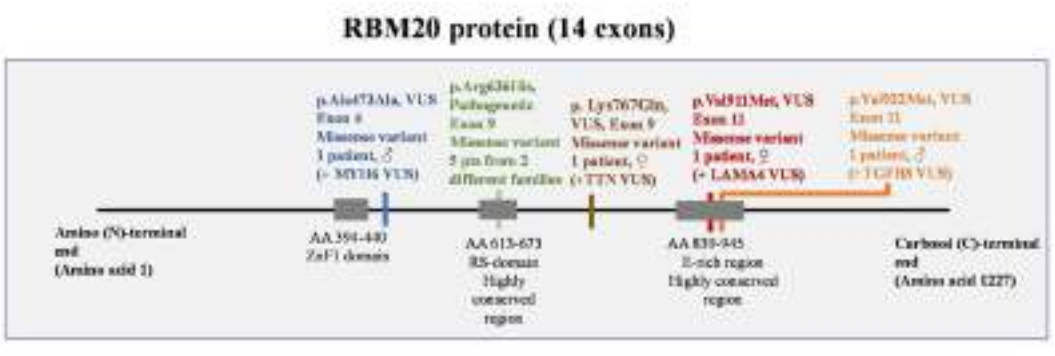
Introduzione: RNA-binding motif protein 20 (RBM20) regola lo splicing post-trascrizionale di diversi geni tra cui geni sarcomerici e altri geni cruciali per l'omeostasi cardiaca. Le varianti di RBM20 sono una rara causa di cardiomiopatia (CMP), ma la correlazione genotipo-fenotipo è ancora elusiva, cosi come la stratificazione del rischio aritmico e di scompenso.

Obiettivo: Descrivere la correlazione genotipo-fenotipo e il rischio aritmico in pazienti con varianti di RBM20.

Metodi: Si tratta di uno studio bicentrico in cui sono stati inclusi tutti i pazienti portatori di varianti patogenetiche/verosimilmente patogenetiche (P/VP) o varianti di incerto significato (VUS) a carico del gene RBM20. Nove pazienti (5 maschi, di 7 famiglie) erano portatori di una variante in eterozigosi di RBM20, compresi 5 con singola variante patogenetica, 4 con VUS di RBM20, associata a una seconda VUS su un altro gene relato a CMP (figura).

Risultato: La maggior parte dei 9 pazienti (pz) studiati (67%) aveva una storia familiare positiva per morte improvvisa. L'età media alla diagnosi era più bassa nei portatori di varianti P in confronto ai portatori di VUS (25±15 vs 47±2 years, p=0.03); non sono state identificate altre differenze significative tra i 2 gruppi. L'eta' alla diagnosi e' risultata simile in maschi (34±15) e femmine (36±14, p=0.9). Alla diagnosi 67% aveva una classe NYHA >1 (44% NYHA III o IV), 78% presentava fenotipo dilatativo-ipocinetico, un pz fenotipo non compatto e uno ipertrofico, l'FE media era di 34±15%. La risonanza magnetica cardiaca (RM), disponibile in 7 pz, mostrava fibrosi non ischemica in 4 (57%). Alla presentazione, 3 pz avevano gia' avuto episodi di tachicardia ventricolare non sostenuta (TVNS), 1 era in flutter atriale (FLA) tipico comune, 1 presentava blocco AV (BAV) di primo grado. Il follow up mediano e' stato di 2 anni (IQR 2-5). In 5 pz (56%) è stato impiantato un ICD a 42± 12 anni; tutti sono stati trattati con betabloccante, 2 anche con amiodarone per TVNS (in un caso sostituito con mexiletina per tireotossicosi). Dei 4 pz non impiantati, una aveva 12 anni ed e' stata trapiantata dopo pochi mesi dalla diagnosi, gli altri 3 avevano una FE tra il 40 ed il 45%, nessuno aveva avuto TVNS e solo 1 presentatava minima fibrosi alla RM. Durante il follow-up, un pz e' stato sottoposto ad ablazione di FLA, una pz è stata sottoposta a trapianto cardiaco a 13 anni, mentre un pz è morto per scompenso; 3 pz (tutti con ICD) hanno avuto TVNS durante il FU, due aritmie atriali parossistiche (in un caso trattata con successo con isolamento delle vene polmonari) e nessuno ha sviluppato BAV avanzati.

Conclusioni: Questa è la prima coorte italiana di pazienti con CMP associate a varianti di RMB20. In questa casistica, le varianti sono associate con una precoce manifestazione di fenotipo cardiaco, sia nei maschi che nelle femmine, con CMP dilatativa e insufficienza cardiaca. Nessuno dei pazienti ha sviluppato BAV avanzati, un terzo ha avuto aritmie atriali, la maggior parte ha manifestato TVNS ma nessuno aritmie ventricolari sostenute o trattate dal device in terapia.



CO.05.02

REPOLARIZATION DISPERSION MAPPING IN BRUGADA PATIENTS WITH SPONTANEOUS ELECTROCARDIOGRAPHIC TYPE 1 PHENOTYPE: CORRELATION BETWEEN ACTIVATION-RECOVERY INTERVAL AND TPEAK-TEND INTERVAL

S. Garibaldi [1], S. Latrofa [2], V. Hartwig [3], L. Bachi [2], M.S. Morelli [4], N. Martini [4], L. Panchetti [1], U. Startari [1], G. Mirizzi [1], M. Nesti [1], N. Zaurino [5], P. Notarstefano [6], G. Mansi [7], N. Vanello [8], C. Passino [2], M. Emdin [2], M. Piacenti [1], A. Giannoni [2], A. Rossi [1]

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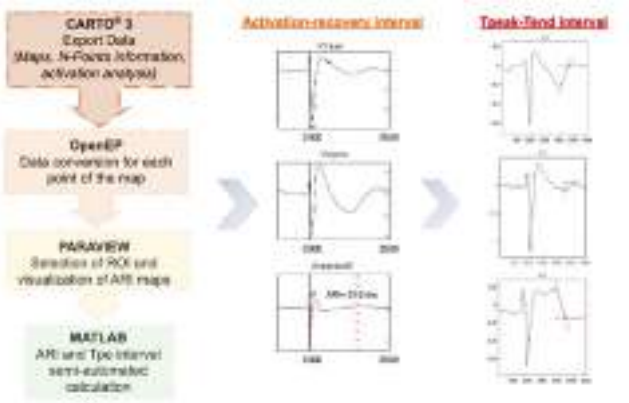
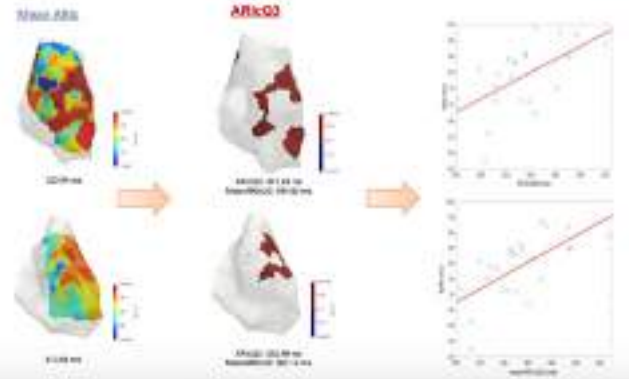
Background: Preferential prolongation of action potential duration of epicardial cardiomyocytes in the right ventricular outflow tract (RVOT) is the electrophysiological basis for the coved-type ECG in Brugada syndrome (BrS). Activation-recovery interval (ARI) approximates action potential duration . Tpeak-Tend (Tpe) interval is a proven measure to assess ventricular repolarization time; longer Tpe intervals have been linked to a higher arrhythmic risk in BrS patients. To our knowledge, data regarding the characterisation of RVOT repolarization in BrS patients is still limited.

Purpose: We sought to examine ARI values collected by unipolar signals from high-density electroanatomical maps in the RVOT endocardium of patients with a spontaneous type 1 pattern. We aimed to investigate the relation between ARI distribution and Tpe intervals averaged from surface V1, V2 and V3 ECG leads.

Methods: 24 BrS patients with a persistent coved-type phenotype underwent endocardial 3D RV mapping (CARTO 3, Biosense-Webster, Diamond Bar, CA, USA). Data was exported from the CARTO system and converted into MatLab format using OpenEP . Subsequently, a specific region of interest (ROI) comprising of sub-pulmonary RVOT and RV free wall was selected using Paraview. A semi-automated algorithm was used to measure ARI for each point of the ROI using the Wyatt method; these values were then corrected using the "Bazett formula" and interpolated to create ARI maps. Tpe intervals were calculated for V1, V2 and V3 from ECG recordings during the procedure for each patient. T-peak was determined as the maximum positive or negative deflection following the QRS, whereas T-end was calculated using the previously described "tangent method" . Each subject's Tpe was averaged on a subset of 20 low-noise sinus beats selected by an automated signal quality scoring algorithm. Tpe intervals were as well corrected for RR using the "Bazett formula". For each patient, we selected the ARI value corresponding to the 75% of the distribution (ARIcQ3) and the mean value of the values above it (meanARIcQ3). ARIcQ3 points were also collected into the mesh and reported as an area visualized into the map.



Results: Out of 24 BrS subjects, one patient had appropriate ICD shocks. We calculated an average ARI of 291.4 ± 22.1 ms, average ARIc of 306.0 ± 27.3 ms, average ARIcQ3 335.1 ± 28.3 ms and meanARIcQ3 was 353.14 ± 30.3 ms. Average Tpe value was 75.0 ± 7.3 ms, with a corrected average Tpe of 79.0 ± 10 ms. ARIcQ3 and meanARIcQ3 correlated well with corrected average Tpe (respectively: R=0.58, p=0.003; R=0.65, p<0.001). ARIcQ3 areas are located into the anterior and subpulmonary RVOT.



Conclusions: ARI approximates epicardial action potential duration and correlates with dispersion of the repolarization measured on surface ECG in BrS patients. Longer ARIc are mainly located into the anterior and subpulmonary aspect of RVOT. Further studies are needed to assess the role of such observations in the context of a multiparametric electroanatomic evaluation in risk stratification especially in asymptomatic BrS type-1 pattern.

CO.05.03
IT'S NOT ALWAYS WHAT IT LOOKS LIKE

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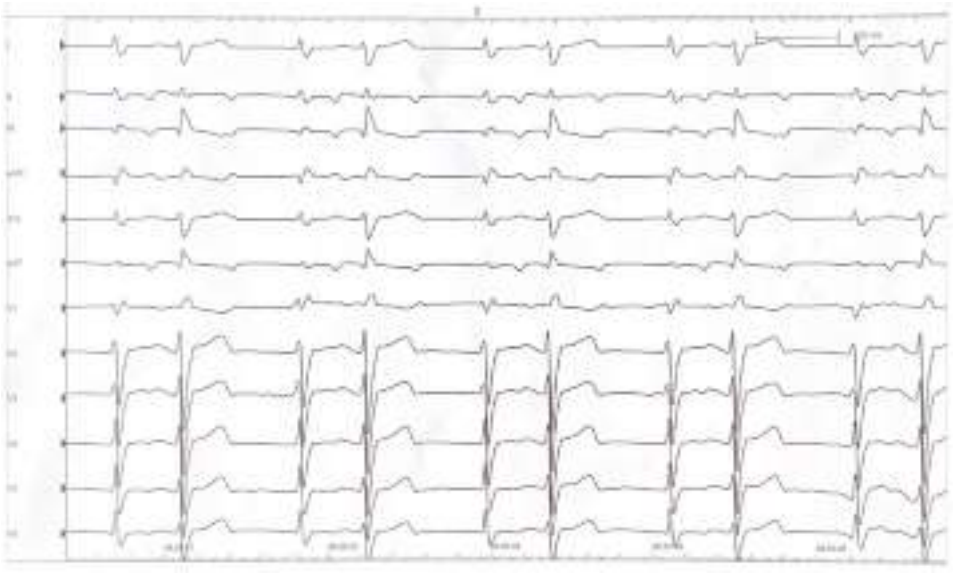
Background: There are several causes of left or right ventricular systolic dysfunction during pregnancy and the peripartum period, which include acute myocarditis, peripartum cardiomyopathy, Takotsubo cardiomyopathy or exacerbation of a pre-existing cardiomyopathy. Differential diagnosis could be challenging and often requires advanced imaging besides endomyocardial biopsy and genetic testing.

Case Summary: We report a case of a 36-year-old woman who was diagnosed with a particular variant of dilated cardiomyopathy (multifocal ectopic premature Purkinje-related contractions), probably associated with a mutation in the SCN5A gene (c.673C>G, pArg225Gly) who presented in our emergency department 8 months after delivery complaining of palpitations and asthenia. There was no family history sudden cardiac death, but her mother suffered from frequent ventricular ectopy. Her past medical history included a microprolactinoma treated with cabergoline 18 years earlier. The electrocardiogram on admission showed sinus tachycardia interrupted by very frequent premature ventricular complexes. Laboratory findings were compatible with thyrotoxicosis; prolactine was normal; infectious disease and autoimmune screenings were negative. The transthoracic echocardiogram showed diffuse hypokinesis leading to severe left ventricular dysfunction (LVEF 28%). A coronary angiography excluded the presence of significant coronary artery disease. The patient was then treated with heart failure medications and a thyrostatic agent.
After normalization of thyroid function, an electrophysiological study was performed: in basal conditions it documented the presence of accelerated idioventricular rhythm in polymorphic pairs with decremental retroconduction; during pacing from the coronary sinus catheter normal atrioventricular conduction appeared and premature ventricular complexes were inhibited only with a cycle length under 460 msec; an electroanatomical mapping of the left ventricle was therefore performed, which documented the focus of the ventricular extrasystoles present in basal conditions at the level of the left anterior fascicle, which was treated by radiofrequency ablation, obtaining an effective suppression; however, during the mapping, high variability of extrasystoles morphology was documented, suggesting the presence of multiple foci, and it was therefore decided to avoid further ablation attempts. At the end of the procedure an endomyocardial biopsy was performed, which then showed histological characteristic compatible with dilated cardiomyopathy.
During the following hospitalization, flecainide was introduced, achieving good control of the arrhythmic burden. A cardiac magnetic resonance was then performed, showing a modest reduction in left ventricular systolic function (LVEF 37%), normal native T1 and T2 mapping values, and no pathological findings on T2-weighted sequences. Before discharge an implantable subcutaneous loop recorder device was implanted. Complete restoration of the left ventricular systolic function was obtained 6 months after the index event (LVEF 62%), in absence of significant arrhythmias relapses.

Discussion: Multifocal ectopic premature Purkinje-related contractions is a rare variant of dilated cardiomyopathy, associated with few mutations in the SCN5A gene, characterized by a high burden of premature ventricular complexes originating from the Purkinje fibers. The particularity of this phenotype lies in the extreme response to flecainide, which often guarantees a significant reduction of the arrhythmic burden with complete recovery of the cardiac function. This case demonstrate the importance of identifying the most probable diagnosis since it can guide the treatment and affect prognosis.



CO.05.04

DISTURBI AVANZATI DI CONDUZIONE CARDIACA AD ESORDIO PRECOCE E/O ARITMIE VENTRICOLARI MAGGIORI IN QUATTRO NUOVE VARIANTI GENETICHE DELLA NESPRINA CON LIEVE CARDIOMIOPATIA

R. Manai [1], G. Gobello [1], F. Angelini [2], S. Pidello [2], P. Bocchino [2], G. Gallone [1], G. De Lio [1], A. Saglietto [1], G.M. Brach Del Prever [3], V. Bracciama [3], M. Millesimo [1], M. Matta [2], F. Ferraris [2], D. Castagno [1], M. Anselmino [1], C. Giustetto [1], S. Deaglio [3], G.M. De Ferrari [1], C. Raineri [2], V. Dusi [1]

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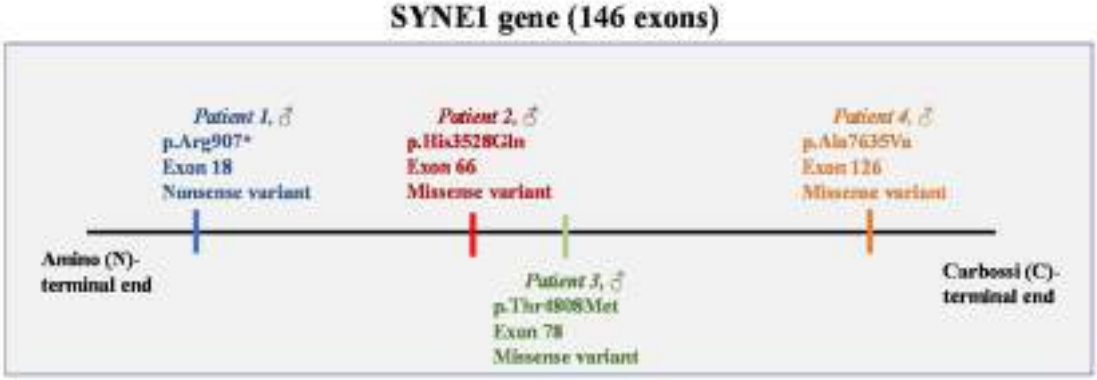
Introduzione: Le Nesprine sono delle proteine codificate dai geni SYNE 1-2 (synaptic nuclear envelope) e contribuiscono insieme alle lamine A/C ed emerine alla funzione dell'involucro nucleare. Sono state identificate circa 140 patologie relate a varianti di SYNE 1-2: per lo più disordini del sistema nervoso centrale e muscolare, in pochissimi casi cardiomiopatie (CMP), con esordio in età avanzata e senza un chiaro profilo aritmico.

Obiettivo: Descrivere il fenotipo cardiaco di 4 nuove varianti di SYNE 1.

Metodo: 250 pazienti (pz) hanno effettuato un'analisi genetica nel nostro centro (2019-2022) per CMP (TruSight Cardio panel, Illumina); il 72% ha avuto esito positivo, includendo varianti patogentiche/verosimilmente patogenetiche o di incerto significato (VUS). Tra questi, 4 (2%) uomini hanno presentato una VUS sul gene SYNE1.

Risultati: Nessuno ha presentato coinvolgimento neurologico o muscolare. I pz 1 e 2 non presentavano storia familiare (SF) e sono stati sottoposti a impianto di pacemaker per blocco atrioventricolare (BAV) di alto grado prima dei 50 anni: come primo segno clinico di malattia nel primo caso, preceduto da anni di BAV di II grado di tipo 1 e BAV 2:1 da sforzo nel secondo caso. L'ecocardiogramma (ETT) e la risonanza magnetica (RM) hanno mostrato una frazione di eiezione (FE) lievemente ridotta senza edema o fibrosi. Durante 3 e 6 anni di follow up (FU), si sono verificati plurimi episodi di tachicardia ventricolare non sostenuta (TVNS) e di tachicardie atriali parossistiche, con buon controllo in nadololo. Il paziente 3 è uomo di 55 anni con SF negativa e un blocco di branca sinistra (BBS) noto dall'età di 45 anni. A dicembre 2021, mentre giocava a calcio, ha avuto un arresto cardiaco da FV trattato con 2 DC shock; l'ECG mostrava un BAV di I grado (PQ 240 ms) e BBS, l'ETT e la RM una FE lievemente ridotta senza edema o fibrosi. E' stato impiantato un ICD sottocutaneo che ha registrato 3 brevi episodi di FA parossistica in 15 mesi di FU. Il paziente 4 è un 49enne, con SF di II grado di morte improvvisa giovanile e rene policistico. Il paziente presentava emiblocco anteriore sinistro sin dal primo ECG e ha sviluppato 2 episodi di TV monomorfa ad origine dalla base del ventricolo destro, trattati con 2 procedure ablative. ETT e RM mostravano FE normale e lieve ipertrofia concentrica senza fibrosi o edema. Durante un successivo FU di 31 mesi, in terapia con nadololo, ha avuto soltanto alcune TVNS dal ventricolo sinistro.

Conclusioni: Varianti del gene SYNE 1 possono associarsi ad un fenotipo cardiaco complesso che include disturbi di conduzione avanzati ad insorgenza precoce, aritmie ventricolari maggiori e cardiomiopatia. Ulteriori studi sono necessari per determinare il significato funzionale di tali varianti; nel frattempo, il gene SYNE1 dovrebbe essere sempre sistematicamente investigato tra i geni cardiaci correlati a CMP, al fine di meglio definire la correlazione genotipo-fenotipo ed il rischio aritmico.



CO.05.05

CAN A VLC GENE VARIANT IDENTIFY INCREASED ARRHYTHMYC RISK?

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Vinculin (VCL) in a structural protein of the cadherins family. It's involved in the connection between cadherine and actine. On the basis of literature data, it's linked to sudden arrhythmia death in VCL knockout mice prior to the appearance of cardiomyopathy. No data exists regarding this correlation in humans even if few observations introduce a correlation between the heterozygosis and the dilated cardiomyopathy. However, in this contest, it's sure that accurately assessment and expression of the pathogenicity of variants with lower penetrance is a challenge.

Case summary
We describe the case of a 23-year-old asymptomatic female patient arrived for palpitations and dizziness. Basal ECG and Holter registration showed frequent non sustained ventricular arrhythmias. Three different morphologies can be identified, but one of these was very predominant enough to be considered as incessant.
Numerous cardiac function tests were ordered and were normal. She had a family history for SCD.
The genetic test revealed a variant in the VCL gene. Because of the risk factors and higher likelihood of sudden death, a EFS was performed and VF was easily induced so that an implantable cardiac defibrillator (ICD) was performed without complications. The patient continued the follow-up with yearly cardiac imaging and device recordings. An appropriate shock was occurred during an emotional effort. Beta-blockers permitted a good control of arrhythmias events even if periodical Holter monitoring revealed a correlation between arrhythmias and physical efforts. For this reason she was candidate to a successful ventricular ablation procedure.

Discussion
LVC loss of function may play a role in dilated cardiomyopathy, and pooled case-control studies suggest low penetrance. VCL loss-of-function variants, however, are rarely identified in affected probands and therefore there is a paucity of family studies elucidating the clinical significance of individual variants.

Vinculine Family studies have shown that heterozygous loss of LVC function alone is not sufficient to cause cardiomyopathy, but that these variants contribute to disease risk. In conclusion, loss-of-function VCL variants should be reported in a diagnostic context, but must be clearly distinguished as having lower penetrance. The association described here was not previously reported in the literature. The decision to use an ICD for primary prevention of sudden death was derived from the global risk evaluation of sudden death of the case, but the description of this association can have a clinical importance, like support the role of genetic tests in the initial stratification of the patient with ventricular arrhythmias and normal cardiac structure, or even a cultural consequence helping to identify a role of mutation for vinculine.

CO.05.06

DLG1 GENETIC MUTATION IN PATIENTS WITH BRUGADA SYNDROME: CLINICAL CHARACTERISTICS AND IN SILICO ANALYSIS

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Background: Brugada syndrome (BrS) is an inherited primary channelopathy syndrome associated to sudden cardiac death. Overall, variants have been identified in eighteen genes encoding for ion channel subunits and seven genes for regulatory proteins. Recently, a missense variant in DLG1 has been found within a BrS phenotype-positive patient. DLG1 encodes for synapse associated protein 97 (SAP97), a protein characterized by the presence of multiple domains for protein-protein interactions including PDZ domains. In cardiomyocytes, SAP97 interacts with Nav1.5, a PDZ binding motif of SCN5A and others potassium channel subunits.

Aim of the study: To characterize the phenotype of an Italian family with BrS syndrome carrying a DLG1 variant.

Methods: Clinical and genetic investigations were performed. Genetic testing was performed with whole-exome sequencing (WES) using the Illumina platform. According to the standard protocol, a variant found by WES was confirmed in all members of the family by bi-directional capillary Sanger resequencing. The effect of the variant was investigated by using in silico prediction of pathogenicity.

Results: The index case was a 74-year-old man with spontaneous type 1 BrS ECG pattern that experienced syncope and underwent ICD implantation. WES of the index case, performed assuming a dominant mode of inheritance, identified a heterozygous variant, c.1556G>A (p.R519H), in the exon 15 of the DLG1 gene. In the pedigree investigation, 6 out of 12 family members had the variant. Carriers of the gene variant all had BrS ECG type 1 drug induced and showed heterogeneous cardiac phenotypes with two patients experiencing syncope during exercise and fever, respectively. The amino acid residue #519 lies near a PDZ domain and in silico analysis suggested a causal role for the variant. Modelling of the resulting protein structure predicted that the variant disrupts an H-bond and a likelihood of being pathogenic. As a consequence, it is likely that a conformational change affects protein functionality and the modulating role on ion channels.

Conclusions: A DLG1 gene variant identified was associated with BrS. The variant could modify the formation of multichannel protein complexes, affecting ion channels to specific compartments in

COMUNICAZIONI ORALI 06

GIOVEDI' 21 SETTEMBRE

SALA ITALIA

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: DEVICE 3

Moderatori: L. Marcantoni (Rovigo), L. Marinaccio (Piove di Sacco-PD)

CO.06.01

EARLY EFFECTS OF LEFT BUNDLE BRANCH AREA PACING ON VENTRICULAR ACTIVATION BY SPECKLE TRACKING ECHOCARDIOGRAPHY

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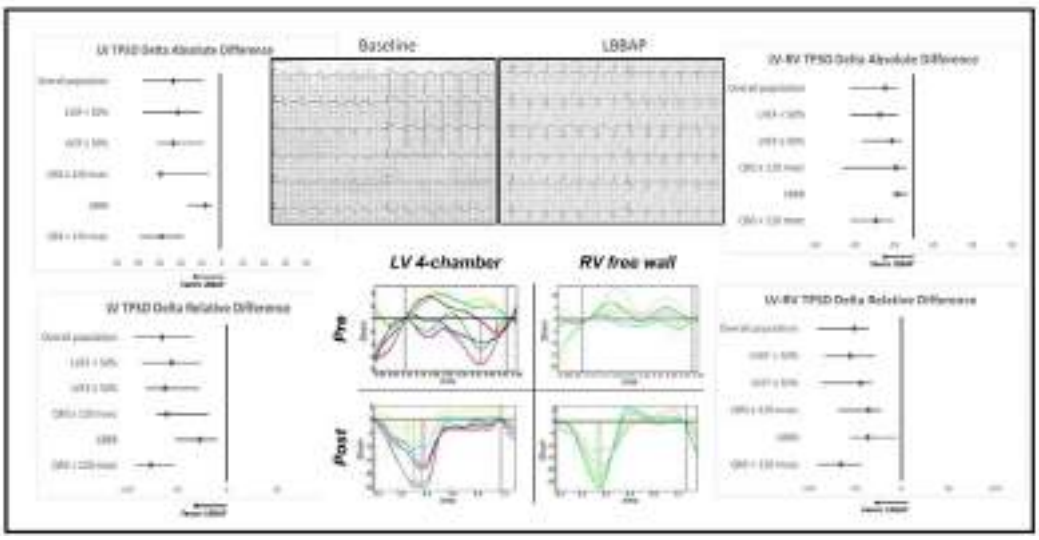
[2] *Università del Piemonte Orientale Amedeo Avogadro - AOU Maggiore della Carità, Novara, ITALY*

Background. Left bundle branch area pacing (LBBAP) is an emerging cardiac pacing modality that preserves fast electrical activation of the ventricles and provides very good electrical measures. Little is known on mechanical ventricular activation during this pacing modality.

Methods. We prospectively enrolled patients receiving LBBAP. Electrocardiographic and electrical parameters were evaluated at implantation, <24 hours and 3 months. Transthoracic echocardiography with strain analysis was performed at baseline and after 3 months, when ventricular mechanical activation and synchrony was analyzed by time-to-peak-standard-deviation (TPSD) of strain curves for both ventricles. Intraventricular left ventricular (LV) dyssynchrony was investigated by LV TPSD, interventricular dyssynchrony by left ventricle-right ventricle TPSD (LV-RV TPSD).

Results. We screened 58 patients with permanent pacing indication who attempted LBBAP. Procedural success was obtained in 56 patients (97%). Strain data were available in 50 patients. QRS duration was 124.1±30.7 msec at baseline, while paced QRS duration was 107.7±13.6 msec (p<0.001). At 3 months after LBBAP, left ventricular ejection fraction (LVEF) increased from 52.9±10.6% at baseline to 56.9±8.4% (p=0.004) and both intraventricular LV dyssynchrony and interventricular dyssynchrony significantly improved [LV TPSD reduction from 38.2 (13.6–53.9) to 15.1 (8.3–31.5), p<0.001; LV-RV TPSD from 27.9 (10.2–41.5) to 13.9 (4.3-28.7), p=0.001]. Ameliorations with LBBAP were consistent in all subgroups, irrespective of baseline QRS duration,
types of intraventricular conduction abnormalities and LVEF.

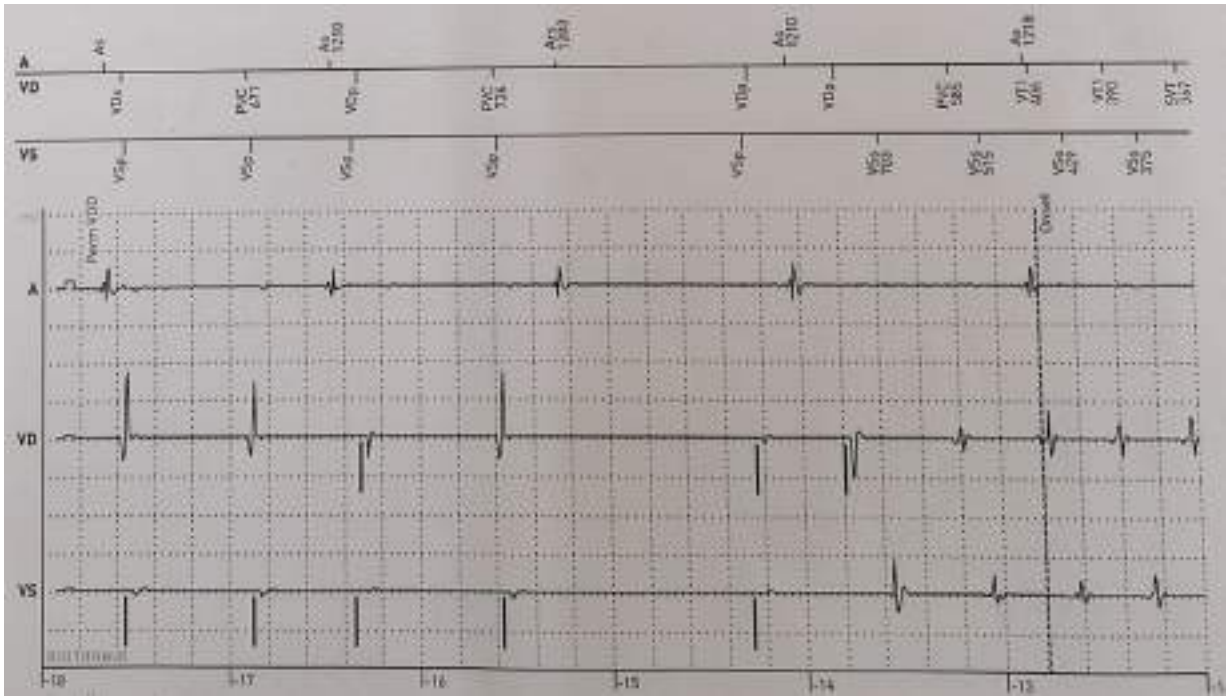
Conclusions. Echocardiographic strain analysis shows that LBBAP determines a fast and synchronous biventricular contraction with a stereotype mechanical activation, regardless of baseline QRS duration, pattern and LV function.



CO.06.02
UN CASO PARTICOLARE DI TACHICARDIA VENTRICOLARE DURANTE STIMOLAZIONE VENTRICOLARE

N. Ferrara, P. Crea, F. Luzza, S. Carerj
AOU G. Martino, Messina, ITALY

La terapia di resincronizzazione cardiaca (CRT), con o senza possibilità di trattamento antitachiaritmico (CRT-D), ha rappresentato un'importante evoluzione nel trattamento dell'insufficienza cardiaca cronica a frazione d'eiezione depressa. Gli studi ne hanno infatti ampiamente dimostrato l'efficacia in termine di riduzione della mortalità, delle ospedalizzazioni per scompenso cardiaco e della morte improvvisa, grazie ad un effetto favorevole sul remodelling ventricolare e di conseguenza sul rischio di aritmie minacciose per la vita. Nonostante ciò, allo stesso CRT-D è anche associato un effetto proaritmico, tale da determinare in alcuni pazienti ricorrenti ed imprevedibili tachiaritmie ventricolari, spesso refrattarie a terapia farmacologica e associate a deterioramento della funzione cardica. Il meccanismo proaritmico indotto da tale terapia rimane sconosciuto sebbene siano varie le ipotesi avanzate, la maggior parte delle quali considerano la stimolazione epicardica sul ventricolo sinistro come la principale responsabile degli eventi aritmici, a causa dell'anomala sequenza di attivazione che essa determina. Nel caso clinico di seguito descritto, un'attenta valutazione della tachicardia ventricolare, ci ha permesso di avanzare un'ipotesi alternativa sull'elettrogenesi dello storm aritmico in un paziente portatore di CRT-D, e di agire in tal modo tramite ottimizzazione della terapia. A.T. è un paziente di anni 63, affetto da cardiomiopatia dilatativa familiare e scompenso cardiaco cronico a frazione d'eiezione ridotta e portatore di ICD Biotronik dal 2015 e successivo upgrade a CRT-D nel 2019 con elettrocatetere in sede apicale ventricolare destra, dipolo flottante in atrio destro ed elettrocatetere in seno coronarico. Viene ricoverato presso la nostra UOC per scariche ricorrenti del dispositivo nelle prime ore della mattina, quadro configurabile con quello di storm aritmico. L'evento si presentava come recidivante, poiché il paziente era stato più volte sottoposto a ricovero per episodi tachiaritmici ventricolari (storm aritmici e tachicardie ventricolari sostenute) e a due procedure di ablazione transcatetere, inefficaci. Il paziente praticava terapia antiaritmica con Metoprololo 100 mg ½ cp bid, Mexiletina cloridrato 200 mg 1 cp bid, Amiodarone 200 mg qd. Entrato in reparto, si è proceduto all'esecuzione di esami ematochimici, risultati nella norma, e ad interrogazione del dispositivo, con evidenza di eventi di tachicardia ventricolare monomorfa, trattati con ATP e secondaria erogazione di singolo shock a 40J. Osservando gli inneschi, abbiamo potuto verificare che essi si presentavano soprattutto in corso di bradicardia sinusale a freq. di 50 b/m', dopo la comparsa di un battito prematuro, responsabile di un allungamento della lunghezza del ciclo fino al raggiungimento dell'LRI e conseguente stimolazione biventricolare. Ciò faceva sì che il battito sinusale seguente non riuscisse ad essere condotto, motivo per cui emergeva una stimolazione del solo ventricolo destro (secondo programmazione del dispositivo Biotronik) e conseguente innesco di tachicardia ventricolare da verosimile circuito di rientro. Vista la terapia medica ottimizzata e le precedenti procedure di ablazione inefficaci, abbiamo optato per l'ottimizzazione della terapia con CRT-D, tramite upgrade con posizionamento di nuovo elettrocatetere in sede auricolare destra e switch della modalità di stimolazione in DDD, al fine di ridurre il rischio di bradicardia sinusale, responsabile dell'inizio della sequenza aritmica. Durante il follow-up di due mesi, non si sono evidenziati nuovi eventi.



CO.06.03

SAFETY AND FEASIBILITY OF LEFT BUNDLE BRANCH AREA PACING: SHORT LEARNING CURVE IN SINGLE CENTRE EXPERIENCE

C. Devecchi, M. Magnano, D. Oriente, E. Occhetta, F. Rametta
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Background: Conduction system pacing (CSP) has emerged as a new physiological pacing modality. His-bundle pacing (HBP) frequently have low R-wave and high capture thresholds and could be ineffective in presence of distal conduction disorders. Both anatomy and histology favor LBBAP over HBP. Implant technique is simple to perform, with a short learning curve, reproducible results and low complications rate. The aim of this study was to assess the feasibility and safety of LBBAP in our centre.

Methods: From September 2022, we started performing LBBAP in patient with pacing indication for bradyarrhythmia or heart failure. Population characteristics were collected at baseline and after 3 months follow up. LBBAP was chosen as first-line therapy without attempting HBP. The lead was delivered through a fixed curve sheath. Both lumenless and stylet-driven leads with exposed activation system has been used.
His bundle was not mapped before lead placement. Sheath and lead were advanced about 1 to 2 cm apical from hypothetical radiological HB site in the right ventricular septum, using right anterior oblique or antero posterior projections. Position is confirmed in left anterior oblique projection and in unipolar pacing searching W-pattern in lead V1 and discordant polarity in leads II and III (lead II with a predominately positive QRS and lead III with a predominately negative QRS). These findings are good predictors for successfully LBBAP. The lead was rapidly turned into interventricular septum, monitoring impedance during screwing. Progressive penetration of the lead in the deep septum resulted in gradually narrowing of paced QRS with terminal r-wave in lead V1 (incomplete right bundle branch block morphology) (Figure 1). In presence of "fixation beats" with typical LBBAP paced QRS morphology, no additional turns should be applied to avoid septal perforation. If primary LBBAP was unsuccessful, lead was replaced. Paced QRS duration <130 ms and peak left ventricular activation times (pLVAT) in leads V5-V6 <80 ms were procedure endpoints.

Results: LBBAP was attempted in 43 patients, CRT was successfully achieved in 1/1 (100%), mean age was 79,4 ± 5,8years, 13 (30%) women, ischemic cardiomyopathy in 10 patients (23,2%), atrial fibrillation in 8 patients (18,6%). Mean QRS duration at baseline was 114,1 ± 32,1, bundle branch block (BBB) in 9 patients (20,9%). Fluoroscopy and procedure time were 416,9 ± 296,5 seconds and 73,3 ± 27,7 minutes respectively. LBBAP threshold and R-wave amplitudes were 0,6 ± 0.3 V at 0,5 ms (unipolar) and 10,4±5,5 mV (bipolar) at implantation and remained stable during follow-up. Paced mean QRS duration was 106,9 ± 11,5 ms; we obtained BBB correction in all patients (9/9). We did not obtain terminale r-wave in lead V1 in only 8 patients (18,6%), but we achieved deep septal pacing in all of them. Only in two patients more than 1 sheath has been used due to acute lead dislodgment. No complications at follow up.

Conclusions: LBBAP has emerged as a novel CSP modality avoiding the detrimental effects of right ventricular pacing. In our experience, LBBAP is safe and feasible in routine clinical practice with a short learning curve.

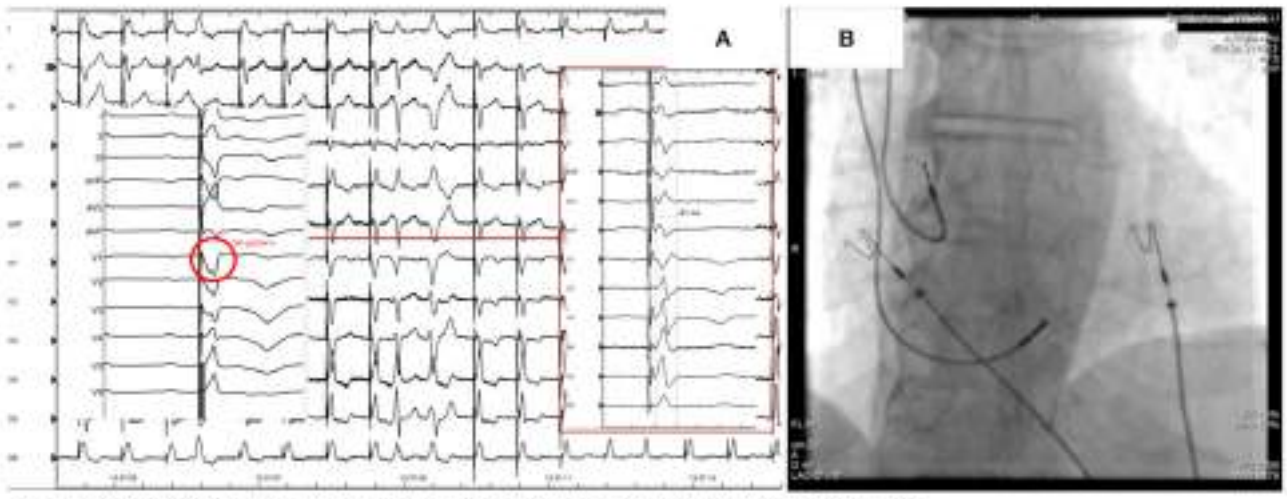

Figure 1: ECG monitoring during screwing, obtaining LBBAP (A), fluoroscopy final view (B)

CO.06.04

PERCUTANEOUS EXTRACTION OF A MICRA AV TRANSCATHETER PACING SYSTEM DUE TO SUDDEN BATTERY FAILURE NOT RELATED TO INCREASED PACING THRESHOLDS: A FIRST EXPERIENCE WORLDWIDE

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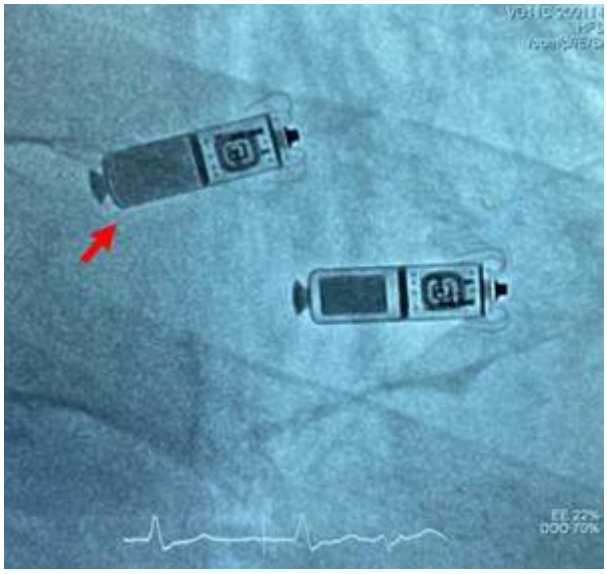
Micra AV Transcatheter Pacing System (TPS) represents an innovative second-generation leadless pacemaker (PM) which represents an effective alternative to conventional devices in selected cases. Observational data demonstrated the safety and efficacy of Micra TPS, with an excellent implant success rate. In contrast, data regarding long-term outcomes, intrinsic malfunctions of these devices and their retrieval are limited.
An 85-year-old man, affected by chronic renal disease, was admitted in our ward in August 2020 after the diagnosis of paroxysmal complete atrioventricular block (AVB). A Micra AV TPS was implanted. No complication occurred, and stable device parameters was maintained throughout the hospitalization. During follow-up, the PM interrogation displayed optimal pacing and sensing parameters with an estimated battery longevity of about 8 years. In March 2022, during a routine PM electronical follow-up, the device was unable to be interrogated. The 24-hours ECG monitoring showed further intermittent complete AVB episodes without pacing activity. A subsequent bi-plane fluoroscopic examination demonstrated that the device was in the appropriate position. Therefore, via femoral vein access an implantation in the right ventricle of a new Micra AV system was performed. During fluoroscopy, a deeper side-by-side morphological examination of the two devices revealed a significant alteration of the battery housing in the old Micra AV TPS battery.



Thus, the old device was extracted, with a surgeon as a bystander, and the cause of its malfunction was investigated. The Micra AV TPS retrieval was performed using a percutaneous tool. The inspection at the end of the procedure, did not reveal structural anomalies, adhesions, or capsules around the retrieved Micra TPS. No complications occurred. An extensive technical investigation of the device retrieved, performed by the manufacturer, revealed a breach in the cathode separator bag, which caused an internal short circuit and, consequently, a sudden depletion of the battery.
Safety and efficacy of LPs was pointed out by several studies, even in older patients.
The Micra TPS is the only approved by US Food and Drug Administration and it has obtained CE mark, due to a safety recall of the Nanostim device in 2016 related to concerns on abrupt battery failure. Similar battery issues have not been described for the Micra TPS. Several cases of battery malfunction are described but related to elevated pacing thresholds.
The Micra AV TPS estimated cycle of live ranges from 5 to 15 years, according to the rate of pacing. The management of End-of-life of these devices is still debated. The preferred option is turning off and leaving the device in situ.
We decided to proceed with the retrieval of the device for safety issues, to be reassured of the external shell integrity. Furthermore, this may allow a thorough analysis of the device by the manufacturer leading to a precise definition of the cause of this unexpected device failure. To the best of our knowledge, we describe the first case of sudden battery malfunction after 19 months from implantation of a Micra AV TPS, which required the extraction and the placement of a new pacing system.

CO.06.05

EUROPEAN TAUROPACE™ REGISTRY (ETPR): CARDIAC IMPLANTABLE ELECTRONIC DEVICE COMPLICATIONS AFTER TWELVE MONTHS FOLLOW-UP IN 588 PROCEDURES

B. Baldauf [1], M. Giaccardi [2], S. Borov [1], E.W. Lau [3], O. Assadian [4], P. Chevalier [5], R. Cemin [6], R. Vonthein [7], H. Bonnemeier [1,8]

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[2] *Santa Maria Annunziata, Firenze, ITALY*
[3] *Royal Victoria Hospital, Belfast, UNITED KINGDOM*
[4] *Landeskrankenhaus, Wiener Neustadt, AUSTRIA*
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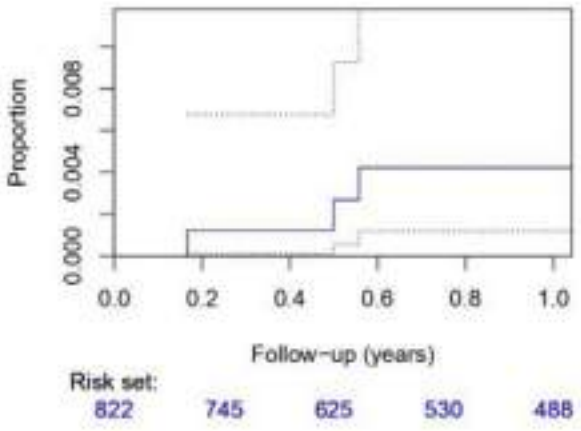
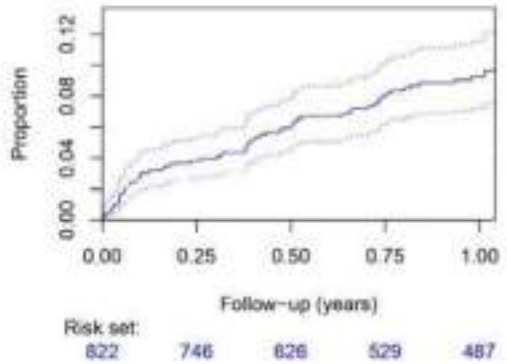
Background: Cardiac implantable electronic device (CIED) infection is the most devastating adverse event related to CIED placement. To date, perioperative antibiotic administration and the use of an antibiotic envelope have shown preventive impact in randomized controlled trials. To plan such a trial for a new taurolidine containing antimicrobial wash, the rate of pocket infections after intraoperative surgical site and device irrigation with TauroPace™ needs to be shown to be even lower.

Methods: The authors prospectively evaluate all consecutive CIED procedures performed with TauroPace™ in the contributing centres. Primary endpoint is major CIED infection according to the current CIED infection criteria. The registry issues reports, when superiority to published event rates may be established starting from registries and advancing to RCT. Complications and all-cause mortality are followed up as secondary endpoints. Follow up times are three months, as mostly acute CIED infections are of interest, 1 year for subacute CIED infections, and 3 years to explore long lasting colonisation. Preoperative intravenous antibiotic administration is standard of care in the contributing centres. Patient and CIED and procedure related risk factors are recorded.

Results: From January 2020 through December 2022 822 of 1170 procedures were performed with adjunct TauroPace™ treatment. Major CIED infections occurred in 1/799 (0.125%, 95%-confidence interval 0.03%–0. 70%) during 91 days of follow-up and 3/588 in 12 months (0.51%, CI 0.11% to 1.48%); CIED pocket infections occurred in 0/799 (0%, CI 0% to 0.46%) during three months and 2/588 (0.34%, CI 0.04% to 1.22%) during 12 months observation; 68/588 = 11.6% (CI 9.1% to 14.4%) died during that year. 81 adverse events related to CIED or procedure were observed (9.9%, CI 7.9% to 12.1%), 23 of them serious (2.8%, CI 1.8% to 4.2%). No adverse events related to TauroPace™ were reported.





CO.06.06

REDUCING INFECTIONS AND POCKET HEMATOMA THROUGH CARDIAC DEVICE ENVELOPE: INSIGHT FROM REAL WORLD DATA. THE REINFORCE PROJECT

M. Ziacchi [1], M. Biffi [1], S. Iacopino [2], M. Di Silvestro [3], P. Marchese [4], F. Miscio [5], V.P. Caccavo [6], G. Zanotto [7], L. Tomasi [8], A. Dello Russo [9], L. Donazzan [10], G. Boriani [11]

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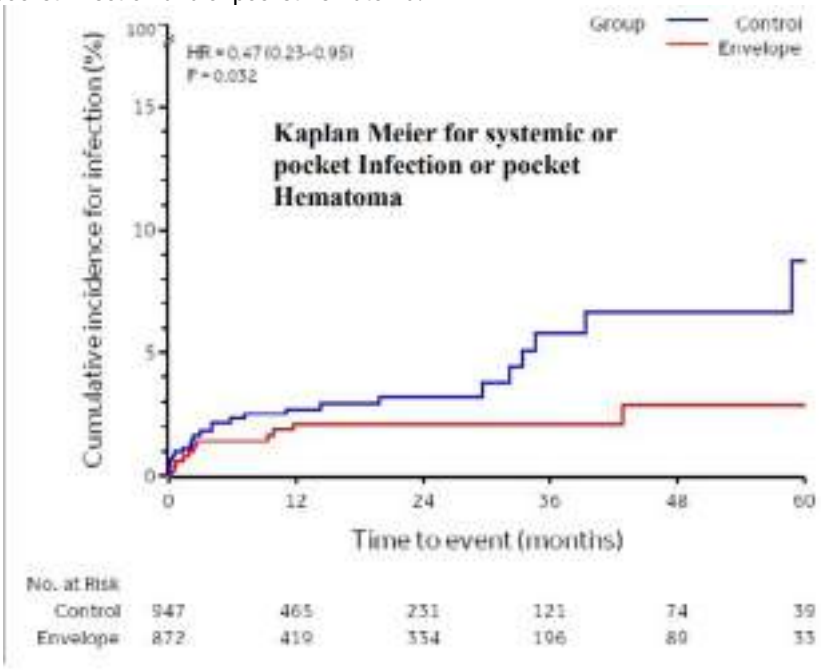
[9] *Azienda Ospedaliero Universitaria delle Marche, Ancona, ITALY*
[10] *Cardiology Department, Ospedale San Maurizio, Bolzano, ITALY*
[11] *Cardiology Division, Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Po, Modena, ITALY*

Purpose: Infections resulting from cardiac implantable electronic device (CIED) implantation are severely impacting on patients' and on health care systems. The use of TYRXTM absorbable antibiotic-eluting envelope has proven to decrease major CIED infections within 12 months of CIED surgery. The aim of the present analysis is to evaluate the impact of the envelope use on infection-related clinical events and the incidence of pocket hematoma in a real-world contemporary patient population.

Methods: Data on patients undergoing initial CIED implantation or device replacement were collected prospectively by participating centers of the One Hospital ClinicalService project. Patients were divided into two groups according to whether TYRXTM absorbable antibiotic-eluting envelope was used or not.

Results: Out of 1819 patients, 872 (47.9%) were implanted with an absorbable antibiotic-eluting envelope and included in the Envelope group and 947 (52.1%) patients who did not receive an envelope were included in the Control group. Compared to control, patients in the Envelope group had higher thrombo-embolic or hemorrhagic risk, higher BMI, lower LVEF and more comorbidities. During a mean follow-up of 1.4 years, the incidence rate per 100 patients-months of infection -related events or pocket hematoma was significantly higher in the control compared to the Envelope group (2.85% vs 1.26%, p< 0.001). The 48-month cumulative incidence of infection-related events or pocket hematoma was 6.7% in the control and 2.9% in the Envelope group (HR:0.47; 95%CI: 0.27-0.95, p= 0.032).

Conclusions: In our analysis, the use of an absorbable antibiotic-eluting envelope in the general CIED population was associated with a lower risk of systemic and pocket infection and of pocket hematoma.



COMUNICAZIONI ORALI 07

GIOVEDI' 21 SETTEMBRE

SALA BIANCA

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: ELETTROFISIOLOGIA INTERVENTISTICA 1

Moderatori: A. Agresta (Maddaloni-CE), F. Borrello (Catanzaro)

CO.7.01

ACUTE IMPACT OF THE VEIN OF MARSHALL ETHANOL INFUSION ON NEWLY-FORMED LESION AND MITRAL LINE BLOCK IN PERSISTENT ATRIAL FIBRILLATION ABLATION

A. Rossi [1], M. Nesti [1], L. Panchetti [1], U. Startari [1], G. Mirizzi [1], S. Garibaldi [1], B.A. Formichi [1], P. Marchese [2], S. Nassi [1], P. Solinas [1], F. Ceccarelli [1], M.B. Levantesi [1], A. Maionchi [1], M. Piacenti [1]

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[2] *Ospedale Mazzoni, Ascoli, ITALY*

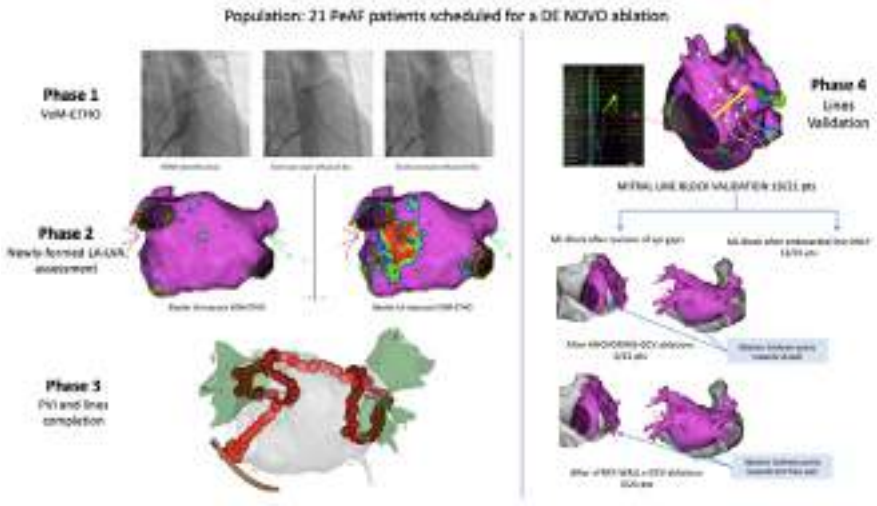
Background: Catheter ablation in persistent atrial fibrillation (PeAF) has limited success. Strategies beyond pulmonary veins isolation failed to demonstrate improvement of long-term rhythm maintenance. The vein of Marshall (VoM) is a promising therapeutic target because it contains triggers and autonomic parasympathetic and sympathetic activity implicated in arrhythmogenesis of AF. Moreover, as the VoM colocalizes with the trajectory of the "mitral isthmus", alcohol infusion into the vein facilitates bidirectional block across the line eliminating protected epicardial connections. Recent evidences suggest that PVI plus linear lesions and ethanol infusion into the VoM (VoM-ETHO) give a favorable outcomes in PeAF patients (1,2).

Purpose: We evaluated acute impact on lesion formation post-VOM-ETHO and the mitral line block validation after a methodical approach including VOM-ETHO, pulmonary vein isolation (PVI), roof-line, mitral line (ML) and cavo-tricuspid isthmus line in a population of PeAF patients. We aimed also to report procedural outcomes after a short follow-up period.

Methods: After a detailed electroanatomical map of the left atrium (LA) (filter at 0.05-0.5 mV if the patient was in sinus rhythm or 0.05-0.3 mV in the case of AF), we thus proceeded with the VoM-ETHO using the technique previously described (3,4). LA map was thus repeated to assess the extension of the newly-formed low voltage area (LVA). According to the newly-formed LVAs, mitral isthmus ablation was completed endocardially. PVI, roof-line and cavo-tricuspid isthmus line were performed to complete the ablation setting. Bidirectional block across line was then validated during pacing from left atrial appendage. In case of persistence of conduction through the mitral line due to epicardial gaps, additional ablations were applied in the "anchored wall" or in the "free-wall" of the great cardiac vein (GCV).

Results: Twenty-one PeAF patients (67+/-6 years; 67% male) underwent ablation. The medium value of basal LA-LVAs was 3.1+/-63.8 cmq and the newly-formed LVAs after the VoM-ETHO procedure was 12.35+/-67.28 cmq. All patients had bidirectional block validated across the roof-line. Bidirectional block of the ML was achieved in 19/21 patients: in 12/21 patients after endocardial line only and in 9/21 after epicardial gaps ablations into the coronary sinus. The ML procedural time was 11.3+/-65.9 minutes. No major complications occurred. One patient had mild pericardial effusion due to VoM perforation with a spontaneous resolution. After a short follow-up period (6+/-63 months), no relapse of AF was observed in 19/21 (90%) patients. 12/21 patients were free from antiarrhythmic drugs (AADs). Interestingly, recurrences happened in patients in whom bidirectional block of the mitral line was not achieved.

Conclusions: VoM ethanol ablation added to PVI and linear lesions in the context of a methodical and anatomical approach seems to have promising results in PeAF patients. This strategy seems to be safe and reproducible. A favourable outcome depended on the interventional setting completion and the procedural end-points validation is crucial.



CO.7.02

FEASIBILITY AND ACUTE OUTCOMES OF CO2 PERICARDIAL INSUFFLATION FOR EPICARDIAL ACCESS IN VENTRICULAR TACHYCARDIA ABLATION: A SINGLE CENTER EXPERIENCE

L. Mazzocchetti, M. Parollo, A. Di Cori, L. Segreti, R. De Lucia, G. Grifoni, V. Barletta, S. Sbragi, A. Canu, S. Viani, L. Paperini, E. Soldati, G. Zucchelli

Azienda Ospedaliero Universitaria Pisana, Pisa, ITALY

Background: Epicardial ablation allows for better long-term results in terms of freedom from ventricular arrhythmias in patients with documented epicardial substrate or previously failed endocardial procedures. Epicardial access via subxiphoid puncture is associated with a 1% to 10% complication rate, including cardiac tamponade, vascular and splanchnic injury. Intentional coronary vein exit with pericardial carbon dioxide insufflation is a known technique documented to increase puncture safety, consisting of coronary sinus cannulation, vein exit with a high tip-force coronary guidewire and pericardial CO2 insufflation (100-150 mL) via a 1.9F microcatheter in order to obtain pericardial layer separation.

Methods: We analyzed data from all epicardial procedures performed from November 2022 to March 2023 in our tertiary referral center for VA management and compared them in terms of procedural efficiency with an historical cohort of patients who underwent epicardial ablation performed with standard puncture technique.

Results: From November 2022 to March 2023, 12 patients underwent epicardial ablation at our center with pericardial CO2 insufflation (92% male, 33% ischemic, mean left ventricle ejection fraction 44±12%). Two patients had a CRT coronary sinus lead at time of procedure. When compared to an historical cohort of 20 patients, we observed comparable procedural duration (334.2±55.4 min vs 289.1±73,8 min; p=0.08) with slightly higher fluoroscopy time (45.3±10.3 min vs 31.9±8.9 min; p=0.001). There were no puncture related complications in both groups.

Conclusions: Pericardial CO2 insufflation allows for safe epicardial access with little impact on procedural efficiency, representing an useful technique especially in low-volume centers or in case of high risk for inadvertent ventricular puncture such as severe right ventricular dilation.

CO.7.03

INCREASED TAG RADIUS IN HIGH POWER SHORT DURATION ATRIAL FIBRILLATION ABLATION: PROCEDURAL CONSIDERATIONS AND FOLLOW UP

S. Cartei [1], F. Turreni [2], G. Mascia [3], E. Crudeli [4], J. Giovacchini [5], G. Pali [5], M. Giaccardi [4]
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[2] *Dipartimento di Emergenza Ospedale Santa Maria della Stella, Orvieto, ITALY*
[3] *Dipartimento Cardiotoracico Ospedale San Martini, Genova, ITALY*
[4] *SOC di Cardiologia Interventistica Firenze II, Firenze, ITALY*
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Background: High Power Short Duration Ablation (HPSD) in Radiofrequency AF ablation (AFAB) evidence showed transmural, larger and thinner lesions comparing to Low Power Long Duration (LPLD). We consequently hypothesized increased TAG radius (ITR) in HPSD 3D AFAB.

Objectives: To evaluate the use of ITR in HPSD AFAB

Methods: 30 consecutive AFAB were analyzed: 10 were performed with standard 3 millimeter Tag radius LPLD approach was used (25 to 35 W power up to 60 seconds, Irrigation up to 30 ml/min); 10 with HPSD and standard TAG radius approach (50 W up to 10 seconds, irrigation up to 30 ml/m, HPSD1) and 10 (HPSD2) using the same HPSD1 power setting and an ITR of 4 millimeters, targeting interlesion distance inferiori or = 8 mm. Follow up at 3, 6 and 9 months included ECG, ambulatory ECG, echocardiography.

Results: PVI with bidirectional block was always obtained. In comparison to LPLD: Total RF application number (TRFN) decreased in HPSD2 (41.8±4.8, vs 32.6±5.1, P=0.002); RF time (RFT) decreased in HPSD1 and HPSD2 (6.9±2.3, 7.2±1.4 vs 16.6±3.3 minutes, P<0.0005 both); Left Atrial Dwelling Time (LADT) decreased in HPSD1 (66.7±9.3 vs 87.7±19.5, P=0,014), with further decrease and stronger significance in HPSD2 (59.4±6.8, p<0,0005); Total Procedural Time (TPT) decreased in HPSD1 (105±23 vs 137±19 minutes, P=0.003), with further decrease and stronger significance in HPSD2 (92±18, p<0.0005). No complication was observed. One AF relapse was observed in LPLD group only at 6 months.

Conclusions: The Use of ITR HPSD may result in reduced TRFN, TRFT, LADT and TPT.

CO.7.04

VT ABLATION USING THE QDOT MICRO CATHETER – A PROPENSITY-MATCHED DUAL-CENTER COMPARISON WITH THE THERMOCOOL SMARTTOUCH CATHETER

P. Compagnucci [1], A. Dello Russo [1], M. Bergonti [2], L. Cipolletta [1], Q. Parisi [1], G. Volpato [1], G. Santarelli [1], M. Colonnelli [1], Y. Valeri [1], L. Carboni [1], G. Stronati [1], F. Guerra [1], M. Marini [1], A. Sarkozy [2], A. Natale [3], M. Casella [1]

[1] *Marche University Hospital, Ancona, ITALY*

[2] *University Hospital Antwerp, Antwerp, BELGIUM*

[3] *Texas Cardiac Arrhythmia Institute, Austin, USA*

Background: Catheter ablation is a pivotal treatment option for patients with recurrent ventricular tachycardia (VT) and electrical storm (ES). The QDOT Micro (QDOT) Catheter (Biosense Webster) is a recently introduced radiofrequency ablation catheter that was found to allow rapid and effective pulmonary vein isolation among patients with atrial fibrillation. There is no published data on the safety and efficacy of catheter ablation of VT using the QDOT catheter, and data concerning a direct comparison of different technologies in this setting are scarce.

Purpose: to assess outcomes of CA for VT in patients with structural heart disease using the QDOT catheter, by comparing them to those observed with the Thermocool Smarttouch (TC-ST, Biosense Webster) catheter.

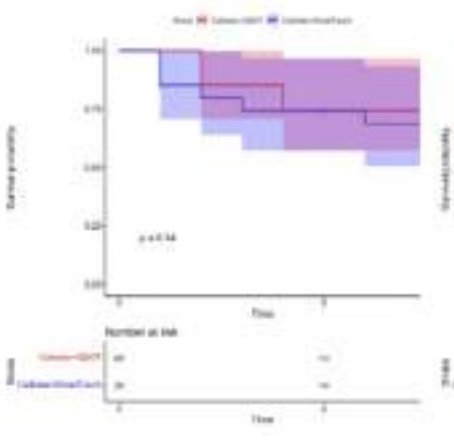
Methods: we conducted a dual-center, observational, prospective study including patients with structural heart disease and recurrent VT/ES undergoing catheter ablation with the QDOT catheter. For comparison, a 1:1 propensity score matching was performed to identify patients who underwent VT CA with the TC-ST catheter, using the nearest neighbor method. Propensity score was based on gender, age, etiology of structural heart disease, left ventricular ejection fraction, electrical storm, and number of previous CAs for VT. The primary efficacy outcome was freedom from recurrent VT, as assessed by implantable defibrillator (ICD) interrogation; the primary safety outcome was in-hospital complications.

Results: Forty patients were included in the analysis (QDOT, n=20; TC-ST, n=20); baseline clinical characteristics were similar in the two groups (Table), although the use of the QDOT Micro catheter was associated with shorter procedural duration and higher power settings. After a median follow-up of 7 months, survival free from any recurrent VT measured 74 (95% CI, 57-97)% and 69 (95% CI, 51-93)% in the QDOT and TC-ST groups, respectively (log-rank p=0.54, Figure A), while survival free from ICD shocks was 95 (95% CI, 86-100)% versus 84 (95% CI, 69-100)% (log-rank p=0.26, Figure B). There were no major complications in the QDOT group, while three patients (15%) in the TC-ST had a primary safety event (p=0.23; femoral pseudoaneurysm, n=1; cardiac tamponade, n=1; aortic cusp perforation, n=1).

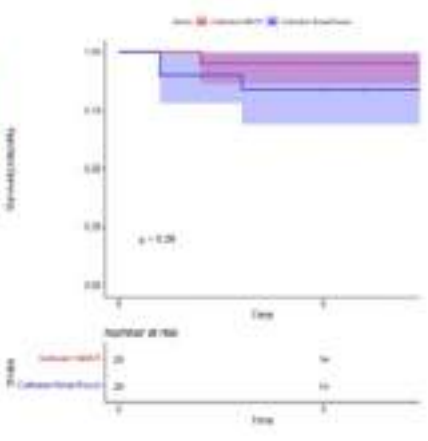
Conclusion: In a cohort of patients with structural heart disease and recurrent VT or ES, the novel QDOT ablation catheter had similar efficacy and safety compared to the TC-ST catheter. Remarkably, no major procedural complications were observed with the QDOT catheter, supporting the safety of this novel device in the ventricular milieu.

	QDOT Micro (n=20)	Thermocool SmartTouch (n=20)	P value
Age – median (1st-3rd quartile)	68 (60-73)	70 (64-75)	0.63
Male Gender – no. (%)	1 (5)	1 (5)	1
Electrical storm – no. (%)	11 (55)	12 (60)	1
Ischemic Cardiomyopathy – no. (%)	12 (60)	10 (50)	0.75
Non-Ischemic Cardiomyopathy – no. (%)	8 (40)	10 (50)	0.75
Procedural approach:			
Endocardial – no. (%)	18	15	0.41
Epi-endocardial – no. (%)	1	3	0.60
Epicardial – no. (%)	1	2	1
Left ventricular ejection fraction (%) – median (1st-3rd quartile)	35 (29-41)	33 (30-39)	1
Number of prior Catheter Ablations for VT – median (1st-3rd quartile)	0 (0-1)	0 (0-1)	0.86

A: Survival free from overall VT recurrences



B: Survival free from ICD shocks



CO.7.05

NOVEL PULSED-FIELD ABLATION TECHNOLOGY FOR PULMONARY VEIN ISOLATION IN PATIENTS WITH ATRIAL FIBRILLATION: PRELIMINARY EXPERIENCE FROM A LARGE MULTICENTER CLINICAL PRACTICE

G. Marano [1], S. Iacopino [2], A. Dello Russo [3], M. Moltrasio [4], F. Solimene [1], S. Bianchi [5], M. Casella [3], A. Rossillo [6], S. Themistoclakis [7], G. Fassini [4], P. Filannino [2], L. Cipolletta [3], V. Schillaci [1], A. Bisignani [5], M. Malacrida [8], A. Valente Perrone [8], C. Tondo [4]

[1] *Montevergine Clinic, Mercogliano, ITALY*
[2] *Maria Cecilia Hospital, Cotignola, ITALY*
[3] *Cardiology and Arrhythmology Clinic, University Hospital Umberto-I-Salesi-Lancisi, Ancona, ITALY*
[4] *Monzino Cardiological Center, Milan, ITALY*
[5] *S. Giovanni Calibita Fatebenefratelli Hospital, Rome, ITALY*
[6] *San Bortolo Hospital, Vicenza, ITALY*
[7] *Dell'Angelo Hospital, Mestre, ITALY*
[8] *Boston Scientific, Milan, ITALY*

Background: Complete electrical pulmonary vein isolation (PVI) by thermal energy sources is a well-established ablation strategy of atrial fibrillation (AF). Recently, a non-thermal ablation approach by means of irreversible cellular electroporation has been made available for clinical use.

Purpose: We report the preliminary experience of a new pulsed-field ablation (PFA) system in the context of AF ablation in a multicenter Italian setting.

Methods: All consecutive patients (pts) undergoing AF ablation with PFA (Farapulse) at 7 Italian centres were included. Protocol-directed PVI was delivered using 2000 V with eight applications per vein, that is, four applications each in the basket and flower poses. Applications were delivered in pairs at any given catheter position, rotating by around 30–40 degrees after the first two applications in each configuration. Additional lesions were performed at the operator's discretion. The ablation endpoint was PVI as assessed by entrance and exit block. Data are reported as median [IQ range].

Results: With a median of 32[25-38] pts treated per center, a total of 205 cases were included (n=150 73.2%, paroxysmal AF, n=55, 26.9% persistent AF). Of them 187 (91.2%) were de novo cases, whereas 18 (8.8%) were redo cases. A mapping system was used in 55 (21.5%) procedures and an intracardiac echocardiography in 65 (31.7%) cases. The number of PFA applications to reach PVI was 32[32-36]. Procedural parameters were: fluoroscopy time = 16[12-22] min, skin-to-skin time = 60[55-85] min, support time (preparation plus skin-to-skin) =75[64-95] min, lab occupancy time was 97[75-120] min and PFA LA dwell time was 23[20-28] min. The first pass isolation (FPI) rate per vein was 99.6% resulting from 202 patients (98.5%) with FPI. At the end of the procedure, PVI was achieved in all pts (100%) using only PFA. Additional PFA delivery outside PVs was performed in 19% (n=39) of the cases, mostly at the posterior wall area only (n=34, 87%), requiring 16[12-24] PFA deliveries. All the additional lesion sets were validated through differential pacing and/or 3D mapping. The learning curve was extremely fast. After only 5 cases time to PVI and total support time have significantly improved, whereas we did not notice any additional improvement after 10 or 20 cases (LA dwell time: 27[22-32] min during the first 5 cases vs 23[19-27] min after the first 5 cases, p=0.0172; support time: 100[65-120] min vs 75[65-90] min, p=0.0181, respectively). In 13 (6.3%) cases a transient bradycardia or asystole occurred after the first PFA application requiring temporary high-output pacing. No major procedure-related adverse events were reported.

Conclusion: In this first multicentric experience, the novel PFA system proved to be safe and effective in both paroxysmal and persistent AF patients. The learning curve seems to be very fast according with procedural parameters.

CO.7.06

LOCAL IMPEDANCE AND CONTACT FORCE FOR EFFECTIVE ABLATION OF PREMATURE VENTRICULAR CONTRACTIONS

G. Shopova [1], V. Schillaci [1], A. Arestia [1], G. Marano [1], A. Agresta [2], A. Salito [1], G. Stabile [1], G. Bottaro [1], F. Maddaluno [3], M. Malacrida [3], F. Solimene [1]

[1] *Montevergine Clinic, Mercogliano, ITALY*

[2] *San Michele Clinic, Maddaloni, ITALY*

[3] *Boston Scientific, Milano, ITALY*

Background: Contact force (CF) sensing catheters have not showed superior success rate compared to standard catheters in the ablation of premature ventricular contractions (PVCs) from the right and left ventricular outflow tract (RVOT, LVOT) and the benefit of Local Impedance (LI) in this context isn't known. We aimed to study whether the use of a catheter combining LI and CF information was associated with superior outcomes compared to other catheter technologies.

Methods: Three groups of 40 propensity-matched patients with PVCs from the OTs, ablated with different catheter technologies were compared: respectively, a CF plus LI-featured catheter, a LI -featured catheter and a standard irrigated catheter.

Results: The CF+LI group was associated with a statistically significant lower risk of PVC recurrence than the standard ablation group (HR,0.22; 95%CI, 0.07-0.71; P=0.01). In the CF+LI group, LI drop and RF time were the only predictors of successful lesion (OR=1.19, CI: 1.13–1.26, p<0.001; OR=1.06 CI: 1.01-1.07, p=0.044). Differently from the RVOT/LVOT, in the coronary cusps CF had no association with LI drop (P=0.48) and RF duration had a linear relationship with the LI drop (P<0.001).

Conclusions: The use of ablation catheters that combine CF and LI information is associated with increased success in RF ablation of PVCs from the OTs. LI drop is the most important predictor of effective lesions, but its behaviour appears to vary by ablation location: namely, longer RF application times were needed to achieve LI drops and successful outcomes compared to ablation in the RVOT/LVOT region.

COMUNICAZIONI ORALI 08

GIOVEDI' 21 SETTEMBRE

SALA ROSSA 2

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: ARITMOLOGIA CLINICA 1

Moderatori: A. Sette (Roma), S. Denti (Olbia)

CO.8.01

IS EPICARDIAL ADIPOSE TISSUE, QUANTIFIED BEFORE CARDIAC SURGERY BY COMPUTED TOMOGRAPHY, ABLE TO PREDICT POSTOPERATIVE ATRIAL FIBRILLATION?

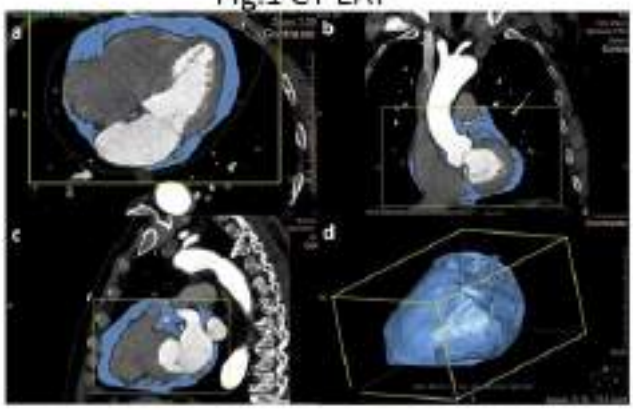
L. Perrotta, F. Genovese, S. Pradella, M. Bugetti, G. Ricciardi, T. Girasole, G. Bambagioni, L. Checchi, S. Bevilacqua [1], E. Gabrielli [1], M. Letteriello [1], V. Miele [1], P.L. Stefano [1], P. Pieragnoli [1], A. Michelucci
A.O.U. Careggi, Firenze, ITALY

Background: Postoperative atrial fibrillation (POAF) is a common complication of cardiac surgery (CS) associated with prolonged hospitalization and increased risk of future adverse events. Epicardial adipose tissue (EAT), defined as adipose tissue between the myocardium and the visceral pericardium, has been recently recognized as a potential contributor to AF pathogenesis.

Purpose: to evaluate the role of EAT, measured by preoperative CT, in predicting the occurrence of POAF after CS.

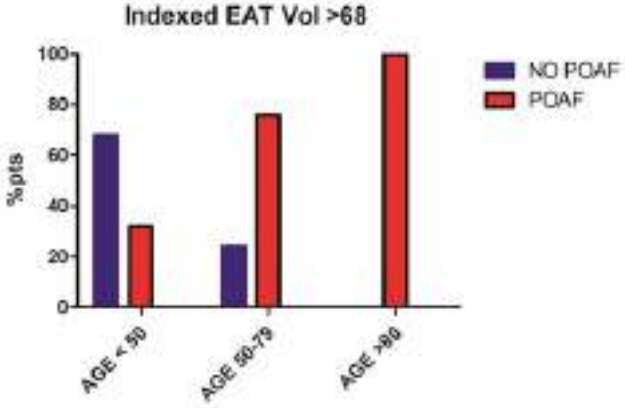
Methods: All patients without prior AT/AF history who underwent CS at our centre were prospectively enrolled and retrospectively analyzed. All the included patients had performed a cardiac CT for the evaluation of the pre-operative coronary arteries. Baseline and surgical characteristics were systematically collected along with pre-operative echocardiographic parameters (LA diameter and area; EF) and CT EAT values. For the evaluation of the EAT we selected the area delimited superiorly from the center of the right pulmonary artery and inferiorly to the end of the pericardial sac. The adipose tissue between the myocardium and the pericardium was manually delimited and the total EAT volume was expressed in mL (total EATV; Fig. 1). Also the thickness (mm) of the EAT at the level of the free wall of the right ventricle (RV EAT) and posterior to the left atrium in a 4-chamber plane (LA EAT) were reported. All the measured EAT were indexed for BSA. Multivariate logistic regression analysis was used to identify independent predictors of the study endpoint: the occurrence POAF during the early postoperative period.

Fig.1 CT EAT



Results: A total of 117 patients (age 65±15 years old; M= 71%) were enrolled. Soon after surgery, POAF was observed in 55 patients (47%). Patients with POAF were significantly older, with higher comorbidities burden (diabetes; CHA2DS2-VASc score >1) than patients without POAF. No other significant differences for clinical features or surgical procedures were observed. Echocardiographic and CT parameters did not significantly differ between the two groups however older patients who developed POAF had elevated levels of indexed total EATV (96.1±46.6 cm3/m2) (Fig.2). At multivariate logistic regression analysis the only indipendent predictor of POAF remained age (OR: 1.053; 95% CI: 1.018-1.089; p=0.003).

Fig.2 EAT by age and POAF



Conclusions: Advanced age is a recognized risk factor for POAF following CS in patients without prior AF history. Older patients who developed POAF had elevated EAT values, however our study did not evidence any link between EAT and POAF.

CO.8.02

DIFFERENCES IN NEUROLOGICAL RECOVERY BETWEEN FA RELATED STROKE VS NON FA-RELATED STROKE DURING HOSPITAL STAY

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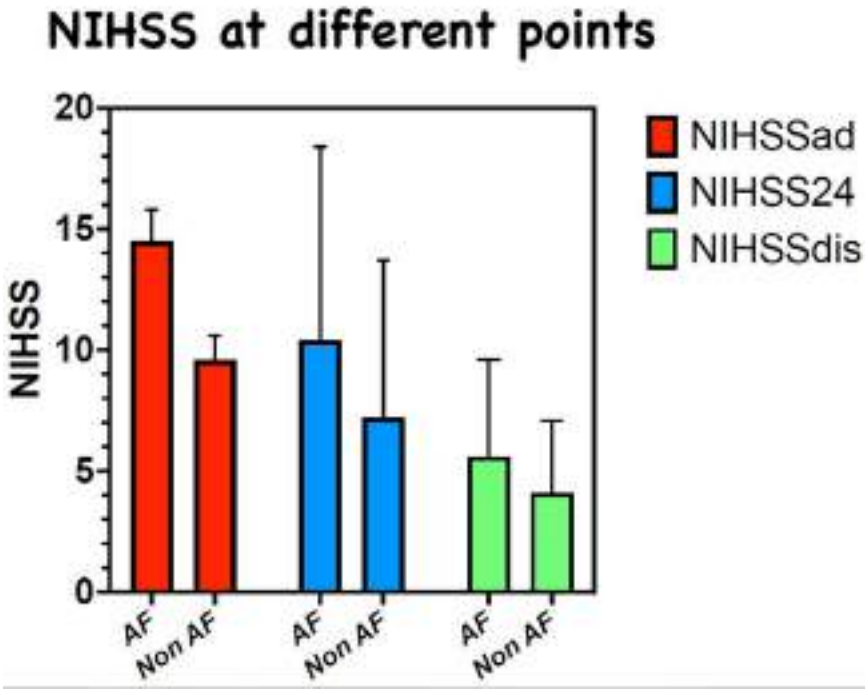
Background: Patients with atrial fibrillation (AF) have higher risk of ischemic stroke.

Purpose: We investigated whether AF patients experiencing an ischemic stroke have worse outcomes.

Methods: AF patients admitted to the stroke unit from 2018 to 2021 were included. The NIHSS and the modified Rankin Scale (mRS) score were calculated at the admission and at discharge. The neurological improvement was calculated as delta NIHSS (NIHSS at admission - NIHSS at discharge =Deltadis)

Results: Six-hundred patients (45% men), mean age 69±13 years. Of these 75 had previous history of atrial fibrillation (AF) and 86 had AF during the hospitalization (46 both). Overall 115 had one of the two. Patients with AF had higher NIHSSad (14.5±7 vs 9.6±7; p<0.001) and NIHSS24 (10.4±8 vs 7.2±7; p<0.001) than patients without, however the neurological improvement was greater (Deltadis -8.4±8 vs -5.1±6; p=0.004), indeed the NIHSSdis was similar (5.6±7 vs 4.1±6; p=0.1). Patients with AF also had a more impaired mRS before the ischemic event and at discharge (1.34±1.3 vs 0.58±1.1, p<0.001; 2.6±1.7 vs 1.8±1.9, p=0.005). Amongst AF patients with CHADVASC^{3}2 in men and ^{3}3 in women, 36% of them were taking antiplatelet therapy, 35% anticoagulants and 29% didn't take any therapy. Of interest, no differences in the NIHSSad nor in the NIHSSdis were found between them and neither in the Deltadis. As for the treatment of AF patients, patients who underwent to mechanical thrombectomy (MT) had higher NIHSSad (17± 5) compared to patients receiving intravenous thrombolysis (IV) or nothing (11± 7 and 12± 8) (p<0.001). The NIHSSdis was similar between the three groups however the Deltadis was significantly higher in patients treated with mechanical thrombectomy (-12.5±6 vs 3.6±4; vs 3.1±8; p=0.003 and p<0.001 respectively).

Conclusions: Patients with AF experience more severe stroke, however the neurological recovery is greater than in patients without the arrhythmia. The treatment with antiplatelets or anticoagulants before the event does not reduce the severity of the stroke and does not influence the improvement of the NIHSS at discharge. The mechanical thrombectomy is more effective in reducing the neurological impairment.



CO.8.03

STUDIO PROSPETTICO CASO-CONTROLLO SULL'IMPIEGO DI DILTIAZEM PER LA TERAPIA DI RATE-CONTROL IN PAZIENTI SELEZIONATI CON FIBRILLAZIONE ATRIALE E SCOMPENSO CARDIACO CRONICO

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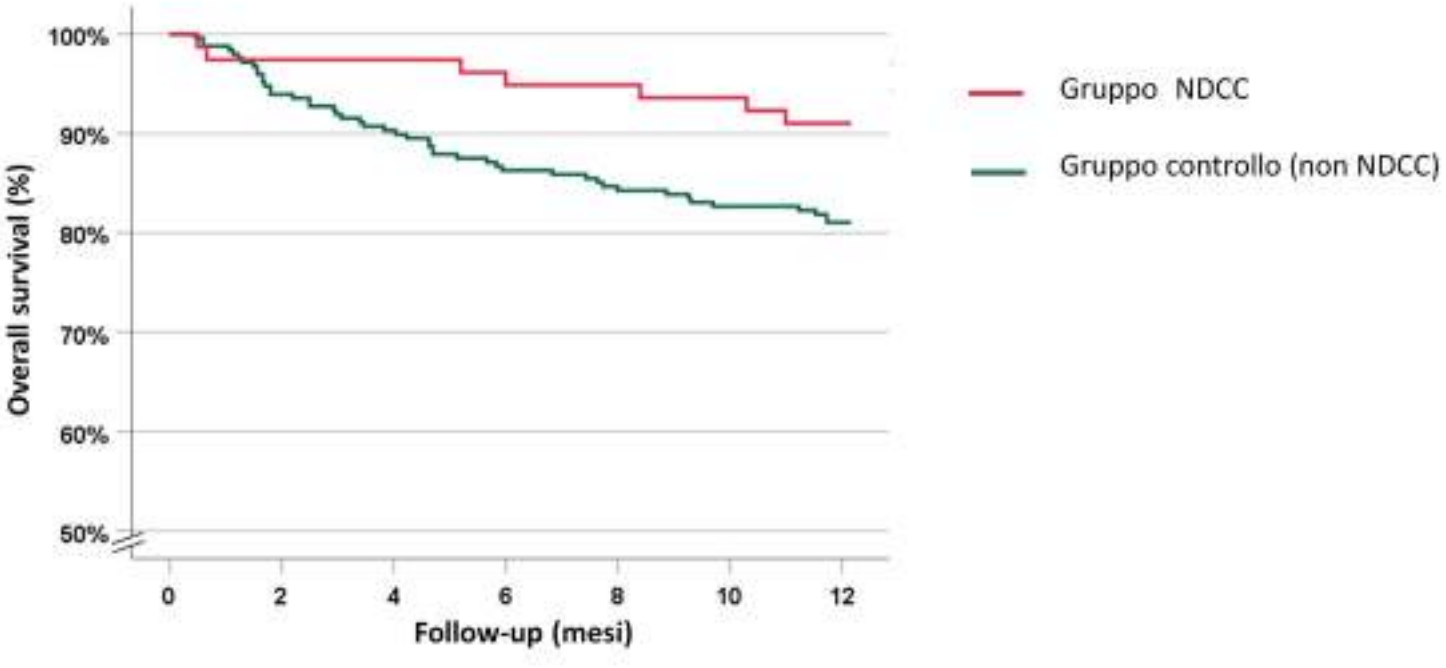
Introduzione: La fibrillazione atriale (FA) è un'aritmia complessa che può beneficiare di un trattamento personalizzato. Nei pazienti con scompenso cardiaco a ridotta frazione di eiezione (HfrEF) l'impiego di calcio-antagonisti non diidropiridinici (NDCC) è sconsigliato a causa del noto effetto inotropo negativo. Considerando l'elevata coesistenza di FA e scompenso cardiaco (SC), questa limitazione (senza alcuna differenziazione tra i diversi farmaci) può rappresentare un vincolo nella gestione terapeutica.

Scopo: Questo studio indaga l'impatto prognostico dell'uso di diltiazem come terapia di rate-control in pazienti con SC rispetto a una terapia di rate-control standard, come definito dalle attuali Linee Guida ESC.

Materiali e Metodi: All'interno di una coorte prospettica di pazienti con FA che sono stati visitati presso il nostro Ospedale Universitario tra Ottobre 2013 e Febbraio 2019 sono stati selezionati i pazienti con SC che assumevano NDCC. Nella definizione di SC abbiamo incluso i seguenti sottogruppi: 1) HFrEF: pazienti che presentavano una frazione di eiezione ventricolare sinistra (LVEF) </= 35% e classe NYHA >/= 2) HF-not-r-EF: pazienti con insufficienza cardiaca a frazione di eiezione conservata o lievemente ridotta (con LVEF > 35% e sintomi di classe NYHA >/= II) o pazienti con disfunzione sistolica ventricolare sinistra asintomatica (con LVEF </= 35%). Ad ogni paziente appartenente al gruppo HF che assumeva NDCC sono stati associati tre soggetti con HF dalla coorte analizzata della non assumevano NDCC, scelti casualmente in base alle seguenti variabili: età, sesso, frazione di eiezione del ventricolo sinistro e assunzione di digossina.

Risultati: All'interno della coorte di pazienti con FA, 1112 assumevano un trattamento esclusivo di rate-control. Tra questi, 85 (7,6%) pazienti avevano uno SC e assumevano un NDCC, che era diltiazem in tutti i casi. Questi pazienti sono statti associati a 255 soggetti scelti casualmente tra i pazienti con SC che non assumevano NDCC. I due gruppi erano omogenei in termini di comorbidità, punteggio CHA2DS2-VASc e assunzione di terapia anticoagulante. Il gruppo di pazienti che assumeva diltiazem presentava una percentuale più alta di soggetti in classe NYHA >/= 2, sebbene questa differenza non fosse statisticamente significativa (95,3% nel gruppo NDCC vs 88,6% nel gruppo di controllo; p = 0,072). L'uso di beta-bloccanti era inferiore nel gruppo NDCC (62,4% nel gruppo NDCC vs 76,9% nel gruppo di controllo; p = 0,009). A un anno di follow-up, vi sono stati 54 (15,8%) decessi, in particolare 7 (8,2%) in pazienti con SC che assumevano NDCC e 47 (18,4%) nel gruppo di controllo. Le curve di sopravvivenza di Kaplan-Meier hanno mostrato che i pazienti con SC che assumevano diltiazem avevano una prognosi migliore rispetto ai pazienti con SC che non assumevano NDCC (Figura 1).

Conclusioni: I nostri risultati suggeriscono un potenziale beneficio dell'impiego del diltiazem nel trattamento di rate-control in pazienti selezionati con FA e SC. Sono necessari tuttavia nuovi studi randomizzati per confermare l'esito di questa analisi e definire meglio il sottogruppo di pazienti che potrebbe trarre maggior beneficio da questo trattamento.



CO.8.04

MEXILETINE AS PHARMACOLOGICAL TREATMENT OF RECURRENT AND REFRACTORY VENTRICULAR TACHYARRHYTHMIAS

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Background: The antiarrhythmic therapy of recurrent ventricular arrhythmias in patients having undergone catheter ablation and in whom amiodarone and/or beta blockers were ineffective or contraindicated, is a controversial issue. Mexiletine surely represents a valuable solution but in Italy, patient access to mexiletine is critically endangered by a market withdrawal.

Purpose: The present study sought to evaluate the efficacy and tolerability of mexiletine in patients with recurrent ventricular arrhythmias, when the standard therapy strategy failed.

Methods: All patients with an implantable cardioverter defibrillator (ICD) treated with mexiletine for recurrent ventricular tachycardia (VT) or ventricular fibrillation (VF) in our institution between January 2020 and June 2022 were enrolled. Patients' medical records, updated on routine follow-up visits, and ICD interrogation, were analysed. The primary endpoint was the total number of ICD interventions after the beginning of mexiletine therapy. Secondary endpoints were total number of VTs and VFs recorded on the ICDs controls, and discontinuation of therapy. The events occurring during mexiletine treatment were compared with a matched duration period before the initiation of therapy with mexiletine. Patients therefore served as self-controls. Wilcoxon test was used to compare the samples.

Results: A total of 7 consecutive patients (100% males, mean age 72±9 years, ischemic etiology 3 out of 7, 43%) were included in the retrospective analysis. All patients were previously submitted to an unsuccessful catheter ablation of VT. The mean time of mexiletine treatment was 12.3±10.9 months. The mean dose of mexiletine was 543±98 mg/die. Mexiletine therapy significantly decreased ICD interventions (DC shock: 13 vs 107, median 1 [0-4,75] vs. 7 [4-30] $p < 0.05$; anti-tachycardia pacing: 4 vs 115, median 0 [0-2] vs. 5 [3-24] $p = 0.08$; 2 patients manifested DC shock after the beginning of treatment vs 7 patients before treatment). Mexiletine also decreased the total number of VT/VF episodes (19 vs 158 episodes, median 1 [0-5] vs 7 [5-18] $p < 0,05$. Only 1 patient (14%) presented severe side effects (hypothension) requiring discontinuation of therapy.

Conclusions: Mexiletine was associated with a significant decrease of DC shock and ventricular arrhythmias burden in patients bearing an ICD, showing an optimal profile of tolerability. We hope that the findings of this study will help scientific societies influence pharmaceutical and healthcare institutions to improve availability of this drug that is valuable in the care of arrhythmic patients.

CO.8.05

IMPIANTO DI LOOP RECORDER DOPO STROKE CRIPTOGENICO: OTTIMIZZAZIONE DELLA GESTIONE DEI PAZIENTI CON PROTOCOLLO CONDIVISO

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Background: Lo stroke e l'attacco ischemico transitorio (TIA) sono patologie frequenti la cui eziologia resta in molti casi indeterminata anche dopo un percorso diagnostico completo. La fibrillazione atriale (FA), specie se asintomatica, è stata riconosciuta esserne un possibile causa. Lo studio CRYSTAL AF ha infatti dimostrato come l'impianto del loop recorder (ILR) nei pazienti dopo stroke criptogenico, si sia dimostrato estremamente utile nella diagnosi di FA asintomatica. Sulla scorta di questo e di altre evidenze scientifiche la European Society of Cardiology nel 2020 e la European Stroke Organization nel 2022 hanno introdotto nelle linee guida l'impianto di ILR nei pazienti dopo stroke criptogenico e senza storia di FA. Nasce pertanto l'esigenza di creare protocolli condivisi tra cardiologi e neurologi al fine di migliorare i flussi operativi e i percorsi intra-ospedalieri dei pazienti, al fine di ottenere migliori outcome clinici.

Materiali e metodi: Il gruppo di Elettrofisiologia e Cardiostimolazione della nostra Unità Operativa di Cardiologia, in collaborazione con la Stroke Unit del reparto di Neurologia, ha realizzato un protocollo condiviso al fine di ottimizzare il percorso ospedaliero dei pazienti colpiti da ictus criptogenico, senza storia di pregressa FA e con indicazione ad impianto di ILR. Il protocollo prevede una iniziale valutazione neurologica clinica e strumentale (TC e RMN encefalo, ecodoppler cardiaco e dei vasi epiaortici) ed una successiva valutazione cardiologica in seguito alla quale viene confermata l'indicazione ad impianto di ILR. Dal 2017 ad oggi, considerando il periodo di pandemia COVID, sono stati impiantati 70 pazienti con dispositivi MEDTRONIC REVEAL LINQ ITM e LINQ IITM, secondo la procedura standardizzata e validata nel nostro centro. I pazienti avevano una eta' media di 65 ±9 anni ed un CHADSVASc Score di 4 nel 67,24% dei casi. La procedura e' eseguita in regime di Day Hospital neurologico e, subito dopo l'impianto e dopo adeguato training da parte del personale infermieristico di sala, viene consegnato al paziente il dispositivo per il controllo remoto.

Risultati: Ad un follow-up medio di 2,5 anni e dopo 38±30 giorni dall'impianto, in 19 pazienti (27%) è stata rilevata FA e prontamente avviata terapia anticoagulante orale. In 14 di questi pazienti (72%) la FA era asintomatica. In 7 pazienti (10%) il dispositivo ha rilevato bradiaritmie sintomatiche che hanno reso necessario l'impianto di un pacemaker definitivo; la diagnosi, in questo ultimo gruppo di pazienti, è stata fatta piu' tardivamente, dopo 401±168 giorni dall'impianto. Non si sono verificate complicanze procedurali e nel follow-up.

Conclusioni: Un monitoraggio ECG continuo a lungo termine si è dimostrato essere molto utile nell' identificare episodi di fibrillazione atriale soprattutto se asintomatica, nei pazienti con stroke criptogenetico e/o TIA. La collaborazione tra cardiologi e neurologi è fondamentale per poter identificare correttamente i pazienti, stratificarne il rischio ed avviarli alla migliore terapia, migliorandone così l'outcome.

CO.8.06

IMMUNOSUPPRESSIVE THERAPY AND ORAL ANTICOAGULATION IN KIDNEY TRANSPLANT RECIPIENTS: DIRECT ORAL ANTICOAGULANTS VERSUS VITAMIN-K ANTAGONISTS

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[2] *Università Sacro Cuore, Policlinico Gemelli, Roma, ITALY*

Background: direct oral anticoagulants (DOACs) are an alternative to conventional antagonists of vitamin-K (AVK). However, immunosuppressive drugs (ISDs) may interfere with DOACs pharmacokinetics.

Aim of this study: evaluate the safety and efficacy profile of DOACs compared with AVK in kidney transplant recipients (KTRs) treated with ISDs.

Methods: a multi-center study from 4 Italian hospitals enrolling consecutive KTRs on DOACs or AVK was conducted. Sixty-six patients on DOACs were compared with fifty patients on AVK with similar clinical features. Serial evaluation of renal function and serum levels of ISDs during 18 months follow-up (FU) was performed.

Results: Mean age of DOACs patients was 67±9 years and mean eGFR was 58,3± 30,4 mL/min/1.73m2. ISDs included tacrolimus (n=47, 71%), cyclosporin (n=13, 20%), everolimus (n=10, 7%) and sirolimus (n=4, 6%).
After 14 days of DOACs therapy initiation, there was a slight but not statistically significant increase of serum levels of tacrolimus (+0.19±0.67 p=0.80) and cyclosporine (+0.12±0.25 p=0.94). Levels of tacrolimus and cyclosporin were stable at serial evaluation during 18-month follow-up.
There were no thromboembolic events among patients treated with DOACs or AVK and no differences in term of major bleeding (5.8% vs 4% p=0.99), at long-term follow-up. There was no difference in terms of eGFR decline from the start of therapy to 18 months FU between DOACs or AVK therapy (-3.9±1 vs -3.8±2 p=0.82).

Conclusion: DOACs have a similar safety and efficacy profile compared to AVK among KTRs treated with ISDs. However, careful evaluation of potential drugs interaction and ISDs blood levels is advised.

COMUNICAZIONI ORALI 09

GIOVEDI' 21 SETTEMBRE

SALA ROSSA 1

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: ARITMIE PEDIATRICHE

Moderatori: A. Correra (Napoli), C. Raimondo (Roma)

CO.09.01

INTERMITTENT VENTRICULAR PREEXCITATION MAY SIGNIFICANTLY HIDE HIGH-RISK ACCESSORY PATHWAYS IN CHILDREN AND YOUNG ADULTS

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Background: Intermittent ventricular preexcitation (IVP) has historically been thought to indicate a low-risk accessory pathway (AP) within Wolff-Parkinson-White syndrome (WPW). Thus, current expert consensus does not recommend invasive risk stratification in cases of asymtomatic IVP during noninvasive testing. However, in the most recent years, growing data from literature highlight the potential even of IVP to carry a significant risk of adverse events, from tachycardias to even sudden cardiac death (SCD).

Aim: The aim of our study was to analyze the clinical and electrophysiological (EP) profile of our single centre cohort of young patients with IVP and to assess the potential risk of SCD.

Methods: This is a single center retrospective study of children and young adults with IVP who underwent risk stratification by means of EP testing, either with esophageal or intracardiac catheters, at baseline and during exercise testing (ET) or isoproterenol infusion (ISO), when indicated. Clinical data were recorded including symptoms, and ECG were reviewed by single observer. IVP was defined as sustained atrioventricular reentrant tachycardia (AVRT) inducibility or EP finding of shortest preexcited R-R interval during atial fibrillation (SPERRI) or shortest cycle lenght with one-to-one conduction via AP by incremental atrial stimulation (1:1 AP) < or =250 ms at baseline or < or =210 ms during ET or ISO.

Results: We identify 73 consecutive patients (males 66%) with age ranging from 0 to 25 (median 15, IQR 12-17) years. A total of 37/73 patients (51%) had at least one risk factor (20 induction of AVRT at baseline, 14 AVRT during ET or ISO, 3 with 1:1 AP <210 ms after ISO). Within symptomatic patients (22/73), in 13 we observed induction of AVRT at rest and 4 after ET or ISO; thus, a total of 17/22 (77%) had IVP at risk. In contrast, 20/51 (39%) asymptomatic patients had VA risk factors (p=0.003). Of note, all patients with IVP at risk (13 symptomatic and 20 asymptomatic) underwent transcatheter successful ablation. Moreover, intermittency was further classified in 2 groups: IVP beat-to-beat at baseline ECG (IVP-BB) and IVP demonstration depending on heart rates (IVP-HR) during ET or ECG Holter monitoring. High-risk IVP was documented in 17/30 IVP-BB (57%) and 20/43 IVP-HR (47%) patients (p NS).

Conclusions: Despite common thinking, IVP significantly may hide high-risk AP, reaching 51% of cases. This incidence reaches 77% when symptoms are associated. Further studies are needed to confirm the indication of risk stratification even in case of nonpersistent preexcitation.

CO.09.02

WOLF PARKINSON WHITE SYNDROME OR ASYMPTOMATIC VENTRICULAR PRE-EXITATION IN CHILDREN: ELECTROPHYSIOLOGICAL PROPERTIES CHANGES IN TWO DIFFERENT TIMING

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Background: In patients with Wolf Parkinson White (WPW) syndrome or asymptomatic ventricular pre-excitation (VP), electrophysiologic study (EPS) is recommended to assess and to stratify the risk of life - threatening arrhythmias and SCD. However, little information exist on the timing of EPS study. In particular, the electrophysiological properties variations of accessory pathway (AP) in patients with asymptomatic or symptomatic VP remain to be defined. The aim of our study was to investigate the evolution of clinical and electrophysiological datas of the manifest PV in symptomatic or asymptomatic children, examined on two separate timing, at least 2 years apart from one EPS to the next.

Methods: Between January 2011 and July 2022, we enrolled 44 children and young adults (32 male, mean age 10 years± 2,42) with manifest ventricular preexcitation underwent, as our standard management, at two electrophysiolgical studies (EPS, transesophageal and/or endocavitary), both at rest and during adrenergic stress (exercise testing or isoproterenol infusion) in two different timing (T0 and T1) within a minimal interval of 2 year. No transchateter ablation was performed between two EPS. Clinical and electrophysiological data were collected and compared.

Results: We observed a significant modification in atrioventricular accessory pathway conductive properties from T0 to T1 in basal study. In particular, at the baseline, preAVA value and 1/1 conduction VA time were respectively 306,59±43 and 292,61±61,7 and significatively decreased at evaluation T1 (respectively to 279,51±41 with p 0,004 and 267,13±51,6, with p 0,003). Furthermore, an ARVT were induced in 14 patients in T1 respect 9 patient in T0 ($p<0,03$) and AF in 16 patients in T1 respect 7 in T0 (p 0,24). This results were not confirmed on adrenergic test during EPS evaluation. We also reported a clinically but not statistically relevant reduction of SPERRI time evaluated during EPS with stress test from T0 to T1 (from 251,44±47,9 to 206,9±36,7; p= 0,18).

Conclusions: There were significant and clinically relevant changes of EP datas in young patients with symptomatic and asymptomatic VP underwent two EPS in two different timing. Therefore a systematic evaluation with repeated EPS should be considered in this population.

CO.09.03

ATRIAL TACHYCARDIA SUBSTRATES EVALUATION IN PATIENTS WITH TETRALOGY OF FALLOT

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Introduction: Adults with repaired tetralogy of Fallot (rToF) are often referred to Adult Congenital Heart Disease centers for atrial tachycardia (AT) and radiofrequency catheter ablation (RFCA). A systematic evaluation of the mechanisms and recurrences of arrhythmias in these patients is lacking.

Methods: 24 patients with rToF referred for catheter ablation to the Interventional Electrophysiology Unit of the Fondazione Toscana Gabriele Monasterio between January 2013 and January 2023 were evaluated. Pts underwent electrophysiologic study (EPS) with 3D electroanatomic high density mapping. Evaluation of right atrial bipolar voltage and activation mapping of the AT was performed, looking for several mechanisms: intra-atrial re-entrant tachycardias (IART), focal AT (FAT), other. Activation mapping was performed to identify the critical isthmus for IART. FATs were localized according to the earliest unipolar signal. Whenever possible, all the induced tachycardias were treated besides the arrhythmia which represented the clinical indication to EPS. RFCA was aimed at the earliest activation point for FAT and at the critical isthmus for IART, anchoring lesion to fixed obstacles (valve annuli or atriotomy scar). All patients provided written informed consent for participating in the study.

Results: Among 24 adult (age 46±13 years) and mainly females (n=13, 55%) enrolled pts, 40 AT were documented: 29 (70%) IART, 10 (27%) FAT and 2 (3%) other. Mean tachycardia cycle length was 307±95 ms. At least 2 ATs were induced in 12 pts during index EPS. Among IARTs, incisional IART (IARTinc, atriotomy and superior and inferior vena cava orifices, SVC and IVC, respectively) was the prevalent critical part of the circuit (n=2, 57%), while CTI was the second mechanism (n=16, 42%). In three pts, due to non-inducibility, a pre-emptive lesion set comprising in one case CTI and in two cases CTI+SVC-atriotomy-IVC line was performed. One patient underwent scheduled pulmonary veins isolation and CTI ablation. Among FAT, in 3 cases the AT was mapped in the coronary sinus, in two at the tricuspid annulus, in the remaining at the crista terminalis, at the right appendage base, at the posterolateral incision scar or between atriotomy and SVC. In 6 patients (25%) atrial fibrillation was induced but not ablated. During a median follow up of 23 months (interquartile range, 6-37) recurrence occurred in 8 pts (25% of pts, 22% of tachycardias). Pts with recurrences were younger (43±7 vs. 48±17 y, p=0.04); no differences were found according to critical isthmus location (4 CTI and 4 IARTinc, 50%, p=ns).

Conclusions: Among rToF pts with AT, IART is the prevalent mechanism and atriotomy scar is the prevalent critical isthmus. FAT location is much more variable. Atrial fibrillation burden is not negligible. Long-term freedom from AT in this clinical setting is encouraging.

CO.09.04

CONTACT FORCE SENSING IRRIGATED TIP CATHETER ABLATION GUIDED BY ELECTROANATOMIC MAPPING IN PEDIATRIC PATIENTS WITH PERMANENT JUNCTIONAL RECIPROCATING TACHYCARDIA

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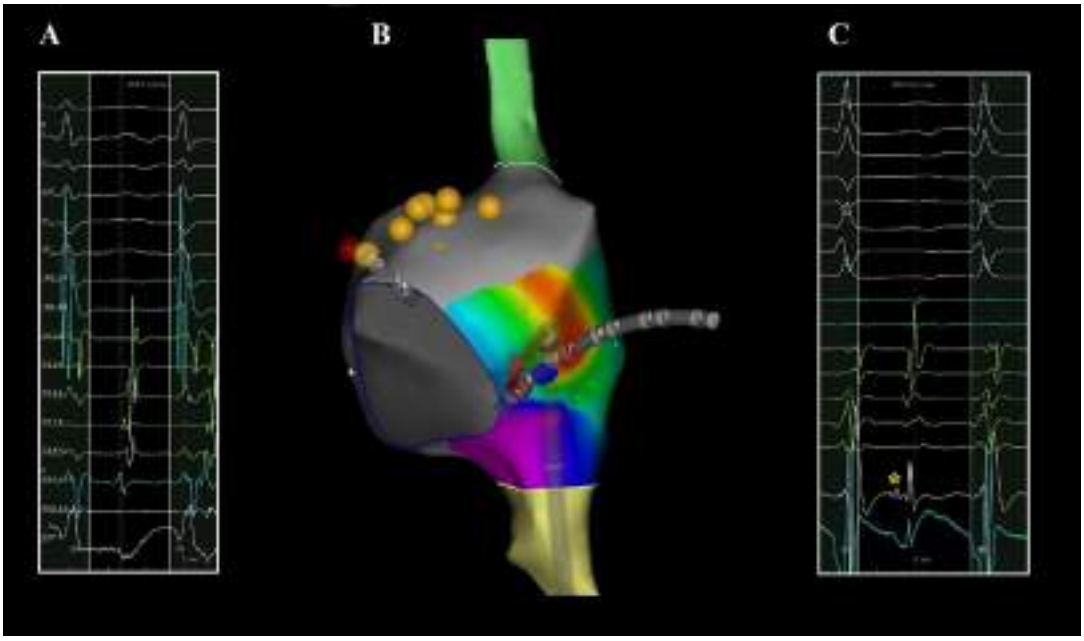
Background: Permanent junctional reciprocating tachycardia (PJRT) is a rare type of supraventricular tachycardia (SVT) that may affects infants and children. Because of disappointing outcomes from medications and very low rate of spontaneous resolution, catheter ablation (CA) has become the treatment of choice in pediatric patients with PJRT. Novel technical advances, such as 3D electroanatomic mapping systems (EAMS) and irrigated tip catheters with contact force sensing (CFS) technology, have been developed for ablation procedures in adult patients, increasing success rates and reducing x-ray exposure. Limited data are available on the use of these new technologies for CA of PJRT in children.

Objectives: The aim of this case series was to analyse our experience on the use of irrigated tip catheters with CFS technology for non-fluoroscopic radiofrequency catheter ablation (NF-RFCA) in a cohort of consecutive paediatric patients with diagnosis of PJRT.

Methods: We considered 5 consecutive pediatric patients (age 12 ± 3.3 years, weight 39 ± 9.1 Kg) who underwent NF-RFCA of PJRT using CFS irrigated catheter (TCL 387 ± 56 ms, VA interval 251 ± 34 ms).
Results: The procedure was successful in all patients with no recurrences after a mean follow-up of 37.8 ± 16.5 months. The accessory pathway was localized at the ostium of the coronary sinus (CS) in all cases. The mean CF during effective RF lesions was 9.4 ± 2.7 g, with a mean number of effective RF pulses of 2.2 ± 0.8 among a total number of lesions of 5.2 ± 0.8. Total RF time was 144 ± 32 s, with a mean power of 25 ± 3.5 W. Total procedure time was 104 ± 23 min. Fluoroscopy was only used to check guidewires after femoral vein punctures (10 ± 2.9 s).

Conclusions: The use of the CFS irrigated tip catheters for NF-RFCA appears to be feasible in pediatric patients with PJRT, without an increased risk of complications. Most of accessory pathways with decremental retrograde conduction that sustain the arrhythmia are placed on the endocardial surface close to the proximal CS. There is a risk of clinical and subclinical coronary damage when RF energy is used to ablate posteroseptal pathways. Therefore, RFCA should be performed with caution by reducing the temperature set point, maximum power and duration, avoiding high CF. Our analysis suggests that high CF values are not necessary to obtain effective RF lesions because transmurality is not usually required to ablate PJRT. Furthermore, lower CF values could be useful to reduce complications, especially in children with lower age and/or weight. An accurate mapping during tachycardia guided by EAM could be useful to reduce the number of RF pulses and minimize fluoroscopy exposure. These advantages can justify the increased costs and the relatively longer procedural time than the conventional techniques. Further studies are warranted to confirm our results and to define the best parameters for CFS ablation in these patients.



CO.09.05

SPONTANEOUS RESOLUTION OF VENTRICULAR PRE-EXCITATION DURING CHILDHOOD: A RETROSPECTIVE STUDY

A. Seganti [1], A. Sanzo [1], A.C. Codazzi [1], I. Raso [2], A. Bongiorno [3], R. Fino [4], A.R. Munafò [3], R. Frassica [1], S. Santacesaria [2], B. Petracci [1], S. Mannarino [2], R. Rordorf [1]

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Background: Ventricular preexcitation was associated to higher incidence of sudden death in children. Transcatheter ablation may be dangerous in smaller children, but it may not be needed since pre-excitation could spontaneously resolve during growth. However, the natural history of preexcitation and the best management in younger children is not well understood yet.

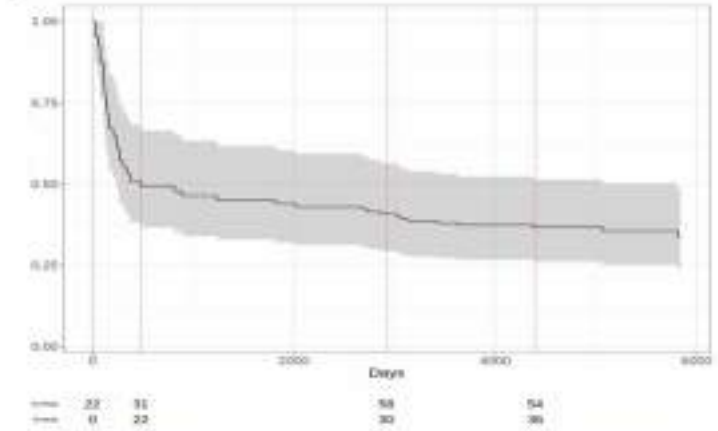
Objective: To study the likelihood of spontaneous resolution of ventricular pre-excitation during childhood and the possible associated factors in a contemporary pediatric cohort.

Methods: Patients with preexcitation diagnosed at age 0 to 12 were retrospectively recruited among those referred to two tertiary care hospitals in Northern Italy from 1993 to 2021. Patients with complex congenital heart disease were excluded. The primary outcome was the spontaneous resolution of ventricular preexcitation. The survival analysis of ventricular pre-excitation considered the left truncation of the data resulted from the design of the study.

Results: Median age of diagnosis was 4.9 years (0.2 – 8.4), and median follow-up time was 4.9 (1.6 – 8) years. During follow-up, 42 (28%) patients spontaneously loss ventricular pre-excitation. The left truncated Kaplan-Meier analysis estimated that the anterograde conduction would persist in 53% (40.1-70.2) and 33.8% (23.7-48.4) of patients at the age of 1 and 16, respectively (Figure). The absence of symptoms and intermittent pre-excitation were associated with loss of pre-excitation (Figure). The vast majority of patients with symptoms was treated with drug therapy before the age of 6, and transcatheter ablation was safely delayed thereafter. No major arrhythmic events were reported in the entire population.

Conclusion: According to our data, a large proportion of pediatric patients are likely to spontaneously lose ventricular pre-excitation within the first year of life, and a spontaneous resolution may occur later during childhood in a non-negligible number of cases. The absence of symptoms and/or intermittent pre-excitation are significant predictors of the outcome. The results of our study are of the utmost clinical relevance, since they support a wait-and-see strategy, especially in very young children.

Figure 1



Left truncated Kaplan-Meier survival curve of VPE. Age in days on the x-axis, red-dotted lines represent birth, median value 1478 days of age), 8 and 12 years of age.

Figure 2

	HR (CI) univariate	p-value univariate	HR (CI) multivariate	p-value multivariate
Sex (female)		0.522		
Intermittent VPE	3.19 (0.9-6.4)	0.063	3.45 (1.3-9.1)	**0.012**
Loss of VPE at high heart rate		0.324		
Symptoms	0.43 (0.2-0.9)	**0.031**	0.2 (0.03-0.68)	**0.014**
SVT		0.473		
Therapy		0.147		
AP localization		NS		

CO.09.06

RADIOFREQUENCY ABLATION VS CRYOABLATION OF RIGHT ATRIAL LATERAL ACCESSORY PATHWAY IN PEDIATRIC AGE: ACUTE AND MID-TERM SAFETY AND EFFICACY PROFILE

C. Raimondo, A. Alberio, S. Garibaldi, I. Cazzoli, V. Pazzano, M.S. Silvetti, F. Drago
Ospedale Pediatrico Bambino Gesu, Roma, ITALY

Background: In literature, transcatheter radiofrequency ablation (RFA) of right lateral accessory pathways (APs) in the pediatric population results in 92-95% of acute efficacy, with about 72% of long-term success rate. Conversely, cryoablation shows excellent acute success (97%), although with a 20% recurrence rate. This study sought to determine acute and long-term success rate, along with predictors of recurrences, in right lateral APs ablation carried out with RF versus cryoenergy approach.

Methods: Data from 53 consecutive pediatric patients who underwent RFA or cryoenergy ablation of right lateral APs between January 2020 and April 2022 at Bambino Gesù Children Hospital were analysed. Accessory pathways were grouped into: right lateral APs (RL group), right antero-lateral APs (RAL group), and right postero-lateral APs (RPL group).

Results: Out of 53 pts with at least 1 AP [57% males, mean age 12.16 ± 2.64 years, median weight 47 kg (IQR 36-59), height 155 cm (IQR 144 – 164), BSA 1.44mq (IQR 1.18-1.65)] all but one with Ebstein anomaly had structurally normal heart. Twenty-five (47.2%) belonged to the RL group, 14 (26.4%) to the RAL group, and remainders to the RPL group. Four cases presented with multiple APs (7.5%). Ouvert APs were observed in 72% of cases (n=38, 4 intermittent pattern), whilst 28% of cases (n=15) presented with concealed APs. Radiofrequency ablation was performed in 36 cases (68%), with a 86% acute success rate: 94.5% in the RL group, 100% in the RAL group, and 66.7% in the RPL group, respectively. Cryoablation was performed in 17 pts (32%) with a 82% acute success rate: 85.7% in the RL group, 87.5% in the RAL group, and 50% in the RPL group, respectively. In 8/53 pts (5 RF and 3 cryoenergy cases) first ablation was acutely unsuccessful. Only 4/53 pts (7.5%) had a recurrence within 24 hours. Long-term recurrences presented in 8 pts (22%; 4 in the RL group, 1 in the RAL group, 3 in the RPL group) who had first undergone RFA. Right transjugular venous approach was chosen in 11/53 cases (21%), all with RAL APs, always resulting in acute success (100%) regardless whether RF or cryoenergy was delivered. Median fluoroscopy time was 0.4 min (IQR 0.1-3.4) in RF vs 0.6 min (IQR 0.0 -3.1) in cryoenergy. Even including multiple redo procedures, over follow up (mean 28 ± 25 months, 4 patients lost to follow up) recurrences occured in 22% of RF cases (5 pts with RL APs, and 3 pts with RPL APs) vs 12% of cryoablations (2 pts with RPL APs).

Conclusions: Transcatheter ablation of right atrial APs shows higher success rate for lateral and antero-lateral localizations, with excellent results also when cryoenergy is employed. Irrespective of the type of energy, a right postero-lateral localization appears to be the main acute and mid-term predictor of procedural failure. Most satisfactory results were observed after a transjugular approach. This study confirms that right lateral PAs ablation is feasible safe and effective in the pediatric population, regardless of the type of energy and vascular access chosen.

COMUNICAZIONI ORALI 10

GIOVEDI' 21 SETTEMBRE

SALA MAGENTA B

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: MISCELLANEA

Moderatori: V. Aspromonte (Catanzaro), A. Ruocco (Napoli)

CO.10.01

PM AND ICD TRENDS DURING COVID-19 PANDEMIC IN ITALY. A GLOBAL ANALYSIS OF THE NATIONAL HOSPITAL DISCHARGE DATABASE

M. Zecchin [1], E. Ciminello [2], M. Torre [2], E. Carrani [2], P. Laricchiuta [2], G. Boriani [3], A. Proclemer [4], G. Zanotto [5], A. D'Onofrio [6], R. De Ponti [7], G. Sinagra [1]

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[5] *Ospedale Magalini, Villafranca di Verona, ITALY*
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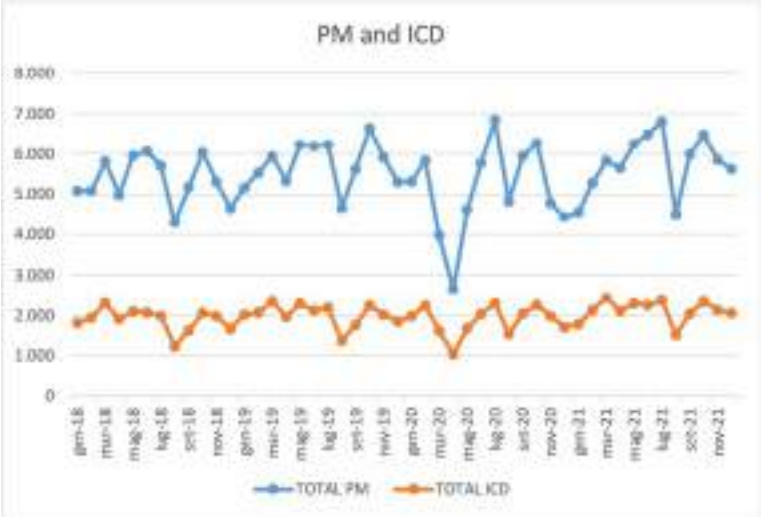
Background: At the beginning of the COVID-19 emergency, important restrictions in hospital admissions for non-urgent procedures, to reduce the spread of the epidemic and to direct resources for the management of patients affected by the SARS-COV2 virus were required. Furthermore, in the same period there was a significant reduction of admissions for cardiological emergencies, too. The nationwide impact of COVID-19 pandemic on invasive procedures, such Pacemakers (PM) and Implantable Cardioverter-Defibrillators (ICD) interventions, is unknown.

Purpose: To evaluate the trend of PM and ICD procedures performed in Italy in the last 10 years and particularly in the pandemic period

Methods: All the Italian Hospital Discharge Records (Schede di Dimissione Ospedaliera – SDO) from 2012 to 2021, sent by the Italian Ministry of Health to the National Institute of Health (NIH, Istituto Superiore di Sanità-ISS) were reviewed. Among these, only records including ICD or PM procedures, either primary or secondary, and correctly reporting patient's age and gender, were selected. The ICD9-CM codes, single and combined, relating to PM and ICD procedures were selected a taxonomy arranged into 16 groups of procedures was defined. PM procedures were also divided in 1°implant and replacement, while ICD could be considered as total procedures only.

Results: From 2012 to 2019 the yearly number of total PM procedures was quite stable, ranging from 63.498 (1.069/million inhabitants) to 68.807 (1.150/million). In 2020, a reduction of total procedures (38.411, 1078/million, -11% towards 2019) and 1st implant of PM (from 52.216 to 43.962, -16%), but not PM replacement, (from 16.591 to 17.331, +4%) was observed; at beginning of pandemic period (April 2020), the drop in 1st PM implantation in comparison to the 2018 and 2019 average value was 53%; outlier significance (o.s.): p=0.0014. No significant reduction of PM replacement was observed. In 2021, an increase to values exceeding the pre-pandemic numbers, was observed (total procedures 69.330, 1170/million, 49.555 1° implants, 19.775 replacements). For ICD, a slow increase of the procedure rate was observed from 2012 (20.774, 350/million) to 2017, 24.255, 400/million); afterwards, a small reduction of implants was observed in 2018 (22.616, 378/million) and 2020 (22.355, 375/million). The drop in ICD procedures observed in April 2020, compared to the 2018 and 2019 average value, was 46% (o.s.: p=0.03).. In 2021 the rate of ICD procedures (25.384, 429/million) increased more than to the pre-pandemic values. In April 2020, together with the expected reduction of non-urgent procedures, a reduction of urgent (AV block for PM, VF for ICD) procedures was observed, but was not statistically significant



Conclusions: During the first year of COVID-19 pandemic, a reduction of PM and ICD procedures was observed, especially in the first period (April 2020); for PM, no reduction of replacements was observed in 2020, while the reduction of 1° PM implant and ICD procedures was compensated by an increase of activity in 2021. The reduction of urgent procedures was not statistically significant.

CO.10.02

IS CARDIOVERSION ALWAYS SAFE? PREDICTORS OF LEFT ATRIAL APPENDAGE THROMBUS IN PATIENTS WITH ATRIAL FIBRILLATION

M. Lo Presti, P. Zappulla, G. Sollano, N. Valenti, L. Avolio, M. Marsala, F. Barreca, J. Milazzo, A.A. Di Grazia, D. Dugo, F. Platania, G.P. Pruiti, V.I. Calvi
A.O.U. G. Rodolico Policlinico San Marco, Catania, ITALY

Background: Atrial fibrillation is the most common sustained cardiac arrhythmia in adults and it has been shown to be associated with a significant increase in cardioembolic stroke risk, due to the presence of thrombi in left atrial appendage (LAA). According to ESC 2020 Guidelines, elective cardioversion can be performed safely after at least 3 weeks of adequate oral anticoagulant therapy.

Methods: Two hundred and seventy-five patients admitted to our Cardiology department for elective cardioversion and undergoing a transesophageal echocardiogram between June 2018 and May 2022 were included in our study. Patients' anamnestic information and echocardiographic data were collected retrospectively. A comparison between the two cohorts of patients with and without the evidence of thrombi has been made to find out potential risk factors.

Results: Left atrial appendage thrombi or pre-thrombotic formations were detected in 43 (15,6%) patients. Thrombus rate was significantly higher in the population who took reduced doses of anticoagulant (p=0,001) and with impaired renal function (eGFR < 40 ml/min/m2) (p=0,005). Other potential predictors of detection of thrombi were higher scores of CHA2Ds2-VASc (p=0,01), echocardiographic finding of low peak LAA velocity (< 20 cm/sec) (p < 0,001), as well as vascular disease (p = 0,003), especially coronary artery disease (p < 0,001). Multivariate analysis corroborated the power of these potential predictors, except for CHA2Ds2-VASc. No significant differences were observed between the anticoagulants about their efficacy in preventing LAA thrombi.

Conclusions: The high prevalence of LAA thrombi in patients revealed by our study highlights the importance of performing transesophageal echocardiogram before electrical cardioversion, with particular attention to patients affected by chronic kidney disease which should be considered a relevant risk factor for LAA thrombosis.

CO.10.03

LONG-TERM OUTCOMES AND ARRHYTHMIC PRESENTATIONS OF LMNA-RELATED HEART DISEASE: INSIGHTS FROM A SINGLE-CENTRE EXPERIENCE

D. Castagno [1], V. Dusi [1], C. Raineri [2], S. Pidello [2], F. Moscarini [1], S. Elia [1], R. Manai [1], G. Gobello [1], C. Giustetto [1], F. Ferraris [2], M. Anselmino [1], M. Matta [2], A. Saglietto [1], G. Gallone [1], F. Angelini [2], M. Jorfida [2], F. Ricci [1], T. Mongini [1], P. Golzio [2], G.M. De Ferrari [1]

[1] *Università degli Studi di Torino - Città della Salute e della Scienza di Torino, Torino, ITALY*

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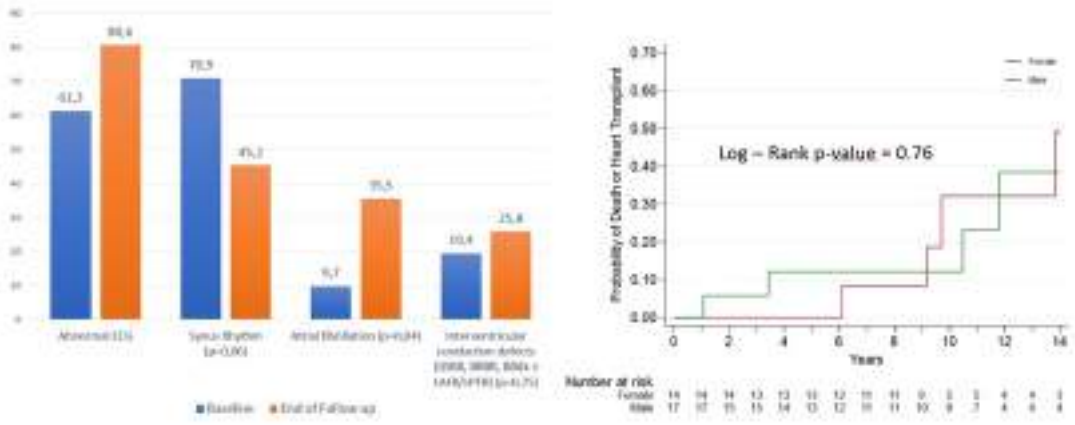
Background: Mutations in LMNA gene, encoding nuclear envelope proteins Lamin A and C, underlie a wide spectrum of diseases including some types of muscular dystrophy, lipodystrophy, progeria and acrogeria syndromes. Heart involvement is frequent and is characterized by dilated cardiomyopathy and a variety of arrhythmic presentations including conduction system disease, supraventricular and ventricular arrhythmias.

Objectives: To describe the main clinical features, arrhythmic presentations and outcomes of a single centre cohort of LMNA mutation carriers.

Methods: Overall, 31 patients were enrolled at the "Città della Salute e della Scienza di Torino" Hospital and followed-up for median of 9.5 years (IQR 6.1 – 13.8). Baseline clinical, electrocardiographic and imaging data were collected. The development of advanced cardiac conduction system disease, supraventricular and ventricular arrhythmias were reported as well as the occurrence of left ventricular systolic dysfunction and advanced heart failure (NYHA III/IV). The need for cardiac device implantation and type of device implanted (i.e. pacemaker, ICD, CRT or ILR) were recorded. All-cause mortality or heart transplantation or mechanical circulatory support were described as cumulative event rates using the Kaplan-Meier method.

Results: The study cohort comprised 31 patients (14 females, 45%) with a mean age of 45 (±16) years at the time of genetic diagnosis. Median time elapsed between the first medical contact and definitive diagnosis was 3 years. A family history of sudden cardiac death was present in 13 (42%) patients. At first medical contact neuromuscular manifestations were observed in 13 (42%) patients and the main symptoms reported were dyspnoea (32%), fatigue (29%) and palpitations (19%). At baseline, abnormal electrocardiogram findings were present in 19 (61%) patients (including 6 atrial fibrillation/flutter or atrial tachycardia, 4 advanced atrio-ventricular block, 6 intraventricular conduction defect), echocardiography showed a mean left ventricular eject fraction of 49% (±13) and, when performed (15 patients), cardiac magnetic resonance highlighted presence of late gadolinium enhancement in 10 (67%) of cases. Left ventricular hypertrophy at echocardiogram was more frequent in 5 patients with LMNA 1718 (C>T) mutation compared with the others (80% vs. 36%, p=0.06). During follow-up, supraventricular and ventricular arrhythmias occurred in 19 (61%) and 21 (68%) patients respectively and advanced heart failure developed in 39% (12 patients) of cases. Cardiac device implantation was performed in 22 (71%) patients (6 pacemaker, 8 ICD, 3 CRT-D, 1 CRT-P and 4 implantable loop recorder) with an average atrial and ventricular pacing of 33% and 68% respectively at the end of follow-up. An appropriate ICD intervention (ATP or shock) was observed in 4 out 11 ICD carriers (36%). Overall, during follow-up 6 (19%) patients died while 4 (13%) received heart transplantation.

Conclusions: Mutations in LMNA gene are associated with a variety of clinical presentations that include frequent arrhythmic events (both brady- and tachyarrhythmias) even in the context of mild impairment of left ventricular systolic function. Prompt recognition of these cardiological phenotypes may accelerate definitive diagnosis and guide the use of appropriate preventive therapies including oral anticoagulation and implantable cardioverter defibrillator implantation.



CO.10.04

RADIOTERAPIA NEI PAZIENTI PORTATORI DI ICD: RISULTATI DI 6 ANNI DI ESPERIENZA INTERDIVISIONALE

S. Quintarelli [1], A. Delana [2], M. Marini [1], R. Agostini [1], M. Demozzi [1], F. Guarracini [1], A. Coser [1], V. Vanoni [3], E. Magri [3], S. Pellizzari [1], A. Trianni [2], R. Bonmassari [1]

[1] *Struttura complessa Cardiologia, Ospedale Santa Chiara, APSS, Trento, ITALY*

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Background: L'incremento dell'utilizzo della radioterapia per la cura delle neoplasie e il contestuale aumento della percentuale di pazienti oncologici portatori di defibrillatore impiantabile (ICD) o defibrillatore biventricolare (ICD-BIV) richiede un'ottimizzazione del loro percorso che garantisca in primis la sicurezza. Recenti dati di letteratura sembrano suggerire una stretta relazione tra la complessità del device e il rischio di complicanze.

Scopo: Revisione dell'esperienza maturata dal 2016 al 2022 presso l'Ospedale Santa Chiara di Trento, anche in relazione all'attuale diffusione del monitoraggio remoto e in considerazione dei dati pubblicati in letteratura.

Metodi: Dal 2016 presso l'Ospedale Santa Chiara di Trento è in vigore un protocollo organizzativo standardizzato per la gestione dei pazienti portatori di device che si sottopongono a radioterapia che stratifica i pazienti in alto o basso rischio in base alla tipologia del device (pacemaker o ICD), grado di elettrodipendenza e dose stimata a livello del dispositivo (< 2 Gy: 2-10 Gy, > 10 Gy).
I portatori di ICD rientrano nella classe ad alto rischio, è prevista ad ogni seduta la disattivazione/riattivazione delle terapie antitachicardiche in assenza di modifiche dei parametri di pacing, indipendentemente dall'elettrodipendenza.
Per tutti i pazienti sono previsti controlli, quando possibile tramite remoto, a 1-3-6-12 mesi dalla fine della radioterapia.

Risultati: tra l'inizio del 2016 e la fine del 2022 22 pazienti portatori di ICD/ICD biventricolari sono stati sottoposti a radioterapia presso il nostro ospedale. Le caratteristiche cliniche sono descritte nella Tabella 1. La dose a livello del device è stata per tutti i pazienti < 2 Gy. L'energia utilizzata è stata in 5 pazienti > 6 MV. Durante il percorso di radioterapia e il successivo follow up non sono emersi danni hardware e software ad eccezione di una transitoria sottostima della longevità della batteria di un ICD in una occasione legata verosimilmente alle ripetute interrogazioni.

Conclusioni: Uno stretto follow up permette di garantire la sicurezza anche a pazienti con device complessi sottoposti a radioterapia. A nostro avviso è possibile considerare di semplificare la gestione di questi pazienti, tuttavia riteniamo necessarie ulteriori conferme da dati multicentrici.

Tabella 1

Numero pazienti		33
Età media (anni)		72
Sesso	Maschile	28
	Femminile	5
Tipo di device	ICD	19
	ICD BIV	14
Regione anatomica RT trattata	Testa collo	4
	Torace	15
	Addome	4
	Pelvi	10
Energia	6 MV – WFF*	23
	6 MV – FFF **	5
	> 6 MV	5
Dose a livello del device	< 2 Gy	33
	> 2 Gy	0

* 6MV con filtro omogeneizzatore
** 6MV senza filtro omogeneizzatore

CO.10.05

SHORT AND LONG-TERM SURVIVAL IN PATIENTS OVER NINETY YEARS-OLD UNDERGOING PACEMAKER IMPLANTATION

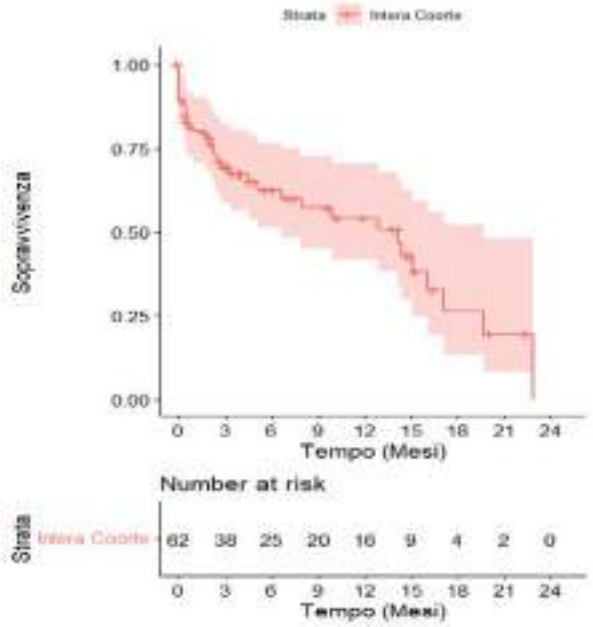
M. Zecchin, B. Trevisan, R. Bessi, C. Baggio, M. Saitta, L. Salvatore, C. Gregorio, E. Bianco, F. Longaro, C. Carriere, A. Zorzin-Fantasia, F. Piccinin, G. Dal Monte, G. Sinagra
Azienda Sanitaria Universitaria Giuliano-Isontina, Trieste, ITALY

Objectives: According to the Italian National Statistical Institute, the 12-month probability of survival in the general population between 90 and 94 years-old is 26%. Pacemaker (PM) implantation is often an urgent and necessary intervention, but in very old patients the benefit in terms of quality and duration of life is unclear and the procedure could be considered futile.
The aim of the present study is to analyze clinical characteristics, outcome and factors associated with survival in patients who had turned 90 at the time of the first PM implant.

Methods: All the PM implants performed in our Centre from January 1st 2019 to December 31st 2020 in patients 90 year-old or more at the time of the procedure were analyzed. Clinical parameters, device characteristics and follow-up data until March 31st 2022 were extrapolated from the SuitEstensa Ebit reporting system; the exitus was verified by analyzing data from the Regional Health System.

Results: During the study interval, among the 554 patients undergoing PM implantation in our Center, 69 (12%) were >90 years-old at the date of implantation (mean age 92±2 years, 46% male; complete/advanced AV block in 76%). Twenty-six (38 %) patients had history of atrial fibrillation and 19 (28%) ischemic heart disease. A cardiological co-morbidity (excluding AF) was present in 23 patients (33%). Oncological, pneumological and neurological comorbidities were present in 12 (18%), 19 (28%) and 32 (46%) respectively. Renal impairment was present in 25 patients (36%). In 47 patients (68%) at least 2 co-morbidities were present. After implantation (single-chamber in 36, dual-chamber in 25 and VDD single-lead dual-chamber in 8 patients) a pneumothorax developed in 2 patients and lead dislodgment in 1. Remote monitoring was activated in 57 patients (83%). Within March 31st 2022 (median follow-up 17 months IQR: 13-24) 33 patients died (37%, in median 12 months after implant, IQR: 3-16), with 12-month mortality probability of 24.6% (95% CI: 13.8-34.1). According to the Regional Health System database, no patients died for cardiac reason or device malfunction. Three patients died because of COVID-19 pneumonia.
Renal dysfunction (Hazard Ratio-HR 2.64, p=0.006), the presence of 2 or more co-morbidities (HR 6.19; p= 0.003), diabetes (HR 2.53; p=0.009), ejection fraction (HR 0.88 for a difference of 5%; p=0.035), walking impairment (HR 3.64, p<0.001), the presence of oncological (HR 2.62; p=0.019), pneumological (HR 2.05; p=0.049), neurological (HR 4.57, p<0.001) and cardiovascular (HR: 2.20; p=0.015) comorbidities were associated with a higher risk of death at univariate analysis. Presence of oncological and neurological comorbidities were significant at multivariable analysis. Moreover, truncating the outcome at 6 months, renal dysfunction, anticoagulant therapy and ischemic disease were associated with short-term mortality.

Conclusions: At our Center, patients over the age of ninety undergo PM implantation mainly for advanced AVB. The good survival does not seem to justify particularly conservative attitudes, in the presence of clear indications for the implantation of the PM.



CO.10.06

ARTIFICIAL INTELLIGENCE-ENABLED SINGLE-LEAD ECG VERSUS STANDARD 12-LEAD ECG

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[2] *Department of Computer Science, University of Turin, Torino, ITALY*

Background: Artificial Intelligence-enabled 12-lead electrocardiogram (AI-ECG) has shown significant potential for early detection of different cardiac conditions. To date, however, no study has systematically assessed the performance of single-lead AI-ECG in correctly identifying cardiac abnormalities which are typically identified using a standard 12-lead ECG.

Aims: The purpose of this work is to evaluate the performance of a Deep Neural Network (DNN) on single-lead ECG traces in correctly identifying cardiac abnormalities which are typically identified using a standard 12-lead ECG.

Methods: The PTB-XL ECG dataset was used to train, validate and test a DNN to predict from a single lead several ECG diagnosis, considering a 20-class multi-label classification task. Lead I was exploited since it is the equivalent of the single-lead ECG recorded by wearable devices. The different diagnostic classes were grouped in 5 diagnostic super-classes, namely: normal ECG (NORM), myocardial infarction (MI), ST/T change (STTC), conduction disturbance (CD) and hypertrophy (HYP). After the data pre-processing phase, a total of 21008 10-second ECGs were finally included in the training set. Two different types of the same DNN were considered, using as input the 1-lead ECG (lead DI) or the 12-lead ECG, and as labels the human-based diagnostic annotations of the 12-lead ECGs (considered as the ground truth). Different performance measures of the trained classifiers were evaluated on the testing set, including the area under the curve (AUC) for each specific diagnosis.

Results: 1-lead ECG DNN model achieved a mean AUC (averaged over the 20 diagnostic classes) of 0.851, compared to 0.931 of the 12-lead ECG DNN; concerning the specific diagnostic classes, the single-lead model showed an identical performance to the 12-lead model for diagnosing complete left bundle branch block (0.996 vs 0.995), while inferior myocardial infarction showed the worst AUC for 1-lead ECG classifier, with a 24% drop compared to the 12-lead model (0.716 vs 0.952).

Conclusion: AI-enabled single-lead ECG shows a good performance in predicting cardiac abnormalities typically identified using a standard 12-lead ECG. If appropriately adapted to the field of wearable devices capable of recording a single-lead ECG, AI could greatly improve patient care by enabling more frequent and accessible screening for cardiac diseases.

COMUNICAZIONI ORALI 11

GIOVEDI' 21 SETTEMBRE

SALA MAGENTA A

18:00-19:00

SESSIONE DI COMUNICAZIONI ORALI: ALLIED PROFESSIONAL

Moderatori: C. Altomare (Milano), M. Campoli (Roma)

CO.11.01

VALUTAZIONE VARIABILITÀ ANATOMICA DEI VASI DELLA FOSSA DI MOHRENHEIM MEDIANTE L'UTILIZZO DELL'ECOGRAFIA TORACICA PRE-PROCEDURALE, IN PAZIENTI SOTTOPOSTI AD IMPIANTO DI CIED CON ACCESSO VENOSO ASCELLARE

K. Pettenuzzo, K. Brunzin, F. Zoppo, R. Nangha, G. Turiano
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Introduzione: L'accesso venoso centrale è parte delicata e cruciale di una procedura di impianto di dispositivo impiantabile (CIED). Gli approcci oggi utilizzati sono:
1) approccio in vena cefalica a cielo aperto
2) approccio in vena succlavia a cielo chiuso
3) approccio in vena succlavia a cielo aperto
4) approccio in vena ascellare a cielo aperto RX-guidato
5) approccio in vena ascellare a cielo chiuso RX-guidato
6) approccio in vena ascellare eco-guidato a cielo chiuso.
L'incidenza di PNX è la complicanza più comune che si osserva durante questo tipo di procedure con utilizzo dell'approccio in succlavia. Proprio per questo, le nuove linee guida suggeriscono l'approccio in vena cefalica o vena ascellare come prima scelta.
Nel nostro centro vengono utilizzati come prima scelta l'approccio in vena ascellare eco-guidato e l'approccio in vena ascellare Rx-guidato a cielo aperto. In nessun caso viene utilizzato l'approccio in vena cefalica come prima scelta. Si utilizza l'ecografia toracica per valutare l'anatomia ed il decorso dei vasi venosi nella Fossa di Mohrenheim per l'approccio in vena ascellare eco-guidato.

Metodi: Sono stati valutati tutti i pazienti sottoposti ad impianto di CIED nel periodo compreso tra maggio 2022 e marzo 2023 se selezionati in casi in cui si è scelto l'approccio venoso ascellare eco-guidato.
Per gli scopi dello studio sono stati valutati i seguenti parametri:
1) rapporti anatomici tra arteria ascellare/succlavia e vena ascellare.
2) distanza dei vasi rispetto al piano pleurico.
Scopo dello studio (retrospettivo osservazionale) è di classificare la variabilità anatomica dei rapporti dei vasi ascellari arteriosi e venosi ed il loro decorso pre-clavicolare nella Fossa di Mohrenheim.

Risultati: Nel periodo di valutazione, 107 pazienti sono stati consecutivamente sottoposti ad impianto di pacemaker (88/71%) o defibrillatore (36/29%) con strategia di accesso venoso in ascellare sx con tecnica eco-guidata.
I pazienti sottoposti ad impianto CIED utilizzando l'accesso venoso in vena ascellare RX-guidato sono stati esclusi dalla valutazione.
Abbiamo identificato e classificato tre variazioni anatomiche del decorso arterioso e venoso nella Fossa di Mohrenheim:
Tipo 1: vena ascellare medialmente ed arteria ascellare lateralmente sullo stesso piano
riscontrata in 101 pazienti (94 %);
Tipo 2A: vena ascellare al di sotto della arteria ascellare riscontrata in 3 pazienti (3 %)
Tipo 2B: vena ascellare al di sopra della arteria ascellare riscontrata in 3 pazienti (3 %)

Conclusioni: Il "mappaggio" ecografico pre-operatorio fornisce indicazioni sui rapporti anatomici e può indirizzare la strategia di accesso venoso durante procedura di impianto CIED.

CO.11.02

IL COUNSELING INFERMIERISTICO PER L'OTTIMIZZAZIONE DELLA GESTIONE IN REMOTO DEI PAZIENTI PORTATORI DI ILR DOPO STROKE CRIPTOGENICO

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Background: Il loop recorder impiantabile (ILR) è un dispositivo utilizzato per diagnosticare e documentare disturbi del ritmo cardiaco in diversi contesti clinici tra cui questi la sincope e lo stroke criptogenico. Gli ILR possono essere controllati da remoto tramite un sistema dedicato costituito da un comunicatore domestico completamente automatico e, nei dispositivi di ultima generazione, anche tramite APP scaricabile dal paziente sul proprio cellulare. Il controllo in remoto di ILR, può essere eseguito dall'infermiere dopo acquisizione delle competenze necessarie sul funzionamento del sistema ed il riconoscimento di eventuali disturbi del ritmo cardiaco.

Materiali e metodi: Dal 2017 e' in atto presso il nostro Ospedale una collaborazione tra la Cardiologi e Neurologi che prevede un protocollo condiviso per la gestione dei pazienti con stroke criptogenico, sottoposti ad impianto di ILR al fine di identificare episodi di fibrillazione atriale asintomatica. Dal 2017, sono stati sottoposti ad impianto di ILR MEDTRONIC REVEAL LINQ ITM e LINQ IITM 70 pazienti con stroke criptogenico con eta' media di 65±9 anni ed un CHADSVASc Score 4 nel 67,24% dei casi. Subito dopo l'impianto, l'infermiere di cardiologia svolge l'importante compito di training e counseling del paziente; inserisce i dati nel sito web Medtronic Carelink, consegna al paziente il comunicatore spiegandone chiaramente l'utilizzo a domicilio e, in ultimo, ottiene dal paziente il consenso informato al controllo remoto del dispositivo. Il counseling infermieristico si conclude con la revisione delle trasmissioni da remoto, l'identificazione di eventuali eventi aritmici (sempre discussi con il medico) e con il contatto telefonico con il paziente per valutare la compliance, i sintomi ed eventualmente stabilire la data per un controllo ambulatoriale.

Risultati: Tutti i 70 pazienti giunti alla nostra osservazione per l'impianto di ILR, sono stati dotati di sistema di trasmissione remota che ci ha permesso di fare diagnosi di fibrillazione atriale (FA) nel 27% dei casi (asintomatica nel 72% dei casi), di bradiaritmie e di episodi di tachicardia ventricolare. Questi pazienti sono stati contattati telefonicamente per un controllo ambulatoriale. In questo percorso assistenziale, il training eseguito degli infermieri subito dopo l'impianto e' stato fondamentale per stabilire un importante rapporto di fiducia tra paziente ed infermiere, procedura che ha significativamente migliorato la compliance del paziente.

Conclusioni: L'utilizzo di ILR ha permesso di evidenziare aritmie spesso asintomatiche in pazienti colpiti da stroke criptogenico. Nella nostra esperienza, l'utilizzo del controllo remoto, dopo adeguato training da parte degli infermieri, e' risultato fondamentale nella diagnosi precoce di FA. Tuttavia, per un migliore counseling infermieristico, e' indispensabile il continuo aggiornamento del personale riguardo ai sistemi di monitoraggio remoto la cui tecnologia e' in rapida evoluzione. Il lavoro in team e la costante comunicazione medico-infermiere è risultata essere fondamentale per offrire la cura migliore a questi pazienti.

CO.11.03

MODELLO ORGANIZZATIVO "EVENT-DRIVEN" PER LA GESTIONE DEL CONTROLLO REMOTO DEI CIED IN OSPEDALE DI III LIVELLO

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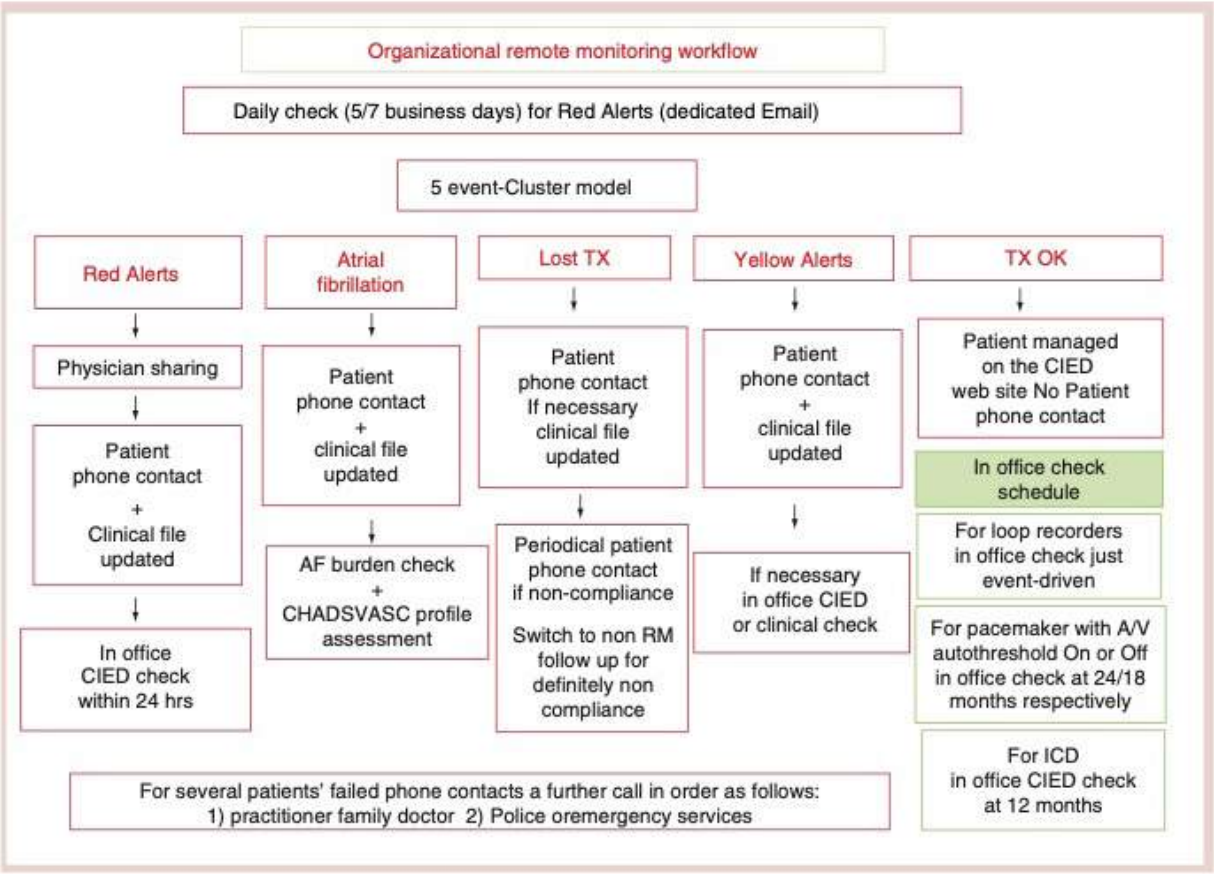
Introduzione: Il monitoraggio remoto (HM) dei dispositivi impiantabili (CIED) è ormai considerato imprescindibile nella pratica clinica. La gestione delle risorse dedicate, in relazione al carico incrementale di pazienti sottoposti ad impianto, e la gestione dei frequenti avvisi di sicurezza impone un ri-assetto organizzativo in ogni realtà cardiologica, con l'intento di rendere accurato ma anche sostenibile nel tempo questo modello. Nella nostra realtà abbiamo formulato un work flow organizzativo che ci consente di rispondere ai diversi eventi classificati in 5 cluster. Per capire il carico di lavoro futuro abbiamo analizzato lo storico del "rate" di impianti degli ultimi 20 anni.

Metodi e Risultati: Dal marzo 2003 al marzo 2023, 4100 pazienti sono stati sottoposti ad impianto di CIED (3318 impianti di pacemaker e 782 impianti di ICD). La popolazione totale servita ad oggi dalla nostra ULSS è pari a 228.636 cittadini. In letteratura è stato calcolato che in una analoga popolazione la percentuale di pazienti portatori di CIED è di circa 1.5%. Traslando questi dati ci aspettiamo di dover seguire annualmente circa 3.400 pazienti con CIED impiantato. Attualmente, nella nostra realtà i pazienti seguiti con monitoraggio remoto sono 322 (di cui 142 CIED Medtronic, 81 CIED Biotronik, 67 CIED Abbott, 32 CIED Boston Scientific), ovvero un teorico 9.4% del totale dei pazienti portatori "attivi" di CIED. Se incrementassimo la proporzione dei pazienti monitorati rispetto al totale di pazienti di solo il 10%/annuo raggiungeremmo il "break even" (100% pazienti monitorati) nel 2032, ma se tale incremento fosse del 20% allora già nel 2027 ci troveremmo a gestire circa 3400 pazienti in remoto. Questo sistema di proiezione necessita di programmazione a standardizzazione organizzativa del work flow. Il nostro modello prevede classificazione in 5 cluster di eventi, che trainano la risposta clinica. (Vd schema).

Conclusione: La gestione del monitoraggio remoto dei CIED va programmata, resa sostenibile nel tempo e standardizzata per essere riproducibile e resiliente.



CO.11.04

L'INFERMIERE NEL FOLLOW UP DEI PAZIENTI PORTATORI DI DISPOSITIVO PER LA TERAPIA DELLA MODULAZIONE DELLA CONTRATTILITÀ CARDIACA

P. Eterno, C. Uran
ASL CE, S. Maria C. V., ITALY

La cardiologia ha fatto enormi progressi nel trattamento di malattie estremamente gravi come l'insufficienza cardiaca. Nello specifico, la cardiologia interventistica si è arricchita, negli anni, di ausili sempre più complessi che hanno contribuito a migliorare la qualità della vita e la sopravvivenza dei pazienti affetti da questa patologia. Questo ha portato il personale medico ed infermieristico a provvedere ad un costante aggiornamento sulle varie tecnologie disponibili.
Sia l'infermiere di reparto che chi collabora con il cardiologo interventista, devono quindi essere a conoscenza delle innovazioni tecnologiche e devono essere in grado di comprenderne il funzionamento, l'utilità dei dispositivi e la gestione dei pazienti portatori di tali presidi. Nella nostra realtà abbiamo imparato a gestire il dispositivo per la modulazione della contrattilità cardiaca (CCM).
Nel nostro ambulatorio ci siamo trovati a gestire 5 pazienti con tale dispositivo. È stato necessario implementare, per il personale infermieristico, un training informativo per la gestione di questi pazienti.
Abbiamo imparato innanzitutto la modalità di selezione del paziente candidato all'impianto, mediante la somministrazione del MLWHFQ che viene sottoposto a tutti i ricoverati per scompenso cardiaco. Abbiamo imparato la modalità di funzionamento e di gestione del dispositivo, in particolare l'uso del caricatore. Abbiamo imparato infine a riconoscere l'ECG del paziente impiantato: il caratteristico tracciato con spike in periodo refrattario. Nel follow-up dei 5 pazienti abbiamo avuto un decesso (paziente 2 affetto da scompenso cardiaco estremamente avanzato); per il paziente 3 abbiamo avuto necessità di contattare il servizio tecnico dell'azienda produttrice per risoluzione tramite programmazione di un allarme comparso sul caricatore per bassa erogazione di terapia CCM. Per il paziente 1 la comparsa di un allarme sul dispositivo (variazione di impedenza post impianto) è stata gestita mediante contatto telefonico. In un altro caso invece è stato necessario, dopo approfondito controllo clinico strumentale, riprogrammare il dispositivo nel tentativo di migliorare lo status clinico con incremento delle ore di terapia e di energia. Per il paziente 4, dopo quattro settimane, si è reso necessario un reintervento per il reimpianto degli elettrocateteri a causa di S. di Twiddler.
Dato che il dispositivo è di tipo terapeutico abbiamo deciso di valutare nel corso del FU l'andamento dello score del MLWHFQ per la valutazione della Qol.

Conclusioni: La terapia per la CCM è una delle novità in uso nei vari centri di elettrostimolazione. È fondamentale, per garantire il necessario supporto al paziente, una collaborazione tra medico ed infermiere nella valutazione e nel FU dei pazienti impiantati.

Paz	Basale	FU 1 mese	FU 3 Mesi	FU 6 mesi	FU 12 mesi
1-DA	56		45	40	38
2-SA	90	Exitus			
3-IF	85		34	32	33
4-PD	80	80	50	49	50
5- MR	70		48	45	

CO.11.05

VALORE PREDITTIVO DELLA VALUTAZIONE INIZIALE NELL'INDIVIDUAZIONE DEL TIPO DI SINCOPE (IPOTENSIVA/BRADICARDICA)

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Introduzione: La sincope si manifesta secondo due meccanismi principali: il fenotipo ipotensivo, in cui il meccanismo prevalente è rappresentato dalla riduzione dei valori pressori, e il fenotipo bradicardico, in cui prevale la riduzione della frequenza cardiaca. Nella diagnosi e nello studio delle sincopi riveste un ruolo importante il Tilt-Test. La richiesta di esecuzione del tilt-test negli ultimi 2 anni è progressivamente aumentata, anche in considerazione della chiusura delle syncope unit presenti in ospedali periferici e della pandemia da covid-19. Le richieste di esecuzione del tilt non sempre risultavano essere appropriate o, comunque, la diagnosi emergeva già evidente alla valutazione iniziale. Lo scopo dello studio è quello di valutare il valore diagnostico della valutazione iniziale nell'individuazione del tipo di sincope a partire dal fenotipo bradicardico/ipotensivo, al fine di selezionare i pazienti che necessitano dell'esecuzione dell'esame.

Metodi: L'iter seguito dal nostro centro per tutti i pazienti che afferiscono alla syncope unit consiste nell'effettuare una valutazione iniziale, la valutazione clinica del paziente secondo il protocollo GIMSI, svolgimento dell'head-up tilt test e del massaggio del seno carotideo, e, in determinati pazienti, impianto di loop recorder. In questo studio sono state prese in considerazione le valutazioni iniziali di 58 pazienti che hanno svolto il tilt test, facendo una valutazione del fenotipo di ciascuno, che, successivamente, è stato confrontato con il risultato effettivo del test.

Risultati: I parametri di valutazione scelti sono stati: la presenza e il tipo di sincopi e prodromi prima del test, sincope traumatica e/o alla guida, pressione e frequenza cardiaca di base. I pazienti che alla valutazione iniziale presentavano un fenotipo ipotensivo risultavano essere 23, quelli con fenotipo bradicardico 24, mentre quelli con fenotipo misto 11. Siamo andati successivamente a considerare i risultati del test eseguito, valutati sulla base della classificazione VASIS. Dal confronto dei dati abbiamo avuto una correlazione del fenotipo nel 72% dei pazienti, mentre nel 28% non è stato possibile prevedere il fenotipo.

Conclusioni: Attraverso questi dati possiamo quindi vedere come la valutazione iniziale permetta di identificare precocemente nel 72% dei pazienti il tipo di sincope, selezionando i pazienti che necessitano effettivamente dello svolgimento dell'esame, a fronte di una richiesta sempre maggiore.

CO.11.06

RUOLO DELL'INFERMIERE NEL RICONOSCIMENTO DELLA FIBRILLAZIONE ATRIALE DURANTE IL CONTROLLO REMOTO DEL DEFIBRILLATORE SOTTOCUTANEO

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Scopo: Nei centri in cui è implementato il servizio di monitoraggio remoto, gli operatori sanitari svolgono un ruolo importante nel gestire informazioni, supporto e follow-up remoto del dispositivo.
Il defibrillatore sottocutaneo (S-ICD) rappresenta ormai un'alternativa valida al tradizionale ICD transvenoso.
L'S-ICD è stato recentemente dotato del sistema di monitoraggio remoto (RM) e di un algoritmo per il rilevamento della fibrillazione atriale (FA) basato sull'analisi dello scatter ventricolare e degli istogrammi della frequenza cardiaca.
Descriviamo la nostra esperienza nella gestione remota dei pazienti con S-ICD, con particolare attenzione sul rilevamento e la gestione degli episodi di FA.

Metodi: Il nostro modello organizzativo si basa sul concetto di "Infermieristica Primaria". Ciascun paziente viene assegnato ad un infermiere ed un medico esperto, con un elenco condiviso di compiti e responsabilità. I compiti dell'infermiere includono il controllo sistematico dei dati con l'identificazione dei problemi critici, la revisione della trasmissione e degli allarmi, discussione clinica dei casi critici con il medico, il contatto con il paziente.
Nel nostro centro, tutti i pazienti impiantati con S-ICD ricevono un comunicatore configurato per richiedere il controllo settimanale del dispositivo. In particolare le trasmissioni vengono inviate in presenza di episodi di FA che durano più di 6 minuti al giorno.

Risultati: Un totale di 53 pazienti S-ICD sono inclusi nell'analisi per un periodo medio di 24 mesi. Il controllo remoto settimanale ha individuato gli eventi di FA classificati come eventi gialli in 5 pazienti, episodi della durata maggiore di 6 minuti al giorno per diversi giorni. Dopo la revisione degli episodi con attenzione l'infermiere ha confermato la presenza di FA per tutti e 5 i pazienti ed ha verificato anche la percentuale di FA totale.
È stata valutata la storia clinica dei pazienti e si è visto che 3 di questi erano già in terapia con NAO.
I restanti 2 pazienti non coperti dalla terapia anticoagulante sono stati contattati per eseguire un controllo clinico ambulatoriale e valutare l'inizio della terapia con NAO, che si è poi dimostrato necessario.

Conclusioni: Con questo modello organizzativo, l'infermiere è in grado di gestire in autonomia i pazienti con S-ICD da remoto. In particolare la gestione remota è molto utile nel rilevamento precoce degli episodi di FA e questo può aiutare il cardiologo nella valutazione della terapia anticoagulante nei pazienti che ne sono sprovvisti.

COMUNICAZIONI ORALI 12

VENERDI' 22 SETTEMBRE

AUDITORIUM

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: ARITMIE 2

Moderatori: R. Proietti (Liverpool-UK), F. Rotondi (Avellino)

CO.12.01

EFFICACIA E SICUREZZA DEL BLOCCO PERCUTANEO DEL GANGLIO STELLATO DI SINISTRA NELLO STORM ARITMICO REFRATTARIO: I NOSTRI CINQUE ANNI DI ESPERIENZA

Sara Compagnoni [1,2], Enrico Baldi [2,3], Francesca Romana Gentile [1,2], Alessia Currao [3], Antonio Sanzo [2,3], Roberto Rordorf [2,3], Simone Savastano [2,3]

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[2] *Unità di Aritmologia ed Elettrofisiologia, Fondazione IRCCS Policlinico San Matteo, Pavia, ITALY*

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Introduzione: La modulazione autonomica mediante blocco percutaneo del ganglio stellato (PSGB) con somministrazione locale di anestetico si è rivelata una strategia antiaritmica applicabile in urgenza.

Obiettivo: Riportare i dati di efficacia e sicurezza del PSGB di sinistra (PLSGB) eseguito con approccio anteriore anatomico in pazienti con storm aritmico refrattario al trattamento convenzionale.

Metodi: Sono stati arruolati i pazienti con storm aritmico da novembre 2017 a dicembre 2022 presso la Fondazione IRCCS Policlinico San Matteo di Pavia. Dopo il fallimento di almeno un antiaritmico per via endovenosa, è stata considerata l'esecuzione del PLSGB: in casi selezionati, è stato ripetuto il blocco o è stata intrapresa un'infusione continua di anestetico locale. Sono stati raccolti dati relativi alle caratteristiche dei pazienti e dei blocchi e alle complicanze. È stata valutata l'efficacia acuta di ogni procedura confrontando il numero di aritmie trattate dal defibrillatore (esterno o interno) con ATP/shock un'ora prima e un'ora dopo il blocco, e l'efficacia per paziente confrontando il numero di ATP/shock nelle 12 ore precedenti la prima procedura con quello nelle 12 ore dopo l'ultima.

Risultati: Sono stati arruolati 37 pazienti: 76% maschi, età media 65 anni, FE media 23.4%; 11 con cardiomiopatia dilatativa a coronarie indenni, 18 con cardiopatia ischemica cronica, 11 con STEMI, 3 con NSTEMI, 1 con cardiomiopatia aritmogena del ventricolo destro, 2 con ipokaliemia e 1 con overdose da metadone. In totale, sono stati eseguiti 62 PLSGB: 19 per tachicardia ventricolare (TV), 26 per fibrillazione ventricolare (FV) e 17 per episodi sia di TV sia di FV nello stesso paziente; 15 su pazienti intubati, 4 su pazienti in circolazione extracorporea (ECMO), 14 su pazienti in arresto cardiaco refrattario, 7 su pazienti in shock cardiogeno/settico. La procedura è stata eseguita anche in corso di terapia anti-aggregante e/o anticoagulante: 28 blocchi su pazienti in singola anti-aggregazione, 11 su pazienti in doppia anti-aggregazione, 33 su pazienti in terapia anticoagulante. I PLSGB sono stati effettuati durante infusione di antiaritmici (amiodarone in 30, lidocaina in 37 procedure). Come anestetico locale è stata usata lidocaina in 27/62 PLSGB, bupivacaina in 6/62, entrambe in 29/62. All'analisi per procedure, il numero di ATP/shock si è ridotto significativamente un'ora dopo il blocco rispetto all'ora precedente [0 (0-1) vs 5 (1-8) $p<0.001$]. Analogamente, all'analisi per paziente il numero di ATP/shock nelle 12 ore successive all'ultimo blocco si è ridotto significativamente rispetto alle 12 ore precedenti il primo blocco [0 (0-1.3) vs 7 (4.8-12.5) $p<0.001$]. Non si sono verificate complicanze.

Conclusioni: Questo studio riporta la nostra esperienza di cinque anni nell'utilizzo del PLSGB a scopo antiaritmico e rappresenta la casistica col maggior numero di procedure in letteratura, confermandone l'efficacia e la sicurezza nel trattamento dello storm aritmico refrattario. In particolare, per l'approccio anatomico occorrono pochi strumenti e questo lo rende una valida strategia da adottare al letto del paziente o in un contesto di emergenza/urgenza.

CO.12.02

CONTINUOUS STELLATE GANGLION BLOCK FOR REFRACTORY VENTRICULAR ARRHYTHMIAS: A SINGLE CENTRE CASES SERIES WITH SYSTEMATIC REVIEW OF THE LITERATURE AND COMPARISON WITH THORACIC EPIDURAL ANAESTHESIA

Veronica Dusi [1], Antonio Toscano [2], Filippo Angelini [3], Carol Gravinese [3], Simone Frea [3], Eleonora Balzani [4], Martina Cedrone [4], Paolo Capuano [5], Chiara Perrucci [6], Andrea Costamagna [2], Arianna Morena [1], Andrea Saglietto [1], Mario Matta [3], Davide Castagno [1], Federico Ferraris [3], Carla Giustetto [1], Matteo Anselmino [1], Mauro Rinaldi [7], Luca Brazzi [2], Gaetano Maria De Ferrari [1]

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Background: Percutaneous transient sympathetic block (PTSB) with either left stellate ganglion block (PLSGB) or thoracic epidural anaesthesia (TEA) from T1 to T4 has been recently proposed for the acute management of refractory ventricular arrhythmias (VAs). PLSGB is most usually performed as a single or repeated bolus injection and data on the feasibility, safety, and efficacy of continuous PLSGB (C-PLSGB) are scant.

Objectives: Here we first report our single center experience with ultrasound (US)-guided C-PLSGB for refractory VAs. Then we perform a systematic review on the usage of continuous PTSB techniques (C-PLSGB and TEA) for refractory VAs and finally we compare the 2 techniques using the overall available data.

Methods: 18 patients received PLSGB in our Center (1/2021-2/2023); among them, 6 had C-PLSGB. The systematic review, performed according to the PRISMA criteria, showed a total of 15 studies (mostly case reports) using continuous PTSB (25 patients received C-PLSGB, 18 TEA). A complete response to TSB was defined as no more episodes of sustained or treated VAs, while a partial response was qualitatively defined as a clinically relevant VAs reduction allowing for patient's acute stabilization.

Results: Our single-center data (6 pts, 83% male, 58 ±18 years, all with structural heart disease) shows that C-PLSGB (mean duration 7± 3 days) is feasible and safe at bedside, in the acute setting, in supine position, even on fully anticoagulated patients. Most patients (4, 67%) had a complete VAs suppression, the rest had a partial response. Overall, including previously published data, 31 patients received C-PLSGB and 18 TEA. Most baseline characteristics were not significantly different except from the prevalence of incessant VT, higher in the TEA group (7/18 vs 0/31, $p<0.001$) and the percentage of patients on general anesthesia, that again was higher in the TEA group (11/18 vs 7/31, $p=0.01$). Finally, 10/31 patients were on full anticoagulation at the time of C-PLSGB, as opposed to no patients in the TEA group ($p<0.01$). A complete antiarrhythmic response was observed in 17/31 versus 9/18 ($p=0.8$), and an overall beneficial antiarrhythmic effect (sum of complete or partial response) in 23/25 versus 11/16 ($p=0.09$). No major complications occurred in either group, yet the discontinuation rate was significantly higher in the TEA group (4/18 procedures, due to infective concerns) compared to C-PLSGB (1/33 procedures, $p=0.046$).

Conclusions: US-guided C-PLSGB is feasible, safe and effective for the acute management of patients with refractory VAs. C-PLSGB, compared to TEA, beyond being easier to perform in acutely ill patients (supine versus lateral decubitus), can be carried out on a full anticoagulation regimen. C-PLSGB efficacy is not inferior to that of TEA despite a significantly lower rate of patients on general anesthesia, and TEA has a higher discontinuation rate.

CO.12.03

CAVOTRICUSPID ISTHMUS ABLATION BY MEANS OF VERY HIGH POWER, SHORT-DURATION, TEMPERATURE-CONTROLLED LESIONS: ACUTE AND MID-TERM OUTCOME

Armando Mariano Salito [1], Vincenzo Schillaci [1], Alberto Arestia [1], Gergana Shopova [1], Giovanni Marano [1], Sara Poggi [2], Teresa Strisciuglio [2], Assunta Iuliano [2], Giorgio Spiniello [2], Pietro Zannella [2], Vincenzo La Rocca [3], Alessia Agresta [3], Riccardo Ricciolino [3], Antonio De Simone [3], Francesco Solimene [1], Giuseppe Stabile [1,2,3,4]

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Background: Very high-power short-duration (vHPSD) temperature-controlled radiofrequency ablation minimizes conductive heating and increase resistive heating, achieving uniform and transmural lesion while reducing the risk of collateral tissue damages. The shape of the vHPSD lesion, wider and shallower than standard radiofrequency, raises some concerns during atrial flutter ablation.

Purpose: We evaluated the feasibility, efficacy and safety of the vHPSD ablation of the cavotricuspid isthmus (CTI) in patients presenting with AFL.

Methods: Sixty-one consecutive patients, with typical AFL, underwent CTI ablation using the QDot Micro catheter and vHPSD (90 w for 4 s). Patients were followed-up by means of visits and ECG in the outpatient clinic 1, 6 and 12 months after the procedure and later on with telephone interviews or by 24-h Holter monitoring in case of symptoms.

Results: Acute CTI bidirectional block was achieved in all patients (91% of first-pass block) with a mean fluoroscopy time of 114±29 s and a mean procedure time of 37±9 min. Two steam pops were observed. Two patients had groin hematoma, no further complications were observed. During a mean follow-up of 14±7 months, two (3.2%) patient had typical AFL recurrence, and four (6.5%) patients had an atrial fibrillation recurrence.

Conclusions: The vHPSD ablation represents an effective and safe ablation strategy to achieve bidirectional block for the treatment of typical AFL.

CO.12.04

ATRIAL FIBIRLLATION CATHETER ABLATION BY MEANS THE NEW TACTIFLEX CATHETER: REDUCING THE PROCEDURAL AND RADIOFREQUENCY TIME

Leonardo D'Angelo, Parisi Quintino, Giovanni Volpato, Paolo Compagnucci, Laura Cipolletta, Silvano Molini, Agostino Misiani, Yari Valeri, Francesca Campanelli, Lara Luciani, Gemma Gaggiotti, Federico Guerra, Michela Casella, Antonio Dello Russo
Azienda Ospedaliero Universitaria delle Marche, Ancona, ITALY

Background: Pulmonary vein isolation (PVI) by radiofrequency (RF) ablation is a cornestone treatment for paroxysmal and persistent atrial fibrillation (AF). The high-power-short duration (HPSD) RF ablation produces shallower lesions than low-power-long-duration one, reducing potential adverse effects, without affecting efficacy. The new TactiFlex Ablation Catheter, Sensor Enabled (TFSE), combining a flexible tip with fiber optic-based contact force sensing, can deliver HSPD RF, resulting in a faster PVI.

Objective: To test safety, and efficacy RF AF ablation performed by TFSE, comparing it with LPLD RF AF ablation using TactiCath Contact Force Ablation catheter, Sensor Enabled (TCSE).

Methods: We conducted a single-centre prospective study including 80 consecutive patients admitted to our hospital for paroxysmal or persistent AF catheter ablation. According to ablation mode, the patients were randomly divided into 2 groups: 40 subjects were treated with HPSD performed by TFSE (58 ± 11 years, male 18); 40 patients were treated with LPLD by TCSE (60 ±9; male 14). In the HPSD group, the RF applications were performed delivering 50W up to 10 seconds with a contact force (CF) index ranging from 5g to 20g. In the LPLD group, the lesions were performed delivering 40W in the anterior segments of veins (LSI 5-5.5) and 35W in the posterior segments (LSI 4-4.5).

Results: PVI was achieved in 100% of patients. No periprocedural complication was registered. No statistically significant differences were found in terms of clinical and echocardiographic characteristics. In the TFSE arm, for each pulmonary vein, a shorter PVI time was reported, (LSPV: 2 (2-3) min vs 10.30 (10:15-15), p<0.005; LIPV 2(1:45-2:15) min vs 12(10-15) min, p<0.005; RSPV: 2 (2-3) min vs 10(6-13:30) min, p<0.005; RIPV 2 (1-3) min vs 11 (8:30-14:30) min, p<0.005). A shorter total procedural time (108 min, range 91-120 vs 175 min, range 142-187, p<0.005), LA mapping time (6 min, range 4-7 vs 14 min, range 11-15, p<0.005) and RF total time were reported in TFSE arm. Despite these findings, no difference was reported in total fluoroscopy time (15 min, range 10-19 TFSE vs 18 min, range 13-26 TCSE, p=0,26). A significant difference was reported for the impendence drop (17.13 ± 2 ω in TFSE vs 15.78 ± 1,5 ω, in TCSE, p=0.003)

Conclusions: In our initial experience, paroxysmal and persistent AF radiofrequency ablation can be safely performed by HPSD protocol through TactiFlex catheter. The shorter time for PVI is the main contributor for shortening total procedural times and reducing potential adverse effects. The greater impedance drop testifies the acute efficacy of HPSD ablation mode and may contribute to a better long-term effectiveness reducing AF recurrences. However, our findings require confirmation in larger studies.

	TACTIFLEX	TACTICATH	P VALUE
AGE	58 (11)	60 (9)	p = 0,373
MALE GENDER	18 (45%)	14 (35%)	p = 0,203
FA RE DO	12 (30%)	8 (20%)	p = 0,308
EF (%)	60 (55 65)	60 (56 63)	p= 0,996
LAVI (mL/m²)	35 (27-43)	31 (24-38)	p= 0,153
$CHAD_2S_2VA_2SC$	1 (0-2)	1 (0-2)	p= 0,519
LSPV (min)	2 (2-3)	13:30 (10:15-15)	p<0,005
LIPV (min)	2 (1:45-2:15)	12 (10-15)	p<0,005
RSPV (min)	2 (2-3)	10 (6-13:30)	p<0,005
RIPV (min)	2 (1-3)	11 (8:30-14:30)	p<0,005
IMPEDENCE DROP (Ω)	17,13 (2)	15,78 (1,5)	p=0,003
PROCEDURAL TIME (min)	108 (91-120)	175 (142-187)	p<0,005
LA MAPPING TIME (min)	6 (4-7)	14 (11-15)	p<0,005
TOTAL RF TIME (min)	8:40 (7:08-10:40)	42 (30:30-52:30)	p<0,005
TOTAL FLUOROSCOPY TIME (min)	15 (10-19)	18 (13-26)	p= 0,26

Table 1 - Value are counts, mean (standard deviation) or median (first quartile, third quartile). EF = Ejection Fraction; LAVi = Left Atrial Volume indexed; LSPV = Left Superior Pulmonary Vein; LIPV = Left Inferior Pulmonary Vein; RSPV = Right Superior Pulmonary Vein; RIPV = Right Inferior Pulmonary Vein; RF = Radiofrequency

CO.12.05

PREDICTIVE VALUE OF LEFT AND RIGHT ATRIAL STRAIN FOR THE DETECTION OF ATRIAL FIBRILLATION IN PATIENTS WITH CRYPTOGENIC STROKE AND IMPLANT OF LOOP RECORDER

Angelica Cersosimo [1], Gianmarco Arabia [1], Manuel Cerini [1], Francesca Salghetti [1], Andrea Dell'Aquila [2], MariaGiulia Bellicini [1], Giada Colombo [1], Luca Bontempi [2], Gianfranco Mitacchione [3], Antonio Curnis [1]

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Background: Structural and functional remodeling of left and right atrium (LA-RA) are predictors of the risk of hospitalization and mortality. These are chronic and complex processes, dependent on an adaptive response implemented by the atrial myocytes against stressors of an electrical, mechanical and metabolic nature. Atrial fibrillation (AF) is the most common condition associated with remodeling of both atria, of which it can be cause and effect at the same time: atrial enlargement, interstitial fibrosis and myocardial distension. Often the first manifestation of AF is cryptogenic stroke (CS) which is associated with a high rate of recurrence and adverse long-term follow-up outcomes, mainly due to its unknown etiology often leading to secondary prevention ineffective. Asymptomatic (AF) may play an important pathophysiological role to detect CS. Evidence has demonstrated the efficacy of AF ablation in restoring the structure of the LA and, consequently, in favoring the maintenance of sinus rhythm. However, little is known regarding the evaluation of RA remodeling and its variation over time in patients with FA.

Aim of the study: Evaluate the relationship between echocardiographic parameters of LA and RA function, and the occurrence of AF revealed by continuous ECG monitoring through insertable cardiac monitors (ICM) implant in a cohort of patients with CS

Methods: Single-center retrospective study. A total of 204 patients who suffered from cryptogenic stroke underwent ICM between May 2013 and July 2022. All detected AF episodes lasting more than 30 seconds were considered, according to Guidelines. All patients underwent to Transthoracic Echocardiography (TTE) to study on LA and RA function, including both standard and longitudinal strain-derived parameters. Transesophageal Echocardiography (TEE) was also performed to exclude embolic sources.

Results: During a median follow-up period of 15.3 months (interquartile range, 7.4 / 23.5), continuous ECG monitoring revealed AF in 96 patients (47.0%). Many echocardiographic parameters, such as LA maximum and minimal volume were significantly associated with the occurrence of AF, suggesting the worst atrial function in the AF group. Furthermore, multivariable regression analysis revealed that peak atrial contraction strain of both atria were independently associated with AF ($p < 0.001$,respectively).

Conclusion: In patients with cryptogenic CS, LA and RA strain analysis are strong and independent predictors of the occurrence of AF despite clinical and morpho-functional echocardiographic parameters.

CO.12.06

PERCUTANEOUS LEFT STELLATE GANGLION BLOCK FOR A REFRACTORY LEFT ATRIAL TACHYCARDIA

Arianna Morena [1], Carol Gravinese [2], Simone Frea [2], Filippo Angelini [2], Pierpaolo Bocchino [2], Francesco Bruno [2], Andrea Saglietto [1], Antonio Toscano [3], Mario Matta [2], Federico Ferraris [2], Davide Castagno [1], Carla Giustetto [1], Matteo Anselmino [1], Gaetano Maria De Ferrari [1], Veronica Dusi [1]

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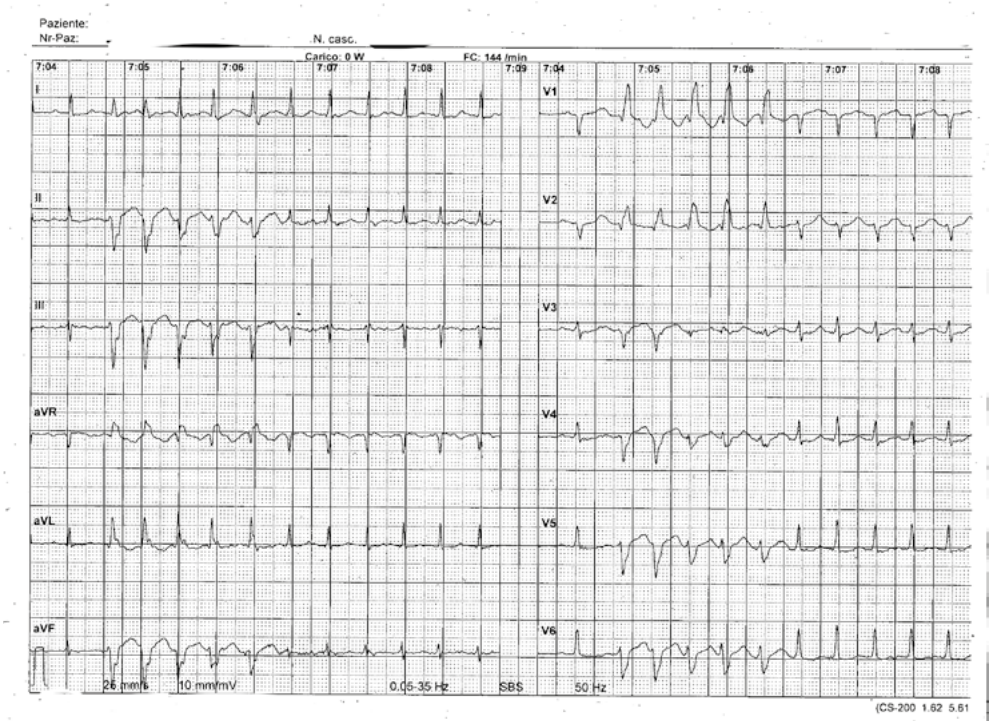
Percutaneous left stellate ganglion block (PLSGB) has been recently implemented for the acute treatment of refractory ventricular arrhythmias (VAs). The beneficial effect on supraventricular arrhythmias susceptibility and their ventricular response is well characterized in animal models, less so in humans. Available data suggest a significant prolongation of atrial refractory period, a reduction in inducibility and duration of atrial fibrillation and of all spontaneous intra- and postoperative atrial arrhythmias after thoracic and cardiac surgery. Here we describe a case of PLSGB (bolus) for focal atrial tachycardia (AT).

Case: we present a 68-year-old men with hypertension, obesity, obstructive sleep apnea syndrome and a previous anterior myocardial infarction in the setting of a trivessel coronary artery disease, treated with percutaneous coronary intervention and complicated by apical aneurysm. LVEF at presentation was 38% and he had a moderate mitral and aortic regurgitation. He was on chronic antiarrhythmic therapy with bisoprolol 1.25 mg and ranolazine 500 mg bid. He presented in the ED due to palpitations, pre-syncopal episodes, and worsening dyspnea. The ECG showed very frequent, self-limiting episodes of AT with a 1:1 atrioventricular (AV) conduction and a variable heart rate (HR) between 100 and 160 bpm, alternating with sinus rhythm with 1:1 AV conduction at 45-50 bpm, sometimes conducted with aberrancy. Isolated and repetitive premature ventricular beats (PVB) organized in runs of non sustained ventricular tachycardia (NSVT, maximum 8 beats) were also documented. Intravenous amiodarone, lidocaine, and unloading therapy were tried, without benefit. Coronary angiography was negative for disease progression. PLSGB with an ultrasound-guided lateral approach (local bolus of lidocaine 100 mg+ropivacaine 20 mg) was performed, without complications, inducing transient palpebral ptosis. Over the next 15 hours we observed the disappearance of NSVT, the reduction of PVBs, and a progressive reduction of AT burden, of mean hourly HR (from 84 to 50 bpm, -40%) and of mean HR during AT (from 158 to 84 bpm, -47%, with AV 1:1 conduction). The patient subsequently underwent ablation of an extra systolic atrial focus located near to the ostium of the right inferior pulmonary vein, with no recurrences after 20 months.

Conclusions: This case highlights the potential efficacy of PLSGB in the acute treatment of supraventricular arrhythmias refractory to medical therapy. Prospective studies will help us to identify the extent, time of onset, and duration of its benefit depending on the type and mechanism of the underlying arrhythmia and the clinical characteristics of the patient.



COMUNICAZIONI ORALI 13

VENERDI' 22 SETTEMBRE

SALA ITALIA

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: DEVICE 2

Moderatori: F. Dettori (Oristano), D. Gianfrancesco (Andria-BT)

CO.13.01

TECNICA INTERMUSCOLARE PER L'IMPIANTO DI UN DEFIBRILLATORE SOTTOCUTANEO: UNO STUDIO CASO-CONTROLLO

Stefano Viani [1], Matteo Ziacchi [2], Gerardo Nigro [3], Antonio D'Onofrio [4], Antonio Dello Russo [5], Pietro Francia [6], Ennio Pisanò [7], Giovanni Bisignani [8], Fabrizio Caravati [9], Federico Migliore [10], Paolo De Filippo [11], Luca Ottaviano [12], Roberto Rordorf [13], Michele Manzo [14], Fabio Lorenzo Canevese [15], Luca Checchi [16], Mariolina Lovecchio [17], Sergio Valsecchi [17], Gianluca Botto [15]

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Aims: A previous randomized study demonstrated that the subcutaneous implantable cardioverter defibrillator (S-ICD) was noninferior to transvenous ICD with respect to device-related complications and inappropriate shocks. However, that was performed prior to the widespread adoption of pulse generator implantation in the intermuscular (IM) space instead of the traditional subcutaneous (SC) pocket. The aim of this analysis was to compare survival from device-related complications and inappropriate shocks between patients who underwent S-ICD implantation with the generator positioned in an IM position in comparison with an SC pocket.

Methods and results: We analysed 1577 consecutive patients who had undergone S-ICD implantation from 2013 to 2021 and were followed up until December 2021. Subcutaneous patients (n=290) were propensity matched with patients of the IM group (n=290), and their outcomes were compared.During a median follow-up of 28 months, device-related complications were reported in 28 (4.8%) patients and inappropriate shocks were reported in 37 (6.4%) patients. The risk of complication was lower in the matched IM group than in the SC group [hazard ratio 0.41, 95% confidence interval (CI) 0.17–0.99, P=0.041], as well as the composite of complications and inappropriate shocks (hazard ratio 0.50, 95% CI 0.30–0.86, P= 0.013). The risk of appropriate shocks was similar between groups (hazard ratio 0.90, 95% CI 0.50–1.61, P= 0.721). There was no significant interaction between generator positioning and variables such as gender, age, body mass index, and ejection fraction.

Conclusion: Our data showed the superiority of the IM S-ICD generator positioning in reducing device-related complications and inappropriate shocks.

CO.13.02
HIS BUNDLE PACING: 10-YEARS FOLLOW-UP

Lina Marcantoni [1], Gianni Pastore [1], Enrico Baracca [1], Francesco Deluca [1], Simone Valenza [1], Enrico Manzato [1], Chiara Pigaiani [1], Sandra Marsiglia [1], Marta Fornasaro [1], Elena Cappato [1], Antonella Tiribello [1], Paola Raffagnato [1], Alessio Follesa [2], Francesco Zanon [1]
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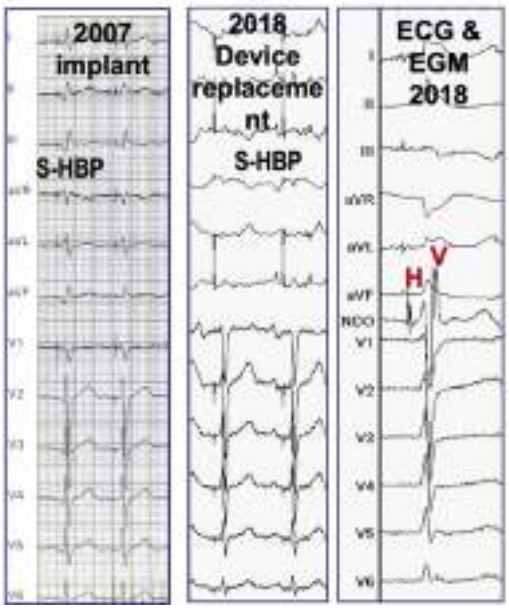
Background: His bundle pacing (HBP) ensures a physiologic ventricular activation and can prevent pacing-induced cardiomyopathy. Published experiences confirm good clinical results on short-term follow-up. Data on long-term follow-up are still lacking

Objective: to analyze both technical and clinical results of HBP in an unselected population during a very long-term follow-up.

Methods: We retrospectively analyzed 370 patients (mean age 75±8 years; 221 males) with standard indication for pacing implanted with HBP from 2003 to 2012. In 52% cases selective-HBP was obtained while 48% was non selective-HBP). In all cases the HBP implant was performed by lumenless fixed screw 3830 Medtronic and deflectable sheath C304. The indications for pacing were AV block in 51%, sinus node disease in 22%, atrial fibrillation with slow ventricular rate in 25%, heart failure in 2%. Ischemic cardiopathy was found in 84 patients (29%); hypertension in 317 patients (86%) and diabetes in 108 patients (29%). Pre-implant QRS duration was 119±30 ms and basal mean EF 57±11%. The Hisian lead was inserted in ventricular port of a CRT-P device in 162 (44%) patients, in the atrial port of a DR device in 183 (49%) patients, and in the only channel of a SR device in 25 (7%) patients. A back-up standard lead was implanted in right ventricular apex or septum in 203 (55%) patients.

Results: All patients were followed by ambulatory check once a year. 124 (34%) patients overstepped 10 years follow-up (mean 12.3 ±1.8 years), they were analyzed on technical and clinical performance. At the end of follow-up, the mean EF was 61±8% (P=NS) and the mean paced QRS duration 123 ± 27 (P=NS). 10 (8%) patients had heart failure hospitalizations. 26 (21%) died after a mean of 12.1 ±1.7 years. From a technical point of view, 99 (80%) patients showed a good performance of the HBP lead at the last follow-up while 25 (20%) patients experienced lead-related problems: 20 (16%) had issues related to HBP lead (2 cases of severe HBP malfunction required hospitalization due to syncope) and 5 (4%) had malfunction of the back-up lead. The mean longevity of the devices was 6.6 ±2.6 years and each patient had 1.5 ±0.8 replacements. It was required to add a back up catheter in 3.6% of patients. The remaining 205 patients completed a mean follow-up of 6.3±2.7 years while 41(11%) patients were lost at follow-up (died within the first month post-implant or checked in other centres).

Conclusion: HBP is safe and feasible in the clinical practice. The system maintains a good performance during a long-term follow-up and ensures a physiologic ventricular contraction thus allowing good clinical outcome. The EF and QRS duration remain in normal values.



CO.13.03

SYSTEMATIC REVIEW ON S-ICD LEAD EXTRACTION

Riccardo Vio [1], Enrico Forlin [2], Sakis Themistoclakis [1], Riccardo Proietti [3], Paolo China [1]
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Background and aim: Subcutaneous implantable cardioverter defibrillators (S-ICDs) have emerged in recent years as a valid alternative to traditional transvenous ICDs (TV-ICDs). Therefore, the number of S-ICD implantation is rising leading to a consequent increase of S-ICD-related complications sometimes requiring complete device removal. Thus, the aim of this systematic review is to gather all the available literature on S-ICD lead extraction (SLE).

Methods: Studies were identified by searching electronic databases (Medline via PubMed, Scopus and Web of Science) from inception to 21st November, 2022. The search strategy adopted was developed using the following key words: subcutaneous, S-ICD, defibrillator, ICD, extraction, explantation. Studies were included if they met all 2 of the following criteria: 1) inclusion of patients with S-ICD; 2) inclusion of patients who underwent SLE.

Results: Our literature search identified 238 references. Based on the abstract evaluation, 38 of these citations were considered potentially eligible for inclusion and their full texts were analyzed. We excluded 8 of these studies, because no SLE was performed. Eventually, 30 studies were included, with 207 patients who underwent SLE. Overall, the majority of SLEs were performed for non-infective causes (59.90%) (Table 1). Infection of device (affecting either the lead or the pocket) was the cause of SLE in 38.65% of cases. Indication data were not available in 3/207 cases. Mean dwelling time was 14 months. SLE were performed using manual traction or with the aid of tool designed for transvenous lead extraction (TLE), including either rotational or non-powered mechanical dilator sheath.

Conclusions: SLE is performed mainly for non-infective causes. Techniques vary greatly across different studies. Dedicated tools for SLE might be developed in the future and standard approaches should be defined. In the meantime, authors are encouraged to share their experience and data to further refine the existing variegated approach.

Table 1. Indication for S-ICD lead extraction

Indication for SLE	Total population, n=207
Non-infective, n (%)	**124 (59.90%)**
- Inappropriate shocks, n (%)	35 (16.91%)
- Necessity for CRT, n (%)	18 (8.70%)
- Heart transplantation/LVAD, n (%)	15 (7.25%)
- Sensing issues, n (%)	9 (4.35%)
- Lead/pocket erosion, n (%)	8 (3.86%)
- Ineffective therapy, n (%)	8 (3.86%)
- Necessity for pacing, n (%)	7 (3.38%)
- Lead rupture, n (%)	5 (2.42%)
- Defibrillation threshold testing failure, n (%)	5 (2.42%)
- Patient discomfort, n (%)	5 (2.42%)
- Lead malposition, n (%)	4 (1.93%)
- Technical issues, n (%)	2 (0.97%)
- Reel syndrome, n (%)	1 (0.48%)
- Necessity for MRI, n (%)	1 (0.48%)
- Premature battery depletion, n (%)	1 (0.48%)
Infective (pocket or lead), n (%)	**80 (38.65%)**
Not specified, n (%)	**3 (1.46%)**

CRT = cardiac resynchronization therapy; LVAD = left ventricular assist device; MRI = magnetic resonance imaging

CO.13.04

TRA HIS E BRANCA SINISTRA, L'HIS DISTALE COME TARGET DI STIMOLAZIONE DEL SISTEMA DI CONDUZIONE: DATI PRELIMINARI

Elena Crudeli [1], Stella Cartei [2], Jacopo Giovacchini [3], Gioele Papi [3], Tania Chechi [1], Marzia Giaccardi [1]
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Background: la stimolazione elettrica cardiaca tradizionale si è dimostrata deleteria sia sulla funzione cardiaca che sul rischio di fibrillazione atriale. La stimolazione del sistema di conduzione è il modo più fisiologico di stimolare il cuore. La stimolazione del fascio di His nella sua porzione prossimale può presentare delle difficoltà oggettive, quali soglie elevate, sensing bassi e scarsa stabilità dell'elettrocatetere all'impianto o innalzamento delle soglie e possibilità dislocazione al follow-up. Abbiamo quindi valutato una sede di impianto alternativa, lievemente più distale, anatomicamente più favorevole in quanto nella porzione muscolare del setto interventricolare.

Metodi e risultati: Abbiamo sottoposto ad impianto sul sistema di conduzione in sede His distale 10 pazienti. È stato identificato il sistema di conduzione mediante elettrocatetere ottopolare Inquiry Abbott, con distanza interelettrodica di 2 mm, per via femorale o succlavia sinistra, sotto guida fluoroscopica o con l'ausilio del sistema di mappaggio (Ensite X Abbott, Carto 3 Biosense). Una volta localizzato il tratto distale del fascio di His è stato impiantato un elettrocatetere stimolatore 3830 Medtronic, nella posizione precedentemente identificata ed avvitato nel punto di miglior cattura. In un solo caso è stato utilizzato un Tendril Abbott. I tempi procedurali ed i tempi di scopia sono stati solo lievemente aumentati rispetto agli impianti convenzionali. Abbiamo riscontrato in tale sede ottimi parametri pacing e sensing che si sono mantenuti tali ad un follow-up medio di 6 mesi.

N.	m (%)	Anni (m±sd)	Tempo procedurale	Soglia His1	Soglia His2	FU (mesi)
10	6 (60%)	71±14	1:30	0.5-1.5	0.75-3	6±3

Conclusioni: La stimolazione dell'His distale potrebbe essere considerata il gold standard della stimolazione fisiologica in quanto consente di ottenere ottimi parametri elettrici che restano stabili al follow-up, senza esssere eccessivamente "time consuming". Inoltre la posizione dell'elettrocatetere in sede hisiana più distale supera il punto si blocco intranodale, mantiene una sincronizzazione interventricolare e riduce il rischio di "oversensing" legato al farfield atriale. I tempi procedurali sono ridotti se identifichiamo preventivamente il sito target mediante mappaggio elettrico o elettroanatomico.

CO.13.05

ESTRAZIONE DI UN DEFIBRILLATORE SOTTOCUTANEO: PROCEDURA, GESTIONE E OUTCOME NELLA PRATICA CLINICA (DATI DAL REGISTRO ITALIANO RHYTHM DETECT)

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Background: Subcutaneous implantable cardioverter defibrillator (S-ICD) therapy is expanding rapidly. However, there are few data on the S-ICD extraction procedure and subsequent patient management. The aim of this analysis was to describe the procedure, management and outcome of S-ICD extractions in comparison with the extraction of transvenous ICD (T-ICD).

Methods: We enrolled consecutive patients who required complete S-ICD extraction at 66 centers, and a control group of patients who underwent single-chamber T-ICD extraction in the same period.

Results: From 2013 to 2022, 2718 consecutive patients undergoing de-novo implantation of an S-ICD were enrolled at 66 Italian centers. Of these, 71 required complete S-ICD system extraction (17 owing to infection). The median time from S-ICD implantation to extraction was 22 (25th-75th percentile: 11-33) months. The S-ICD system was successfully extracted in all patients and no complications were reported; the median procedure duration was 40 (20-55) min. Simple manual traction was sufficient to remove the lead in 59 (84%) patients, in whom lead-dwelling time was shorter [20 (9-32) months vs. 30 (22-41) months; p=0.032]. The control group comprised 135 patients with T-ICDs (67 extracted for infection), all successfully extracted. Hospitalization time was lower in S-ICD than in T-ICD patients in the case of both noninfectious [2 (1-2) days vs. 3 (2-5) days; p=0.001] and infectious indications [3 (1-6) vs. 10 (7-18) days; p<0.001]. In the case of extraction for infection, the S-ICD was also associated with less use and shorter duration of antibiotic therapy and more frequent re-implantation during the same procedure [5 (29%) vs. 2 (3%); p=0.003]. No complications arose over a median of 21 months, except for the recurrence of infection in one T-ICD patient.

Conclusions: S-ICD extraction was safe and easy to perform, with no complications. Simple traction of the lead was successful in most patients, but specific tools could be needed for systems implanted for a longer time. Compared with T-ICD, the peri- and post-procedural management of S-ICD extraction was less burdensome.

CO.13.06

DISTRIBUZIONE CIRCADIANA E CIRCANNUALE DELLE TACHIARITMIE VENTRICOLARI NEI PAZIENTI PORTATORI DI DEFIBRILLATORI IMPIANTABILI

Francesco Barreca, Daniela Dugo, Francesco Platania, Paola Pruiti, Paolo Zappulla, Marco Lo Presti, Giuseppe Sollano, Noemi Valenti, Luca Avolio, Marco Marsala, Josef Milazzo, Angelo Di Grazia, Valeria Calvi
Azienda Ospedaliera Universitaria G. Rodolico - San Marco, Catania, ITALY

Background: secondo studi precedenti, gli episodi aritmici ventricolari sembrerebbero avere una caratteristica distribuzione circadiana e circannuale. Queste evidenze potrebbero fornire indicazioni per una migliore gestione delle aritmie ventricolari.

Methods and results: nel nostro lavoro abbiamo considerato una coorte di 131 pazienti, 71 dei quali affetti da disfunzione ventricolare sinistra a eziologia ischemica e 60 a eziologia non ischemica. Di questi 131 pazienti, 116 (88,5%) hanno impiantato un defibrillatore in prevenzione primaria, 15 (11,4%) in prevenzione secondaria. Abbiamo considerato tutti gli episodi aritmici ventricolari (sostenuti e non sostenuti) che si sono verificati nell'arco di circa 10 anni (dal Novembre del 2012 al Marzo del 2022), per un totale di 1213 eventi. Per capire come gli episodi aritmici ventricolari si distribuiscono nel corso delle 24 ore, abbiamo diviso la giornata in 4 fasce orarie (mattina, pomeriggio, sera, notte); invece, per quanto concerne la distribuzione annuale, abbiamo considerato le canoniche 4 stagioni (primavera, estate, autunno e inverno). Dai risultati è emerso che nei pazienti con disfunzione ventricolare sinistra non-ischemica la distribuzione giornaliera degli eventi aritmici ventricolari è più uniforme rispetto a quella dei soggetti affetti da disfunzione su base ischemica, in cui la variabilità giornaliera è più marcata, con un picco di eventi mattutino (32,5%) ed un nadir durante le ore notturne (14,6%); infine, per quanto riguarda la distribuzione circannuale, gli eventi aritmici ventricolari tendono a verificarsi più frequentemente durante le stagioni fredde con un picco in autunno (30%) per i pazienti ischemici e un picco in inverno (31,7%) per i pazienti non-ischemici.

Conclusions: esiste una specifica distribuzione circadiana e circannuale degli eventi aritmici ventricolari con differenze tra i pazienti affetti da cardiopatia ischemica e quelli affetti da cardiopatia non-ischemica.

COMUNICAZIONI ORALI 14

VENERDI' 22 SETTEMBRE

SALA BIANCA

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: ELETTROFISIOLOGIA INTERVENTISTICA 2

Moderatori: R. Vitale (Venezia-Mestre), F. Notaristefano (Perugia)

CO.14.01

IMPACT OF VENTRICULAR TACHYCARDIA ABLATION ON THE CLINICAL OUTCOMES OF RECIPIENTS OF SUBCUTANEOUS IMPLANTABLE CARDIOVERTER DEFIBRILLATORS: A POST-PARTITA ISUSI ANALYSIS

Marco Schiavone [1], Alessio Gasperetti [1], Paolo Compagnucci [2], Mikael Laredo [3], Julia Vogler [4], Gianfranco Mitacchione [1], Elisabetta Montemerlo [5], Simone Gulletta [6], Matteo Ziacchi [7], Pietro Palmisano [8], Giovanni Rovaris [5], Carlo Lavalle [9], Jurgen Kuschyk [10], Mauro Biffi [7], Luigi Di Biase [11], Antonio Dello Russo [2], Claudio Tondo [12], Paolo Della Bella [6], Roland Tilz [4], Giovanni B. Forleo [1]

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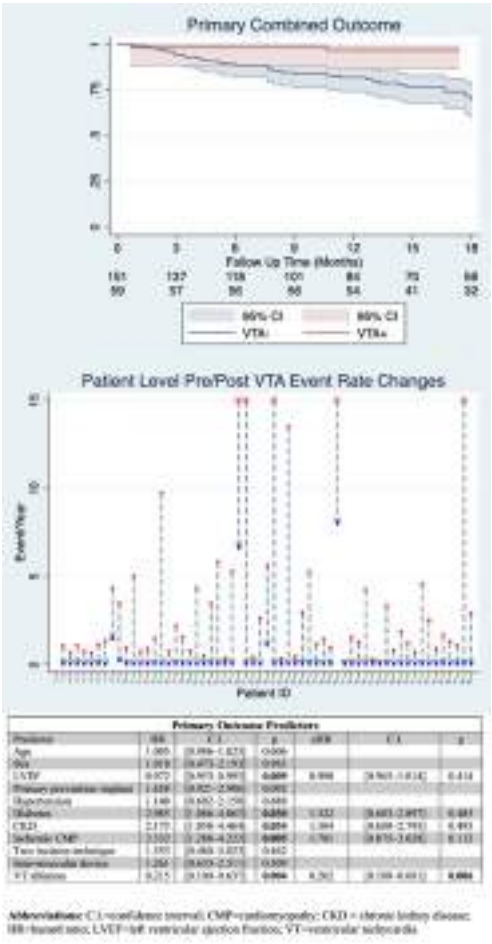

Background: The recent PARTITA trial showed a net clinical benefit of early ventricular tachycardia (VT) ablation in patients with implantable cardioverter defibrillator (ICD) experiencing appropriate shocks. The PARTITA trial analysis, however, was performed in transvenous ICD recipients and data regarding its generalizability in subcutaneous ICD (S-ICD) recipients are lacking.

Purpose: To test whether VT ablation after an ICD shock or a hospitalization for slow VT impacts long-term clinical outcomes in S-ICD recipients.

Methods: All patients experiencing an ICD shock or a hospitalization for slow VT (index event) in the multicenter, international, physician-initiated, real-world iSUSI registry were included in the study. Time zero was set as time of first ICD shock / slow VT hospitalization. Patients were stratified based on performance of VT ablation after the index event (VTA+ vs VTA- cohorts). The primary outcome was a combination of device-related appropriate shocks, slow VTs, and cardiovascular mortality during follow-up. Secondary outcomes were device-related appropriate shocks, slow VTs and cardiovascular mortality, taken individually.

Results: Among 1701 patients enrolled in the iSUSI registry, n=211 were included in this study (n=178 experiencing appropriate shocks; n=33 with slow VTs). After the index event, n=58 (27.5%) underwent VT ablation (VTA+ cohort). No significant differences regarding baseline characteristics between VTA+ and VTA- cohorts were observed: mean age 47.3±16.0 years (VTA+) vs 47.9±17.0 years (VTA-), p=0.799; males 82.8% (VTA+) vs 82.4% (VTA-), p=0.945; mean LVEF 43.8±13.2% (VTA+) vs 42.3±15.5% (VTA-), p=0.530; underlying ischemic cardiomyopathy 31.0% (VTA+) vs 32.7% (VTA-), p=0.8.19; primary prevention implant 36.2% (VTA+) vs 43.4% (VTA-), p=0.434; median number of shocks at index time n=2 [1-4] (VTA+) vs n=2 [1-3] (VTA-), p=0.590. Overall, the median follow-up of the study was 17.3 [10.4-34.8] months and the combined primary outcome was experienced by 46 (21.8%) patients. Even if a slightly longer follow-up time was observed in in the VTA+ cohort (23.7 [14.2-40.4] vs 15.4 [8.4-33.0], p = 0.004), both the crude and the yearly event rate of the primary outcome (5/59 and 3.8% yearly event-rate VTA+ vs 41/152 and 16.4% yearly event rate in the VTA-; log-rank p value = 0.0013) as well as the cardiovascular mortality (1/59 and 0.7% yearly event-rate VTA+ vs 13/152 and 4.7% yearly event-rate VTA-, log-rank p= 0.0432) were significantly lower in the VTA+ cohort. Panel A graphically shows event rate reduction at an individual patient level. Survival analysis plotted using Kaplan Meier curves has been reported in Panel B. At multivariate Cox-Regression, VTA performance was associated with a lower incidence of the primary outcome (aHR 0.262 [0.100-0.681], p=0.006), even after accounting for all other variables that were significant at univariate (i.e. LVEF: HR/% increase 0.972 [0.953-0.993], p=0.009; diabetes: HR 2.985 [1.086-4.863], p=0.030; CKD: HR 2.173 [1.058-4.464], p=0.034; ischemic CMP: HR: 2.332 [1.288 - 4.223], p=0.005). The whole regression output showing predictors of the primary outcome has been reported in Panel C.

Conclusions: In a real-world registry of S-ICD recipients, VT ablation post ICD shocks or hospitalizations for slow VTs was associated with a combined improved arrhythmic and mortality outcome at long-term follow-up.

CO.14.02

CONTACT-FORCE LOCAL IMPEDANCE ALGORITHM TO GUIDE EFFECTIVE PULMONARY VEIN ISOLATION IN AF PATIENTS: 1- YEAR OUTCOME FROM AN INTERNATIONAL MULTICENTER CLINICAL SETTING

Ilaria Meynet [1], Valerio De Sanctis [2], Matteo Anselmino [3], Antoine Lepillier [4], Ruggero Maggio [1], Gergana Shopova [5], Giuseppe Stabile [6], Cyril Zakine [7], Laure Champ-Rigot [8], Gabriele Dell'Era [9], Fabien Garnier [10], Giovanni Marano [5], Giuseppe Mascia [11], Antonio Dello Russo [12], Luca Segreti [13], William Escande [4], Vincenzo Schillaci [5], Maurizio Malacrida [14], Renata Ricci Maga [14], Francesco Solimene [5]

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Background: The combination of highly localized impedance (LI) and contact force (CF) may improve tissue characterization and lesion prediction during radiofrequency (RF) pulmonary vein isolation (PVI) in patients with atrial fibrillation (AF).

Objective: We report the outcomes of our acute and long-term clinical evaluation of CF-LI guided PVI in consecutive AF ablation cases from an international multicenter clinical setting.

Methods: Consecutive patients (pts) from 16 European centers undergoing de novo AF RF catheter ablation with the Stablepoint catheter endowed of CF and LI measurement capabilities were enrolled in the CHARISMA registry. Ablation was guided by the magnitude and time-course of LI drop during RF delivery. The maximum distance between each ablation spot (center-to-center) was suggested to be <= 6 mm. Procedural endpoint was the achievement of the PVI as assessed by entrance and exit block. Post-ablation, all patients were monitored with ambulatory event monitoring. Additional ECG monitoring was performed as indicated by patient symptoms. Data are reported as mean±SD.

Results: From a total of 212 consecutive pts, 151 were followed-up for at least 12 months after the procedure and were included in this 1-year outcome analysis (61.6% paroxysmal AF, 38.4% persistent AF, 78.8% de novo procedures, 21.2% redo procedures). Baseline LI was 161.2±19 Ohm with LI drop of 21.9±9 Ohm (LI drop rate=3.1±2 Ohm/s). The first pass isolation rate per vein was 93.3%. LI drop was predicted by baseline LI (r=0.56, 95%CI:0.55 to 0.57, p<0.0001). Effective ablation spots showed both higher baseline LI and LI drop compared with PV gap spots (161.4 Ohm vs 153.0 Ohm, p<0.0001 for baseline LI; 22.1 Ohm vs 14.4 Ohm, p<0.0001 for LI drop). No steam pops or complications, including atrio-esophageal fistula or tamponade were reported during or after the procedures. At the end of the procedures all PVs were successfully isolated in all study patients. During a median follow-up of 377 [365 – 402] days, 11 (7.3%) patients experienced an early recurrence of AF during the 90-day blanking period. Overall, 21 pts (13.9%) suffered an AF recurrence after the 90-days blanking period (10.8% with paroxysmal AF vs 19% with persistent AF, p=0.226; 10.9% for de novo procedures vs 25.0% for redo procedures, p=0.079). De novo paroxysmal AF pts showed the lowest rate of recurrence (5 out 69 pts, 7.2%). The time to recurrence was comparable among AF type (HR=1.73; 0.73 to 4.05; p=0.210 for persistent vs paroxysmal AF) whereas was shorter in repeated AF ablation procedures (HR=2.49; 1.04 to 5.98; p=0.042 for redo vs de novo procedure). Early recurrence was not associated with late recurrence (HR=2.29; 0.68 to 7.76; p=0.182).

Conclusions: In our experience, the magnitude of LI drop is predictive of PV segment isolation. An ablation strategy for PVI guided by CF-LI technology was safe and effective, and resulted in a low recurrence rate of AF at 1-year follow-up irrespective of underlying AF type.

CO.14.03

LOCAL IMPEDANCE TISSUE CHARACTERIZATION TO IMPLEMENT PULMONARY VEINS ISOLATION SUCCESS IN AF PATIENTS

Federico Ferraris [1], Ruggero Maggio [2], Velerio De Sanctis [3], Giuseppe Stabile [4], Matteo Anselmino [1], Paolo Di Donna [5], Antoine Lepillier [6], Gergana Shopova [7], Cyril Zakine [8], Laure Champ-Rigot [9], Gabriele Dell'Era [10], Anna Ferraro [2], Giovanni Marano [7], Antonio Dello Russo [11], Luca Segreti [12], Ilaria Meynet [2], Giacomo Bonacchi [1], Pietro Matcovich [13], Maurizio Malacrida [13], Francesco Solimene [7]

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Background: Novel radiofrequency (RF) ablation technology permits local impedance (LI) assessment, enabling increased knowledge of the underlying tissue's properties. In addition, LI can provide details on catheter tip contact and extent/effectiveness of radiofrequency (RF) delivery. To date, the extent to which left atrial (LA) tissue characterization by LI can guide RF ablation has not yet been explored.

Purpose: We aimed to assess LI capabilities of predicting RF ablation success in consecutive AF cases with different underlying cardiac tissue characteristics.

Methods: Two-hundred twelve consecutive patients undergoing de novo AF ablation at 16 European centers were included in the CHARISMA registry. A novel ablation catheter (Stablepoint) with dedicated algorithm (DirectSense) was used to measure LI at the distal electrode. Each ablation point was characterized in terms of RF delivery time, baseline LI and LI drop during ablation according to different atrial substrates: normal-voltage (NV, >0.5mV), intermediate-voltage (IV, 0.1-0.5mV) and low-voltage tissue (LV, <0.1mV). First pass isolation (FPI) was defined as successful PVI at or before completion of the first encircling lesion set regardless of visual gaps. Ablation endpoint was pulmonary vein isolation (PVI) as assessed by entrance and exit block. Data are reported as mean±SD.

Results: Atrial substrate was analyzed at 11405 (82%) sites with complete high-quality data. Ablation spots were more frequently deployed in NV areas (n=6714, 58.9%) than in areas of IV (n=4065, 35.6%) or LV (n=625, 5.5%). Both baseline LI (163.8±19Ohm) and LI drop (23.0±9Ohm) were higher in NV areas than in IV areas (baseline LI: 159.4±18Ohm, p<0.0001; LI drop: 20.5±9Ohm, p<0.0001) and LV areas (baseline LI: 157.8±18Ohm, p<0.0001; LI drop: 19.5±9Ohm, p<0.0001). RF delivery time was shorter in the NV (9±5s) than both in IV and LV areas (10±4s, p<0.0001 for IV; 10±4s, p<0.0001 for LV, respectively). The LI drop that best predicted successful ablation spots was >20Ohm for NV areas (Sensitivity=62.5%, Specificity=91.5%, PPV=99.6%, Area under the receiver-operating characteristic curve (AUC)=0.7896, p<0.0001) and >18Ohm for IV and LV areas (Sensitivity=57.7%, Specificity=94.6%, PPV=99.8%, AUC=0.8008, p<0.0001). No complication occurred. The acute procedural success was 100%, with all PVs successfully isolated in all study patients.

Conclusion: LI drop during ablation significantly differs according to atrial substrates. These findings suggest that a tailored AF ablation strategy taking into account the underling LA substrate may be useful.

CO.14.04

LOCAL ABNORMAL VENTRICULAR ACTIVITY AND DECREMTAL EVOKED POTENTIAL: DO WE NEED TO LEAVE THE SCAR ASIDE? NEW DATA AFTER 24 MONTHS FOLLOW-UP

Stefan Borov [1], Marzia Giaccardi [2], Ernest W. Lau [3], Juergen Dunst [1,4], Hendrik Bonnemeier [1,5], Benito Baldauf [1]
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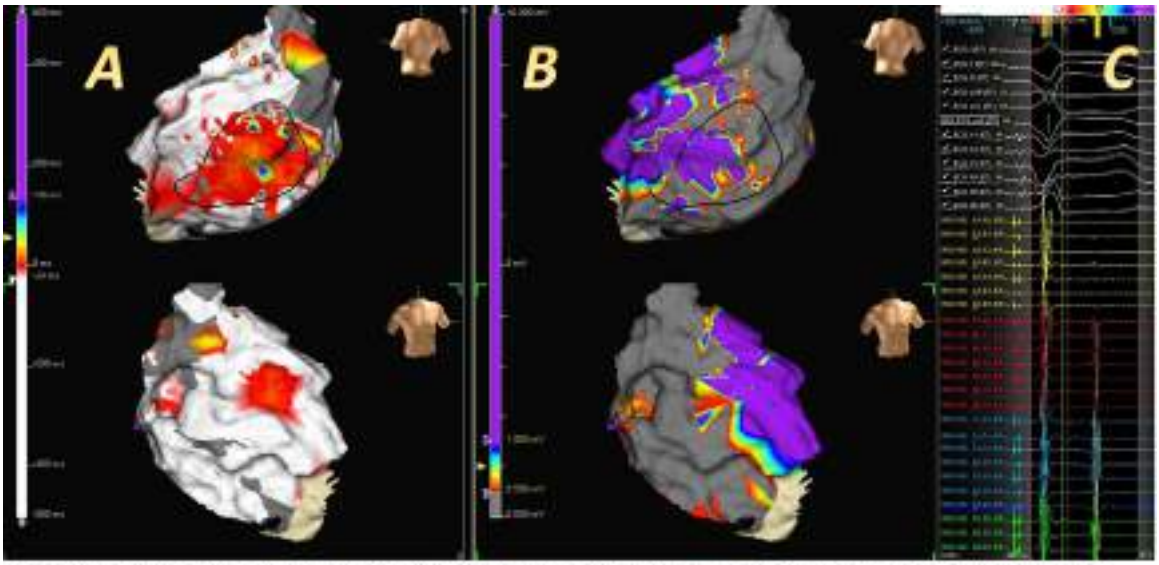
Introduction: Local abnormal ventricular activities (LAVAs) are well established as substantial targets for substrate-based ablation of ventricular tachycardia (VT). Traditionally, they are mapped with the ablation catheter. However, the distal electrode of the ablation catheter is large to be able to form an effective lesion (radiofrequency energy, cryothermia). A circumstance that is not conducive to high-resolution mapping of low-amplitude, high-fractionation electrograms that are the hallmark of LAVAs. High density mapping catheters (e.g. Abbott's Advisor HD grid catheter, Biosense-Webster's Pentaray) could reveal LAVAs that maybe missed by the ablation catheter. These additional targets for ablation could improve the clinical effectiveness of the procedure.

Methods: VT ablation was performed in sinus rhythm whenever possible. A substrate-based approach was always followed. The background is the prevention of haemodynamic instability in patients with structural heart disease. The endocardial surface of the relevant chamber (mainly the left ventricle) was first mapped using the Advisor HD grid catheter (Abbott). All LAVAs identified by the multipoles of the catheter were marked in the conventional substrate map based on the maximum local electrogram amplitude. All LAVAs identified by the mapping catheter that were located in or around 'scarred' areas or in apparently 'healthy' areas, and that did or did not exhibit decremental properties, were ablated. Other ablation strategies (e.g. scar homogenisation, core isolation, dechannelling, etc.) were not used. Post-procedural VT inducibility was not tested. Clinical outcomes of a cohort of patients who received LAVA-guided ablation only were analysed during a 24-month follow-up period. Secondary endpoints were all-cause mortality, grade 3 and 4 adverse events, and reablation throughout the entire follow-up period. Follow-up ended when reablation was required or patients died.

Results: Between Mar 2019 and Mar 2021, 22 patients (20 male; mean age 68yrs [32 - 85]) out of 59 patients who underwent VT ablation received only LAVA-guided ablation but no VT ablation in the preceding 12 months and were included in the study. Median follow-up time per participant was 636 days [156-1167]. A trans-septal approach was used in 20 of 22 patients (91%). A median of 3 [2 – 7] LAVA zones were be identified in each patient. Out of the 72 LAVA zones identified, 71 (98.6%) were modified. A single LAVA zone (1.4%) was not ablated due to proximity to the atrio-ventricular node. There were no procedural deaths. One peri-procedural pericardial effusion resolved without the need for intervention. During 24-months observation, after a median 216 [156 – 323] days, 4 patients (18%) experienced recurrent VT. Two patients (9%) underwent repeat LAVA-guided ablation, 1 (4.5%) received conventional VT ablation within the 24 months follow-up period. One patient (4,5%) was satisfactorily controlled by the ICD, ultimately receiving LAVA guided ablation after the 24 months follow-up period. During all follow-up altogether 5 patients (22.7%) experienced recurrent VT after a median of 361 [156-941] days. The fifth patient was satisfactorily controlled by the ICD until receiving a heart transplant. Nine patients (40.7%) died due to end stage heart failure, neoplasia, vascular surgery and haemorrhage during all follow-up (mean 508 [5-763]).



A; B: Voltage map of the LV endocardial surface LAVAs (tagged) were identified not only in or along scarred areas, but also within apparently healthy areas;
C: signals

CO.14.05

SEDATION STRATEGIES FOR PULSED-FIELD ABLATION OF ATRIAL FIBRILLATION WITH MONITORED ANESTHESIA CARE VERSUS GENERAL ANESTHESIA: A SINGLE-CENTER EXPERIENCE

Laura Carboni [1], Michela Casella [1], Maurizio Malacrida [2], Arcangelo Iovinella [1], Laura Cipolletta [1], Ludovica Procicchiani [1], Sara Fori [1], Francesco Masci [2], Giovanni Volpato [1], Paolo Compagnucci [1], Rita Enrico [1], Quintino Parisi [1], Andrea Natale [3], Cristopher Münch [1], Antonio Dello Russo [1]

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Background: Atrial Fibrillation (AF) ablation has been performed successfully under different methods of anesthesia and varies between centers, from general anaesthesia (GA) to conscious sedation. Recently, a novel pulsed-field ablation (PFA, Farapulse) technology based on non-thermal ablation has become available for clinical use. To date, no structured sedation strategy has been implemented for this specific energy source.

Purpose: We sought to compare a GA protocol and a monitored anesthesia care (MAC) protocol used at a high-volume center, with special consideration on efficiency and optimization of mapping and ablation conditions.

Methods: All consecutive patients (pts) undergoing AF ablation with PFA at our center were included. Briefly, PFA was delivered by a protocol-directed PVI using 2kV with eight applications per vein, that is, four applications each in the basket and flower poses. The choice of anesthesia's protocol depends on the preference and experience of operator and general conditions of the patient. The MAC protocol includes propofol as only anesthetic agent and analgesia with fentanyl. The GA protocol include propofol and sevofluorane as anesthetic agents and fentanyl and remifentanyl for analgesia. Anesthesia related complications (hypotension and hemodinamic instability, respiratory complications, postoperative nausea and vomit) operative pain, chest movements, operator and patient satisfaction have been reported. Data are reported as mean±DS.

Results: Thirty-six pts were included in this analysis, 28 (78%) indicated for ablation of paroxysmal AF and 8 (22%) of persistent AF. MAC protocol was applied in 16 (44%) procedures and GA protocol in 20 (56%) procedures. No differences were found in terms of procedural and management parameters according with these two strategies, that is MAC vs GA: 114±28min vs 121±19min for lab occupancy time, p=0.3521; 66±14min vs 81±25min for total support time, p=0.0683; 63±9min vs 63±18min for skin-to-skin time, p=0.3887; and 19±6min vs 20±5min for fluoroscopy time, p=0.3313, respectively). No major procedure-related adverse events were reported. Operative pain and chest movements were less in GA protocol, operator satisfaction was greater in GA protocol. No significant differences in post-operative nausea and vomit and patient satisfaction were found

Conclusion: The adoption of a structured workflow with proper perioperative assessment during pulsed-field ablation of AF, both general anesthesia and monitored anesthesia care showed similar efficacy and safety profile.

CO.14.06

INSORGENZA DI FIBRILLAZIONE E FLUTTER ATRIALE DURANTE INTERVENTO DI ABLAZIONE TRANSCATETERE: CONFRONTO TRA ELETTROPORAZIONE E RADIOFREQUENZA

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Introduzione: La Pulsed Field Ablation (PFA) è una energia non termica con alta selettività per il tessuto miocardico e con efficacia comparabile con le altre energie già disponibili. Nelle prime esperienze cliniche abbiamo rilevato una elevata insorgenza di aritmie atriali durante le procedure ablative.

Scopo: Comparare il tasso di insorgenza di aritmie atriali (fibrillazione atriale (FA) e flutter atriale (FLA)) durante l'impiego di PFA con una popolazione simile trattata con energia a radiofrequenza (RF).

Metodi: Abbiamo confrontato un gruppo di pazienti con FA parossistica o persistente trattata per via percutanea con PFA (PFA-group) con un gruppo simile per caratteristiche cliniche trattate con RF (RF-group) con tecnica punto-punto. Nel PFA-group tutte le procedure sono state eseguite con il catetere ablatore Farawave (Farapulse PFA System; Boston), mentre per le procedure nel RF-group sono stati utilizzati cateteri ablatori irrigati 3.5 mm (SmartTouch SF; Biosence Webster oppure TactiCath SE; Abbott). In entrambi i gruppi veniva utilizzato anche un catetere circolare (Lasso; Biosence Webster o Advisor FL; Abbott) per la mappa elettroanatomica pre- e post-ablazione. Esclusi dall'analisi finale i pazienti che si presentavano con FA/FLA ad inizio procedura ed anche i pazienti con comparsa di FA/FLA durante le punture transettali o manovre iniziali dei cateteri. Per rendere più confrontabili i gruppi abbiamo escluso pazienti nel RF-group che abbiano trattato anche altre strutture cardiache oltre all'isolamento delle vene polmonari (PVI) e della parete posteriore (PP). L'evento registrato era l'insorgenza di FA o FLA intraprocedurale.

Risultati: 32 pazienti (16 PFA-group, 16 RF-group) sono stati confrontati (età mediana 65 anni; per gruppo 16 maschi, 8/16 con FA parossistica, 8/16 FA persistente). Di questa popolazione due pazienti avevano cardiopatia ipertensiva ed uno una pregressa tachicardiomiopatia. La funzione sistolica ventricolare sinistra mediana era del 61%.
Nel PFA-group 11/16 erano a ritmo sinusale all'ingresso in sala, in 2 l'aritmia è insorta durante le punture transettali o l'iniziale manovra dei cateteri. Dei rimanenti 9/16 pazienti in ben 7 (78%) è insorta FA/FLA indotta durante l'erogazione di energia pulsata ed in 4 l'aritmia si è si è mantenuta fino a fine trattamento (esclusivamente PVI o PVI + PP). Nel gruppo RF 12/16 pazienti erano a ritmo sinusale ad inizio procedura e 2 hanno osservato FA/FLA indotta durante le punture transettali o l'iniziale manovra dei cateteri. Dei 10/16 pazienti rimanenti diversamente dal PFA-group solo in 3 (30%) è insorta FA/FLA indotta durante le diverse erogazioni punto-punto di energia a RF. L'incidenza di FA/FLA nel PFA-group è molto più frequente rispetto al RF-group (OR 8.16 , 95% CI [1.02-64.93], P=0.023).

Conclusioni: L'utilizzo di energia PFA rispetto alla RF comporta una incidenza maggiore di FA/FLA intraprocedurale. I meccanismi coinvolti possono essere molteplici: l'erogazione di energia non triggerata con il ritmo spontaneo, il treno di impulsi e l'entità dell'energia utilizzata, la stimolazione muscolare e nervosa/dolorosa evocata. Questo fenomeno pro-aritmico apparentemente secondario può essere cruciale qualora per questa energia si cerchi un impiego clinico anche nelle camere cardiache ventricolari.

COMUNICAZIONI ORALI 15

VENERDI' 22 SETTEMBRE

SALA ROSSA 2

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: ARITMOLOGIA CLINICA 2

Moderatori: B. Catuzzo (Aosta), M. Porfirio (L'Aquila)

CO.15.01

COGNITIVE IMPAIRMENT IN PATIENTS WITH ATRIAL FIBRILLATION AND ASSOCIATION WITH ADVERSE OUTCOMES: A REPORT FROM THE FAMO OBSERVATIONAL PROSPECTIVE STUDY

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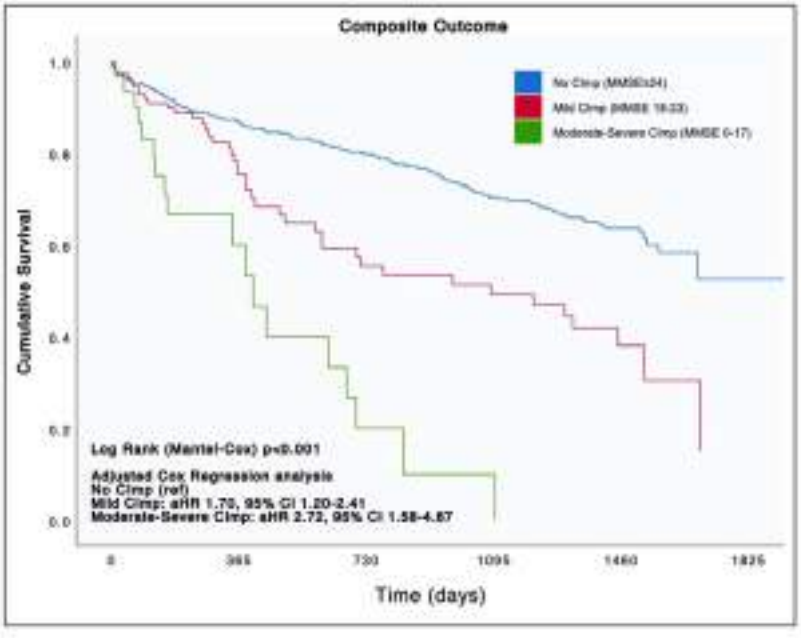
Background: Atrial fibrillation (AF) has been associated with cognitive impairment (CImp) and cognitive decline. The relationship between AF and CImp is complex and multifactorial since they share several risk factors and epidemiological links. However, there are limited data on the association between CImp and adverse outcomes in real-world patients with AF.

Purpose: To investigate the factors associated with CImp as well as the association between CImp and adverse outcomes at follow-up in a contemporary cohort of patients with AF.

Methods: We analyzed AF patients enrolled in the Fibrillazione Atriale in Modena (FAMO) prospective observational study. Cognitive status was evaluated by the Mini-Mental State Examination (MMSE). Patients were stratified according to MMSE scores obtained at baseline into 3 groups: (i) No CImp (MMSE score >= 24), (ii) Mild CImp (MMSE score 18-23) and (iii) Moderate-Severe CImp (MMSE score <= 17). The composite outcome of all-cause mortality, any thromboembolism, any acute coronary syndrome, any myocardial revascularization and new or worsening heart failure was the primary endpoint.

Results: A total of 931 AF patients were included (median age 75 [IQR 66-82], CHA2DS2VASc score median 4 [2-5], HASBLED median 1 [1-2]). A total of 772/931 (82.9%) patients had No-CImp, while 13.5% and 3.5% of the patients had Mild or Moderate-Severe CImp. Overall, 830/910 (91.2%) of the patients were treated with oral anticoagulants (OACs) without significant differences among the three groups (91.1% vs 93.5% vs 83.9%, p=0.23). At the multivariable logistic regression analysis, age (OR 1.08, 95% CI 1.05-1.10), female sex (OR 1.60, 95% CI 1.09-2.35) and permanent AF (OR 2.11, 95% CI 1.41-3.17) were independently associated with CImp (i.e. MMSE<24) After a median follow-up of 632 [IQR 199-1503] days, there were 232 (27.6%) events of the composite outcome with a significantly higher prevalence in patients with Moderate-Severe and Mild CImp vs. No CImp (60.0% vs 37.5% vs 24.6%, p<0.001). Kaplan-Meier curves showed a lower cumulative survival for the composite outcome in patients with Mild or Moderate-Severe CImp vs. No-CImp (Log Rank p=0.01, Figure). At Cox regression analysis adjusted for CHA2DS2VASc score, type of AF, malignancy, chronic kidney disease and use of OACs, both Mild and Moderate-Severe CImp were independently associated with a higher risk of the composite outcomes compared to No-CImp (Mild CImp: aHR 1.70, 95% CI 1.20-2.41, Moderate-Severe CImp: aHR 2.72, 95% CI 1.58-4.67) (Figure)



Conclusions: In a prospective observational real-world cohort of AF patients, age, female sex and permanent AF were associated with CImp. Any grade of CImp, even mild, was independently associated with a higher risk of adverse outcomes during the follow-up compared to No-CImp.

CO.15.02

SHORT DURATION HEAD-UP TILT TEST POTENTIATED WITH ORAL NITROGLYCERIN IN SUSPECTED VASOVAGAL SYNCOPE: THE FAST ITALIAN PROTOCOL

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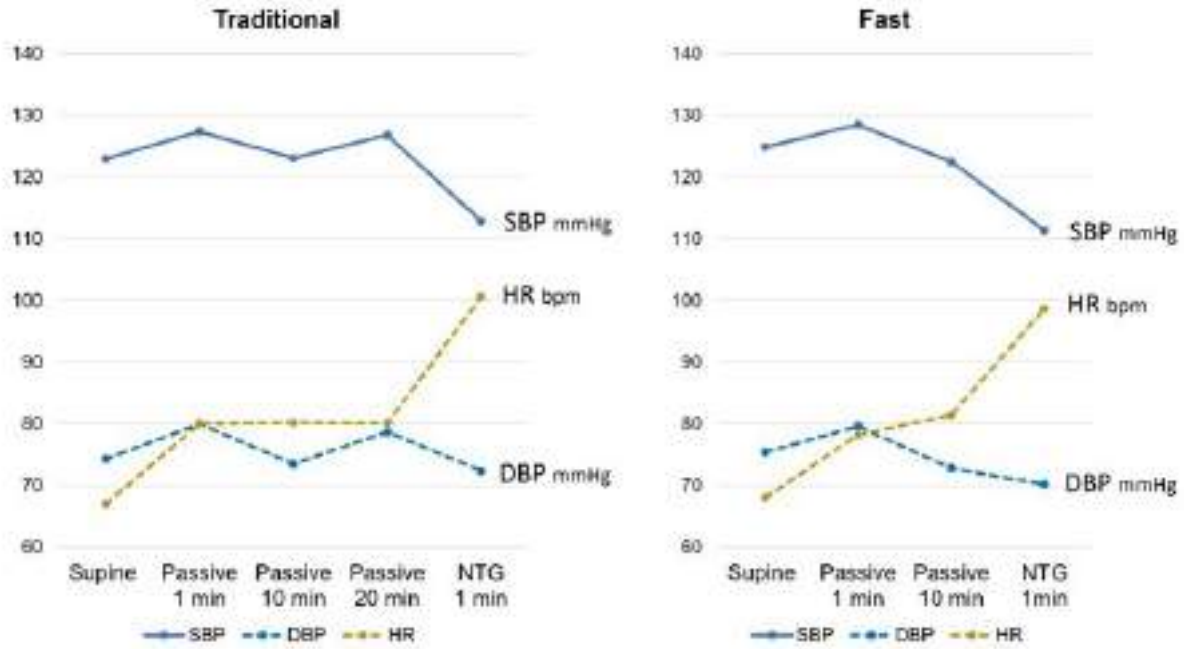
Background: The traditional nitroglycerin (NTG) head-up tilt test (HUTT) is time-consuming and the test duration is a barrier to widespread utilization in clinical practice. It was hypothesized that a short-duration protocol is not inferior to the traditional protocol as regards positivity rate and has a similar distribution of hemodynamic responses.

Method: Patients undergoing HUTT were randomized 1:1 to 10 min passive plus 10 min 0.3 mg NTG if the passive phase was negative (Fast) or to 20 min passive plus 15 min 0.3 mg NTG if the passive phase was negative (Traditional). A sample size of 277 patients for each group would have achieved 80% power to detect an expected difference of 0% with a non-inferiority margin of -10% using a one-sided t-test and assuming a significant level alpha of 0.025.

Result: A total of 554 consecutive patients (mean age 46.6± 19.3 years, 47.6% males) undergoing HUTT for suspected vasovagal syncope were randomly assigned to the Fast (n=277) or Traditional (n=277) protocol. A positive response, defined as the induction of syncope in presence of hypotension/bradycardia, was observed in 167 (60.3%) patients with Fast and in 162 (58.5%) patients with Traditional protocol. There was a trend for fewer vasodepressor responses (14.8% Fast versus 20.6% Traditional) which was significant during the passive phase (p=0.01). The optimal 10 min duration of the passive phase is consistent with the pattern of systolic BP changes observed during this phase. We showed a significantly increased HUTT positivity during the 10 min NTG phase in the Fast group compared to the first 10 min of NTG phase in the Traditional group (151 versus 101 patients, p=0.0001)

Conclusion: The diagnostic value of the Fast HUTT protocol is similar to that of the Traditional protocol and therefore the Fast protocol can be used instead of the Traditional protocol



CO.15.03

PREDITTORI ELETTROCARDIOGRAFICI DI FIBRILLAZIONE VENTRICOLARE PRIMARIA DURANTE UN PRIMO INFARTO MIOCARDICO ACUTO

Marta Ruffinazzi [1], Enrico Baldi [2], Rita Camporotondo [2], Filippo Angelini [3], Vanessa Peano [4], Cristina Picollo [4], Paolo Cerea [5], Luca Lichelli [6], Alberto Cipriani [6], Luisa Cacciavillani [6], Filippo Dossi [7], Elisabetta Petitti [8], Maria Christina Kotta [5], Maria Luce Caputo [9], Angelo Auricchio [9], Lia Crotti [10], Massimiliano Gnecchi [1], Peter J Schwartz [5], Gaetano Maria De Ferrari [4], Veronica Dusi [4]

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Introduzione: Pochi studi di esigua numerosità campionaria hanno valutato i predittori elettrocardiografici (ECG) di fibrillazione ventricolare (FV) prima della riperfusione durante un primo infarto miocardico acuto (IMA). Nessuno ha tenuto conto del tempo intercorso tra insorgenza dei sintomi ed ECG.

Obiettivi: valutare i predittori ECG di FV primaria nella popolazione PREDESTINATION (PRimary vEntricular fibrillation and suDden dEath during a firST myocardIal iNfArcTION).

Pazienti e metodi: PREDESTINATION è uno studio caso-controllo (appaiamento 1:2 per sesso ed età), prospettico, multicentrico e tuttora in corso, che arruola pazienti di 18-80 anni con un primo IMA, complicato (casi) o meno (controlli) da FV prima della riperfusione. Per la presente analisi, abbiamo appaiato 1:1 per età, sesso, sede dell'infarto e tempo sintomi-ECG, gli ECG di casi prima dell'FV e di controlli rivascolarizzati ad almeno 60 minuti dall'esordio dei sintomi. Gli ECG sono stati digitalizzati in pdf e ingranditi del 400%. Sono state eseguite, in cieco, 3 analisi (variabili in figura): intera popolazione, solo IMA anteriori e solo non anteriori.

Risultati: PREDESTINATION al momento include 1522 pazienti (media 59 anni, 83% maschi) di cui 544 casi. Tra i casi, soltanto 59 (58 ± 11 anni, 10% femmine, 64% con IMA anteriore, tempi medi sintomi-ECG 78±60 minuti, ECG-FV 23±15 minuti) presentavano un ECG pre-FV di qualità adeguata. Sia nella popolazione generale (118 ECG) che nei soli IMA anteriori (76 ECG), la presenza di extrasistolia ventricolare (CPV) o sopraventricolare è risultata associata allo sviluppo di FV (OR massimo 8.35 per le CPV negli anteriori). Nel sottogruppo degli IMA anteriori, l'intervallo Tpeak-Tend nelle derivazioni non infartuali, sia corretto per l'intervallo RR (Bazett) che per l'intervallo QT (TpTe/QT) e' risultato significativamente più lungo nei casi. Un TpTe/QT >=0.33 nelle derivazioni non infartuali è risultato associato con un OR di 4.6 (p= 0.02) di sviluppare FV.

Conclusioni: la presente analisi, volta ad indentificare predittori ECGrafici di FV primaria, è la prima ad aver effettuato un rigoroso appaiamento casi-controlli comprensivo del tempo sintomi-ECG. Oltre all'extrasistolia, noto marker e promotore di instabilità elettrica, abbiamo indentificato, soltanto per gli IMA anteriori, un unico addizionale predittore (TpTe/QT), che correla con una aumentata dispersione della ripolarizzazione e di conseguenza della refrattarietà ventricolare.

Principali variabili elettrocardiografiche studiate

Valutazione generale	Misure specifiche per derivazione
• Ritmo • Intervallo RR (medio, max, min, delta) • Presenza di extrasistolia e caratteristiche • Presenza di disturbi della conduzione atrio o intraventricolare e tipologia • Caratteristiche delle alterazioni ischemiche: ➢ Massima deviazione del tratto ST ➢ Numero di derivazioni con ST sopra o sottolivellato ≥ 0.1 mV, ➢ *ST deviation score* (somma di tutti i mm di deviazione del tratto ST), ➢ Morfologia del sopraST ➢ Presenza di onda R gigante (> 10 mm) nelle derivazioni infartuali, ➢ Presenza o meno di onde q nelle derivazioni infartuali, ➢ Distorsione del QRS in almeno 2 derivazioni contigue • Presenza o meno di ripolarizzazione precoce nelle derivazioni non infartuali.	- DII, V2, derivazione infartuale con QRS e QT più lunghi e derivazione non infartuale con QRS e QT più lughi ➢ Durata e ampiezza dell'onda P, ➢ Durata dell' intervallo PQ, ➢ Durata dell' intervallo QRS, ampiezza onde Q ed onda R, se frammentazione del QRS, ➢ Durata intervallo QT (assoluto e corretto con formula di Bazett), ➢ Durata intervallo Tpeak-Tend (TpTe) assoluto e corretto per la frequenza cardiaca (Bazett) e per l'intervallo QT (TpTe/QT).

CO.15.04

INFILTRATION OF CONDUCTION TISSUE IS A MAJOR CAUSE OF ELECTRICAL INSTABILITY IN CARDIAC AMYLOIDOSIS

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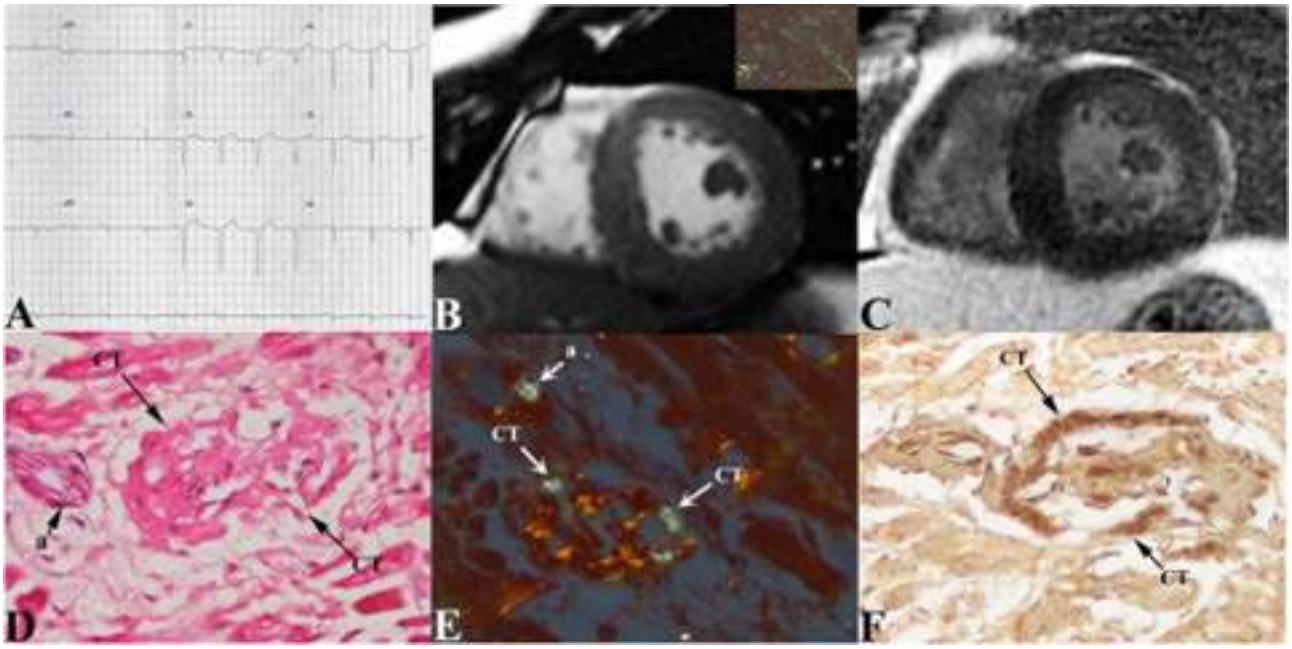
Background: Pathology of conduction tissue (CT) and relative arrhythmias in living subjects with cardiac amyloid have never been reported.

Purpose: Reporting CT pathology and its arrhythmic correlations in human cardiac amyloidosis.

Methods and Results: In 17 out of 45 cardiac amyloid patients, a left ventricular endomyocardial biopsy included conduction tissue sections. It was identified by Aschoff-Monckeberg histologic criteria and positive immunostaining for HCN4.
The degree of conduction tissue infiltration was defined as mild when minus or equal 30%, moderate when 30-70% and severe when > 70% cell area was replaced.
Conduction tissue infiltration was correlated with ventricular arrhythmias, maximal wall thickness and type of amyloid protein.
Mild involvement was observed in 5 cases, moderate in 3 and severe in 9. Involvement was associated with a parallel infiltration of conduction tissue artery. Conduction infiltration correlated with severity of arrhythmias (Spearman rho=0.8, p <0.001). In particular, major ventricular tachyarrhythmias requiring pharmacologic treatment or ICD implantation occurred in 7 patients with severe, 1 patient with moderate and none with mild conduction tissue infiltration. Pacemaker implantation was required in 3 patients with complete conduction section replacement. No significant correlation was observed between the degree of conduction infiltration and age, cardiac wall thickness or type of amyloid protein.

Conclusion: Amyloid-associated cardiac arrhythmias correlate with extent of conduction tissue infiltration. Its involvement is independent from type and severity of amyloidosis, suggesting a variable affinity of amyloid protein to conduction tissue.

Figure: Mild infiltration of CT in cardiac amyloid. Low QRS voltages with absence of brady and/or tachyarrhythmias (panel A), are associated at CMR with severe LV hypertrophy (panel B, MWT 20mm). CineMR images show some slight "patchy" areas of LGE at mid-ventricular lateral wall (panel C). Apple-green birefringent material at polarized light of Congo-red stained myocardial sections is visible in insert in panel B. Histology (Panel D, hematoxylin and eosin 400x), Congo-red staining (panel E 400x) and immunohistochemistry for HCN4 (panel F, 400x) show mild infiltration of CT (conduction tissue) (arrows).



CO.15.05

RANOLAZINA E NUOVI CASI DI FIBRILLAZIONE ATRIALE IN PAZIENTI CON SINDROME CORONARICA CRONICA: UN'ANALISI DI MONDO REALE IN UNA POPOLAZIONE ITALIANA

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Introduzione: La ranolazina (Ran) è un farmaco anti-anginoso che agisce inibendo la corrente tardiva del sodio a livello della membrana cellulare. Questo meccanismo d'azione potrebbe spiegare la presenza di effetti antiaritmici della molecola, sinergici a quelli di amiodarone e dronedarone.
Scopo di questo studio è stato valutare se l'uso della Ran in pazienti con sindrome coronarica cronica (SCC), rispetto all'impiego di altri trattamenti (No-Ran), fosse associato ad una minore incidenza di fibrillazione atriale (FA) in un'ampia popolazione italiana.

Metodi: Sono stati valutati 6.1 milioni di pazienti del Sistema Sanitario Nazionale registrati nelle Unità Sanitarie Locali partecipanti allo studio; le informazioni analizzate riguardavano i ricoveri e le patologie correlate, gli eventi clinici e le visite mediche successive all'ospedalizzazione, e la terapia farmacologica. Sono stati inclusi nell'analisi i pazienti ricoverati per qualsiasi causa e dimessi con diagnosi di angina tra il 2011 e il 2020 (codici ICD-9-CM: 413-414), in assenza di un episodio di FA nei 12 mesi precedenti (periodo di caratterizzazione). La popolazione è stata così suddivisa nelle coorti Ran (almeno una prescrizione del farmaco nel periodo considerato) e No-Ran. Il follow-up medio è stato di 4.3 anni per la coorte Ran e di 5.0 anni per la coorte No-Ran.

Risultati: Sono stati valutati complessivamente 171.015 pazienti (età media: 72 anni, uomini: 66%). Tra questi, i No-Ran erano 148.808, mentre i Ran erano 22.207. Dopo propensity score matching, le coorti Ran (N=6.384) e No-Ran (N=25.536) non differivano per età, indice di comorbilità (Charlson Comorbidity Index), uso di aspirina, beta-bloccanti, Ca-antagonisti e nitrati. Durante il follow-up, l'incidenza di FA è stata, rispettivamente, del 5.3 e del 9.6% nelle coorti Ran e No-Ran ($p<0.001$). L'analisi di regressione di Cox ha mostrato che la terapia con Ran era associata ad una riduzione del 41% del rischio di sviluppare FA (HR=0.59, 95%CI: 0.53-0.67, $p<0.001$) indipendentemente da età, sesso maschile, BPCO, insufficienza cardiaca e renale, dalle procedure cardiovascolari, e dall'uso di beta-bloccanti, Ca-antagonisti e nitrati.

Conclusioni: Questa analisi real-world di una parte ampia della popolazione italiana ha dimostrato che, in un follow-up a lungo termine, l'uso di Ran era associato a una minore incidenza di FA in pazienti con sindrome coronarica cronica.

CO.15.06

PCSK9 INHIBITORS AND INCIDENCE OF ARRHYTHMIAS IN CLINICAL PRACTICE: PRELIMINARY DATA

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Introduction: PCSK9 inhibitors (PCSK9i) are a novel drug class indicated for the treatment of dyslipidaemia. The have been shown to significantly reduce cardiovascular events in patients at high risk.
Little data is currently available regarding the correlation between the drug and arrhythmias, including the incidence of atrial fibrillation or ventricular events or other arrhytmias.
The aim of our study was to study the incidence of arrhythmias in patients before and after treatment with PCSK9i.

Methods: All consecutive patients starting treatment with PCSK9 inhibitors, either evolocumab or alirocumab, were consecutively enrolled in two high-volume Italian arrhythmia centres. All patients were treated according to ESC guidelines for primary and secondary prevention. All patients failed to achieve the recommended LDL goals with standard treatment before the introduction of PCSK9i. Patients with familial hypercholesterolemia were excluded. All arrhythmic endpoints were collected in a one-year follow up before and after the first dose of PCSK9i.

Results: 191 patients were enrolled (mean age 63±15 years, 76.6% males) and followed up for one year.
The recommended LDL threshold was reached in 45.1% of patients at very high-risk and 76.7% at high-risk. 14.9% of all patients had a history of PACs and 15.6% had a history of PVCs.
7.8% had a previous diagnosis of atrial fibrillation, 2.1% of TRNAV and 6.4% of sustained ventricular arrhythmias. These 6.4% all had an ICD implanted for secondary prevention, while another 0.9% had a primary prevention indication.
The total number of PACs in 24 hours decreased from 1260 to 800, although the difference was not statistically significant (p=0.058). Similar results were noted for PVCs (from 271 to 195 in 24 hours; p=0.089). The one-year incidence was 6.1% for atrial fibrillation, 2.3% for TRNAV and 3.8% for sustained ventricular arrhythmias, with no difference between the year before (all p=NS). Of all patients with an ICD and a history of appropriate ICD therapies (n=11, 5.7%) only one experienced appropriate therapies in the year after PCSK9i started.

Conclusions: The treatment with PCSK9 inhibitors does not significantly modify the risk of supraventricular or ventricular arrhythmias in patients with non-familial hypercholesterolemia.

COMUNICAZIONI ORALI 16

VENERDI' 22 SETTEMBRE

SALA ROSSA 1

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: MONITORAGGIO REMOTO/TELEMEDICINA/MORTE CARDIACA IMPROVVISA

Moderatori: M. Corsino (Corigliano-Rossano-CS), V. Tavoletta (Napoli)

CO.16.01

REMOTE MONITORING OF IMPLANTABLE LOOP RECORDERS REDUCES TIME TO DIAGNOSIS IN PATIENTS WITH UNEXPLAINED SYNCOPE: RESULTS FROM THE SYNCRM PROPENSITY SCORE-MATCHED, CONTROLLED STUDY

Michele Iavarone [1], Anna Rago [1], Nicola Grimaldi [2], Raffaele Chianese [3], Aniello Viggiano [4], Giuliano D'Alterio [5], Diego Colonna [2], Agostino Mattera Iacono [3], Andrea Antonio Papa [1], Antonio Rapacciuolo [4], Berardo Sarubbi [2], Antonio D'Onofrio [5], Gerardo Nigro [1], Vincenzo Russo [1]

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Background: Remote monitoring (RM) of cardiac implantable electronic devices has been consistently shown to safely reduce the burden of in-office visits while ensuring early detection of arrhythmias and adverse events. However, there is little data on RM of ILRs in patients with unexplained syncope and whether it confers enhanced diagnostic power.

Methods: SyncRM is propensity score-matched, controlled study including 133 consecutive patients with unexplained syncope who underwent ILR and followed-up by RM (RM-On Group). A historical cohort of consecutive ILRs patients was used as control group (RM-OFF group), after balancing potential confounders with a propensity score (PS) method. The primary endpoint was the time to the clinician's evaluation of true relevant arrhythmias automatically detected by ILR. We further reported the time to evaluation of asymptomatic true ILR-detected episodes and of arrhythmias eventually leading to pacemaker implantation.

Results: In a minimum study follow-up of 18 months, diagnosis of ILR-detected events presumably underlying unexplained syncope was reached in 38 patients (28.6%) of the RM-ON group and in 22 patients (20.4%) of the RM-OFF group. Median time to event evaluations was 46 days (interquartile range, 13-106) in the RM-ON group and 92 days (25-368) in the RM-OFF group. When including only the 32 asymptomatic events, the ratio of the rates of event evaluations almost doubled, with a PS-matched adjusted HR of 4.28 (CI, 1.52-11.96; p=0.006) in the RM-ON versus RM-OFF group, and a median time to evaluation of 35 days (interquartile range, 7-119) in the RM-ON group and 240 days (83-470) in the RM-OFF group.

Conclusion: In our PS-matched controlled study, RM of ILR patients with unexplained syncope was associated with 2.5-fold higher chance of evaluations of arrhythmias underlying syncope as compared to conventional follow-up with biannual in-office visits.

CO.16.02

RUOLO DEL MONITORAGGIO REMOTO PER LA STRATIFICAZIONE DEL RISCHIO ARITMICO NEI PAZIENTI "ASINTOMATICI" AFFETTI DA SINDROME DI BRUGADA: UN CASO ESEMPLARE

Vincenzo Ezio Santobuono [1], Marco Maria Dicorato [1], Stefano Favale [1], Maria Cristina Carella [1], Eugenio Carulli [2], Paolo Basile [1], Michele Luca Dadamo [1], Cinzia Forleo [1], Riccardo Memeo [1], Marco Matteo Ciccone [1], Andrea Igoren Guaricci [1]

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In accordo con le recenti Linee Guida (LG) sulla prevenzione della morte cardiaca improvvisa, la Sindrome di Brugada (SBr) può essere diagnosticata in presenza di pattern spontaneo tipo 1, indipendentemente dai sintomi, mentre un pattern di tipo 1 indotto da farmaci bloccanti canali del sodio, richiede la presenza di altre caratteristiche cliniche, come episodi documentati di tachicardia ventricolare polimorfa (TVP), fibrillazione ventricolare (FV), sincope aritmica o storia familiare rilevante. Nei pazienti con SBr e sincope inspiegata, è indicato in classe IIa l'impianto di un loop-recorder. Sebbene i dati riguardanti l'importanza della telemedicina e del remote monitoring applicati anche a questi ultimi device siano limitati, tuttavia nella pratica clinica emerge come siano uno strumento indispensabile nel percorso diagnostico-terapeutico del paziente. L'osservazione completa 24/24 ore del ritmo cardiaco, consente di agire tempestivamente in soggetti spesso giovani ancora asintomatici ma a potenziale alto rischio aritmico.

Un ragazzo di 18 anni, con familiarità paterna per episodi sincopali e cardiopatia ischemica, giungeva alla nostra ossevazione dopo visita cardiologica effettuata per attività agonistica. All'ECG veniva documentato un aspetto rSr' in V1. I parametri vitali, l'esame obiettivo e gli esami ematochimici risultavano nella norma. Il test da sforzo al cicloergometro evidenziava invece durante l'esercizio una accentuazione dell'aspetto rSr', con regressione nella fase di recupero. L'Ecocardiogramma e la RMN documentavano normale funzione biventricolare. L'ECG dinamico delle 24 ore secondo Holter non mostrava alterazioni degne di nota. Sottoposto a test alla Flecainide, il paziente risultava positivo per pattern di Brugada di tipo I indotto. In virtù di tali evidenze, in accordo con le LG ed in attesa dei risultati genetici veniva dunque impiantato un loop-recorder, con sistema di remote monitoring. Durante il monitoraggio, alcuni mesi dopo, furono riscontrati un episodio di fibrillazione atriale parossistica di 5 ore associato a TVP sostenuta.

Immediatamente contattato, il paziente negava perdita di coscienza, angor o dispnea e riferiva cardiopalmo associato a sensazione d'ansia della durata di alcune ore, a regressione spontanea, dopo intenso stress emotivo. Ricoverato presso il nostro reparto, durante la degenza veniva riscontrato pattern di Brugada tipo 1 spontaneo . Il paziente veniva dunque sottoposto ad impianto di un cardiovertitore-defibrillatore sottocutaneo. Ad oggi il paziente rimane sotto monitoraggio remoto e si reca a periodici controlli presso i nostri ambulatori di elettrofisiologia e delle cardiomiopatie.

Il nostro caso dimostra come il monitoraggio ECG continuo mediante impianto di loop-recorder iniettabili dotati degli attuali sistemi di monitoraggio remoto sia oggi uno strumento imprescindibile nelle mani del clinico, in grado di consentire una valutazione accurata del rischio aritmico e guidare decisioni terapeutiche. La telemedicina è ormai parte integrante della pratica clinica, ed è destinata a rivestire un ruolo sempre più importante. Per quelle che sono le nostre attuali conoscenze, questo è il primo caso di riscontro di TVP sostenuta, al monitoraggio remoto di un loop recorder impiantato in un giovane soggetto con pattern di Brugada tipo 1 indotto.

CO.16.03

MONITORAGGIO REMOTO: OTTIMIZZAZIONE E GESTIONE DEGLI ALLARMI DEL BIOMONITOR AL FINE DI RIDURRE GLI EPISODI FALSI POSITIVI E IL CONSEGUENTE SOVRACCARICO DI LAVORO

Simone Zanchi [1], Carmelo La Greca [1], Amedeo Prezioso [1], Joseph Kheir [1], Alberico Sorgato [1], Umberto Simoncelli [1], Salvatore Ginex [2], Luca Carozzi [2], Nunzia Di Nanni [1], Emma Fogliata [1], Mariagnela Zani [1], Domenico Pecora [1]

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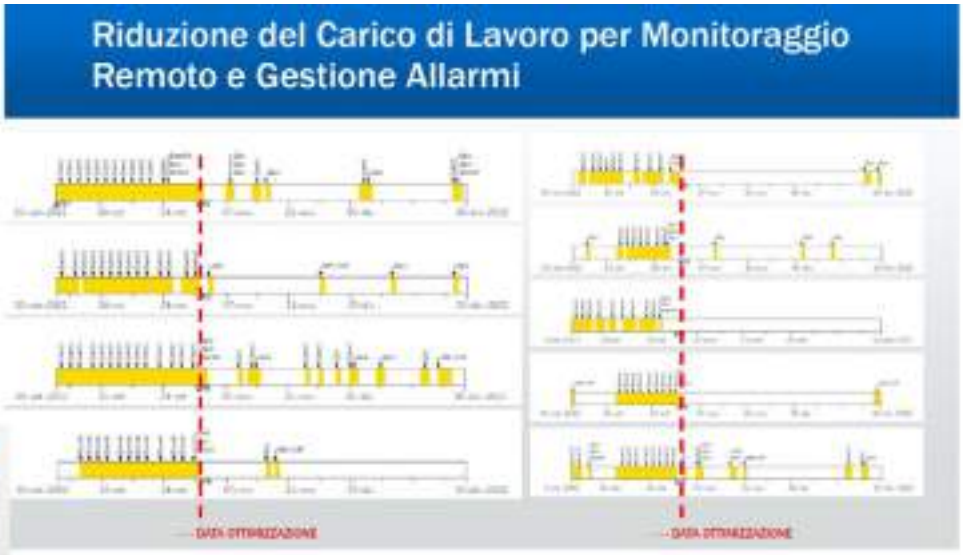
Introduzione: l'utilizzo degli Implantable Cardiac Monitor (ICM) associati all'Home Monitoring (HM) permette di seguire un gran numero di pazienti al fine di garantire una Telemedicina efficace ed efficiente. La presenza di Episodi Falsi Positivi (EFP) complicano il lavoro di analisi del monitoraggio domiciliare. Ne deriva un importante sovraccaricano di lavoro dello staff clinico, con ritardi nella diagnosi dei disturbi aritmici dei pazienti monitorizzati.

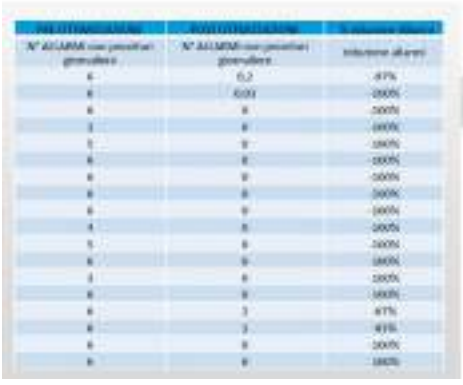
Materiali e metodi: sono stati inizialmente analizzati gli EFP su HM e sono state valutate le correzioni da apportare agli algoritmi di rilevamento delle aritmie e il corretto riconoscimento del segnale sottocutaneo. Tutti i pazienti sono stati quindi sottoposti ad una seduta ambulatoriale dedicata (della durata complessiva di 4 ore). Gli stessi sono stati infine sottoposti ad una analisi su HM per la durata di 1 mese post ottimizzazione degli algoritmi.

Risultati: sono stati sottoposti ad una prima analisi della durata di 1 mese 18 su 124 pazienti (età media 71,05 anni, 44% femmine) impiantati dal 2019 al 2022 con BIOMONITORIII (Biotronik Italia S.P.A) e seguiti in Telemedicina in HM che manifestavano la presenza di EFP. 5 Biomonitor III avevano una programmazione degli algoritmi dedicata già all'impianto mentre il resto presentava una programmazione degli algoritmi come impostata dalla casa madre . L'analisi delle trasmissioni in HM ha mostrato la media di 5,38 tracciati trasmessi giornalmente ritenute dallo staff clinico EFP. Nello specifico, 8 pazienti con EFP di fibrillazione atriale a causa di ritmo sinusale con extrasistolia sopraventricolare, 8 pazienti con EFP di bradicardia a 40 bpm, 4 pazienti con EFP di asistolia per undersensing e 3 pazienti con EFP di alta frequenza ventricolare. Dall'analisi su HM per la durata di 1 mese post ottimizzazione degli algoritmi, è derivata una media di 0,17 tracciati trasmessi giornalmente con EFP, con una riduzione del 96% di EFP, per un totale di 14 pazienti su 18 liberi da FP.

Conclusione: Il presente lavoro dimostra come attraverso un'adeguata ottimizzazione degli ICM sia possibile migliorare le performance tecnologica riducendo il carico di lavoro dello staff clinico e permettendo una diagnostica efficace e tempestiva a vantaggio del paziente. Nonostante gli ICM abbiano una programmabilità estesa, l' ottimizzazione delle performance del loop recorder al momento dell' impianto in base al tipo di segnale ed all'indicazione di impianto è sottoutilizzata, ma sarebbe vantaggiosa.

Figura. Analisi degli episodi falsi positivi pre e post-ottimizzazione degli Implantable Cardiac Monitor.





CO.16.04

INCIDENCE, CHARACTERISTICS AND OUTCOMES OF OUT-OF-HOSPITAL CARDIAC ARREST DUE TO VENTRICULAR FIBRILLATION IN THE GENERAL POPULATION: TEN-YEAR ANALYSIS FROM A SINGLE-CENTER LONG-TERM REGISTRY

Serena Bricoli, Luca Rossi, Valentina Pelizzoni, Andrea Biagi, Maria Giulia Bolognesi, Concetta Sticozzi, Greta Comastri, Federico Gibino, Stefano Nani, Enrica Rossi, Stefania Bertocchi, Maria Sole Pisati, Stefano Ferraro, Daniela Aschieri
Ospedale Guglielmo Da Saliceto, Piacenza, ITALY

Out-of-hospital cardiac arrest (OHCA) is a major public health problem and ventricular fibrillation (VF) is the most common initial rhythm when cardiac disease is the cause of arrest. It can be favorably treated with defibrillation but rapidly tends to deteriorate to non-shockable rhythms over time, so that reported survival rates vary from 3% to 10%.
Early defibrillation strategy has led to a considerable survival improvement; however, automated external defibrillators are still used in <3% of episodes of OHCA.
Here, we analyze data from a single-center emergency-medical-service (EMS) registry, involving all consecutive OHCA occurring in Piacenza from January 2013 to December 2022 in whom resuscitation or defibrillation has been attempted. The "Progetto Vita" initiative has been developed in our province more than twenty years ago with the aim of improving deployment of automated external defibrillators into the public space so that the first line involved in the chain of survival (laic bystander or policemen/health care staff) and the use of automatic external defibrillators (AED) by policemen/citizens before the arrival of the EMS personnel are crucial indicators involved in the registry since 1999. Patients presenting with OHCA due to VF were considered eligible for this analysis.

During the 10-year period of examination, 3,310 patients received medical care for OHCA; 354 of them presented VF and were considered for subsequent analysis. VF occurred prevalently at home (73%), in men (75%); mean age was 70. Bystander or laic citizen CPR was performed in 45 cases (13%) with a survival rate of 66%. AED used by either laic bystander or police was used in 45 cases (13%) with a success rate of 72%.
Cardiac comorbidities were noted in 67 patients, predominantly males, and CAD was the most common disease. Main historical, clinical, ECG, instrumental features and therapeutic management and differences in sex groups are listed in Table 1.
There were 262 deaths (mortality rate 74%), 45 of them occurring after arrival at Emergency Service. Among successfully admitted patients, VF was mostly related to coronary artery disease (70%) and STEMI was the most frequent manifestation of acute ischemic heart disease, both in males and females. Overall, 92 (26%) patients survived and were successfully admitted to intensive care unit or coronary care unit. Multivariate logistic regression analysis showed that laic-performed CPR (OR 2.61, 95% CI 1.04, 6.1, p=0.04) and use of AED (OR 7.18; 95% CI 2.66, 19.19, p<0.001) were both independent predictors of survival.
VF in the general population is still poorly predictable and mortality remains high: implementation of community involvement in early-defibrillation through publicly available AEDs appears effective in improving survival.

VF Study population (n=354)	
Clinical features	
Male sex, n(%)	265(75)
Age, median (25°-75°)	72(60-82)
Previous cardiac disease, n(%)	73(21)
Previous CAD, n(%)	56(16)
Previous EF(%), median (25°-75°)	44(35-52,5)
CPR performed by laic bystanders, n(%)	**45(13)**
AED use, n(%)	**36(10)**
Diagnosis	
STEMI, n	42
NSTEMI, n	16
Survivors features	
N(%)	92(26)
Males, n	70
Females, n	22
Nr of vessel(s) diseased	
1, n(%)	23(25)
Males, n	13
Females, n	10
2 or more, n(%)	38(41)
Males, n	33
Females, n	5
Percutaneous revascularization, n	51
CABG, n	7
EF (%) at discharge, median (25°-75°)	45(39-53)
ICD implantation, n(%)	34(37)

CO.16.05

AMPLITUDE SPECTRAL AREA (AMSA) IS ASSOCIATED WITH ONE-YEAR SURVIVAL WITH GOOD NEUROLOGICAL OUTCOME IN OUT-OF-HOSPITAL CARDIAC ARREST

Francesca Romana Gentile [1], Alessandro Fasolino [1], Elisabete Aramendi [2], Iraia Isasi [2], Sara Compagnoni [1], Enrico Baldi [3], Enrico Contri [4], Alessandra Palo [4], Federico Quilico [1], Luca Vicini Scajola [1], Clara Lopiano [1], Roberto Primi [3], Sara Bendotti [3], Alessia Currao [3], Simone Savastano [3]

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[4] *Agenzia Regionale dell'Emergenza Urgenza, Pavia, ITALY*

Background: Patients resuscitated from Out-of-Hospital Cardiac Arrest (OHCA) with shockable rhythms are reported to have better survival rates. Amplitude spectral area (AMSA) of ventricular fibrillation (VF), a surrogate for the metabolic status of the myocardium, can predict shock success and return of spontaneous circulation (ROSC). There is minimal evidence regarding its role in predicting survival from OHCA, and the evidence that exists is limited to survival at discharge.

Purpose: To test the hypothesis that the first, the maximum, the minimum and the average values of AMSA are associated with one-year survival with good neurological outcome in OHCA patients.

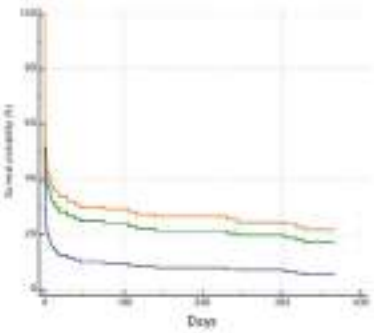
Methods: All the OHCAs with at least one shockable rhythm, that occurred from January 2015 to December 2020 and collected from an Utstein-style database, were considered. AMSA values were calculated by retrospectively analyzing the data collected by the monitors/defibrillators used in the field and by using a 2-second pre-shock ECG interval. The first, the maximum, the minimum and the average AMSA values during resuscitation were computed. Data were analyzed by using Cox regression analysis.

Results: 250 patients (84% male, median age 67 [57-77] years) with at least one computable AMSA value were included; 12% achieved ROSC and 9.4% survived at one year with good neurological outcome, defined as Cerebral Performance Category (CPC) <= 2. The first, the maximum, the minimum and the average values of AMSA were higher in patients alive one year after OHCA with CPC<=2 (first: 11.6 [9.9-14.7] vs 7.8 [5.1-11.8]; max: 15.4 [12-20] vs 9.9 [6.2-14.4]; min: 9.9 [8.5-12.2] vs 6.1 [4.3-9.6]; avg: 12.5 [10.7-15.2] vs 8.3 [5.5-12]; all p <0.01). These values showed similar areas under the curve of the receiver operating characteristic (ROC) curve for one-year survival with good neurological outcome (first: 0.77; max: 0.76; min: 0.78; avg: 0.78, p=ns). In univariable model, the survival probability with good neurological outcome was significantly lower in the first tertile (T1) of AMSA compared to the third one (T3; p<0.05). In multivariable analysis, after correction for sex, presence of bystander CPR, age, EMS arrival time, witnessed status, OHCA location, the use of mechanical CPR and the total amount of epinephrine administered, AMSA was significantly associated with probability of death or poor neurologic outcome [HR 0.5 (95%CI 0.3-0.9), p=0.03].

Conclusions: This is the first study to evaluate the association between AMSA values and one-year survival with good neurological outcome. We found that AMSA is independently associated with one-year survival with good neurological outcome in OHCA patients and that the first, the maximum, the minimum and the average of AMSA values all have similar prediction power in survival rate with CPC<=2.

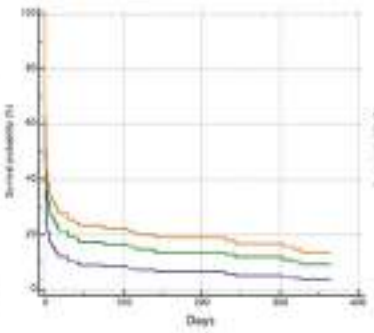
Univariable COX regression model for death or poor neurological outcome

First AMSA



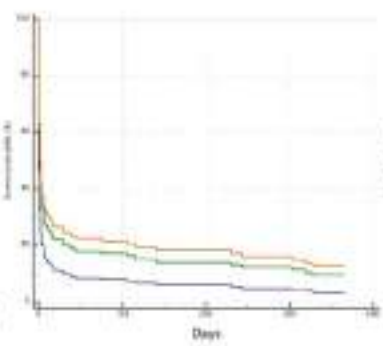
Variable	HR	95%CI	p
T1	ref		
T2	0.7	0.5-0.9	0.04
T3	0.6	0.4-0.9	0.03

Minimum AMSA



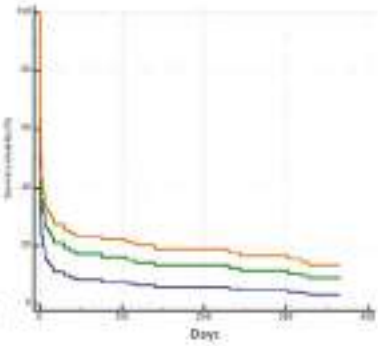
Variable	HR	95%CI	p
T1	ref		
T2	0.7	0.5-1	0.07
T3	0.6	0.4-0.9	0.015

Maximum AMSA



Variable	HR	95%CI	p
T1	ref		
T2	0.7	0.5-0.98	0.04
T3	0.6	0.4-0.9	0.01

Average AMSA



Variable	HR	95%CI	p
T1	ref		
T2	0.7	0.5-1	0.055
T3	0.6	0.4-0.9	0.01

CO.16.06

SHOULD I HAVE KNOWN BETTER? A REAPPRAISAL OF A SUDDEN DEATH CASE IN MITRAL PROLAPSE

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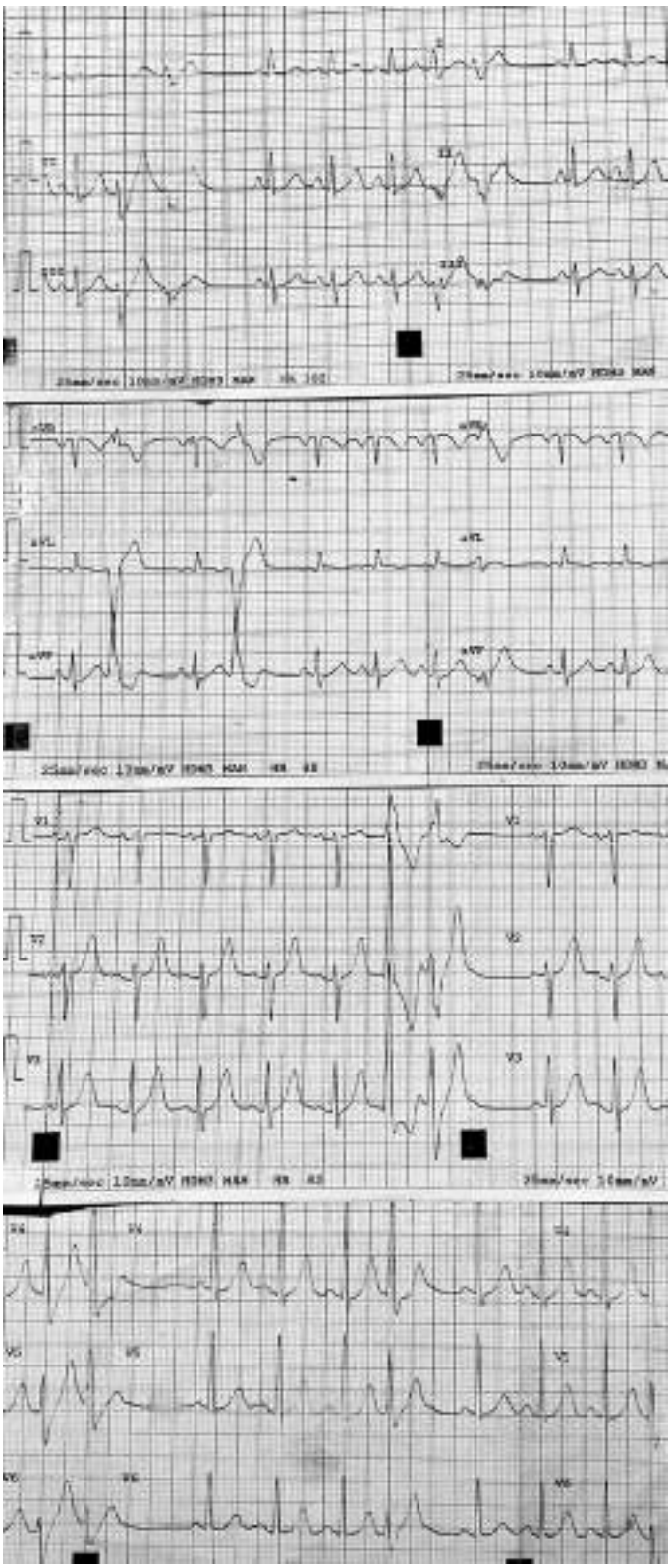
On January 2021 a 24 year old triathlon female athlete came to our attention for cardiological consultation, because of ventricular arrhythmias found at the pre participating competitive sports evaluation. There was no history of sudden death of first degree relatives, her mother had a mitral valve prolapse (MVP).
The 12 lead ECG (figure 1): showed sinus rhythm, 100 bpm, normal QRS axis and normal conduction intervals (PR 140 msec, QRS 60 msec). QRS fragmentation is not observed. In precordial lead V1 there was a biphasic P wave with normal duration (100 msec). The repolarization was normal with a QTc (Bazzett) of 430 msec. There were several premature ventricular contractions (PVCs), presenting a superior and rightward axis, 140 msec duration, right bundle block morphology, R/S in V6<1, both isolated and couplets, with the shortest coupling interval of 360 msec. We also observe subtle PVC morphology variations suggestive of multiple exits from a single source.
During the Exercise test (figure 2): There were frequent PVCs with the same morphology described at the 12 lead ECG, isolated, bigeminal and couplets. There were also present 3 and 4 beats polymorphic non sustained ventricular tachycardia (NSVT). At the at maximum heart rates there was a reduction of PVC burden.
The MRI evidenced a prolapse of the mitral posterior lead (8 mm), a mitroannular disjunction (6 mm) and systolic curling (3mm). The left ventricular volumes were increased with a preserved normal ejection fraction (70%). The right ventricular dimensions were within normal range. There was no evidence of oedema, biventricular late gadolinium enhancement was absent.
The diagnosis was: complex ventricular arrhythmias in mitral valve prolapse with some markers of arrhythmic risk and posterior leaflet prolapse causing mild regurgitation.
Therapy with propanolol 40 mg bid was initiated, and competitive sports participation was not anymore allowed.
On the 1st July 2021, in the afternoon, the patient was found dead, leaning over her university books.
The autopsy concluded: sudden death caused by arrhythmogenic right ventricular cardiomyopathy
The genetic analysis found a variant of uncertain significance in the FLNA gene, a heterozygous 9-nucleotide deletion c.4304-25_4304-17del in intron 25 of FLNA gene, which is foretold to be responsible for the activation of a cryptic splicing site.
Generally MVP without significant degenerative MR or LV dysfunction has a good prognosis. Only recently has the entity of arrhythmic mitral valve prolapse (AMVP) been better described, considering a prominent phenotype and the increased incidence of ventricular arrhythmias.
The decision to implant an ICD, which remains the only effective therapy in preventing sudden death in this subset of patients, even if subcutaneous, in an asymptomatic 24 year old sportive woman is not a simple issue.



COMUNICAZIONI ORALI 17

VENERDI' 22 SETTEMBRE

SALA INDACO

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: I MIGLIORI POSTER

Moderatori: V.M. Bonfantino (Bari), G. Ventura (Belvedere Marittimo-CS)

CO.17.01

NOVEL CRYOBALLOON ABLATION SYSTEM FOR PULMONARY VEIN ISOLATION: MULTICENTER EVALUATION OF COOLING CHARACTERISTICS AND LONG-TERM OUTCOME

Alessia Agresta [1], Claudio Tondo [2], Saverio Iacopino [3], Stefano Bianchi [4], Giuseppe Stabile [5], Gemma Pelargonio [6], Domenico Pecora [7], Ruggero Maggio [8], Gaetano Fassini [2], Fabrizio Tundo [2], Andrea Petretta [3], Pietro Rossi [4], Massimo Moltrasio [2], Maurizio Malacrida [9], Pasquale Petrucci [9], Antonio De Simone [1]

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Background: Cryo-balloon (CB) ablation has proved to be an effective and safe approach for achieving pulmonary vein isolation (PVI) in patients with atrial fibrillation (AF). Initial experience suggests that the POLARx CB system has a similar procedural efficacy and safety than prior CB technology.

Objective: To provide insight into cooling characteristics and 1-year outcome of both paroxysmal (pAF) and persistent AF (PsAF) CB ablation from a large, multicenter clinical setting.

Methods: A total of 166 patients with pAF and PsAF were included and underwent POLARx CB-based PVI in 7 experienced centres. Protocol-directed CB application (CBA) was delivered for 180 sec or 240 sec according to operator's preference for isolation achieved in <= 60 sec, or 240 sec if isolation occurred >60 sec or when time to isolation (TTI) was not available. The ablation endpoint was PVI as assessed by entrance and exit block. All patients completed at least a 12-month follow-up after the procedure.

Results: From 166 pts (PAF: n=125, 75.3%; PsAF: n=41, 24.7%) a total of 813 CBAs were delivered. Two transient phrenic nerve palsy were observed, with full recovery in the 48 h post procedure; no major procedure-related adverse events were reported. During the blanking period 7 (4.2%) pts experienced an early recurrence of AF, whereas after the blanking period, over a mean of 412±68 days of follow-up, 18 pts (10.8%) suffered an AF recurrence (8.8% with pAF vs 17.1% with PsAF, p=0.15; hazard ratio of 2.04, 95%CI: 0.8 to 5.2, log-rank p=0.133). CBAs with measured TTI<90s and TTI<60s occurred more frequently in the group of pts without AF recurrence than in the group of pts with recurrences (TTI<60s: 88.1% vs 74.1%, p=0.009; TTI<90s: 76.5% vs 61.1%, p=0.019, respectively). Both deflation time and total deflation time were longer in the group of pts without AF recurrences than that whit recurrences (28.3±15s vs 25.4±15s for deflation time, p=0.0078; 48.0±20s vs 43.8±20s, p=0.0079 for total deflation time).

Conclusions: In this large multicentre assessment, the novel POLARx cryoballoon shows a promising acute and long-term efficacy in both paroxysmal and persistent AF patients.

CO.17.02

UNNECESSARY PACING DUE TO INAPPROPRIATELY SHORT AUTO POST-VENTRICULAR ATRIAL BLANKING CAN LEAD TO DECOMPENSATED HEART FAILURE

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A 75-year-old men with non-ischemic cardiomyopathy (NICM) and bicameral ICD for secondary prevention of ventricular events and sick sinus syndrome was referred for a first episode of decompensated heart failure three months after a ventricular tachycardia ablation. Device interrogation revealed normal pacing behaviour with more high percentage of ventricular pacing compared with other previous device controls. Regular A:V conduction was present. No troubles were observed. During hospitalisation continuous ECG monitoring revealed frequent isolated PVC with late atrial retroconduction tracked to the ventricle. this behaviour was hence appropriate but with an 'unnecessary' pacing related to auto PVARP algorithm after every spontaneous PVC. When heart rate exceeded over than 80 bpm automated shorter PVARP explained VA retroconduction and consequent frequent ventricular paced activity always hidden to the system. Turning off the algorithm the phenomenon disappeared. At the follow up the patient became compensated without increased diuretic drugs.

CO.17.03

THE PREDICTIVE ROLE OF LEFT VENTRICULAR CATHODE TOPOGRAPHY RELATIVE TO CMR-DETERMINED LATEST MECHANICAL ACTIVATION AND SCAR SEGMENTS ON RESPONSE TO CARDIAC RESYNCHRONISATION THERAPY

Michele Bertelli [1], Frebus Van Slochteren [2], Emanuele Rondanina [3], Mirco Lazzeri [4], Alessandro Carecci [4], Andrea Quaranta [4], Andrea Angeletti [4], Alberto Spadotto [4], Giulia Massaro [4], Jessica Frisoni [4], Igor Diemberger [4], Cristian Martignani [4], Nazzareno Galié [4], Mauro Biffi [4], Matteo Ziacchi [4]

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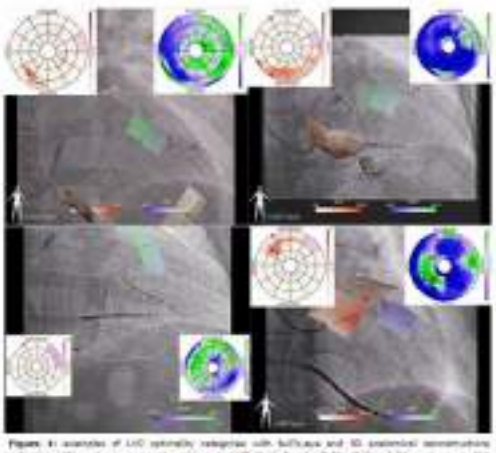
Background: Cardiac resynchronisation therapy (CRT) is still burdened by considerable rates of non-response. Herein left ventricular cathode (LVC) positioning has the greatest room for optimisation. Nonetheless, a purely CMR-based approach exploring LVC topography relative to both mechanical delay and tissue viability is yet to be investigated.

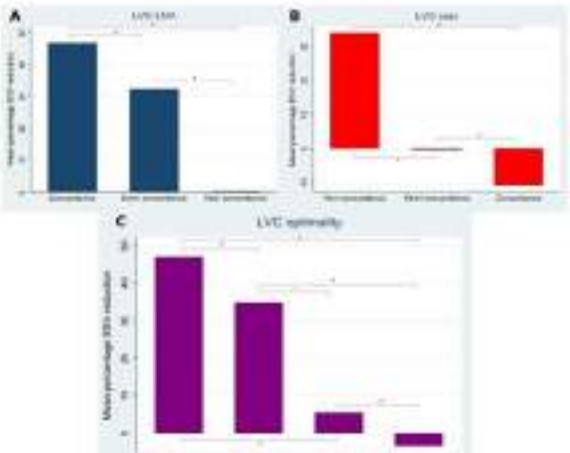
Purpose: To retrospectively analyse the effect on reverse remodelling of CMR-determined LVC topography relative to latest mechanical activation (LMA) and scar segments in a CRT population.

Methods: This is a retrospective single-centre analysis of 104 CRT-D/P consecutive patients with CMR performed within 6 months before implantation. Electrical delay (Q-LV time) was mapped on all suitable veins with LV lead positioning and cathode programming set in the region of latest electrical activation. Through CART-Tech® software analysis of CMR images, 36-segment 3D anatomical models of radial strain and scar were superimposed on their corresponding fluoroscopy images (Figure 1). Patients were then stratified based on LVC concordance (within), semi-concordance (adjacent) or non-concordance (at least one segment away) with LMA and scar segments (defined as segments with >50% scar transmurality). Follow-up echocardiography was performed at least 6 months after implantation and the degree of reverse remodelling expressed as percentage reduction in end-systolic volume (ESV).

Results: Of the 104 patients, 36 were excluded due to suboptimal CMR quality (8), switch to conduction system pacing (5), loss to follow-up (18) or death within 6 months of implantation (5), leaving a total of 68 (63 CRT-D and 5 CRT-P). LVC concordance with LMA was associated with a statistically significant improvement in reverse remodelling (Figure 2, A), while the contrary occurred with regards to scar (Figure 2, B). A greater impact of distance from scar compared to LMA proximity was observed, thus a combined analysis of LVC topography relative to both was developed accordingly. Patients were stratified into 4 categories of LVC optimality: optimal (LVC-LMA concordance + LVC-scar non-concordance), semi-optimal (LVC-LMA semi-concordance + LVC-scar non-concordance), suboptimal (LVC-LMA non-concordance + LVC-scar non-concordance), and unfavourable (LVC-scar semi-concordance or concordance regardless of LVC-LMA). The unfavourable group had higher rates of atrial fibrillation, non-LBBB QRS morphology and higher scar burden, while no significant differences were observed in the other 3 groups. This classification appears to predict the degree of reverse remodelling, ESV reduction being more pronounced the more optimal the group (Figure 2, C).

Conclusions: CMR-determined LVC topography relative to LMA and scar segments predicts left ventricular reverse remodelling in Q-LV-guided CRT implants. Optimisation of CRT response may thus benefit from a CMR-based approach assessing mechanical delay and tissue viability to guide LVC positioning.





CO.17.04

PERIOPERATIVE AND POSTOPERATIVE PAIN IN PATIENTS UNDERGOING SUBCUTANEOUS IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR PLACEMENT

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Background: The recent Avoiding Transvenous Leads in Appropriate Subjects (ATLAS) Trial demonstrated that the subcutaneous implantable cardioverter–defibrillator (S-ICD) reduces lead-related complications without significantly compromising the effectiveness of ICD shocks, but with more early postoperative pain.

Purpose: To assess the perioperative and postoperative pain during S-ICD implantation in current clinical practice and evaluate the influence of implantation techniques.

Methods: We analyzed 255 consecutive patients (84% male, 52±16 years, body mass index 26±4 Kg/m^2, ejection fraction 42±16%) who had undergone S-ICD implantation from 2017 to 2022. The primary endpoint was pain during S-ICD placement. The secondary outcome measure included static and dynamic pain intensity 6 hours after the end of the procedure. Patients were asked to rate pain intensity on a 10-point visual analogue scale from 0 (no pain) to 10 (worst imaginable pain).

Results: The mean procedure duration was 62±22 minutes. The serratus anterior plane block (SAPB) was performed in 161 (63%) patients for anesthesia/analgesia, and 161 (63%) patients underwent the defibrillation testing. Implantation success was reported in all patients with no operative complications. In the overall group, the pain intensity was 2 [range: 1-8] during the implantation procedure, and 1 [1-7] for both static and dynamic pain, 6 hours after the end of the procedure. Significantly lower values were recorded during implantation in the SAPB group (p=0.010) and among those who did not undergo the defibrillation testing (p=0.008). The adoption of the SAPB (coefficient: -0.54, p=0.047) and the omission of defibrillation testing (coefficient: -0.70, p=0.028) remained associated with less pain during implantation after correction for age, sex, body habitus, ejection fraction. Six hours after the end of the procedure the static and dynamic pain intensity remained lower among those with omitted testing (p=0.018 and 0.004, respectively).

Conclusions: In current clinical practice, S-ICD implantation is associated with very little discomfort. The adoption of novel anesthetic techniques and the omission of defibrillation testing is associated with lower pain levels.

CO.17.05

CAN WE IMPROVE RESPONSE TO HIS BUNDLE PACING: A SMALL CASE SERIES HIGHLIGHTS A NEW APPROACH

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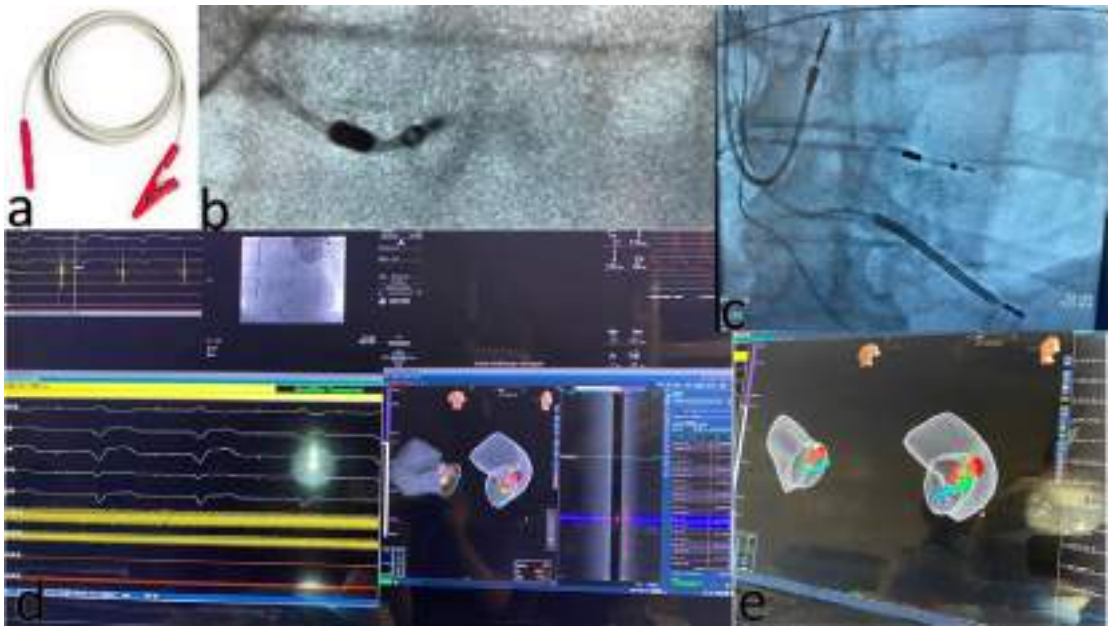
His-bundle and left-bundle pacing are evolving techniques of pacing that take the approach of physiological excitation propagation in the heart using the conduction system. In the best case, this enables complete cardiac resynchronisation, which has been shown in initial studies to be at least comparable to classical cardiac resynchronisation therapy and better than right ventricular, i.e. apicoseptal, pacing alone. In patients who are candidates for implantation of a cardiac implantable electronic device (CIED) and in whom a high proportion of ventricular pacing is to be expected, physiological pacing should therefore be preferred in order to avoid deterioration of cardiac function due to non-physiological pacing. Compared to His bundle pacing, stimulation of the left bundle - anterior/posterior fascicle - has a better response, more stable pacing thresholds and better success in correcting pre-existing bundle branch block. Placement of a CIED electrode is not trivial with this stimulation technique. We started a small case series (n=6) in March 2022. We implemented the CIED electrode (which could be a CS electrode or a His bundle electrode in patients in whom we could not place the electrode in the CS) with an alligator clip [Figure 1a] into our mapping system ESI NavX (Abbott) as a mapping catheter, created a map of the target area with the CIED electrode, and simultaneously derived an intracardiac ECG to live-derive the cycle length and thus the success of the excitation propagation [Figure 1b-e]. In contrast to the left ventricular mapping/right ventricular pacing combination, this procedure is simplified and uses less ressources.

Physiologic pacing adotta l'approccio della propagazione fisiologica dell'eccitazione nel cuore utilizzando il sistema di conduzione. Nel migliore dei casi, ciò consente una risincronizzazione cardiaca completa, che negli studi iniziali si è dimostrata almeno paragonabile alla terapia di risincronizzazione cardiaca classica e migliore della sola stimolazione ventricolare destra, cioè apicosettale. Nei pazienti candidati all'impianto di un dispositivo impiantabile elettronico cardiaco (CIED) e nei quali si prevede un'elevata percentuale di stimolazione ventricolare, la stimolazione fisiologica dovrebbe quindi essere preferita per evitare il deterioramento della funzione cardiaca dovuto alla stimolazione non fisiologica. Rispetto alla stimolazione del fascio di His, la stimolazione del fascio sinistro - fascicolo anteriore/posteriore - ha una risposta migliore, soglie di stimolazione più stabili e un migliore successo nella correzione del blocco preesistente. Il posizionamento di un elettrodo CIED non è banale con questa tecnica di stimolazione. Abbiamo iniziato una piccola serie di casi (n=6) nel marzo 2022. Abbiamo implementato l'elettrocatetere CIED (che poteva essere un elettrocatetere sinus coronarius o un elettrocatetere del fascio di His nei pazienti in cui non potevamo posizionare l'elettrocatetere nel sinus coronarius) con una clip a coccodrillo [Figura 1a] nel nostro sistema di mappatura ESI NavX come catetere di mappagio, abbiamo creato una mappa dell'area target con l'elettrocatetere CIED e contemporaneamente abbiamo ricavato un ECG intracardiaco per rilevare in diretta la lunghezza del ciclo e quindi il successo della propagazione dell'eccitazione [Figura 1b-e]. A differenza della combinazione mappatura ventricolare sinistra/pacing ventricolare destro, questa procedura è semplificata e risparmia un catetere di mapping.



CO.17.06

SUBCUTANEOUS IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (S-ICD) IMPLANTATION IN PACEMAKER RECIPIENTS WITH COMPLEX CONGENITAL HEART DISEASE. A SINGLE-CENTER EXPERIENCED BASED STUDY

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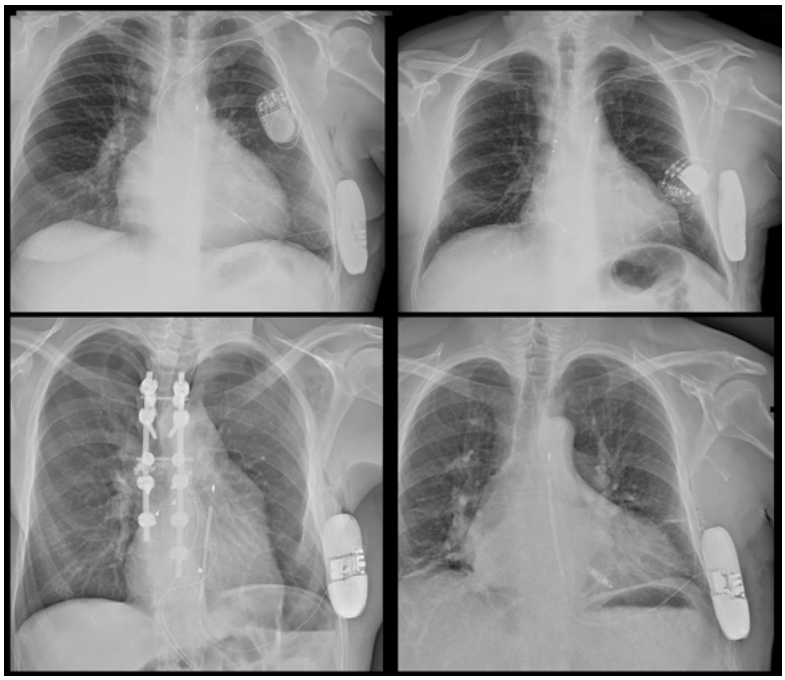
Background: Subcutaneous implantable cardioverter defibrillator (S-ICD) is widely accepted therapy in congenital heart disease (CHD) patients at risk of life-threatening ventricular arrhythmias or sudden cardiac death when pacing is not required. Occasionally, pacemaker (PM) recipients will subsequently develop an indication for a cardioverter defibrillator. In such a scenario, common options for upgrade include implantation of an additional transvenous ICD lead with or without extracting the pre-existing pacing lead. Sometimes such an approach may not be possible or desirable in CHD patients due to central venous obstruction, various anatomic constraints, technical difficulties, high-risk procedures or patient preferences. The addition of a S-ICD to an existing transvenous or epicardial pacing device may be another option, instead of implantation of a transvenous ICD lead. Although the S-ICD has been advocated to be ideally suited to the adult congenital heart disease (ACHD) population, there is a very limited clinical experience with this technology in PM recipients with complex CHD. Moreover, the use of S-ICD in complex CHD who have had already PM devices implanted implies some specific considerations.

Methods: We reviewed the data and studied the indications for S-ICD in complex CHD with previous PM and discuss its usefulness in our clinical practice.

Results: From a large cohort of 345 patients enrolled in the S-ICD "Monaldi care" registry, that encompass all the patients implanted in the Monaldi Hospital of Naples, we considered 11 consecutive complex CHD patients (10M/1F aged 40.4 ± 18.4 years) who underwent S-ICD implant after a previous PM implant, from February 2015 to October 2022. Seven had endocardial-lead PM (2 DDD PM, 3 VVI PM, 2 VDD PM), three had epicardial-lead PM (2 DDD PM, 1 CRT-P device) and one a leadless PM at the time of S-ICD implant. Mean follow-up was 23.7 ± 22.5 months. All the patients showed a good compliance to the device system with no complications (infections or skin erosions). Only one patient experienced an inappropriate shock (IAS) due to double counting (T wave oversensing); after re-programming the conditional shock zone, no other IAS occurred.

Conclusions: Our series demonstrate that S-ICD treatment combined with an endocardial, epicardial or leadless PM devices may be a safe and effective approach in CHD patients. The combination of the S-ICD with a PM device is technically feasible and offers both cardiac stimulation and arrhythmia protection even in complex CHD patients, avoiding PM upgrading to transvenous ICD system, abandoned leads or life-threatening lead extraction. However, there are important issues with regards to testing and programming that need to be addressed at the time of implantation.



CO.17.07

LEADLESS PACEMAKER IMPLANTATION IN DEXTROCARDIA WITH SITUS VISCERUM INVERSUS: A CASE REPORT AND LITERATURE REVIEW

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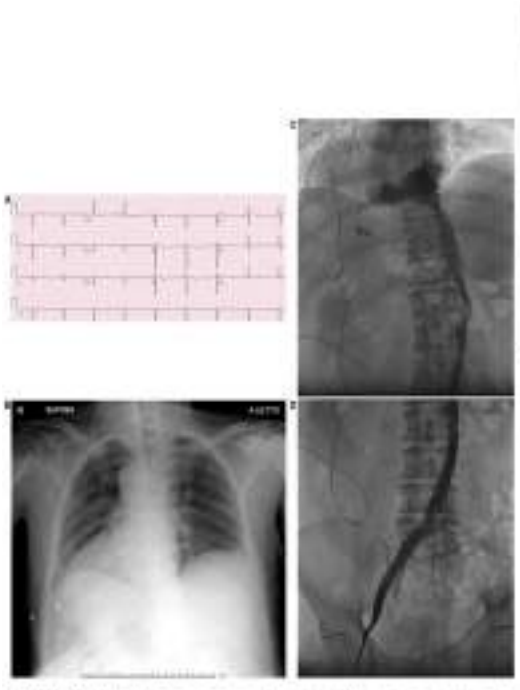
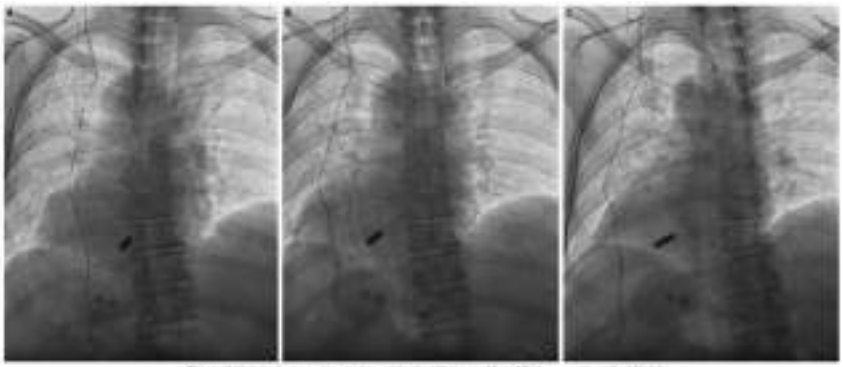
Introduction: Leadless pacemaker implantation (LPI) has fewer device complications and reduced chance of infection compared to conventional pacemakers. Dextrocardia with situs viscerum inversus (DC+SVI) is a rare condition, which seldom leads to cardiac complications. However, its presence poses a challenge to operators in cardiac procedures. LPI reports in DC patients are scarce. We report a case of LPI in a DC+SVI patient, followed by a brief but comprehensive literature review.

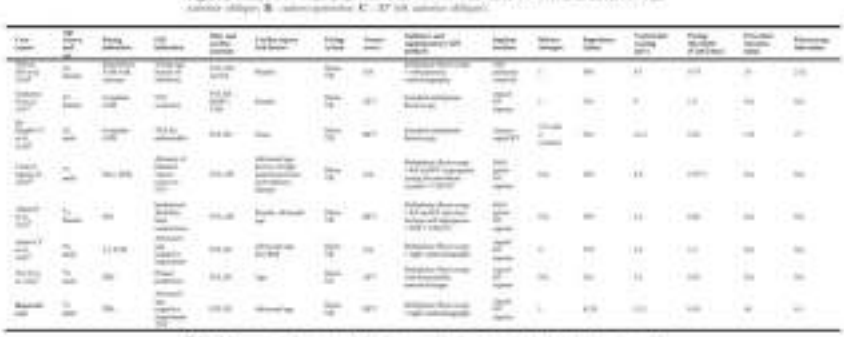
Case Report: After obtaining a double right femoral venous (RFV) access, phlebography of the inferior vena cava (IVC) was performed, showing a left-sided course with outlet on the right atrium (RA), which was left-sided as well. Ventriculography with a pig-tail catheter was performed to document precise right ventricular (RV) anatomy. After progressive dilatation of the RFV with sheaths of increasing size (16 and 20 Fr) over a stuff wire, a dedicated 27 Fr introducer was placed in the RFV and was advanced in the IVC up to the IVC-RA junction. Using a dedicated steerable delivery system, a Micra VR single-chamber device (Medtronic Inc., Minneapolis, Minnesota, USA) was advanced in the RA and then, after crossing the tricuspid valve, was implanted on the apical RV septum on the first attempt. A pull-and-hold test demonstrated adequate fixation of 3 out of 4 tines. Before and after device release, electrical parameters were within normal range, with a final pacing threshold of 0.38 V @ 0.34 msec, ventricular sensing 12.2 mV, impedance 1220 ohm. The device was programmed in VVI 60 bpm mode with rate hysteresis 50 bpm. The pigtail catheter and the delivery system were removed and RFV hemostasis was obtained by manual compression. Procedural time was 40 min, fluoroscopy time was 4.3 min. Pre- and post-procedural TTE excluded pericardial effusion.

Discussion: DC+SVI is a rare condition which rarely leads to cardiac complications3,4. However, its presence poses a challenge to the operators of cardiac procedures. In particular, due to its extremely rare incidence, PPI and LPI reports in DC patients are scarce.
In particular, there are no reports of LPI in isolated DC without SVI or other congenital heart diseases (CHD).
All reported cases of LPI in patients with DC or dextroposition of the heart are summarized in Table 1, with a detailed description of acute electrical parameters, patient- and procedural-related details and supplementary methods used to facilitate implantation.

Conclusion: We reported a case of LPI in a DC+SVI patient. Furthermore, we provided a brief but comprehensive review of all other cases available in literature. Although extremely rare and seldom leading to cardiac complications, DC poses a real challenge to operators if the patient requires permanent pacing. Therefore, with this article, we hope to encourage use of LPI as a safe and feasible pacing option in such patients.







CO.17.08

LEADLESS PACEMAKER IN COMPLEX ANATOMY: THE JOURNEY TO THE LEFT VENTRICLE OF A MICRA IN A MAN WITH TRANSPOSITION OF GREAT ARTERIES

Paolo De Filippo, Giovanni Malanchini, Gabriele Ferrari, Anna Merlo, Claudio Scanguzzi, Paola Ferrari
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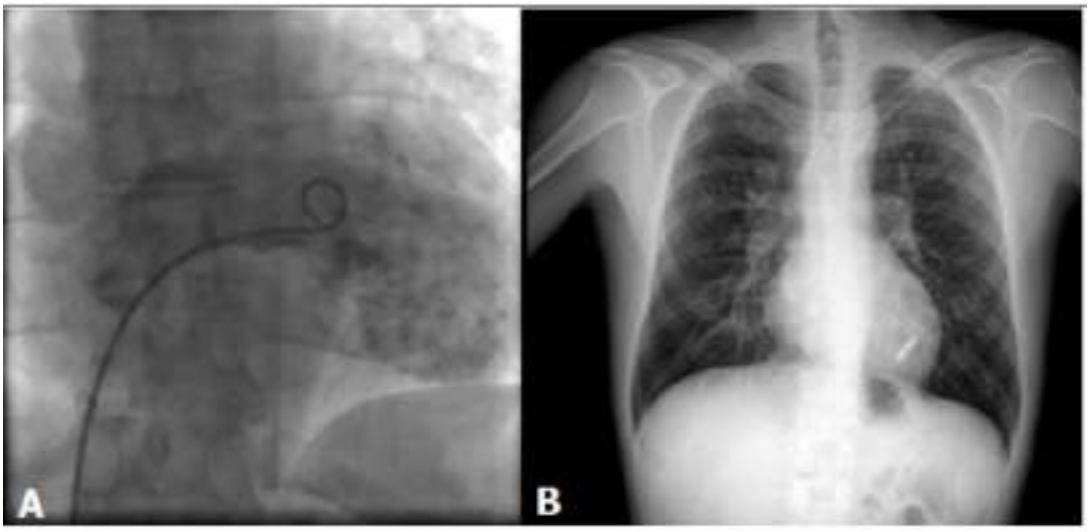
A 47 years-old man was referred to our Centre for pacemaker implantation after dual chamber pacemaker extraction due to pocket infection.
The patient has congenital transposition of the great arteries, corrected at 7 months by atrial switch procedure (Mustard). At the age of 20 he was diagnosed with initial sinus node disfunction. 18 years later he was implanted with dual-chamber pacemaker for tachy-brady syndrome. During subsequent years incessant atrial arrhythmias were considered permanent and the pacemaker re-programmed in VVI mode.
In July 2022 he underwent generator change, complicated by early pocket infection, confirmed with 18FDG-PET and blood cultures. So, he was referred to tertiary Centre for lead extraction.
After 35 days of antibiotic therapy (with cefazolin) the patient demonstrated negative microbiological test.
He was, then, referred to our Centre for pacemaker implantation after extraction. The telemetry ECG monitoring demonstrated permanent atrial tachycardia and infrequent but symptomatic diurnal and nocturnal pauses. After thorough discussion with the patient and Cardiologists we decided to schedule him for leadless pacemaker implantation.
Due to known right femoral vein occlusion, we decided to use a left femoral vein approach. A pigtail catheter was introduced to verify anatomical connections and sizing trough the systemic venous baffle (image 1 A). We advance a ultra-stiff guide-wire to the sub-pulmonary left ventricle (LV) and positioned the standard Micra delivery system to the region of septal apex of the LV. Release of the leadless pacemaker was performed in a standard manner. When coming to the tether pull back, the unusual retraction and curve of the delivery system made the tension felt higher than normal.
All 4 tines were engaged with excellent device stability. The electrical parameters were very good (R wave sensing 8 mV, impedance 530 Ohm, pacing threshold 0.5x0.24 V x msec). Post implant course was normal. Chest X-ray (image 1B) showed correct device position, and the patient was discharged home in the first day after procedure.

Conclusion: we describe a case in which leadless pacemaker implant was chosen after transvenous system infection, and was performed safely and efficaciously even in complex anatomy using standard equipment.
Leadless pacemakers are standard of care for implantation after lead extraction due to infection. Their implanting procedure is certified for RV septal placement. Management of unusual anatomies in this setting is still a clinical challenge.



CO.17.09

POCKET HISTOLOGY AT CARDIAC IMPLANTABLE ELECTRONIC DEVICE REPLACEMENT

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Background: Repeated procedures involving the cardiac implantable electronic device (CIED) pocket increase infection risk, and the extension of pocket adhesions may prolong procedure time. Nowadays, few data on pocket histology at the time of CIED replacement are available on literature.

Objective: The aim of this study was to describe CIED pocket histology in a cohort of patients undergoing CIED replacement or upgrade.

Methods: All consecutive patients undergoing CIED reopening procedures at our center between November 2019 and May 2020 were enrolled. Subclinical pocket infection was ruled out by physical
inspection and laboratory parameters before the procedure. Pocket tissue specimens from the anterior and posterior wall of the pocket were obtained intraoperatively. A systematic histological analysis of capsular thickness, fibrous connective tissue, neovascularization, inflammation, and calcifications was performed.

Results: 30 patients (6 women, 20%) were enrolled. Mean capsular thickness was 0.8 ± 0.3 mm in the anterior wall and 1.1 ± 0.4 mm in the posterior one. Subcapsular fibrosis was mild and multifocal in the anterior wall, moderate and focal in the posterior one. Neovascularization was focal in most cases, and vessel remodelling mainly involved tunica media. Chronic inflammation was usually mild and non-granulomatous; and in a quarter of cases, subacute exudative fibrous inflammation was detected in the posterior pocket wall.

Conclusion: The CIED pocket is a histopathologically dynamic environment, characterized by the coexistence of a subacute foreign body response and fibrous tissue growth, causing a continuous remodelling due to an injury-repair mechanism. Strategies that interact with foreign body response might minimize inflammatory pocket activity, especially device encapsulation by tight fibrous tissue, possibly reducing complications related to repeated CIED procedures.

CO.17.10

DEEP SEPTAL LEFT VENTRICULAR PACING VS HIS BUNDLE PACING: A SINGLE-CENTER EXPERIENCE COMPARISON

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Introduction: Right ventricular apical pacing (RVAP) results in dyssynchronous ventricular activation that can lead to impairment of ventricular function. Biventricular pacing (BVP) certainly improves upon RVAP, but still produces a non-physiological activation pattern. Alternative myocardial pacing sites as, His Bundle Pacing (HBP) and Left Bundle Branch Area Pacing (LBBaP), overcome this difficulty. However, technical aspects regarding implantation procedure of HBP result in elevated capture thresholds and longer procedures, exposing patients to higher peri-procedural risks and decreased battery life span. On the other hand, Left Bundle Branch Pacing, as defined by MELOS study, solves the issue regarding capture threshold but results in strict electrocardiographical signs, not always achieved although a successful implantation. Deep Septal Left Ventricular Pacing (DSLVP) emerges as an alternative but more studies are needed to outline comparable clinical outcomes and long-term performances.

Aim of the study: In our study, we compare HBP and DSLVP considering hemodynamic impact of implantation appraising echocardiographic changes regarding left ventricular systolic function during a mean follow-up of a year through semestral re-evaluation. Furthermore we assess implantation success rates, capture thresholds and sensing amplitude during follow-up.

Methods: This study is an observational retrospective study which enrolled 51 patients who had implantation indication for bradycardia/resyncronization therapy based on current guidelines. Of these, 35 underwent to successful HBP; 16 underwent first to a failure through BVP; then, in tailored-to-patient attempt to consider individual anatomic features, these 16 patients underwent to DSLVP. Patients were followed in the device clinic at 6-months and 1-year follow-ups, collecting echocardiographic and capture threshold and sensing amplitude.

Results: We noticed a comparable increase in Ejection Fraction (EF) for both pacing systems comparing EF assessed at implantation to EF assessed at the end of follow-up period (40% vs 46%, p value < 0.47 for HBP and 40% to 48%, p value for DSP). We highlighted no QRS duration narrowing in DSLVP before and after implantation (146 ms vs 136 ms, p value = 0.2). The average HBP lead implantation success rate was 97% (34 patients out of 35). The average DSLVP implantation success rate was 100% (16 out 16 patients). Capture threshold and sensing amplitude at implant and at final follow-up were satisfactory for both implantation technique and no increases were highlighted during follow-up (0.55 V vs 0.58 V, p > 0.05 for DLVSP and 1.24 V vs 1.38 V, p > 0.05 for HBP). However, we outlined HBP capture threshold statistically significant higher than DSLVP capture threshold both at baseline implantation (0.55 V vs 1.24V, p value < 0.002) and at follow-up (0.58 V vs 1.38 V, p value < 0.01).

Conclusion: DSLVP results in comparable to HBP results in terms of haemodynamic benefits, implantation success rate, safety and hemodynamic benefits after implantation. Moreover, lower capture threshold in DLVSP compared to HBP allows longer battery life span. For these reasons, DSLVP emerges as a valid and comparable alternative to HBP.

CO.17.11

ABLAZIONE DEL NODO AV ASSOCIATA A PACING FISIOLOGICO: ESPERIENZA DEGLI ULTIMI 3 ANNI

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Background: In patients with atrial fibrillation refractory to medical therapy, atrioventricular (AV) node ablation after permanent conduction system pacing (CSP) could be a therapeutic option for heart rate control. We aimed to demonstrate the feasibility effectiveness and safety of AV node ablation with CSP applied over a 3-year experience in a single center.

Methods: Retrospective analysis including patients with uncontrolled permanent atrial arrhythmias who were candidates for rate control (from 2019 to 2022) and underwent CSP and AV node ablation.

Results: A total of 37 patients aged 79 ± 9 years were included. Intrinsic QRS duration was 133 ± 35 ms. The mean left ventricular ejection fraction (LVEF) was 43±14%; 78% in NYHA class II and 22% in NYHA class III and manifest heart failure due to tachycardiomyopathy. CSP was achieved in 100% of cases (HBP 17 patients; LBBP 18 patients; HBP+LBBP 2 patients), and AV node ablation was successfully performed in all patients (34,6% at implant; 65,4% one month after PM implant). After a mean follow-up of 664±373 days, mean LVEF significantly improved to 51±11%; a significant NYHA class improvement was observed (follow-up, 53% class I and 47% class II patients). The CSP lead thresholds did not significantly change during the follow-up and remained stable (Threshold at implant 0,9±1V@0,5 ms vs threshold at follow-up 1,2±0,7V@0,5 ms). No lead related problems and no heart failure hospitalizations occurred. 2 deaths were recorded, both of them related to cancer.

Conclusions: In patients with uncontrolled atrial arrhythmias ablate&CSP is a feasible approach and could mitigate the risk of dyssynchrony-induced cardiomyopathy. After 664±373 days of follow-up NYHA class and LVEF significantly improved while electrical parameters remained stable. No heart failure hospitalizations were recorded.

CO.17.12

CONDUCTION SYSTEM PACING TO REPLACE LEADLESS PM IN A YOUNG FEMALE WITH AV BLOCK

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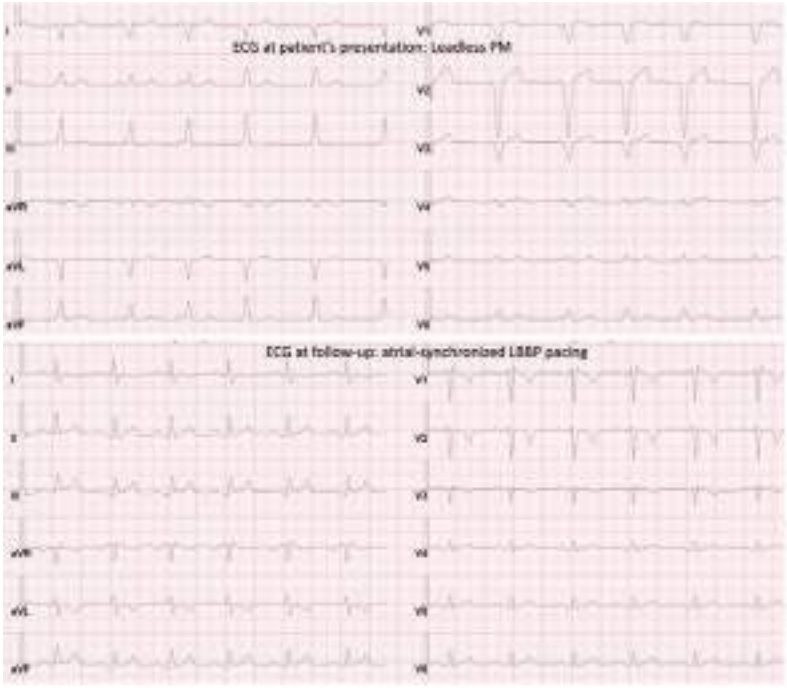
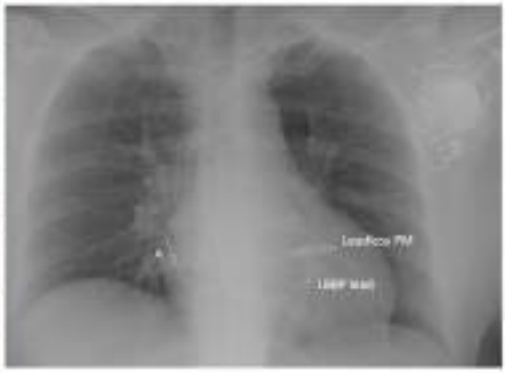
Abstract: Conduction system pacing (CSP) ensures a physiologic activation pattern and can avoid heart failure in patients with expected high rate of ventricular pacing. Nevertheless, it counts potential procedure- and device-related complications, as all endovascular leads. Over the years, the evolution and miniaturisation of technology have led to the development of fully programmable, leadless systems, containing the battery, circuitry, and electrodes, all functioning as a single unit, which avoids endovascular lead complications.

Case Report: A female patient born in 1972 was referred to our centre in May 2022, due to exertional dyspnoea and palpitations lasting for several months which conditioned limitation of activities in daily life. Patient had been implanted with leadless PM Micra AV in septal position 2 years previously due to paroxysmal AV block. Having lost the AV synchrony she development PM syndrome. No other comorbidities were recorded, and baseline cardiac function was normal (EF 63%) as confirmed by cardiac MR. Baseline ECG showed sinus atrial activity dissociated from ventricular paced beats (Fig 1). We decided to go for an endovascular dual-chamber implant with CSP, as also requested by the patient. From axillary left venous access we obtained left bundle branch pacing reducing the paced QRS to 104 ms. LVAT was measured 72 ms and V6R6-R1 interval 40 ms confirming conduction system capture. An active-fixation lead was placed in the right atrial appendage and the two lead were connected to a DDDR PM obtaining atrial-synchronized ventricular pacing. Post-implant echo confirmed left ventricular synchrony and normal ejection fraction. The pre-existing leadless PM was left in situ with the plan to extract it during the follow-up. Patient quickly recovered after the procedure and after 2 days was discharged. No pharmacological therapy was prescribed. After 6 months follow-up the patients experienced complete symptoms resolution and she works as a nurse without any limitations. The last ECG confirmed AS-VP morphology with narrow QRS.

Conclusion: Conduction system pacing represents an attractive option which offers physiological synchrony in patients with expected high pacing burden. There are also ongoing efforts towards achieving AV synchrony using leadless pacing, and we'll follow the trajectory of this over the next years.





COMUNICAZIONI ORALI 18

VENERDI' 22 SETTEMBRE

SALA MAGENTA B

08.30-09.30

SESSIONE DI COMUNICAZIONI ORALI: MAPPAGGIO ED IMAGING

Moderatori: A. Pappalardo (Roma), N. Marrazzo (Salerno)

CO.18.01

LIPOMATOUS METAPLASIA IS THE BEST CT PREDICTOR FOR SUBSTRATE LOCALIZATION IN SCAR-RELATED VENTRICULAR TACHYCARDIA

Matteo Parollo, Lorenzo Mazzocchetti, Andrea Di Cori, Luca Segreti, Valentina Barletta, Sara Sbragi, Raffaele De Lucia, Gino Grifoni, Antonio Canu, Stefano Viani, Luca Paperini, Ezio Soldati, Giulio Zucchelli
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Introduction: Recent evidence has shown that intramyocardial lipomatous metaplasia (LM) can be directly identified with cardiac computer tomography (CT) and plays a significant role in ventricular arrhythmogenesis and facilitation in structural heart disease.

Purpose: We sought to explore the diagnostic performance of three different CT features (LM, CT channels, wall thinning) identified at ADAS3D post-processing as electroanatomical substrate predictors and their potential role in planning and aiding ventricular tachycardia (VT) scar dechanneling procedures.

Methods: All patients undergoing VT ablation at our institution were enrolled. CT images were post-processed with ADAS3D software to assess LM and left ventricle wall thickness. Images were then retrospectively imported into CARTO3 software and concordance between CT and electroanatomical features (conducting channels, channel entrances, bipolar scar, voltage channels, ablation VISITAGs, a composite model including at least one feature and a model consisting of at least a conducting channel or an ablation site) was assessed at a cardiac segment level according to the 17 segments ASE classification.

Results: From July 2016 to December 2022 131 patients underwent VT ablation at our institution. 88 patients did not undergo preprocedural CT examination, 15 patients had a low-quality CT scan and, at ADAS3D analysis 9 patients did not have significant LM. 19 patients (14 ischemic and 5 non-ischemic, 323 cardiac segments) were then included for analysis. 90 segments (27,86%) showed LM, 93 segments (28,79%) showed thickness < 5 mm and 12 segments (3,72%) held CT channels. In terms of conducting channel prediction, in ischemic patients, LM showed 70% sensitivity, 89% specificity, 73% PPV and 88% NPV when compared to CT channels (10% sensitivity, 98% specificity, 70% PPV, 72% NPV) or wall thinning (61% sensitivity, 82% specificity, 58% PPV and 84% NPV). In non-ischemic patients LM showed with 69% sensitivity, 81% specificity, 39% PPV and 94% NPV when compared to CT channels (15% sensitivity, 100% specificity, 100% PPV, 87% NPV) or wall thinning (46% sensitivity, 82% specificity, 32% PPV and 89% NPV).
In terms of a composite model (presence of at least a conducting channel or ablation site), in ischemic patients, LM showed 69% sensitivity, 92% specificity, 81% PPV and 86% NPV when compared to CT channels (10% sensitivity, 99% specificity, 80% PPV, 69% NPV) or wall thinning (58% sensitivity, 82% specificity, 61% PPV and 80% NPV). In non-ischemic patients LM showed with 69% sensitivity, 81% specificity, 39% PPV and 94% NPV when compared to CT channels (15% sensitivity, 100% specificity, 100% PPV, 87% NPV) or wall thinning (46% sensitivity, 82% specificity, 32% PPV and 89% NPV). Overall, at multivariate analysis only LM (OR 12,46 95% C.I. 6,59-23,58) and wall thinning (OR 4,73 95% C.I. 2,45-9,14) were independent predictors for conducting channel.

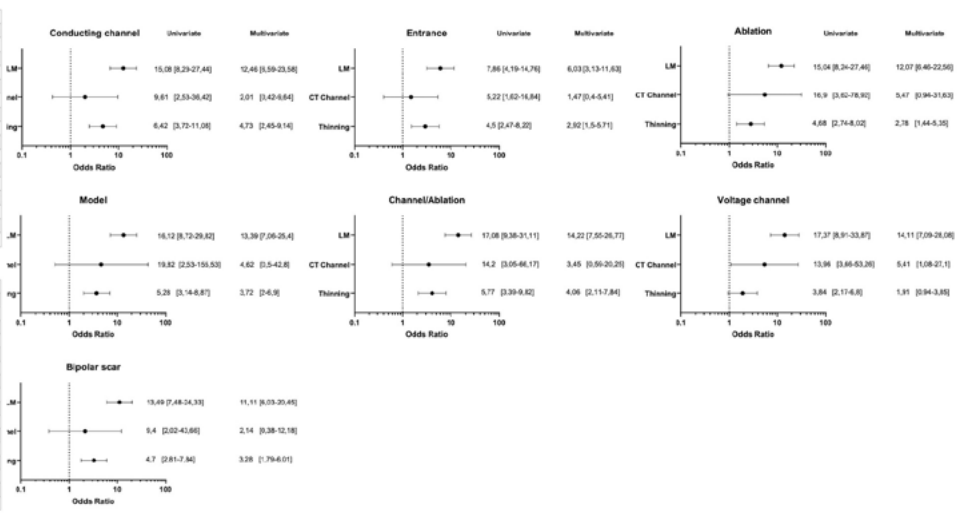
Conclusion: Lipomatous metaplasia is the best CT predictor for conducting channel presence both in ischemic and non-ischemic patients

ISCHEMIC

	LM/CHAN	LM/ENTR	LM/ABL	LM/MODEL	LM/CHAN-ABL	LM/VOLT	LM/SCAR
Sens	0,70 0,58-0,80	0,67 0,52-0,80	0,70 0,57-0,80	0,61 0,51-0,70	0,69 0,58-0,79	0,78 0,65-0,89	0,60 0,50-0,70
Spec	0,89 0,84-0,94	0,82 0,76-0,87	0,89 0,83-0,93	0,96 0,92-0,99	0,92 0,87-0,96	0,86 0,80-0,90	0,94 0,89-0,98
PPV	0,73 0,61-0,83	0,49 0,37-0,62	0,72 0,59-0,82	0,93 0,83-0,98	0,81 0,69-0,89	0,60 0,47-0,72	0,88 0,78-0,95
NPV	0,88 0,82-0,92	0,91 0,85-0,95	0,88 0,82-0,92	0,77 0,70-0,83	0,86 0,80-0,91	0,94 0,89-0,97	0,77 0,70-0,84
	RIDGE/CHAN	RIDGE/ENTR	RIDGE/ABL	RIDGE/MODEL	RIDGE/CHAN-ABL	RIDGE/VOLT	RIDGE/SCAR
Sens	0,10 0,04-0,20	0,07 0,02-0,16	0,12 0,05-0,22	0,09 0,04-0,16	0,10 0,05-0,19	0,14 0,06-0,26	0,08 0,04-0,15
Spec	0,98 0,95-1,00	0,98 0,95-1,00	0,99 0,96-1,00	0,99 0,96-1,00	0,99 0,96-1,00	0,98 0,95-1,00	0,99 0,95-1,00
PPV	0,7 0,35-0,94	0,63 0,24-0,91	0,80 0,44-0,97	0,90 0,56-1,00	0,80 0,44-0,97	0,70 0,35-0,94	0,80 0,44-0,97
NPV	0,72 0,66-0,78	0,74 0,69-0,80	0,73 0,67-0,79	0,59 0,53-0,66	0,69 0,63-0,75	0,81 0,75-0,86	0,61 0,54-0,67
	THIN/CHAN	THIN/ENTR	THIN/ABL	THIN/MODEL	THIN/CHAN-ABL	THIN/VOLT	THIN/SCAR
Sens	0,61 0,49-0,73	0,61 0,46-0,75	0,57 0,44-0,58	0,64 0,53-0,74	0,58 0,46-0,69	0,46 0,33-0,59	0,52 0,42-0,62
Spec	0,82 0,75-0,87	0,77 0,70-0,83	0,79 0,72-0,85	0,85 0,78-0,91	0,82 0,75-0,88	0,99 0,99-1,00	0,84 0,76-0,89
PPV	0,58 0,46-0,69	0,41 0,29-0,53	0,53 0,41-0,64	0,73 0,61-0,83	0,61 0,49-0,72	0,38 0,29-0,50	0,69 0,57-0,79
NPV	0,84 0,77-0,89	0,88 0,83-0,93	0,82 0,75-0,87	0,79 0,72-0,87	0,80 0,73-0,86	0,99 0,99-1,00	0,71 0,64-0,78

NON-ISCHEMIC

	LM/CHAN	LM/ENTR	LM/ABL	LM/MODEL	LM/CHAN-ABL	LM/VOLT	LM/SCAR
Sens	0,69 0,39-0,91	0,57 0,18-0,90	0,75 0,43-0,95	0,55 0,32-0,77	0,69 0,39-0,91	0,69 0,39-0,91	0,55 0,32-0,77
Spec	0,81 0,70-0,89	0,76 0,65-0,85	0,81 0,70-0,89	0,82 0,70-0,90	0,81 0,70-0,89	0,81 0,70-0,89	0,82 0,70-0,90
PPV	0,39 0,20-0,61	0,17 0,05-0,39	0,39 0,20-0,61	0,49 0,27-0,69	0,39 0,20-0,61	0,39 0,20-0,61	0,48 0,27-0,69
NPV	0,94 0,84-0,98	0,95 0,87-0,99	0,95 0,87-0,99	0,85 0,74-0,93	0,94 0,84-0,98	0,94 0,84-0,98	0,85 0,74-0,93
	RIDGE/CHAN	RIDGE/ENTR	RIDGE/ABL	RIDGE/MODEL	RIDGE/CHAN-ABL	RIDGE/VOLT	RIDGE/SCAR
Sens	0,15 0,03-0,45	0,14 0,003-0,58	0,17 0,03-0,48	0,10 0,01-0,33	0,15 0,03-0,45	0,15 0,03-0,45	0,10 0,01-0,33
Spec	1 0,95-1	0,99 0,93-1	1,00 0,95-1	1,00 0,94-1	1,00 0,95-1	1,00 0,95-1	1,00 0,94-1
PPV	1 0,16-1	0,5 0,01-0,99	1,00 0,16-1	1,00 0,16-1	1,00 0,16-1	1,00 0,16-1	1,00 0,16-1
NPV	0,87 0,78-0,93	0,93 0,85-0,97	0,88 0,79-0,94	0,78 0,68-0,86	0,87 0,78-0,93	0,87 0,78-0,93	0,78 0,68-0,86
	THIN/CHAN	THIN/ENTR	THIN/ABL	THIN/MODEL	THIN/CHAN-ABL	THIN/VOLT	THIN/SCAR
Sens	0,46 0,19-0,75	0,29 0,04-0,71	0,42 0,15-0,72	0,35 0,15-0,59	0,46 0,19-0,75	0,46 0,19-0,75	0,35 0,15-0,59
Spec	0,82 0,71-0,90	0,78 0,67-0,87	0,81 0,70-0,89	0,82 0,70-0,90	0,82 0,71-0,90	0,81 0,71-0,90	0,82 0,70-0,90
PPV	0,32 0,13-0,57	0,11 0,01-0,33	0,26 0,09-0,51	0,17 0,06-0,42	0,32 0,12-0,57	0,32 0,13-0,57	0,17 0,06-0,41
NPV	0,85 0,79-0,90	0,92 0,83-0,97	0,89 0,79-0,96	0,80 0,69-0,89	0,89 0,79-0,96	0,89 0,79-0,96	0,80 0,69-0,89



CO.18.02

DIAGNOSING BRUGADA SYNDROME THROUGH ELECTROPHYSIOLOGICAL FEATURES: PREDICTIVE MODELING OF ACTIVATION DELAY IN THE RIGHT VENTRICULAR OUTFLOW TRACT

Cinzia Monaco, Luigi Pannone, Alvise Del Monte, Domenico G. Della Rocca, Antonio Bisignani, Vincenzo Miraglia, Gian Battista Chierchia, Pedro Brugada, Carlo De Asmundis
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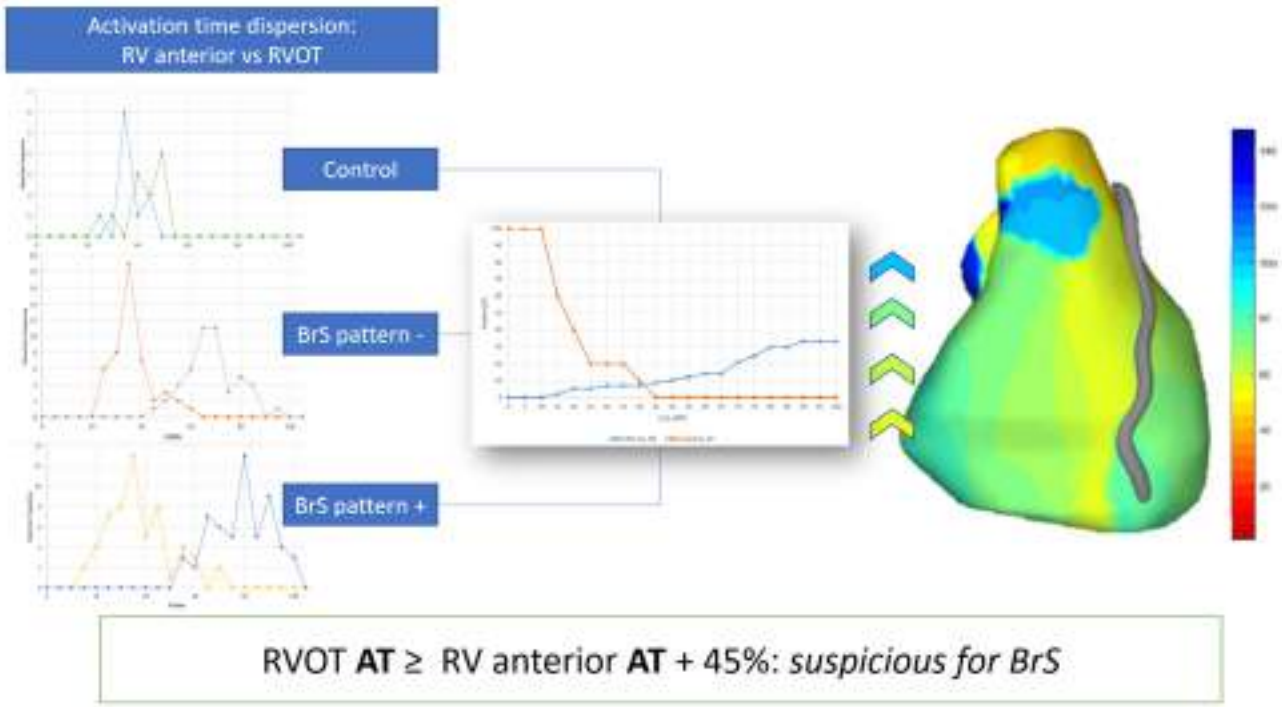
Introduction: Diagnosis in Brugada Syndrome (BrS) involves detecting the type 1 electrocardiographic (ECG) pattern, either spontaneously or drug-induced, which can sometimes be challenging in case of concomitant diseases, phenocopies, unavailability of the pharmacological agents or hypersensitivity. Behind the ECG characteristic lies the pathogenic mechanism that can lead to the onset of ventricular tachyarrhythmias (VA) and sudden cardiac death (SCD); over the years, the study of the pathology has focused on the physiopathological aspects for the developing of the characteristic pattern 1. Although debated, molecular and cellular mechanisms underlying BrS, have been subject of research since the first description of the syndrome itself; instead, the electrophysiological (EP) substrate, is today less known and deepened. Studies with electrocardiographic imaging (ECGI) may provide the basis for understanding some EP mechanisms, such as delayed activation in right ventricular outflow tract (RVOT), and lead to further diagnostic implementation and risk stratification, based on electrophysiological parameters, when the conventional diagnosis is doubtful or difficult.

Methods: Fifty-seven patients with BrS were enrolled. A novel MathLab tool was used for post-processing analysis of the electrocardiographic imaging (ECGI) maps. Ten control patients and 8 right bundle branch block (RBBB) patients were studied for comparison. Right and left ventricular epicardium has been divided into 8 regions and the mean activation time (ATM) has been calculated for each region. The ATM for each area was normalized to QRS length (ATM%); ATM and ATM% were compared across populations. The relationship between the anterior RV and the right RVOT create a predictive model to determine a threshold value for the diagnosis of BrS.

Results: Analysis of ATM in the anterior RV show differences only between controls and BrS with positive pattern 1 (30.7±4.00 vs 63.45±16.37 ms, p<0.001); in RVOT, ATM showed significant differences between controls and BrS patients in both the absence and presence of pattern 1 (37.2±6.23 vs 68.33±14.73 ms, p<0.001; 37.2±6.23 vs 107.6±21.16 ms, p<0.001). A 45% increase in anterior RV ATM was the best predictor of delayed RVOT activation in BrS patients (AUC=0.97, Accuracy=0.92, F-score=0.95). The comparison between BrS and RBBB patients strengthened the validity of this finding.
The increase between ATM and ATM% between RVa and RVOT in RBBB patients is below the identified cut-off of 45% (respectively 43% and 40%).

Conclusion: The study found that more than 45% increase in anterior right ventricular mean activation time was the best predictor of pathological delayed RVOT activation in BrS patients, with high levels of accuracy and reliability in diagnostic performance tests.
The method for predicting RVOT activation delay identified in this study has the potential to improve diagnosis and treatment of BrS in situations where an ECG diagnosis is not sufficient or not possible, such as in cases of allergies or hypersensitivity to certain medications, ECG phenocopies, or in the presence of overlapping syndromes that may worsen with pharmacological induction.



CO.18.03

MICROELECTRODE VOLTAGE MAPPING FOR SUBSTRATE ASSESSMENT IN CATHETER ABLATION OF VENTRICULAR TACHYCARDIA: A PRELIMINARY CLINICAL EXPERIENCE

Paolo Compagnucci [1], Michela Casella [1], Marco Bergonti [2], Laura Cipolletta [1], Quintino Parisi [1], Giovanni Volpato [1], Giulia Santarelli [1], Michela Colonnelli [1], Johan Saenen [2], Yari Valeri [1], Laura Carboni [1], Procolo Marchese [3], Marco Marini [1], Andrea Sarkozy [2], Andrea Natale [4], Antonio Dello Russo [1]

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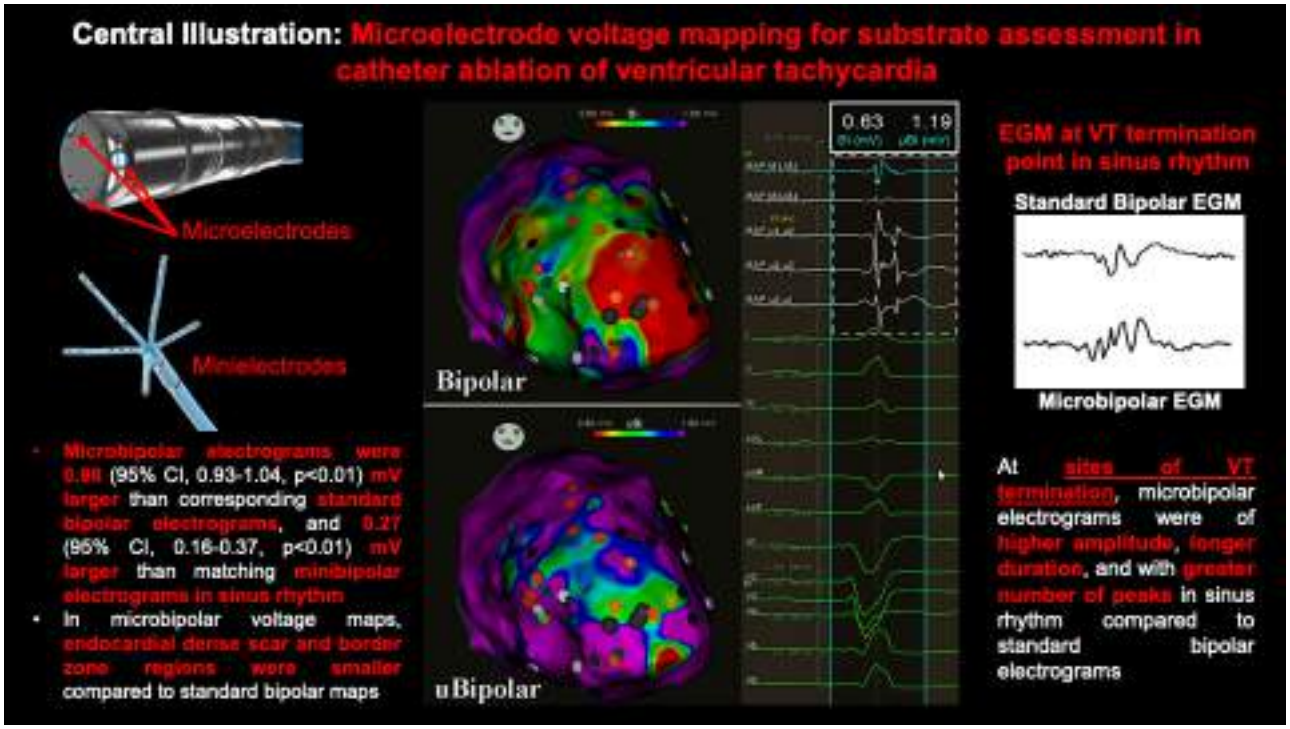
Background: The assessment of the ventricular myocardial substrate critically depends on the size of mapping electrodes, their orientation with respect to wavefront propagation, and interelectrode distance. We conducted a dual-center study to evaluate the impact of microelectrode mapping in patients undergoing catheter ablation (CA) of ventricular tachycardia (VT).

Methods: We included 21 consecutive patients (median age, 68 [12], 95% male) with structural heart disease undergoing CA for electrical storm (n=14) or recurrent VT (n=7) using the QDOT Micro catheter and a multipolar catheter (PentaRay, n=9). The associations of peak-to-peak maximum standard bipolar (BVc) and minibipolar (PentaRay, BVp) with microbipolar (BVmicroMax) voltages were respectively tested in sinus rhythm with mixed effect models. Furthermore, we compared the features of standard bipolar (BE) and microbipolar (microBE) electrograms in sinus rhythm at sites of termination with radiofrequency energy.

Results: BVmicroMax was moderately associated with both BVc (beta=0.85, p<0.01) and BVp (beta=0.56, p<0.01). BVmicroMax was 0.98 (95% CI, 0.93-1.04, p<0.01) mV larger than corresponding BVc, and 0.27 (95% CI, 0.16-0.37, p<0.01) mV larger than matching BVp in sinus rhythm, with higher percentage differences in low voltage regions, leading to smaller endocardial dense scar (2.3 [2.7] vs. 12.1 [17] cm2, p<0.01) and border zone (3.2 [7.4] vs. 4.8 [20.1] cm2, p=0.03) regions in microbipolar maps compared to standard bipolar maps. Late potentials areas were non-significantly greater in microelectrode maps, compared to standard electrode maps. At sites of VT termination (n=14), microBE were of higher amplitude (0.9 [0.8] mV versus 0.4 [0.2] mV, p<0.01), longer duration (117 [66] ms versus 74 [38] ms, p<0.01), and with greater number of peaks (4 [2] versus 2 [1], p<0.01) in sinus rhythm compared to BE.

Conclusions: microelectrode mapping is more sensitive than standard bipolar mapping in the identification of viable myocytes in SR, and may facilitate recognition of targets for catheter ablation.



CO.18.04

REDUCED RIGHT VENTRICULAR OUTFLOW TRACT STRAIN AT CARDIAC MAGNETIC RESONANCE CORRELATES WITH LOW-VOLTAGE AREAS AT UNIPOLAR ELECTROANATOMIC MAPPING IN PATIENTS WITH BRUGADA SYNDROME

Michele Ciabatti [1], Chiara Zocchi [1], Maurizio Pieroni [1], Valentina Tavanti [2], Martina Nesti [1], Niccolo' Sisti [1], Carlo Fumagalli [3], Lorenzo Malatesti [2], Francesca Raimondi [3], Gianni Pedrizzetti [4], Raymond H. Chan [5], Iacopo Olivotto [3], Pasquale Notarstefano [1], Leonardo Bolognese [1]

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[5] *Peter Munk Cardiac Centre, Toronto General Hospital, University Health Network, Toronto, CANADA*

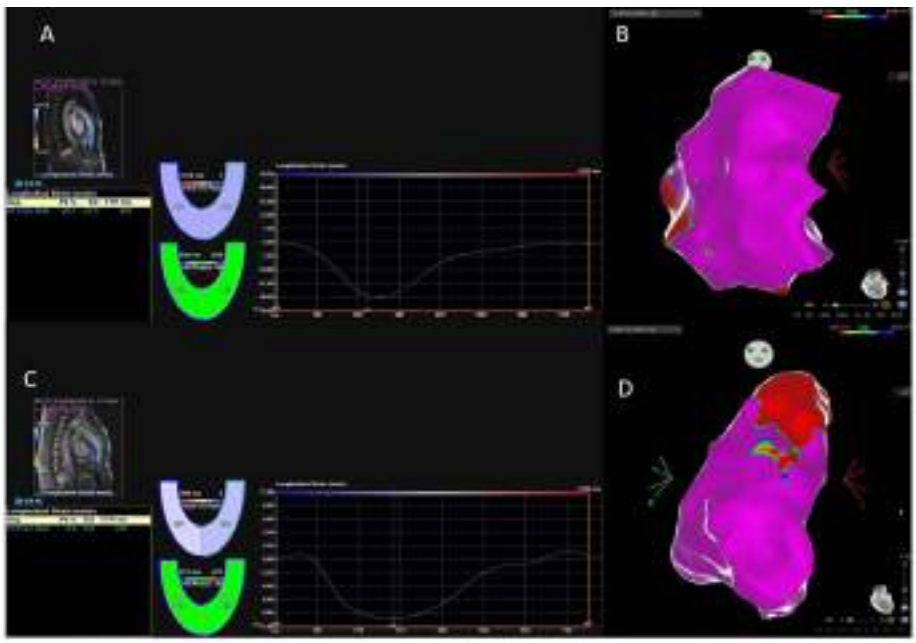
Background: Brugada Syndrome (BrS) was initially described as a channelopathy without underlying structural substrate, but pathological and electroanatomic abnormalities of the right ventricular outflow tract (RVOT) are increasingly recognized, suggesting a possible role of electroanatomic mapping (EAM) in risk stratification of these patients. New echocardiographic and cardiac magnetic resonance (CMR) tools are able to identify subtle structural and functional myocardial abnormalities associated with an increased arrhythmic risk.

Purpose: We aimed to assess the presence of structural and functional abnormalities of RVOT by CMR-derived RV and RVOT feature tracking in BrS patients. We also sought to evaluate the relationship between RVOT functional abnormalities and the presence and extension of RVOT abnormal voltage areas at EAM.

Methods: we retrospectively enrolled BrS patients submitted to CMR comprehensive of RVOT sequences and bipolar and unipolar endocardial EAM. Abnormal voltage areas were defined by the presence of signal amplitude <4mV at unipolar mapping and signal amplitude <1.5mV at bipolar mapping. We included a control group of 15 healthy volunteers submitted to CMR including RVOT sequences.

Results: We studied 16 patients, 12/16 males, mean age 42±9 years. In all cases CMR showed normal left and right ventricular ejection fraction (LVEF 57±4%, RVEF 56±6%). RVOT peak strain values were significantly impaired in BrS patients compared to controls (-17.9±8.6% vs -26.4±9.5%, p=0.011), while RV-GLS did not differ between the two groups (-22.2±4.0% vs 24.6±2.5%, p=0.061). EAM showed the presence of pathological voltages at both unipolar and bipolar mapping in 12 patients, abnormal unipolar and normal bipolar maps in 1 case and both unipolar and bipolar normal maps in 3 patients. Median extent of abnormal voltage areas was 5.3 cm2 [IQ 1-4 = 0.6-9.3 cm2] at unipolar and 4.1 cm2 [IQ 1-4 = 0.7-7.5 cm2] at bipolar map. RVOT peak strain showed a significant correlation with abnormal voltage areas at unipolar EAM (r=0.546, r2=0.525, p=0.029). Patients with both unipolar and bipolar normal maps (n=3) had normal RVOT strain values compared to controls (-25.7±3.9 vs -26.4±9.5%, p=0.90).

Conclusions: In patients with BrS, RVOT peak strain is significantly reduced compared to controls and is associated with abnormal voltage areas at endocardial unipolar EAM. Noninvasive evaluation of BrS patients with CMR-derived RVOT feature tracking may help to identify patients requiring invasive evaluation with EAM. Prospective studies evaluating the prognostic role of RVOT strain and EAM in BrS patients are needed.



A BrS patient with preserved RVOT-FT values (A) and normal unipolar voltage electroanatomic map (B).
A BrS patient with reduced RVOT-FT (C) values and RVOT low-voltage area at unipolar voltage electroanatomic map (D).

CO.18.05

STRAIN ATRIALE E MAPPAGGIO ELETTROANATOMICO: DUE FACCE O UNA SINGOLA "UNICA MEDAGLIA" DELLA ABLAZIONE DELLA FIBRILLAZIONE ATRIALE?

Eleonora Ruscio [1], Francesca Gabrielli [1], Francesco Spera [1], Federica Giordano [1], Maria Lucia Narducci [1], Gianluigi Bencardino [1], Francesco Perna [1], Filippo Crea [2], Gaetano Pinnacchio [1], Gemma Pelargonio [1]

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Introduzione: Sebbene la valutazione delle anomalie dell'atrio sinistro (LA) sia stata estensivamente studiata nella fibrillazione atriale (AF), i cambiamenti strutturali e funzionali dell'atrio destro (RA) rimangono inesplorati in questo contesto.

Obiettivo: Investigare il ruolo dello strain bi-atriale in pazienti con fibrillazione atriale sottoposti a ablazione transcatetere.

Metodi e Risultati: Cinquantasei pazienti consecutivi sottoposti a ablazione transcatetere di AF sono stati studiati prospetticamente con valutazione cardiaca non invasiva e invasiva, che ha incluso l'ecocardiografia con metodica speckle-tracking e lo studio elettrofisiologico, prima e dopo ablazione (follow-up mediano: 7±3 mesi). Trentadue pazienti sottoposti a ablazione di tachicardia da rientro nodale atrio-ventricolare, in assenza di malattia strutturale cardiaca, hanno rappresentato il gruppo di controllo. I pazienti con AF avevano peggiori indici di strain atriale sinistro ma anche di strain atriale destro, rispetto ai controlli (picco di strain atriale destro longitudinale, pRASr: 22±12vs.29±12%, p=0.009; dispersione meccanica atriale destra, definita come deviazione standard dei tempi al picco dello strain regionale, SD-regional-RA-TTP: 0.112±0.085vs.0.073±0.052, p= 0.025). I pazienti con AF persistente hanno mostrato simili valori di strain atriale sinistro, ma peggiori valori di strain atriale destro, rispetto ai pazienti con AF parossistica (pRASr: 25±12vs.16±11%,p=0.017; SD-regional-RA-TTP:0.043±0.023vs.0.062±0.030, p=0.016). Gli indici di strain dell'atrio destro sono risultati significativamente correlati con gli indici di strain e volume dell'atrio sinistro e con i parametri di alterato substrato elettroanatomico dell'atrio sinistro (pRASr e pLASr, correlazione di Pearson: r 0.594, p< 0.001; pRASr e area di basso voltaggio atriale sinistro: -0.316, p=0.018). I parametri dell'atrio destro, ma non dell'atrio sinistro, sono risultati significativamente ridotti nei pazienti con recidiva di AF dopo ablazione transcatetere rispetto a quelli che hanno mantenuto ritmo sinusale (pRASr: 22±12vs.29±12,p=0.035; SD-regional-RA-TTP:0.112±0.085 vs.0.073±0.052, p=0.001), mentre l'unico predittore clinico indipendente di recidiva di AF è stato il profilo cardiovascolare (CHA2DS2 VASc Score: HR 1.47,CI 1.003-2.158, p= 0.048).

Conclusioni: La funzione dell'atrio destro, valutata con lo strain imaging, è risultata progressivamente alterata in sottotipi peggiori di fibrillazione atriale, mostrando una correlazione significativa con parametri meccanici ed elettroanatomici bi-atriali, e risultando associata alle recidive di fibrillazione atriale dopo ablazione.

CO.18.06

ELECTROANATOMICAL VOLTAGE MAPPING IN CARDIAC AMYLOIDOSIS: CHARACTERISTICS AND CLINICAL VALUE

Paolo Compagnucci [1], Giuseppe Ciliberti [1], Umberto Falanga [1], Alessandro Barbarossa [1], Yari Valeri [1], Laura Cipolletta [1], Giovanni Volpato [1], Giulia Stronati [1], Stefania Rizzo [2], Monica De Gaspari [2], Fabio Vagnarelli [1], Carla Lofiego [1], Gian Piero Perna [1], Andrea Giovagnoni [1], Andrea Natale [3], Cristina Basso [2], Federico Guerra [1], Antonio Dello Russo [1], Michela Casella [1]

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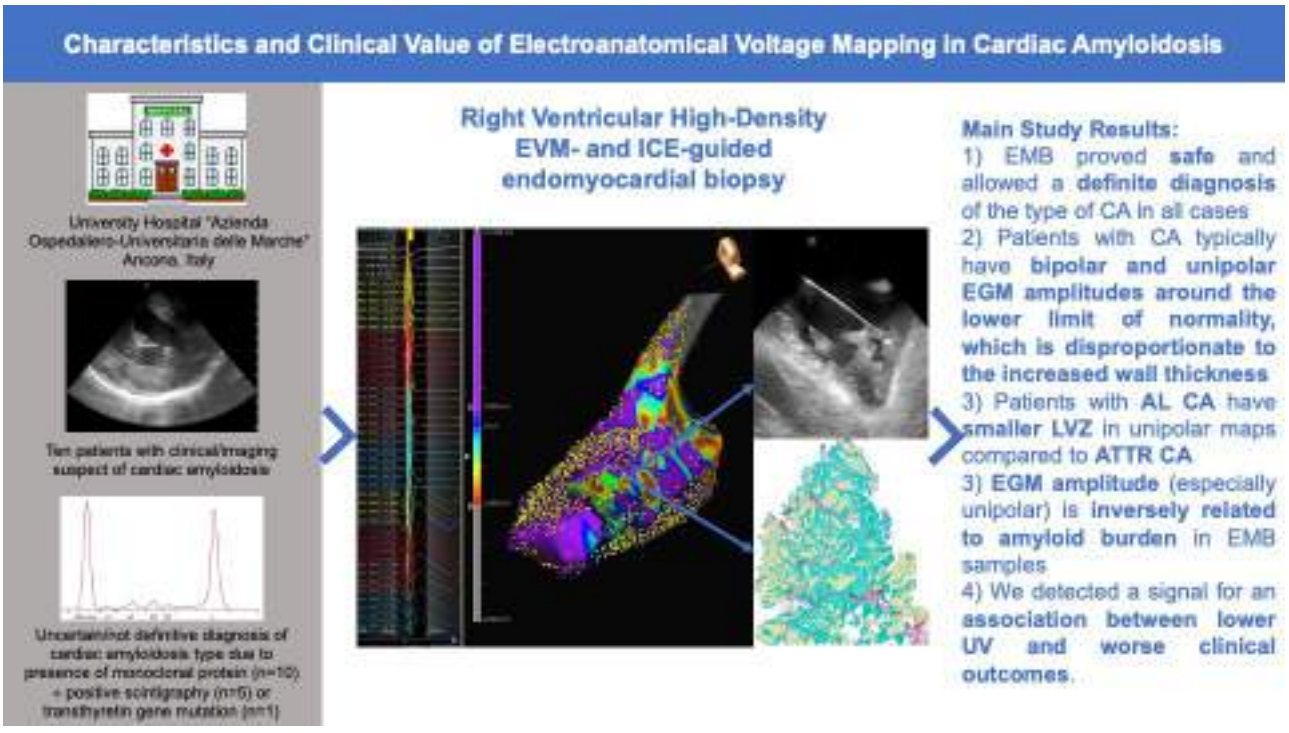
Background: Cardiac amyloidoses (CA) are an increasingly recognized group of infiltrative cardiomyopathies associated with high risk of major adverse cardiac events. The aim of this study was to provide the first description of the right ventricular (RV) electroanatomical substrate of CA, and assess its association with endomyocardial biopsy (EMB) findings and clinical outcomes.

Methods: we enrolled ten consecutive patients undergoing EMB for suspected CA (median age, 68[63-77]; male, 50%) in an observational, retrospective study. Each patient underwent RV high-density electroanatomical voltage mapping (EVM) using a multipolar catheter, and EMB. The primary outcome was death or hospitalization at 1-year follow-up. We recorded electrogram features at EMB sampling sites and in the overall RV, and explored their correlations with histopathological findings and primary outcomes events.

Results: A final EMB-proven diagnosis of immunoglobulin light chain or transthyretin-related CA was formulated in 6 and 4 patients, respectively. Electrogram amplitudes in the bipolar and unipolar configurations averaged 1.58±0.65 mV, and 5.38±1.41 in the overall RV. We found a significant inverse correlation between unipolar electrogram amplitude and amyloid burden at EMB (p<0.001). At 1-year follow-up, 6 patients (60%) experienced a primary outcome event. Compared to subjects with uneventful follow-up, patients with a primary outcome event had larger unipolar low-voltage zones (32.3 [6.1] cm2 vs. 20.7 [6.5] cm2, p=0.043) and bipolar dense scar areas (6.1 [2.3] cm2 vs. 1.8 [0.7] cm2, p=0.005), and after pooling mapping points from all patients, unipolar electrogram amplitude was moderately associated with primary outcome events (AUC: 0.65 [95% CI, 0.64-0.65]).

Conclusions: In CA, electrogram amplitudes are around the lower limit of normal, yet disproportionately low compared to the increased wall thickness. We found evidence that unipolar electrogram amplitude may be a quantitative marker of amyloid burden, possibly associated with adverse clinical outcomes.



SESSIONI E-POSTER

SESSIONI NON ACCREDITATE ECM

E-POSTER 1

GIOVEDI' 21 SETTEMBRE

AREA E-POSTER

17:00-18:00

SESSIONE E-POSTER 1
DEVICE 1

Moderatori: E. De Maria (Carpi, Italia), L.M. Zuccaro (Roma-RM, Italia)

EP.01.01
DESCRIZIONE DI UN CASO CLINICO DI MALPOSIZIONAMENTO INVOLONTARIO DELL'ELETTROCATETERE IN VENTRICOLO SINISTRO DURANTE L'IMPIANTO DI PACEMAKER

V. Amantea [1], G. Azzolini [1], L. Spighi [2], N. Trevisi [2], D. Saporito [2], F. Fabbri [2], N. Franco [2], R. Campana [2], A. Santarelli [2]
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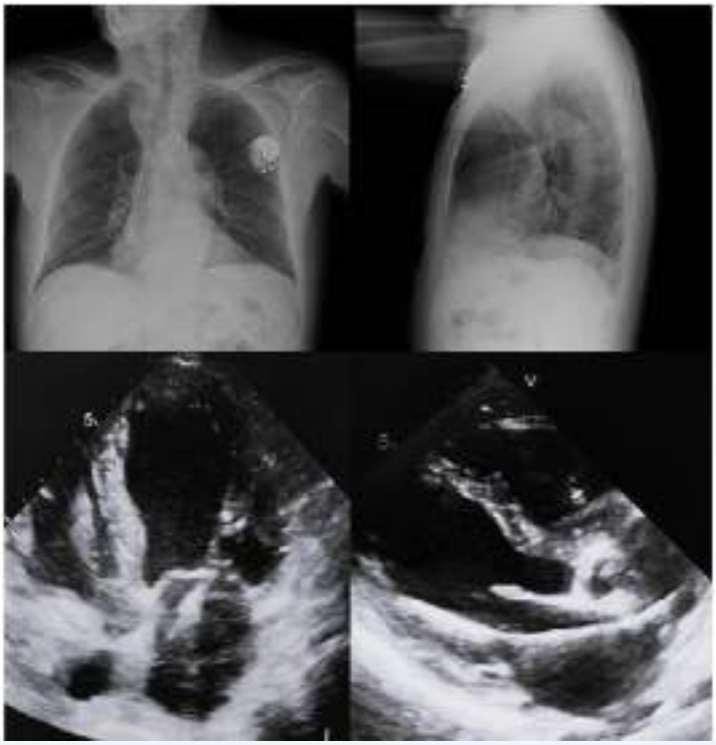
Il malposizionamento di elettrocateteri durante l'impianto definitivo di pacemaker può avvenire in diverse sedi, ma raramente tale complicanza coinvolge il ventricolo sinistro. In questo caso, il malposizionamento si verifica per attraversamento accidentale del setto interatriale, dell'atrio sinistro e della valvola mitrale fino a raggiungere la camera ventricolare sinistra. Proponiamo il caso di un paziente di 93 anni giunto alla nostra osservazione per visita di controllo. In anamnesi aveva storia di ateromasia dei tronchi sovraortici in terapia domiciliare con cardioaspirina. Nel 2011, era stato sottoposto presso altro centro, ad impianto di pacemaker monocamerale sentinella per sincope recidivante a sospetta origine cardiogena. Nel 2012, era stato poi sottoposto a procedura di revisione per comparsa a distanza di deficit di cattura.
Durante la visita di controllo presso il nostro centro, veniva eseguito un ecocardiogramma con evidenza di immagine in plus in ventricolo sinistro a livello del muscolo papillare antero-laterale, in proiezione "off-axis". Tale immagine si prolungava attraverso la mitrale ed infine attraverso il setto-interatriale. Dalla proiezione parasternale si evidenziava la presenza di un'immagine compatibile con elettrocatetere malposizionato in ventricolo sinistro via setto-interatriale.
Il paziente avrebbe dovuto assumere warfarin per l' elevato rischio cardioembolico relativo al malposizionamento. Nonostante ciò, il paziente non ha mai sviluppato eventi cerebro-vascolari, assumendo cardioaspirina per altri motivi. Pertanto, si è deciso di proseguire la terapia antiaggregante, soprassedendo alla terapia anticoagulante.

Conclusioni: In conclusione, questo tipo di complicanza è un evento raro e nella maggior parte dei casi viene riconosciuto durante la procedura di impianto cosí da poter essere corretto. Talvolta, viene riconosciuto a distanza di anni. Tuttavia, sono riportati in letteratura casi associati ad eventi tromboembolici cerebrali o, più raramente, sistemici e per questo, pur non essendo menzionata questa problematica nelle linee guida, l' iter terapeutico di questi pazienti prevede la terapia anticoagulante con gli inibitori della vitamina K o l' estrazione quando ritenuto opportuno. Tuttavia, in condizioni particolari, come nel caso riportato, può essere presa in considerazione anche la terapia antiaggregante.



EP.01.02

EFFECTS OF DIRECT IRRADIATION ON CARDIAC IMPIANTABLE ELECTRONIC DEVICES

G. Arabia [1], G. Mitacchione [2], A. Cersosimo [1], M. Cerini [1], F. Salghetti [1], A. Dell'Aquila [3], L. Bontempi [3], A. Curnis [1]
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Aims: Cardiac implantableelectronic devices (CIDs)maysustaindamagesduringa course of radiation therapy,especially when the beam is directed onto the pulse generator, with device electrical reset and/or sudden battery drain. 2010 HRS/ ASA expert consensus, and all CIDs manufacturers, recommend to avoid devices direct irradiation withan accumulated dose that exceed 5grays(Gy). In our prospectivestudy wetested the effectsof direct irradiationon CIDs with different ra- diationdoses, also higher than 5Gy.

Methods: 124 CIDs of Medronic, Abbott, Biotronik, Boston Scientific, were col- lected during system upgrading or lead extraction procedures. Al devices were considered if they hadat least 80%ofresidual battery capacity. AlCIDs were pro- grammed with samedefault electrical parameters.Dependingby CIEDtype, pacing mode was configured inVI, VVIR, VDDR orDDDR, andbiventricular stimulationwas activated, ifpresent. IDselectrical therapies were setup with a pre-determined configuration. Al devicesweresingularly placed ina 30 cm×30 cm plastic bowl con- taining 2 Lt of deionized water thatwas placedover 5cm Rockwool to simulatethe backscatter andirradiated b ya linear accelerator (Elekta Synergy®). CIEDs were divided into twogroups depending on irradiation dose delivered:5 Gy and 10 Gy. Results: No significant differences in battery drainage were observed after irradi- ation respect to baseline in 5 Gy a swell 10 Gy group (7.8‡3.1 vs. 7.4+2.1 [years] battery longevity, p=0.693; 7.6‡3.1 vs. 7.3+2.1 [years] battery longevity, p=0.677, respectively).
Moreover, all CIEDS saved the baseline program setting, without device reset events.

Conclusions: Our data confirm that CIEDs direct irradiation of 5Gy si safe, of note, direct irradiationup to 10Gyseems to be similarly safe concerning theriskofCIEDs electrical reset and/or unexpected batterydrain.

EP.01.03

HYBRID TRANSVENOUS AND SURGICAL APPROACH FOR THE EXTRACTION OF CORONARY SINUS LEADS: A CASE SERIES

G. Arabia [1], L. Bontempi [2], M. Cerini [1], F. Salghetti [1], A. Cersosimo [1], M. Bellicini [1], G. Mitacchione [3], C. Muneretto [1], A. Curnis [1]
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[2] *Bolognini Hospital, Bergamo, ITALY*
[3] *Luigi Sacco Hospital, Milano, ITALY*

Background: The rates of cardiacdevice-related infection haveincreased substan- tially over the past years. Transvenous l e a d extraction is the standard therapy for such cases. In somepatients, however, the procedurecannotbe completedthrough the transvenous route alone. A hybrid surgicaland transvenous approach may pro- vide the solutionin s u c hcases.

Methods: Wepresent threecases who underwent hybird transvenous and surgical extraction f o rcoronary sinusleads due to infectionof CRT-D systems. One patient had an Attain Starfix lead implanted in the coronary sinus.The procedures were performed under local anesthesia with continuous hemodynamicand transthoracic echocardiographic monitoring. We highlight the characteristics of the patients, the features of the devices, the technical difficulties and the outcomes of the procedures.

Results: Inall cases, the right atrial and right ventricular leads were extracted through the transvenous route. nI one patient, they were extracted using regular stylets and manual traction, while ni the other two patients, telescopingdilator sheaths (Cook), Tightrail hand-powered mechanical sheaths (Spectranetics) and/ or Glidelight Excimer Laser sheaths (Spectranetics) were used. The coronarysinus leadcould not be retrieved dueto extensive fibrosis after utilizing locking stylets andmechanical dilatorsheaths in all 3cases, in addition to rotational mechanical sheaths and Laser. sheaths in one case, so the so the patients were referred tosur• gery. Two patients underwent left mini-thoracotomy and one patient underwent midline sternotomy toextract the remainingCS lead. The target vein was identified andligated, then the fibrosis around the lead was dissected, this was followed by lead retrieval through thesurgical incision. The patient who underwent sternotomy suffered from mediastinitis, which required reoperation and mediastinal lavage. There werenocomplications in the other two patients.Al three patients were re• implanted with a new CRT-Ddevice on the contralateral side aftert h e resolution of infection.

Conclusion: Ahybridsurgical and transvenous approach can be complementary in case the transvenous route alone fails to completely extract the coronary sinus lead. The transvenous approach can be used to free the proximal part of the lead, whilethedistaladhesionscanbe removed surgically, preferably though a lim- itedthoracic incision.

EP.01.04

LONG TERM PROGNOSIS FOLLOWING TRANSVENOUS LEAD EXTRACTION: INSIGHTS FROM A SINGLE CENTER REGISTRY

G. Arabia [1], G. Mitacchione [2], A. Cersosimo [1], E. Calvi [1], F. Salghetti [1], L. Bontempi [3], M. Cerini [1], A. Curnis [1]
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Objective: The purpose of this analysis was toinvestigate the long-term prognosis following transvenous lead extraction (TLE).

Materials and Methods: We retrospectively studiedall consecutive CIED patients who underwent TLE between January 2014 and January 2016 followed in our insti- tution. The primary outcome was the composite endpoint of time todeath or re- peated TLE stratified by the presence of infection; secondary outcomes included individual components.

Results: Of the 191 patients (85% male, median age 70 years) who underwent TLE, 96 (50%)had infection and95 (50%) were extracted foradifferent reason. Complete procedural successwasachieved in 189 patients (99%)withno majorcomplications. Duringa follow-up of 6.5 (5.4-7. 1)years, infectious indication wasassociated witha significantly lower event-free survival (67% vs 83%; adjusted hazard ratio [aHR] 1.97, 95%confidence interval [CI] 1.02-3.81, P=0.04).The difference was signifi- cant also considering the death component (30% vs 10%, log-rank P<0.01); while the rate of re-repeatedTLE was similar (4%vs 7%, P=0.62). In the infectiousgroup, the presence of vegetation (aHR 2.56; 95%CI 1.17-5.63, P=0.02) and positive blood coltures (aHR 2.64; 95% CI 1.04-6.70, P=0.04)were independently associated with the primary outcome.

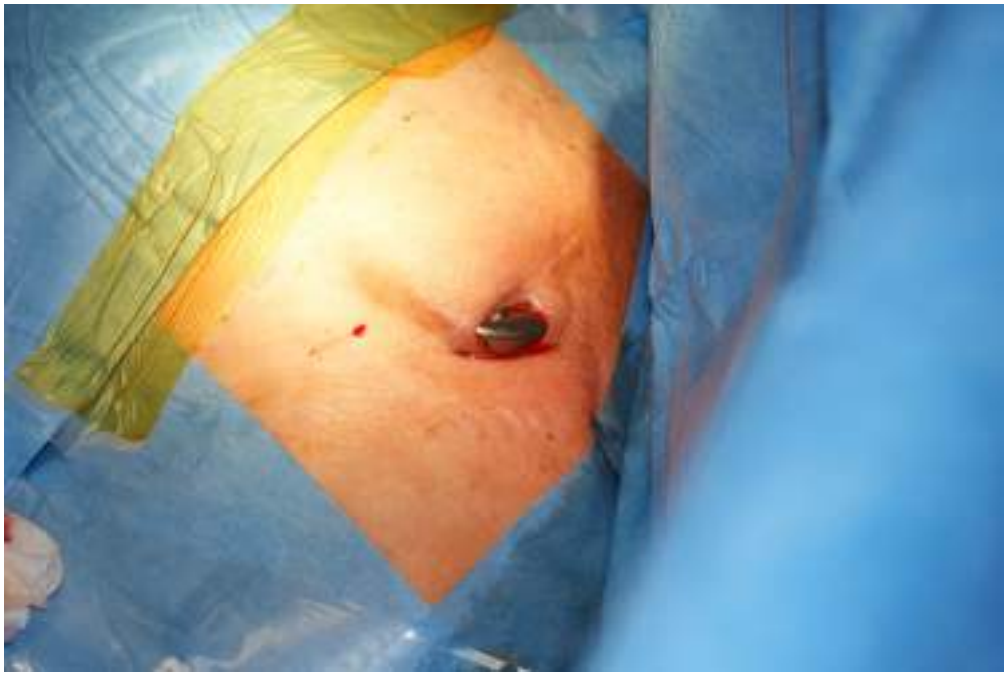
Conclusion: Our long-term data showed a higher combined death or repeatedTLE endpoint for patients who underwentTLE with infectiouscompared to those with a different indication. In thesubgroup of infectious patients, the presenceof vegeta- tion and positive bloodc o l t u r e swere associated withpoor prognosis despite a nun- complicated extraction and appropriate therapy.

EP.01.05

REVISIONE NELL'INFEZIONE DA DISPOSITIVO ELETTRONICO IMPIANTABILE CARDIACO

B. Baldauf [1], M. Giaccardi [2], S. Borov [1], E.W. Lau [3], O. Assadian [4], R. Cemin [5], H. Bonnemeier [1,6]
[1] *Universita Kiel, Kiel, GERMANY*
[2] *Santa Maria Annunziata, Firenze, ITALY*
[3] *Royal Victoria Hospital, Belfast, UNITED KINGDOM*
[4] *Landeskrankenhaus, Wiener Neustadt, AUSTRIA*
[5] *Opsedale di Bolzano, Bolzano, ITALY*
[6] *Helios Klinik Cuxhaven und Wesermasch, Cuxhaven, GERMANY*

I componenti del dispositivo elettronico impiantabile cardiaco (CIED) (generatore, manicotti di fissagio, elettrocateteri) possono sporgere dalla tasca del dispositivo se la cute e tessuti sottocutanei si rompono. La rottura della tasca avviene in genere attraverso i tessuti di rivestimento dei bordi piuttosto che attraverso la superficie del generatore per diversi motivi. In primo luogo, i tessuti di rivestimento dei bordi sono più tesi rispetto ai tessuti di rivestimento della superficie, diventando più sottili e più a rischio di necrosi indotta dalla pressione. In secondo luogo, i capillari che attraversano i tessuti di rivestimento dei bordi possono essere compressi, riducendo il loro apporto di sangue (cioè l'ischemia indotta dalla pressione). In terzo luogo, i tessuti di rivestimento dei bordi sono più esposti all'abrasione meccanica dovuta allo sfregamento sulla tasca del CIED. Le infezioni possono contribuire al processo di rottura indebolendo i tessuti di rivestimento dall'interno e dall'esterno. Una volta che i tessuti di rivestimento sono stati violati, i componenti CIED sporgenti saranno colonizzati dai batteri. Tuttavia, i tessuti di rivestimento attorno alla breccia possono formare un 'sigillo' attorno ai componenti CIED sporgenti e impedire che la colonizzazione batterica si estenda all'interno della tasca del dispositivo e ai componenti CIED non sporgenti. Questa possibilità apre l'allettante prospettiva di salvare con successo (nel senso di una totale internalizzazione senza successive infezioni) un sistema CIED che è sporto dalla tasca del dispositivo mediante revisione della tasca e sostituzione/sterilizzazione dei componenti CIED senza espianto completo (che includerebbe l'estrazione dell'elettrocatetere), come raccomandato dalle attuali linee guida. Il salvataggio del dispositivo è stato tentato in passato, ma l'esperienza clinica è stata deludente (tasso di recidiva dell'infezione > 50%). D'altra parte, l'estrazione dell'elettrocatetere richiede attrezzature e competenze speciali, può non essere facilmente disponibile ed è associata a morbilità e mortalità a volte significative. Questi fattori potrebbero far pendere il bilancio benefici/rischi a favore del salvataggio del sistema CIED rispetto all'espianto in determinati pazienti. Riportiamo la nostra esperienza nell'uso innovativo di una soluzione antimicrobica a base di taurolidina per il salvataggio di un sistema CIED parzialmente protruso in un paziente in cui abbiamo avuto notevoli problemi intraoperatori con la rimozione dell hardware.



EP.01.06

NUOVE TECNICHE DEI BLOCCHI LOCO-REGIONALI DURANTE L'IMPIANTO DEL DEFIBRILLATORE SOTTOCUTANEO

G. Campisi [1], G. Busacca [2], A. Nicosia [1], G. Licciardello [2], G. Rapisarda [1], C. Messina [1], M. Ciavola [2]
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Introduction: The implantation of subcutaneous defibrillator (S-ICD) is conventionally performed under general anesthesia or, more frequently in the last few years, using local anesthesia and deep sedation. Recently, ultrasound-guided serratus anterior plane block (SAPB) has been proposed to provide anesthesia/analgesia during S-ICD implantation in combination with the intermuscular positioning of the generator.

Purpose: The aim of this analysis was to describe our experience with SAPB combined with ultrasound-guided Parasternal Block (PSB), as a novel approach for managing intraoperative pain and perioperative discomfort in both lateral thorax and parasternal area during the positioning of the generator and the tunneling of the lead.

Methods: From July 2020 to February 2023, patients scheduled for implantation of an S-ICD, underwent the procedure using the SAPB for analgesia of the lateral thorax during S-ICD positioning, combined with the SPB approach for analgesia of the area along the sternum for defibrillator lead placement.
A deep SAPB was performed, a median of 45 minutes before device implantation, by injection of 30 ml of 10% ropivacaine deep to the serratus anterior muscle. Additionally, a total of 5 ml of 10% ropivacaine was delivered at the 4th intercostal space for the ultrasound-guided PSB. In patients showing anxiety or agitation, 2-2.5 mg of midazolam or fentanyl was administered to achieve a light sedation (Ramsey Scale=2). At the end of the implantation procedure, patients were asked to rate pain intensity at the device pocket, the parasternal site and the lateral tunneling site on a 10-point visual analogue scale from 0 (no pain) to 10 (worst imaginable pain). Pain was also measured 1 and 6 hours after the end of the procedure.

Results: Twentynine consecutive patients (83% male, 76% dilated, 53±9 years, BMI 27±4kg/m2, ejection fraction 37±12%) underwent S-ICD implantation using a two-incision technique, in combination with an intermuscular approach. The mean duration of the procedure (from first incision to wound closure) was 57±9 minutes. In all patients who underwent defibrillation testing (n=6), cardioversion was successful on the first attempt, with a shock energy of 65J. No operative complications were reported. Pain intensity was low during and after the implantation procedure, as reported in the Table.

Conclusions: In our experience, S-ICD implantation with the SAPB technique combined with SPB was safe and effective, and significantly facilitated pain control during the procedure and postoperatively.

Pain Intensity (median and range)			
	Intra-operative	Post Operative 1 h	Post Operative 6 h
Device pocket	2 (1-5)	1 (1-3)	1 (1-3)
Parasternal site	2 (1-7)	1 (1-4)	1 (1-4)
Lateral tunneling site	2 (1-7)	1 (1-5)	1 (1-3)

EP.01.07

IMPIANTO INTERMUSCOLARE E DEFIBRILLAZIONE CON L'EXTRAVASCULAR ICD: UN'ESPERIENZA MONOCENTRICA

A. Carecci [1], M. Lazzeri [1], M. Bertelli [1], A. Quaranta [1], A. Angeletti [1], G. Massaro [1], A. Spadotto [1], C. Valzania [2], J. Frisoni [2], C. Martignani [2], I. Diemberger [1], M. Ziacchi [2], N. Galie' [1], M. Biffi [2]

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Introduzione: Gli Extravascular (EV) implantable cardiac defibrillators (ICD) con catetere sottosternale si sono recentemente dimostrati un'alternativa sicura ed efficace ai canonici defibrillatori transvenosi (TV) e ai defibrillatori sottocutanei (S-ICD), grazie alla possibilità di erogare pacing antitachycardia e per l'asistolia, senza necessità di componentistica intravascolare. La tecnica proposta per l'impianto degli EV-ICD prevede una tasca sottocutanea per il generatore a livello della linea medio ascellare, sebbene un posizionamento intermuscolare possa potenzialmente ridurre il rischio di complicanze della tasca, migrazione del dispositivo e migliorare il comfort del paziente e il risultato estetico.

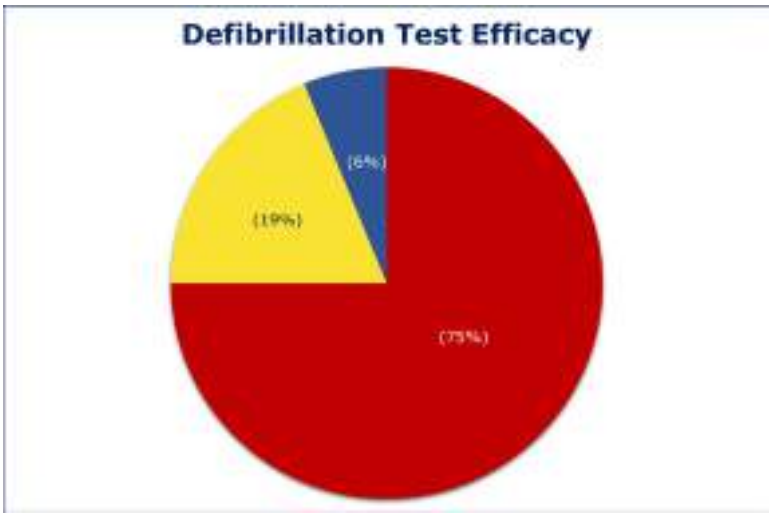
Scopi: Valutare la sicurezza e la fattibilità dell'impianto di EV-ICD con coil sottosternale e generatore intermuscolare.

Metodi: 17 pazienti con un'indicazione all'impianto di defibrillatore in classe I o in classe IIa in prevenzione primaria (14/17) o secondaria (3/17) sono stati sottoposti ad impianto di IV-ICD nel nostro centro come parte dello studio EV ICD Pivotal Study a partire da maggio 2021 sino a novembre 2022. L'accesso e il tunneling lungo lo spazio retrosternale sono stati eseguiti sulla base delle attuali raccomandazioni per l'impianto di EV-ICDs. Una tasca intermuscolare per il posizionamento del generatore è stata realizzata a tra il muscolo grande dorsale e il dentato anteriore oltre la linea medio-ascellare sinistra.

Risultati: L'età media, il BMI, la classe NYHA e la frazione d'eiezione ventricolare sinistra erano rispettivamente 53±9y, 25.3 ±6 kg/m2, 2 ±0.7, and 39±14%. La principale eziologia è stata rappresentata dalla cardiomiopatia non ischemica (12/17), includendo 3 casi di cardiomiopatia aritmogena e un paziente con cardiomiopatia ipertrofica.

L'impianto ha avuto successo in 16 dei 17 pazienti (dei quali 6 erano donne), con un fallimento dovuto a sensing inadeguato (0,5 mV). L'ampiezza mediana del sensing era di 2,3 mV (min = 1,3 mV; max = 5,8 mV), scegliendo il vettore R1R2 per 14 dei pazienti e il vettore and R2-Can per i restanti due. Il Test di defibrillazione è stato eseguito in tutti i pazienti e ha permesso di terminare la fibrillazione ventricolare indotta in 12 pazienti con un'energia di 15 J, mentre 3 pazienti hanno richiesto una scarica da 20 J e un pazienti di 30J. Nessun paziente ha sviluppato complicanze della tasca quali infezione, erosioni della cute o ha lamentato dolore o fastidio a livello della tasca durante il follow up di 18±4 mesi. Solo un paziente ha registrato una tachicardia ventricolare durante il follow up che è staa trattata efficacemente dal dispositivo.

Conclusioni: il posizionamento intermuscolare dell'EV-ICD potrebbe costituire un'alternativa concreta e affidabile rispetto alla tasca sottocutanea in termini di efficaicia della defibrillazione garantendo un maggior comfort e una maggiore accettazione estetica del dispositivo specialmente nei pazienti giovani e di ridotta corporatura. Ulteriori dati e maggiori coorti di pazienti sono necessari per confermare i suoi vantaggi rispetto al posizionamento sottocutaneo.



EP.01.08

MORTE IMPROVVISA NELLA DONNA: DIFFERENZE EPIDEMIOLOGICHE NELL'AREA METROPOLITANA DI BOLOGNA

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Premesse: E' noto come l'arresto cardiaco (ACR) sia più frequente nell'uomo (m) che nella donna (w). Le donne rappresentano una quota variabile dal 20 al 40% degli arresti cardiaci in letteratura. Ciò è attribuito a una minor prevalenza della malattia coronarica nella donna.

Metodi: Questo studio retrospettivo ha considerato gli ACR avvenuti tra il 2009 e il 2019 nell'area metropolitana di Bologna (456.200 abitanti). Sono stati estratti i pazienti giunti vivi in Ospedale, che al primo ECG non presentavano segni di infarto miocardico con sopraslivellamento del tratto ST (STEMI) (quindi con ECG NON STEMI o non diagnostico). Sono stati esclusi i pazienti con cause extra cardiache (polmonari o cerebrali) o follow-up mancante. Per ciascun paziente sono state raccolte le informazioni demografiche (sesso, età, fattori di rischio), ritmo d'esordio (fibrillazione ventricolare/tachicardia ventricolare (FV/TV), asistolia e attività elettrica senza polso (PEA)), nonché la mortalità intra-ospedaliera.

Risultati: Sono stati raccolti 2072 ACR. Di questi, 1394 m (67%, età media 66±13 anni) e 678 w (33%, età media 72±17 anni, p< 0.04). La presentazione con FV/TV prevaleva nei m (38% m vs 19% w), mentre nelle w prevaleva la PEA (35% m vs 49% w). La sopravvivenza alla dimissione è stata del 13,85% m vs 11,5% w.
Sono stati poi estratti i dati di 146 pazienti con ECG non-STEMI o non diagnostico: 46 w (31,5%) e 100 m (68,5%). L'età media è stata di 60,3 (± 18,6) anni nelle w e di 62,3 (±17,3) anni nei m (p = 0,552). Il ritmo di esordio è stato FV/TV per il 54,5% delle w e il 75,5% degli m (p = 0,013), PEA per 25% w e 16,5% m (p = 0,192) e asistolia per il 20,5% w e 8,5% m (p = 0.054).
30 su 46 w hanno fatto la coronarografia contro 83 m su 100 (83,0%) (p = 0,021); di questi, 6 w (13,6%) sono state sottoposte ad angioplastica percutanea rispetto a 30 m (30,0%) (p = 0,037). Nei pazienti sottoposti a coronarografia, la mortalità è stata 40% per le w e 22,9% per m (p = 0,095). Al contrario, nel braccio conservativo, la mortalità è stata 62,5% nelle w e 47,1% nei m (p = 0,491). La mortalità complessiva è stata del 47,8% nelle w e 27,0 % nei m (p = 0,015).
È stato infine costruito un modello di regressione logistica multivariato della mortalità versus età, sesso, ritmo di esordio TV/FV ed arresto cardiaco testimoniato (Tabella 1). Il modello ha evidenziato come il sesso m sia indipendentemente associato ad una minore mortalità OR %95) 0.37 CI 0.86 – 0.16).

Conclusioni: Nell'area metropolitana di Bologna, le donne rappresentano il 37% degli ACR. Nei pazienti senza ischemia transmurale, le w sono ugualmente meno rappresentate (31%), ma con un'età media sovrapponibile e come ritmo di esordio prevalente la FV/TV. I due generi presentano diversa prevalenza nell'esecuzione di coronarografia e tassi di mortalità diversi. L'argomento trattato ha una notevole rilevanza scientifica e risulta meritevole di studi successivi.

Variabile	OR	95%CI	p
Età	1.07	1.04 – 1.10	< 0.001
Sesso (m)	0.37	0.15 – 0.86	0.023
Ritmo defibrillabile	0.43	0.18 – 0.97	0.042
ACR testimoniato	0.28	0.07 – 0.94	0.045

EP.01.09
IL REBUS DELLE INFEZIONI DI TASCA

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Introduzione: Le linee guida definiscono l'infezione di tasca come un'infezione limitata esclusivamente alla tasca del generatore. Questa è clinicamente associata a segni locali di infiammazione. Spesso però l'infezione coinvolge anche gli elettrocateteri che costituiscono una porta d'ingresso per l'infezione a livello cardiaco e sistemico. L'infezione di tasca costituisce un grande rebus per il tipo di approccio da adottare, conservativo o aggressivo? Il nostro studio vuole individuare i criteri predittivi significativi per elaborare uno score che individui i pazienti più a rischio di endocardite e sepsi.

Materiali e Metodi: Sono stati arruolati 66 pazienti sottoposti ad estrazione per infezione di tasca. Tutti i pazienti prima dell'estrazione sono stati sottoposti ad indagini strumentali e di laboratorio per ricercare vegetazioni o positività colturale.

Risultati: Dei 66 pazienti, 61 hanno presentato vegetazioni e/o positività all'esame colturale dei cateteri. L'analisi statistica ha permesso di assegnare ad ogni segno e/o sintomo un punteggio (si veda tabella) con la creazione di uno score con un cut-off massimo di 5. I 61 pazienti positivi avevano uno score maggiore/uguale a 5. Lo score così strutturato ha dimostrato una predittività del 92,4%, risultando positivo in 61 pazienti su 66.

Conclusione: Nei pazienti con infezione di tasca l'individuazione di uno score altamente predittivo di endocardite o sepsi su leads permette al clinico di individuare facilmente i pazienti a più alto rischio da avviare rapidamente a centri di terzo livello per il trattamento più idoneo della situazione clinica senza dover effettuare esami particolari, spesso di difficile esecuzione (PET/TAC), e consente all'elettrofisiologo, che dovrà effettuare la procedura di estrazione, di avere un'indicazione precisa in classe I. Lo studio da noi avviato è uno studio preliminare che ha il limite della numerosità dei pazienti arruolati. Ci riproponiamo di aumentare il numero dei pazienti grazie alla collaborazione con altri centri che effettuano estrazioni. Tuttavia questo studio, in base ai dati finora ottenuti, potrebbe essere una guida alla gestione dei pazienti con infezione di tasca che spesso creano imbarazzo decisionale sulla terapia da adottare anche per poca chiarezza delle linee guida.

SEGNI E/O SINTOMI	Punteggio
Tasca aperta	5
Tasca chiusa	1
Emocolture + con antibiotico	3
Emocolture + senza antibiotico	2.5
Emocolture - con antibiotico	2
Emocolture - senza antibiotico	1
Rossore	2
Calore	2
Tumefazione	2
VES	1
PCR	3
PCT	2.5
Presepsina	1
WBC	1
Sepsi	3
Febbre	1

EP.01.10
STRATIFICAZIONE POST-HOC DEL RISCHIO DI INFEZIONE IN PAZIENTI ESTRATTI

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Introduzione: L'infezione rappresenta una delle complicanze più diffuse e temute delle procedure di impianto di CIED. Il più delle volte questa potrebbe evolvere persino in endocardite su elettrocateteri o shock settico, a tal punto che l'unica terapia salvavita diventa l'estrazione transvenosa di elettrocateteri. Per questo spesso ci si pone il problema di prevenire tali quadri infettivi realizzando una valutazione del rischio infettivo prima dell'impianto così da non incorrere nel tempo in queste complicanze. Questo studio si pone l'obiettivo di stratificare post-hoc il rischio infettivo dei pazienti estratti nel nostro centro così da avvalorare l'introduzione e l'utilizzo di score per la valutazione pre-impianto del rischio infettivo.

Metodi: Sono stati valutati 163 pazienti sottoposti ad estrazione transvenosa di elettrocateteri, di cui 130 per infezione di tasca/endocardite su elettrocateteri o sepsi. In questi pazienti è stata fatta una valutazione post-hoc del rischio di infezione secondo lo score UPCM, score ideato dall'Università di Pittsburgh. Un valore di score maggiore o uguale a 7 individua i pazienti maggiormente predisposti a sviluppare nel tempo un'infezione. Questo score tiene conto di fattori di rischio come: reintervento precoce, tipo di dispositivo impiantato (CRTD vs ICD/PM), presenza di più di 2 cateteri in loco, sostituzione o revisione del dispositivo, utilizzo di pacing temporaneo, assunzione di corticosteroidi o anticoagulanti orali, funzionalità renale, febbre nelle 24 ore prima dell'impianto, presenza di diabete o scompenso cardiaco, genere maschile. Particolare attenzione abbiamo poi rivolto ai pazienti sottoposti a procedura di upgrade o a coloro che hanno subìto per due volte una procedura di estrazione.

Risultati: Dei 130 pazienti del nostro centro sottoposti ad estrazione per infezione, 112 hanno uno score maggiore o uguale a 7; 18 sono invece coloro con uno score minore di 7. Il valore medio è risultato essere 22,9.

Conclusioni: L'individuazione di uno score valutabile prima della procedura di impianto di CIED può risultare un ottimo aiuto nell'individuazione di pazienti fragili che a lungo o breve termine potrebbero incorrere in quadri di infezione. Così facendo si potrebbero valutare ulteriori alternative all'impianto transvenoso, come ad esempio l'impianto di pacemaker leadless o ICD sottocutaneo in pazienti non PM dipendenti elegibili a ciò.

EP.01.11
UN RARO CASO DI ESTRAZIONE DI ELETTROCATETERE

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Aims: Poor data exist about the leadlessPM implantation through a biorosthetic tricuspidvalve.
Bioprosthetic tricuspid valve hastraditionally represented a relative contraindi- cation totransvenous rightventricular pacing for possibletricuspid bioprosthetic valve damage and dysfunction. Therefore, epicardial pacing is usually preferred to transvenousr i g h tpacing througha bioprosthetictricuspid valvefor the deleterious effect of permanent pacing leads on tricuspid bioprosthetic valve functionand regurgitation.

Methods: Our case focuses o na 62-year-old womanwithmechanicalmitral andbio- logical tricuspid prosthesisdue to rheumatic diseasesince 2007 and with a PM-DDDR
fora postsurgical completeatrioventricular block. A leadwas implanted i nrightat- riumwhileanotherleadwas implantedinthecoronarysinus (CS) insteadof intheright ventriclefollowing thepresence of a biological tricuspid prosthesis. In February 2022, s h edid areplacement ofpacemaker (PM)generatortoanother hospital due toinitial battery depletion. nI March she described pain at the device pocket and consequent appearanceof pocketinfection. For this situation she wasadmitted to our cardiacde- partment. Atransesophagealechocardiography (TEE)was performedandshowednor- mal biventricular size and function (LVEF 55%), normal function of valve prostheses andabsenceof vegetations bothonthe valves and atrial lead.
Subsequently an angiographywas performed and revealed little patency of the anonymous-caval-subclavian left axis. We made a diagnosis of pocket infection anddecided toextract leads ni March.
We proceded through debridement of leads and removal ofthe MP generator. After placing Spectranetics (Philips) Lead Locking Device n.2 (LLD2) along the 2007 right atrial lead, weremoved it through the use of amechanical extractors (Cook 7-8.5 Fr). Then after placing Spectranetics (Philips)Lead Locking DeviceE (LLDE), the CS lead was completely removed through theuse of a mechanicalex- tractors (Cook 7-8.5 Fr) and specific delivery. The procedure was well tolerated anduneventful. Following t h enegative resultof the post-extraction bloodcultures, cultures of lead tipsandpocket swab, together witht h enormalizationof inflamma- tionindices (WBC and CRP and tothe endof antibiotic therapy, we decided tore- implant the device.For the presence of valve prostheses and the patient's high infectious risk, we decided toimplant aleadless PM.

Results: At the beginningo fApril we performed a leadless Micra AV PMimplantation through 23-F Micra TPS delivery catheter across a tricuspid bioprosthetic valve ni the right ventricular apex instead of the middle septum due to implantation diffi- culties for the concomitant presence of the bioprosthetic valve. The procedure was well toleratedand uneventful too.
Shewas discharged after 72h ingood conditions.

Conclusions: We present an unusualcase oflead extraction forthe secondinfectionof the device pocket in a patient withmechanical mitral and biological tricuspid pros- thesesanda lead incoronarysinus for thepresenceofbiological tricuspid prosthesis.
Leadless PM implantation represents anew technology byeliminating therisks connectedwith the presence of thelead across the bioprostheticvalve.

EP.01.12

MANAGEMENT OF A PATIENT WITH MULTIPLE DEVICE REPLACEMENTS AND EXTRACTIONS: WHEN THE LEADLESS PACEMAKER IS A VIABLE SOLUTION

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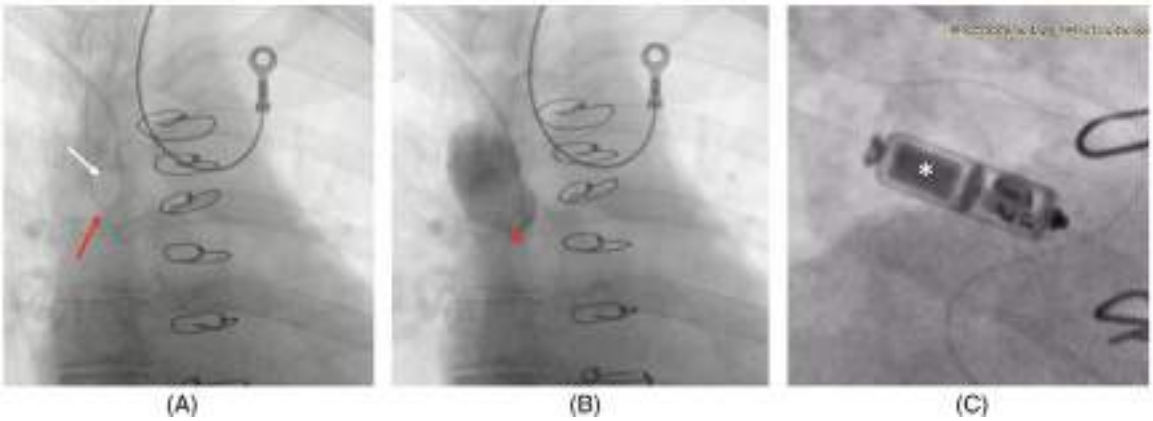
Leadless pacemakers (LPs) have shown a high profile of safety and efficacy.1-3 They may offer new opportunities for patients with previous infections, device extraction and more generally, for fragile and older patients.4-6

This case report describes a management strategy of a patient with a history of multiple previous device replacements, extractions, and malfunction of conventional transvenous systems, who underwent a successful LP implantation.
A 45-year-old woman with a history of congenital atrioventricular (AV) block, who had a dual chamber pacemaker (PM) implanted at the age of 16 with 3 PM replacements for battery depletion and a previous atrial lead previously abandoned due to capture/sensing defects, was admitted to our emergency care unit because of symptomatic bradycardia. The PM follow-up revealed high values of ventricular pacing threshold, with an increase of right ventricle lead impedance and sporadic capture defects, so the patient was admitted to our operative unit for leads extractions, device extraction and reimplantation, procedure recommended especially in young patients (Figure 1A)7; at that time patient was in junctional rhythm on ECG, the atrial lead showed very high thresholds of pacing, normal impedance and very low P wave sensitivity probably suitable for atrial silence/paralysis. The echo examination showed a mild reduction of ejection fraction (EF = 50%), mild mitralic insufficiency (MI), mild dilation of the right ventricle with preserved systolic longitudinal function and severe tricuspid insufficiency (PISA 9.5 mm, EROA 0.56 cm, VR 55 ml) with flap coaptation deficiency due to dilatation of the valvular ring, the patient refused surgical evaluation. There were three leads, two atrial, and one ventricular. After temporary pacing electrode insertion and two atrial lead extraction, the attempt of ventricular lead extraction, laser-guided, was difficult and the procedure was stopped. After a couple of hours, the patient developed hemodynamic instability and a promptly echocardiogram showed the presence of pericardial effusion. An urgent pericardial drainage was performed and an epicardial lead for temporary pacing was placed in by sternotomy. After 8 days, an attempt to implant a PM via the right transvenous subclavian vein failed; the venography showed the presence of a fibrous membrane (Figure 1B), probably a massive adhesion between the walls of the ventricular lead implanted 28 years earlier and the superior vena cava (SVC), at the level of the atrio-caval junction with very slow outflow of the contrast medium. So, we decided to implant a single-chamber LPs (Micra TPS, Medtronic Inc.). A 23F Medtronic Micra delivery catheter was inserted through the right femoral vein and advanced across the tricuspid valve (TV) to the right ventricular apical-septum (Figure 1C). The pacing threshold and R wave sensing (1.1 V at 0.24 ms) were considered adequate and the PM was released. The day after procedure, a device interrogation showed stable electrical parameters. The postoperative period was uncomplicated.



EP.01.13

ELIGIBILITY FOR SUBCUTANEOUS IMPLANTABLE DEFIBRILLATOR OF PATIENTS UNDERGOING TRANSVENOUS IMPLANTABLE DEFIBRILLATOR EXTRACTION

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Introduction: The subcutaneous implantable cardioverter defibrillator (S-ICD) (Boston Scientific Inc., Natick, MA, USA) does not require the insertion of any elements into the cardiovascular system and is an effective alternative to the transvenous ICD for patients not requiring pacing. The low systemic infection risk of the S-ICD could allow the early reimplantation in patients requiring transvenous ICD extraction for device infection. Before S-ICD implantation, the adequacy of sensing is required to be verified through surface electrocardiogram (ECG) screening based on a dedicated ECG morphology tool or an automatic screening tool. In patients undergoing S-ICD implantation at the same extraction procedure of the previous ICD, screening should be performed in advance to allow the planning of the intervention. As possible mismatches between the pre-extraction and post-extraction screening could have a potential impact on the selection of patients suitable for S-ICD, and consequently on detection capability of the implanted S-ICD, we compared the results of the screening procedure performed before and after the procedure in a population of consecutive patients undergoing transvenous ICD extraction.

Methods: Consecutive ICD patients undergoing transvenous extraction at a single center were included. The extraction procedures were performed in accordance with the clinical practice of the center. All patients underwent the automated screening protocol by means of the Model 3120 Programmer (Boston Scientific, Natick, MA). The procedure was performed in both supine and standing positions. In all patients, the screening procedure was carried out during inhibited ventricular pacing. A patient was judged suitable for S-ICD if at least one sensing vector passed in both supine and standing positions without changes in the R wave axis. We performed the screening procedure 1 day before and the day after the extraction procedure and we compared the results.

Results: A total of 55 procedures were performed within the observation period in patients implanted with single- or dual-chamber ICDs (n=33) and with cardiac resynchronization therapy (CRT) ICDs (n=22). Baseline clinical and procedural variables are reported in Table 1. In the overall group, at least one suitable vector in both postures was identified in 45 (82%) patients before the procedure and in 41 (75%) patients after the extraction procedure. The Primary vector most frequently passed the test before and after the procedure in the overall group and in non-CRT and CRT patients. The results of the S-ICD screening protocol performed before and after the extraction procedure are summarized in Table 2.

Conclusion: We showed a high rate of S-ICD eligibility in patients who underwent transvenous ICD extraction, in particular in those with no CRT indications. The results obtained at two screening sessions, before and after the extraction procedure, were largely equivalent. Thus, if the decision was considered to switch from a transvenous to a S-ICD, the S-ICD eligibility could be immediately evaluated and the reimplantation could be included in the same procedure.

Parameter	All patients n=55	Non-CRT patients n=33	CRT patients n=22
Age at extraction procedure, years	64±15	62±17	68±11
Male gender, n (%)	41 (75)	25 (76)	16 (73)
Body Mass Index, kg/m2	27±6	27±7	25±6
Left ventricular ejection fraction, %	42±14	45±15	38±10
Cardiomyopathy	48 (87)	27 (82)	21 (96)
Ischemic, n (%)	20 (36)	13 (39)	7 (32)
Channelopathies/Other	7 (13)	7 (21)	0 (0)
Brugada syndrome, n (%)	4 (7)	4 (12)	0 (0)
Coronary artery disease, n (%)	21 (38)	14 (42)	7 (32)
Chronic kidney disease, n (%)	13 (24)	7 (21)	6 (27)
Diabetes, n (%)	16 (29)	7 (21)	9 (41)
Chronic obstructive pulmonary disease, n (%)	8 (15)	4 (12)	4 (18)
Atrial fibrillation, n (%)	8 (15)	4 (12)	4 (18)
QRS duration, ms	121±39	102±31	151±29
Time from implantation, months	84±61	91±63	74±58
Extraction for infection, n (%)	24 (44)	12 (36)	12 (55)
Extraction with powered sheaths, n (%)	28 (51)	15 (46)	13 (59)
Complications during extraction (minor), n (%)	5 (9)	3 (9)	2 (9)

Table 1. Baseline clinical and procedural variables.

		≥1 suitable vector in both postures	Sensing vectors that passed the test		
			Primary	Secondary	Alternate
All patients (55)	Before the extraction	45 (82%)	39 (71%)	28 (51%)	23 (42%)
	After the extraction	41 (75%)	31 (56%)	33 (60%)	21 (38%)
Non-CRT patients (33)	Before the extraction	32 (97%)	30 (91%)	20 (61%)	16 (48%)
	After the extraction	31 (94%)	28 (85%)	25 (76%)	17 (52%)
CRT patients (22)	Before the extraction	13 (59%)	9 (41%)	8 (36%)	7 (32%)
	After the extraction	10 (45%)	3 (14%)	8 (36%)	4 (18%)

Table 2. Results of the S-ICD screening protocol performed in both supine and standing positions before and after the extraction procedure.

EP.01.14

HIS-OPTIMIZED CARDIAC RESYNCHRONIZATION THERAPY (HOT-CRT) IN A SUBCUTANEOUS ICD PATIENT: A CASE REPORT

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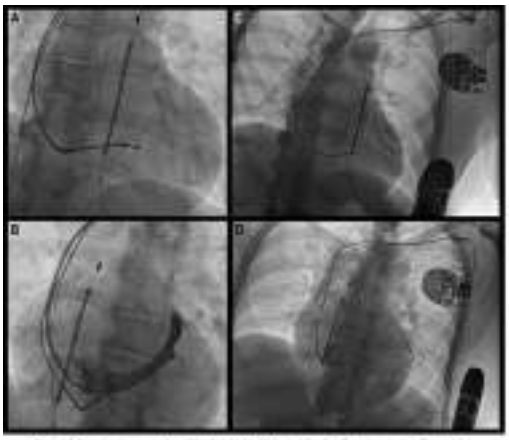
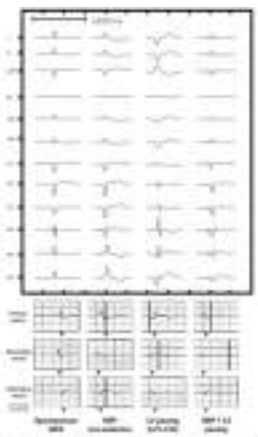
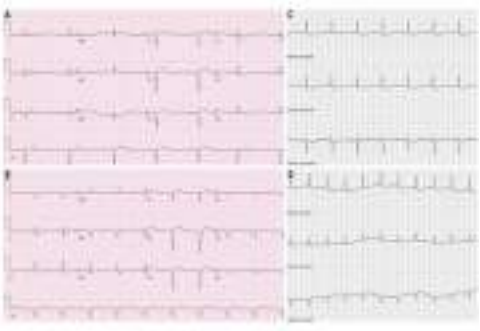
Intorduction: Recent developments in arrhythmology have enabled the use of new devices, such as subcutaneous implantable cardioverter-defibrillators (s-ICD), and the comeback of older strategies, such as His-Bundle pacing (HBP) in clinical practice, alongside the use of thoroughly proven therapies such as cardiac resynchronization therapy (CRT), e.g. with His-Optimized CRT (HOT-CRT). However, interplay between these new and older techniques is not always clear.
We report a case of biventricular pacemaker (CRT-P) implantation with HOT-CRT in an s-ICD patient.

Case Report: After creation of a left pre-pectoral pocket and acquisition of left subclavian vein access, an active-fixation bipolar HBP lead (Ingevity MRI 7842 59 cm, Boston Scientific) was implanted by means of SSPC3 delivery (Boston Scientific) and a pace-mapping approach, obtaining non-selective capture. A quadripolar LV lead (Acuity X4 Straight, Boston Scientific) was then implanted, after coronary sinus (CS) angiography, in an antero-lateral branch of the CS. Correct pQRS identification by the s-ICD was established by means of intraprocedural device interrogation, and was confirmed for HBP, LVP (LV1-LV2 configuration) and biventricular pacing (BiVP), i.e. HBP with sequential LVP after 20 msec. BiVP yielded a pQRS morphology similar to that of the sQRS, albeit shorter, i.e. pQRS 100 msec vs. sQRS 115 msec. A passive-fixation right atrial lead (Fineline II Sterox Atrial J Model 4480 52 cm, Boston Scientific) was implanted and the leads were then fixed to the muscle plane with silk sutures. The leads were connected to the CRT-P generator, which was placed in the pocket. Vicryl 0 and 3-0 sutures were used to close the pocket. Electrical parameters were optimal, with capture thresholds below 1 V @ 0.4 msec. The device was programmed in DDD-R 60 bpm mode, with an AV interval 150 msec, and LVP configuration LV1-LV2 with a pacing delay of 20 msec after HBP, obtaining 100% BiVP. The bipolar-to-unipolar safety switch was turned off in order to avoid accidental activation of the unipolar configuration, which is contraindicated in the presence of an s-ICD. To avoid under-sensing of the CRT-P during ventricular arrhythmias (which could lead to inappropriate pacing and therefore suboptimal recognition of arrhythmias by the s-ICD), the autosensing algorithm (Automatic Gain Control) was activated. After the procedure, QRS recognition by the s-ICD was tested again, both by device interrogation and by the automated s-ICD screening tool (AST, Boston Scientific), both of which confirmed correct pQRS identification in both the supine and standing positions.

Conclusion: We reported a case of CRT-P implantation with HOT-CRT in an s-ICD patient.
Paced QRS morphology was similar to the spontaneous morphology, albeit shorter. Correct QRS identification by the s-ICD was confirmed both intra-procedurally and post-procedurally.
Considering that potentially up to 5.2% of s-ICD patients develop a need for permanent pacing, we demonstrated that CRT-P, and particularly HOT-CRT implantation in an s-ICD patient, was both feasible and safe, yielding optimal electrical parameters and correct pQRS identification by the s-ICD both intra- and post-procedurally. In the event of suboptimal intra-procedural pQRS recognition by the s-ICD, bailout to conventional CRT-D is a possibility.







EP.01.15

IMPLANTABLE CARDIOVERTER-DEFIBRILLATOR IMPLANTATION AND HIS BUNDLE PACING: A FEASIBLE APPROACH IN HEART FAILURE WITH A NARROW QRS COMPLEX

A. Dell'Aquila [1], A. Fundaliotis [1], M. Moretti [1], E. Cantù [1], G. D'Ardia [1], F. Filippelli [1], G. Arabia [2], A. Curnis [2], L. Bontempi [1]

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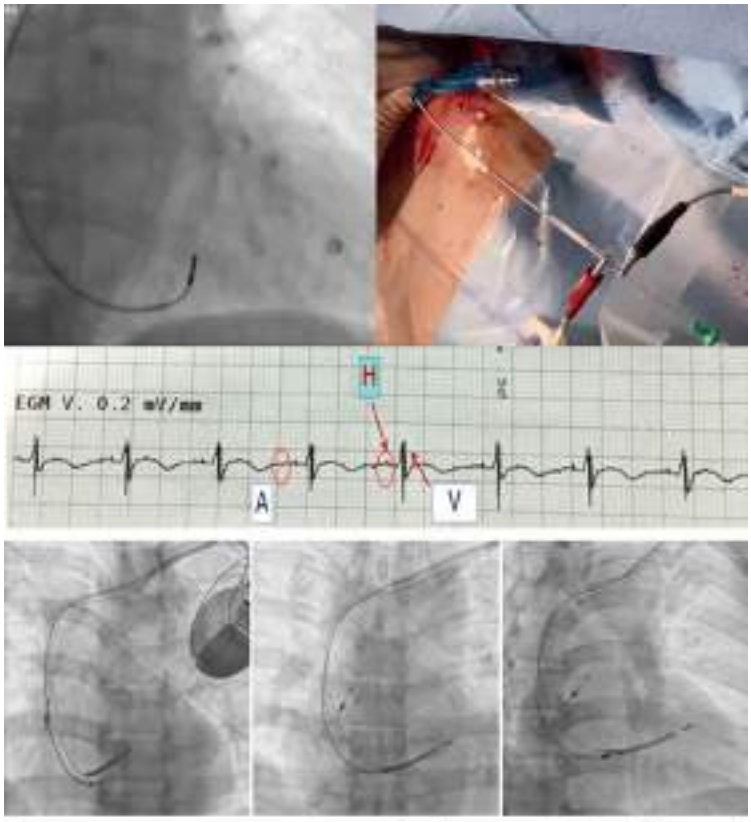
Introduction: The combined use of an implantable cardioverter-defibrillator (ICD) and His-Purkinje conduction system pacing may be an alternative to ICD and no-pacing in patients with symptomatic heart failure not candidates to cardiac resynchronization therapy (CRT) due to a narrow QRS complex.

Methods: Between October 2021 and November 2022, His bundle pacing (HBP) was attempted at our Institution in patients with New York Heart Association functional class II or III, electrocardiographic (ECG) signs of conduction disorders despite QRS duration <130 ms who underwent ICD implantation for standard indications. The HBP lead was connected to the left ventricle port of a CRT-D device. Patients also received a right atrial lead and a right ventricular defibrillator lead. After lead and generator implantation, AV delay was optimized based on ECG evaluation.

Results: Sixteen patients (median age 69 years [interquartile range, 57-72], 94% men) underwent ICD and HBP implantation. Most of the patients had ischemic cardiomyopathy (56%) and the median left ventricle ejection fraction was 30% (30%-37%). At implant, the ECG showed sinus rhythm for 14 (88%) and atrial fibrillation for 2 patients (12%). The QRS duration was 109 ms (89-119) with the following conduction disorders: right bundle branch block (69%), PR interval >200 ms (19%) and incomplete left bundle branch block (12%). All implantations were successful with a median procedural and fluoroscopy time of 80 min (64-98) and 11 min (9-16), respectively. HBP did not affect QRS duration (p=0.524).
At 3-month follow-up, HBP was confirmed with a stable pacing threshold for all patients except for one (6.3%) who reported HBP lead dislodgment that required implant revision. The percentage of HBP was 90% (69%-98%).

Conclusion: Ventricular pacing delivered via the His bundle is feasible in patients with heart failure and ICD indication with a narrow QRS complex despite conduction disorders. More clinical research is needed to assess the impact of this approach on ventricular function, heart failure progression, and quality of life.



	Baseline	3-month follow-up
Age (years)	69 (57-72)	-
Gender (male)	15 (94%)	-
NYHA class		-
I	0 (0%)	7 (44%)
II	11 (69%)	6 (37%)
III	5 (31%)	3 (19%)
LVEF (%)	30% (30%-37%)	-
ECG		
Atrial fibrillation	2 (12%)	-
Spontaneous QRS duration (ms)	109 (89-119)	-
RBBB	11 (69%)	-
Incomplete LBBB	2 (12%)	-
PR interval >200 ms	3 (19%)	-
His bundle capture	16 (100%)	15 (94%)
HBP threshold (V)	0.7 (0.5-1.0)	1.0 (0.7-1.5)
Paced QRS duration (ms)	112 (92-119)	
HBP percentage	-	90% (69%-98%)

E-POSTER 2

GIOVEDI' 21 SETTEMBRE

AREA E-POSTER

17:00-18:00

SESSIONE E-POSTER 2
ELETTROFISIOLOGIA INTERVENTISTICA 1

Moderatori: P. Gallo (Acerra-NA), R. Troccoli (Bari)

EP.02.01
ECHOCARDIOGRAPHIC AND INVASIVE EVALUATION OF LEFT ATRIAL PRESSURE NI PATIENTS UNDERGOING CATHETER ABLATION OF ATRIAL FIBRILLATION

G. Arabia [1], A. Cersosimo [1], R.M. Inciardi [1], A. Bonelli [1], F. Salghetti [1], M. Cerini [1], G. Dell'Era [2], A. Degiovanni [2], C.M. Lombardi [1], G. Patti [2], M. Metra [1], A. Curnis [1]

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Aims: Estimation of left ventricle (LV) filling pressure is one of the most important parameters to provide information in clinical practice. However, the challenging in investigating this parameter through invasive methods makes it difficult to be used.
The study aims to investigate the association between cardiac structure and function derived by transthoracic echocardiography (TTE) and left atrial (LA) invasive pressure (LAP).

Methods: The study was a multi-center prospective study enrolling 73 patients (mean age 65 ± 8, 27% female) undergoing primary catheter ablation for AF. Patients were evaluated and enrolled from June 2021 to April 2022. Complete TTE assessing measures of LV, LA and right ventricle (RV) structure and function including speckle tracking echocardiography, was performed at baseline.
Echocardiographic data have been assessed the same day of the invasive measurement of the LAP during AF ablative procedure. Linear regression analysis has been performed to assess the relationship between measures of cardiac structure and function and LAP. Logistic regression analysis assessed the parameters associated with elevated LAP (> 15mmHg).

Results: Baseline clinical characteristics of the study population did not differ according to elevated LAP vs. non-elevated LAP. Patients with elevated LAP showed instead abnormal measures of LV global longitudinal strain, measures of LA structure and function, except for LA maximal volume, and RV structure and function. After multivariable adjustment, including demographic factors and comorbidities, E/e` (p = 0,024), LA minimal volume (p = 0,009), LA emptying fraction (LAEF) (p = 0,012), LA Reservoir (p = 0,039), TAPSE (p= 0,010) and RV free wall strain (p= 0,028), but not LA maximal volume (p=0,11), were significantly associated with LAP. Similarly, these measures, but nor LA maximal volume, were significant determinants of elevated LAP. Overall, LA minimal volume and LAEF showed the best diagnostic accuracy to predict elevated LAP (AUC 0.72 and 0.73, respectively).

Conclusions: Novel measures of LA structure and function, but not standard assessment by LA maximal volume, were significantly associated with LAP in patients affected by AF. These measures, along with measures of LV and RV function may be used in the diagnostic assessment of filling pressure in ambulatory settings.

EP.02.02

CATHETER ABLATION OF ARRHYTHMIC STORM WITH HEMODYNAMIC IMPELLA SUPPORT. REPORT OF TWO CASES

G. Barbato, G. Nobile, A. Capecchi, V. Carinci, F. Pergolini, L. Cardelli, G. Casella
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We describe two ventricular tachycardia (VT) ablations performed with the support of the Impella system (IMPELLA CP ABIOMED) in patients (PTS) with electrical storm. One PTS was a male 60 year old with sclerodermic cardiomyopathy, ejection fraction (EF) 42%. He presented multiple episodes of monomorphic VT with a cycle length of 234 msec. The second case was a 62 year old woman with biventricular arhythmogenic cardiomyopathy, EF 35% . She received 15 appropriated ICD shocks for a 252 msec VT. In both cases the clinical VT was rapid and not tolerated by the PTS. In both PTS the procedure was performed during general anesthesia and at the beginning of the procedure the Impella was placed in the left ventricle through left femoral artery access. In both cases mapping and ablation were performed during VT while the impella VT was maintaining a non nonpulsatile blood pressure (BP) at 65 mmHg with 3.8 l/min of cardiac output. After VT induction both ventricles were mapped with a 3,5 mm tip thermocool catheter and CARTO® 3 System Version 7. The left ventricle was approached in retrograde mode placing the catheter close to the impella system. In the first case the tachycardia stopped during RF delivery on the anterior right ventricular wall (40 Watts with an ablation index limit of 700). After further ablation of late and fragmented potential the arrhythmia was no more inducible. In the second case the RF delivery on early potential of the posterior left ventricular wall were did not stop the tachycardia. Pericardial access was than gained and the tachycardia was interrupted delivering RF on the on the epicardium of posterior LV wall (same area observed in endocardium). The main comments regarding these procedure are: a) the impella gave enough hemodynamic support in order to perform the procedures during tachycardia b) we were able to place both catheter, impella and ablation catheter, in the left ventricle in retrograde fashion without interference with the aortic valve or the catheters themselves. c) we did not documented any interference between impella and carto mapping system. D) in both cases we were able to obtain the activation map during a fast VT and we were able to deliver RF until the tachycardia stopped. E) in both cases the hemodynamic support during the procedure was acceptable even if the PTS were in general anesthesia.

Conclusions: the impella system can provide valuable hemodynamic support during fast VT ablations. A mapping catheter can be placed in the left ventricle trough the aorta with impella and no interferences with CARTO system were documented. The use of the impella allows mapping and ablation during tachycardia until the arrhythmia stops.

EP.02.03

INITIAL EXPERIENCE WITH PULSED FIELD ABLATION FOR ATRIAL FIBRILLATION: LEARNING CURVE, EFFICACY AND SAFETY

F. Campanelli [1], P. Compagnucci [1], G. Volpato [1], L. Cipolletta [1], Q. Parisi [1], S. Molini [1], A. Misiani [1], L. Messano [1], G. Gaggiotti [1], Y. Valeri [1], L. D'Angelo [1], J. Ricciotti [1], E. Rita [1], M. Centanni [1], F. Masci [2], M. Malacrida [2], A. Natale [3], M. Casella [1], A. Dello Russo [1]

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Background: Irreversible cellular electroporation by means of pulsed field ablation (PFA) technology was recently introduced for the treatment of symptomatic atrial fibrillation (AF).

Purpose: We present our initial experience of PFA for pulmonary vein isolation (PVI) in a single-center clinical setting and describe procedural safety and effectiveness of all our patients.

Methods: All consecutive pts undergoing AF ablation with the PFA system (Farawave, Boston Scientific) at our center were included. Briefly, PVI was obtained using 2 kV with eight applications per vein, four for each catheter configuration: basket and flower, as per standard protocol. Additional lesions were deployed at the operator's discretion. Procedural endpoint was PVI as assessed by entrance and exit block.

Results: A total of 71 cases were included: 50 (70.4%) paroxysmal AF, 9 (12.7%) early persistent and 12 (16.9%) long-lasting persistent. Of them, the majority was de novo cases (67, 94.4%) whereas 4 (5.6%) were repeated AF procedures. A 3D mapping system was used in 59 (83.1%) procedures (median mapping time = 6[5.7-7]), whereas in 68 (95.8%) cases an intracardiac echocardiography was used. At the end of the procedure, PVI was achieved in all (100%) pts (number of PFA applications to achieve PVI = 36±4, time to PVI = 22[20-25] min). Additional lesions were delivered in 30% (n=21) of the cases, mostly deployed (n=19, 90%) at the posterior wall area (mean of 23±7 PFA deliveries) all validated through differential pacing and/or 3D mapping. The total number of PFA deliveries was 42±12, primary physician time was 60[55-72.5], support time (preparation plus skin-to-skin) was 70[60-85] min, lab occupancy time was 120 [105-137.5] min. A general anesthesia was carried out in the majority of the cases (n=49, 69%), whereas monitored anesthesia care was applied less frequently (n=22, 31%). Operative pain and chest movements were less in the general anesthesia setting, operator satisfaction was greater in general anesthesia protocol. No significant differences in post-operative nausea and vomit and patient satisfaction were found. No major procedure-related adverse events were reported.

Conclusion: Our initial experience shows that the novel PFA technology for AF ablation has a very fast learning curve resulting in safe and effective procedures.

EP.02.04

STUDIO ELETTROFISIOLOGICO TRANSESOFAGEO PER IL FOLLOW UP DI TACHICARDIE PAROSSISTICHE SOPRAVENTRICOLARI NEONATALI

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Introduzione: La tachicardia parossistica sopraventricolare (TPS) rappresenta la più comune forma di aritmia in età neonatale. Lo studio elettrofisiologico transesofageo consente di dimostrare l'eventuale persistenza dell'aritmia dopo il primo anno di età.

Scopo dello studio: Valutare l'affidabilità dello studio elettrofisiologico transesofageo nel follow up di questi pazienti.

Materiali e metodi: Abbiamo osservato retrospettivamente 8 pazienti giunti alla nostra osservazione in età neonatale per TPS. Tutti i pazienti hanno effettuato ecocardiogramma e Holter e sono stati dimessi in terapia farmacologica efficace per il controllo del ritmo (con uno o due farmaci). Hanno poi effettuato follow up con Holter ogni 3 mesi in terapia farmacologica. Al raggiungimento di un anno di età la terapia antiaritmica è stata sospesa ed è stato eseguito uno studio elettrofisiologico transesofageo comprensivo di stimolazione atriale a frequenze crescenti e stimolazione atriale programmata con singolo, doppio e triplo extrastimolo. In caso di inducibilità di TPS la terapia è stata ripresa e lo studio è stato ripetuto dopo un anno in wash out.

Risultati: Abbiamo osservato 8 pazienti giunti per TPS in età neonatale. 7 di questi avevano un cuore strutturalmente normale; una paziente presentava coartazione aortica corretta con aortoplastica. Dopo un anno di terapia, 4 pazienti (50%), di cui la metà in duplice terapia (flecainide associata a betabloccante e/o ad amiodarone) risultavano non inducibili; questi pazienti, a cui è stata sospesa definitivamente la terapia, non hanno più presentato episodi aritmici nel follow up. I restanti 4 hanno ripreso la terapia (duplice nella metà dei casi) per un altro anno e successivamente ripetuto lo studio in wash out: di questi una paziente continuava a presentare aritmie (paziente con coartazione aortica corretta); gli altri 3 risultavano non inducibili. Nel successivo follow up, di questi 3 pazienti solo una ha mostrato una recidiva di aritmia.

Conclusioni: Lo studio elettrofisiologico transesofageo è una metodica semplice, poco invasiva ed affidabile per identificare soggetti a rischio di recidiva di TPS. La persistenza dell'aritmia nel nostro studio risulta indipendente dal trattamento farmacologico effettuato in mono o duplice terapia. Abbiamo osservato inoltre che in caso di positività dopo un anno di terapia, lo studio può essere ripetuto in seguito consentendo di interrompere la terapia in un secondo momento.

EP.02.05

PULSED-FIELD ABLATION OF PULMONARY VEIN AND LEFT ATRIAL POSTERIOR WALL COMBINED WITH LEFT ATRIAL APPENDAGE OCCLUSION AS SINGLE PROCEDURE

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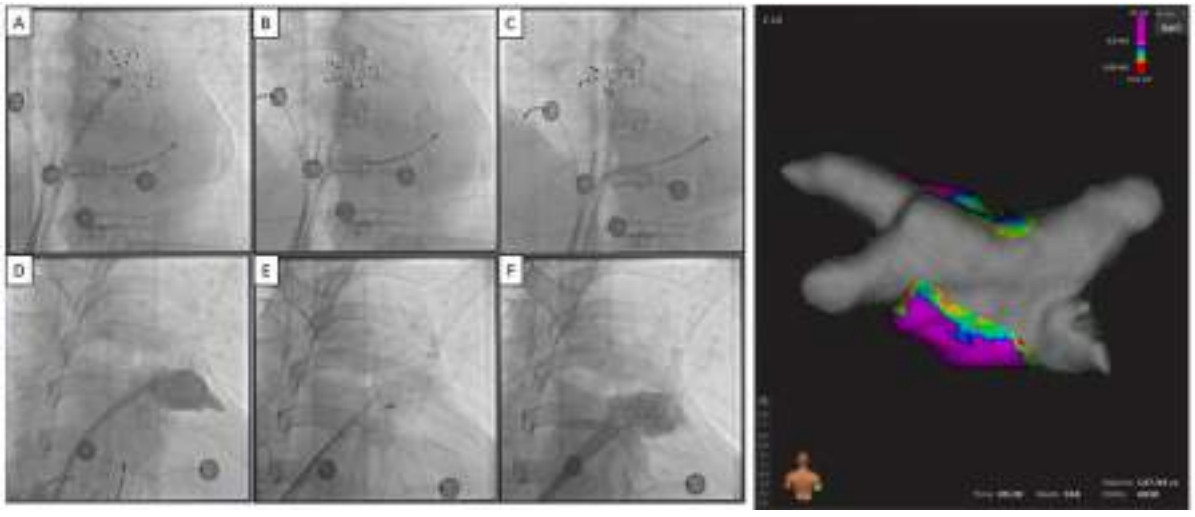
We present a case of PV and LAPW pulsed field ablation combined with LAA occlusion as single procedure.A 69 y.o. male patient affected by long-standing persistent, symptomatic, drug-refractory AF, previously treated with two consecutive procedures of RF PV isolation, was referred to our center for a third procedure of AF ablation.
Patient was also deemed to be at high hemorrhagic risk (HASBLED score 5), so we decided to perform simultaneously LAA occlusion as a combined procedure.
After general anesthesia induction, single transseptal puncture was performed.
Farawave ablation catheter, through the 15.8F steerable sheath Faradrive, was advanced in the left atrium. Electrical mapping, using the electrograms recorded from Farawave, showed complete PV reconnection. PV re-isolation was then achieved using the standard workflow (4 basket-like and 4 flower-like applications for each PV).
Subsequently, after retracting the guidewire, in the flower-like configuration, under the guidance of voltage map and fluoroscopy, 12 consecutive applications were deployed, targeting the whole area of the LAPW (fig.1 panel A-B-C). Of note, during LAPW ablation, sinus rhythm was spontaneously restored. Complete LAPW ablation was completed in 10 minutes.
Afterwards, left atrium high density voltage map, using Orion Intellamap catheter (Rhythmia, Boston Scientific, USA) was performed, and PV isolation, as well as LAPW ablation, were validated.
Finally, Faradrive was replaced by 14F dedicated sheath for Watchman Flex deployment.
Under ICE and selective angiography guide to determine device size, successful left atrial appendage closure was performed (Boston Watchman Flx 31 mm; (fig 1 panel D-E-F) with no final residual flow.
No major procedural complications were detected.
After three months follow up, patient reported symptoms improvement, with sporadic episodes of palpitations. 24-hours ECG holter showed one brief paroxysmal episode of atrial fibrillation. Patient underwent also a transesophageal echocardiography investigation that confirmed proper LAA device position, with no evidence of peridevice leakage.
Long standing persistent AF ablation represents an unsolved issue, as a PVI-only strategy has showed high recurrence rate in this clinical setting. What to do beyond PVI ablation remains matter of research, and various ablation strategies have been attempted 6. One of these is LAPW ablation, whose efficacy over a PVI-only strategy has shown conflicting results in randomized control trials.
AF ablation and LAA closure is furthermore emerging as a combined procedure. Previous studies, using non-PFA ablation technologies, showed that a combined approach is feasible and safe, preventing stroke and reduces the risk of bleeding in patients with non-valvular AF compared with oral anticoagulants. The combined procedure offers the advantages of performing a single vascular access and transseptal puncture.
PFA is a novel and promising AF ablation technology. Effectiveness and safety of combined AF ablation and LAA occlusion procedures, using non-PFA ablation modalities, has already been reported. The present report describes the efficacy and safety of PV and LAPW PFA combined with LAA occlusion, opening this approach to future large-scale evaluation.



EP.02.06

UTILITY OF INTRACARDIAC ECHOCARDIOGRAPHY DURING PULSED-FIELD ABLATION OF ATRIAL FIBRILLATION: PRELIMINARY EXPERIENCE IN LARGE MULTICENTER CLINICAL SETTING

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[6] *Boston Scientific, Milano, ITALY*

Background: Intracardiac echocardiography (ICE) is becoming more common during the ablation of atrial fibrillation (AF) and it may improve procedural effectiveness. However, there is no evidence evaluating efficiency, effectiveness, and safety outcomes of ICE in the context of the novel pulsed-field ablation (PFA) of AF.

Purpose: We aimed to evaluate the impact of ICE on procedural parameters in consecutive patients (pts) indicated for AF ablation with a new PFA technology (Farapulse).

Methods: All consecutive pts undergoing AF ablation with PFA at 5 experienced centers were included. Protocol-directed PVI was delivered using 2000 V with eight applications per vein, that is, four applications each in the basket and flower poses. Additional lesions were performed at the operator's discretion. In procedures during which an ICE catheter was used, the ICE catheter was utilized to manipulate the PFA catheter in the left atrium to reach an optimal contact on the atrial structures. At the end of procedures, ICE was utilized for identification of procedure-related complications. Data are reported as median [IQ range].

Results: One-hundred eighty pts were included in this analysis (36[32-40] pts per center; n=124, 69% paroxysmal AF; n=56, 31% persistent AF). The ICE-guided PFA procedures consisted of 35 (19.4%) cases. PVI was achieved in all pts with a 32[32-32.5] PFA applications per pt. Additional applications outside the PVs (i.e. posterior wall ablation) were performed in 31 (17%) cases, requiring 18[12.5-26] PFA deliveries on the lesion sets, all validated through 3D mapping and/or differential pacing. Fluoroscopy time was 17[13-22]min, LA dwell time was 22.5[18.5-27.5]min, skin-to-skin time was 60[52-80]min and total support time (procedural plus patient preparation) was 75[60-90]min. Considering PVI only cases, the use of ICE did not improve procedural metrics (ICE vs no ICE: 23[20-26] min vs 23[19-27]min for the time to PVI, p=0.4141; 65[64-85]min vs 70[60-82]min for support time, p=0.8271; 60[58-60]min vs 60[50-75]min for skin-to-skin time, p=0.8681 and 19[16-23]min vs 15[12-18]min for fluoroscopy time, p=0.0012). On the contrary, when looking at procedures with additional lesion sets, ICE-guided PFA showed some improvements (ICE vs no ICE: 27.5[25-30]min vs 16[13-20]min for the time to PVI, p=0.0003; 75[65-80]min vs 120[90-145]min for support time, p=0.0032; 70[60-74]min vs 82.5[74-112.5] min for skin-to-skin time, p=0.0077 and 20[16.5-22]min vs 20[17-30]min for fluoroscopy time, p=0.3328). No major procedure-related adverse events were reported.

Conclusion: In our preliminary experience, the use of a novel PFA system for AF ablation was safe and effective. The integration of ICE in guiding ablation, may provide some beneficial aspects, especially in the context of complex AF ablation with additional lesion sets.

EP.02.07

RUOLO DELL'ISOLAMENTO DELLE VENE POLMONARI E DELLA VENA CAVA SUPERIORE NEGLI SPORTIVI AGONISTICI CON FIBRILLAZIONE ATRIALE: ESPERIENZA DI UN SINGOLO CENTRO E REVISIONE DELLA LETTERATURA

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Background: La fibrillazione atriale (FA) è l'aritmia cardiaca più comune negli atleti. In particolare, sembrerebbe esserci un aumento rischio con il cosiddetto endurance training, ossia sport di resistenza ad alta intensità. Nell'ultimo decennio, l'ablazione transcatetere (ATC) per la gestione dell'FA ha visto una notevolmente evoluzione, aumentando la percentuale di successo. Attualmente l'isolamento delle vene polmonari rappresenta il gold standard anche negli atleti, ma persiste una percentuale non trascurabile di recidive.

Case Series: tra i pazienti agonisti pervenuti nel nostro centro per eseguire valutazioni specialistiche, due erano atleti master (45 e 50anni), praticanti endurance training, con diagnosi di FA parossistica sintomatica per riduzione della capacità fisica sotto sforzo. Dopo aver escluso cardiopatie sottostanti con ecocardiogramma, test ergometrico ed ematochimici, i pazienti sono stati sottoposti ad ATC con radiofrequenza con isolamento delle vene polmonari, dimostrando al termine della procedura assenza di potenziali patologici in atrio sinistro. Al follow up successivo, in assenza di recidive sintomatiche anche nel blancking period, è stata sospesa la terapia antiaritmica e anticoagulante e si riconcedeva l'idoneità agonistica. A distanza di pochi mesi i due atleti tornano per ripresa di cardiopalmo, dimostrando recidive di FA. Nel sospetto di una ripresa di attività delle vene polmonari, sono stati sottoposti entrambi a una seconda procedura ablativa, utilizzando in questo caso un sistema di mappaggio ad alta densità per ricercare eventuali gap o potenziali patologici. Non mostrando ripresa di attività in atrio sinistro, si è quindi passati in atrio destro ed è stata studiata la vena cava superiore (VCS) dimostrando la presenza di potenziali patologici e si è quindi proceduto ad ablazione ottenendo abbattimento del potenziale. Ad un follow-up di 12 mesi i pazienti sono tutt'ora asintomatici senza più dimostrazione di recidive aritmiche anche dopo sospensione della terapia antiaritmica e ripresa dell'attività fisica a livello agonistico.

Conclusioni: il 28% delle recidive di FA sembrerebbe essere causata da focolai ectopici in aree esterne all'atrio sinistro come la VCS, il seno coronarico, la vena cava inferiore e il legamento di Marshall. L'ablazione con radiofrequenza di questi foci risulta in un aumento del tempo libero da recidive aritmiche. In accordo con quanto riportato, nella nostra piccola casistica, l'isolamento della VCS sembrerebbe ridurre la percentuale di recidive di FA rispetto alla sola ablazione delle vene polmonari in un follow-up di 12 mesi. Pertanto nei casi di recidiva di FA, è assolutamente valido sottoporre il paziente a un'ulteriore procedura per consolidare eventualmente le lesioni a livello delle vene polmonari e per ricercare ed ablare altri foci parasimpatici. Tra questi il focus più utilizzato negli studi è l'ablazione della VCS, dimostrando a un follow-up a 1,5 anni assenza di recidive aritmiche. Studi che però correlano l'ablazione combinata della VCS con l'isolamento delle vene polmonari e la riduzione della recidive di FA non sono tuttora disponibili, soprattutto nei paziente atleti. È proprio in questa particolare sottopopolazione di pazienti che andrebbero ricercati tali foci in correlazione a un aumentato tono parasimpatico dovuto all'inteso allenamento. Partendo da questa ipotesi andrebbero condotti ulteriori studi per validare l'efficacia della tecnica.

EP.02.08

LEFT ATRIAL THROMBUS FORMATION DURING PULMONARY VEIN CRYOABLATION: THE PIVOTAL ROLE OF INTRACARDIAC ECHOCARDIOGRAPHY

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Introduction: Trans-septal puncture (TSP) is a challenging step in pulmonary vein isolation (PVI) procedure for atrial fibrillation. Fluoroscopy guidance alone is burdened by a high rate of
complications. Therefore, additional transesophageal echocardiography or intracardiac echocardiography (ICE) guidance is recommended to reduce the risk of adverse events. We report the case of a PVI procedure using cryoablation complicated by the formation of a serpiginous left atrial swinging thrombus after TSP. This high-risk adverse event was resolved without sequelae using ICE guidance.

Case Report: A 59-year-old male patient without cardiovascular risk factors was referred to our center for PVI for symptomatic paroxysmal AF episodes, not well controlled with pharmacological therapy. Considering that the patient missed a dose of his anticoagulation regimen with Rivaroxaban 20 mg qd in the week before the procedure, pre-procedural TEE was undertaken, showing mild LA dilation, normal LAA emptying velocity (40 cm/sec) and absence of LAA thrombosis. Therefore, a PVI by cryoablation attempt was performed on the same day. Three femoral venous accesses were obtained, two in the right vein, one for TSP and the other for insertion of a decapolar diagnostic catheter (Dynamic Xt 10-poles, Boston Scientific), and the last in the left vein for insertion of the ICE probe (Viewflex Xtra ICE, 3Mhz, Abbott Medical). For TSP, an 8Fr Swartz introducer (Abbott Medical) with a Brockenbrough needle (Abbott Medical) inside of it was used. After numerous attempts due to elastic resistance by the floppy IAS, TSP with ICE guidance was performed safely. An IV bolus of unfractionated heparin (UFH) was administered according to patient weight (10,000 UI). Before advancing PVI-tools, an angiography was performed to document PV anatomy, and LA and vascular integrity were confirmed using both ICE and angiography. Checking the correct position of the introducer in the LA with ICE, the formation of a serpiginous thrombus swinging from the tip of the introducer was noticed. Activated clotting time was therefore tested, being 221 sec. Therefore, an additional IV bolus of 2000 UI of UFH was administered. Under continuous ICE and fluoroscopic guidance, the introducer was carefully removed from the LA, taking care not to detach the clot from the introducer.
The patient remained asymptomatic throughout the procedure and was transferred to the cardiac intensive care unit for further monitoring and to continue anticoagulation therapy with UFH IV infusion. After 4 days, UFH anticoagulation therapy was switched to Rivaroxaban and UFH the patient was discharged without documented thromboembolic complications.
Three weeks later, a second successful PVI attempt was conducted using the same TSP technique described above. The patient was discharged in sinus rhythm. At 3-month follow-up, no AF recurrences were reported.

Conclusion: In our case, ICE guidance allowed early diagnosis of LA thrombus formation on the tip of the introducer used for PVI after introduction into the LA, thus avoiding thromboembolic complications. If only fluoroscopy guidance had been used, it would not have been possible to diagnose said thrombus formation and therefore prevent thromboembolic complications, such as ischemic stroke.

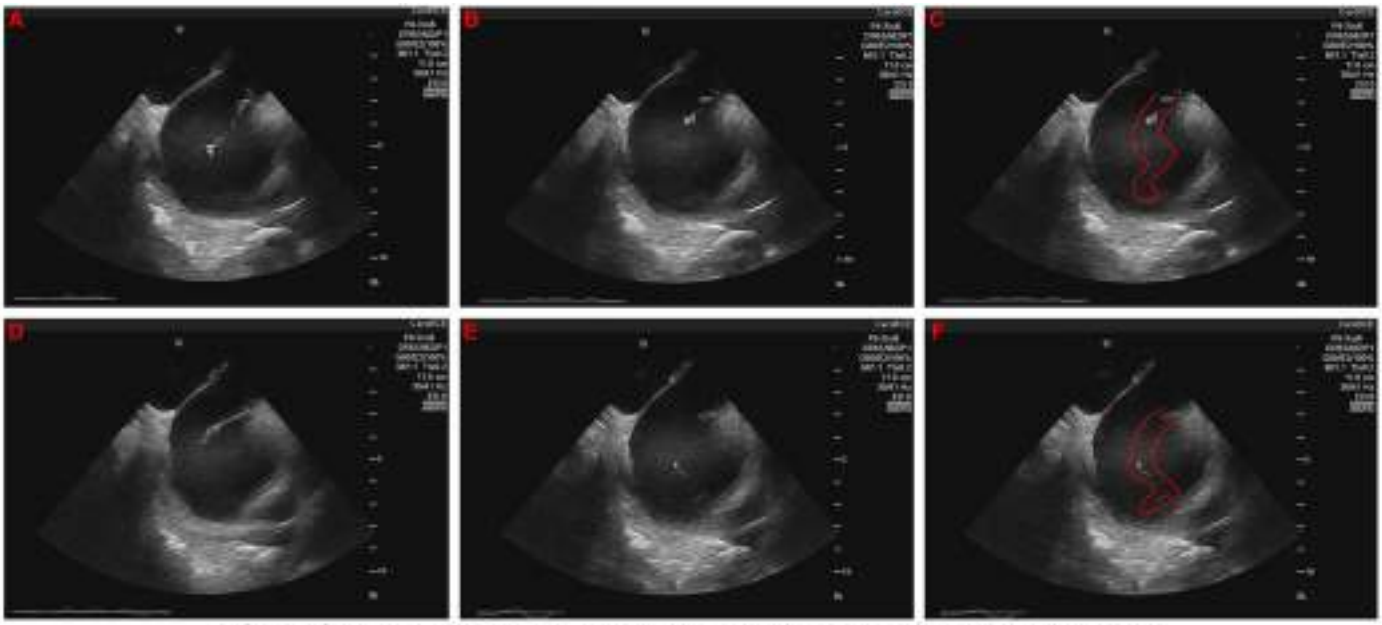

Figure 1 Intracardiac echocardiography images (A-F) of a serpiginous thrombus swinging from the tip of the introducer in the left atrium, after transeptal puncture conducted for pulmonary vein cryoablation. Red markings externally to the contour of the the thrombus were delineated in some images (C, F) in order to facilitate visualization.

EP.02.09

PRE-EXCITED ATRIAL FIBRILLATION IN WOLFF-PARKINSON-WHITE (WPW) SYNDROME: A CASE REPORT

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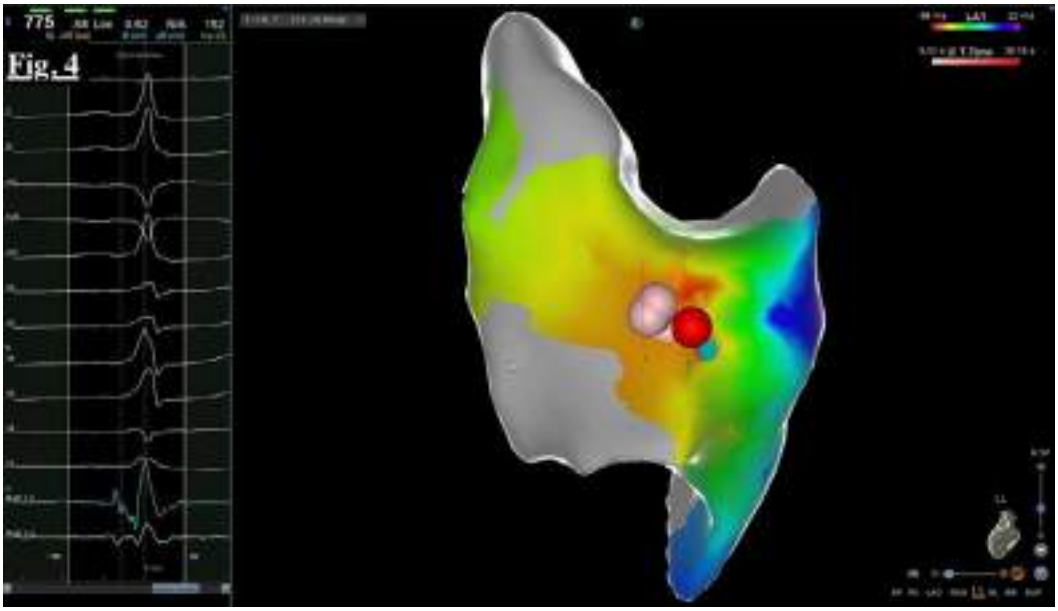
A 40-year-old Asian man was admitted to our emergency department (ED) due to palpitations, atypical chest pain, diaphoresis, and dizziness, arose 36 hours before ED admission. He had history of a multinodular thyroid goiter with hyperthyroidism with poor compliance to drug therapy with methimazole. Physical examination revealed a fast heart rate (HR) with a 2/6 systolic cardiac murmur; and a diffuse enlargement of the thyroid gland. Blood pressure was low (around 90/60-50 mmHg). An ECG was recorded (Figure 1), showing a wide-complex tachycardia, with slurred QRS upstroke and slightly irregular cycle length. The differential diagnosis included antidromic atrioventricular re-entry tachycardia (AVRT), pre-excited atrial fibrillation (AF), and ventricular tachycardia (VT). Due to the initial hemodynamic instability, electrical cardioversion (EC) was performed; 3 synchronized DC shocks at 150>200>200 J was attempted. The third shock was capable to interrupt the tachycardia for five beats, with a subsequent spontaneous new incessant tachycardia onset. While waiting for complete laboratory test results, the ECG monitoring showed phases of irregular tachycardia cycles (Figure 2); therefore, pre-excited AF was diagnosed. Subsequently, laboratory tests showed thyroid hormone value consistent with a thyroid storm. An intravenous (i.v.) infusion of flecainide was started; procainamide and ibutilide were not available. Meantime, high doses of steroids and methimazole were started. Flecainide was suddenly stopped due to a sudden acceleration of the tachycardia cycle length (about 300/bpm), with the occurrence of wider QRS as well. Due to the well-known risk of converting AF into ventricular fibrillation (VF), related to drugs that might slow atrioventricular nodal conduction, adenosine, b-blockers and calcium-antagonist drugs were not administered. Six hours later, a spontaneous cardioversion occurred. A new ECG shows a short PR interval (90 msec) and a mild delta wave, more evident in the inferior leads (Figure 3). Using algorithms that can predict AP location, the ECGs suggested the presence of a left lateral accessory pathways. During hospitalization, a gradual normalization of thyroid hormone was witnessed; the LV showed inverse remodeling and both mitral and tricuspid regurgitation normalized. The managing physicians decided to postpone catheter ablation (CA) due to the recent thyrotoxicosis. A loop recorder (ILR) was implanted to monitor arrhythmic recurrences and the patient was discharge with no anti-arrhythmic therapy. The ILR monitoring showed 2 episodes of self-limiting AF (HR 160/min, max duration 33 second), mostly conducted along the AV node (QRS duration < 120 msec), occurring 5 and 17 days after discharge, respectively. Sixty days after discharge, the electrophysiological (EP) study confirmed the presence of a left-lateral AP and a CA with radiofrequency was performed (Figure 4). No complications occurred. After 19 months of follow-up with the ILR monitoring, no arrhythmia recurrences were detected.

Conclusion: Pre-excited AF with rapid ventricular response is a challenging clinical scenario. Considering its possible evolution to more severe and potentially lethal events, its promptly ECG recognition is crucial. In order to reduce the risk of life-threatening events, an emergency CA could be a reasonable option in patient presenting with pre-excited AF hemodynamically unstable, refractory to antiarrhythmic drug therapy and to cardioversion.



EP.02.10

URIC ACID SIGNIFICANTLY CORRELATES WITH THE PRESENCE OF LOW-VOLTAGE AREAS AT THE ENDOCARDIAL MAPPING IN PATIENTS WITH NON-VALVULAR ATRIAL FIBRILLATION

M. Baroni [1], M. Fortuna [2], A. Maloberti [3], F. Leidi [2], C.M. Ciampi [2], M. Carbonaro [1], A. Testoni [1], S. Vargiu [1], M. Varrenti [1], M. Paolucci [1], L. Gigli [1], C. Giannattasio [3], P. Mazzone [1]

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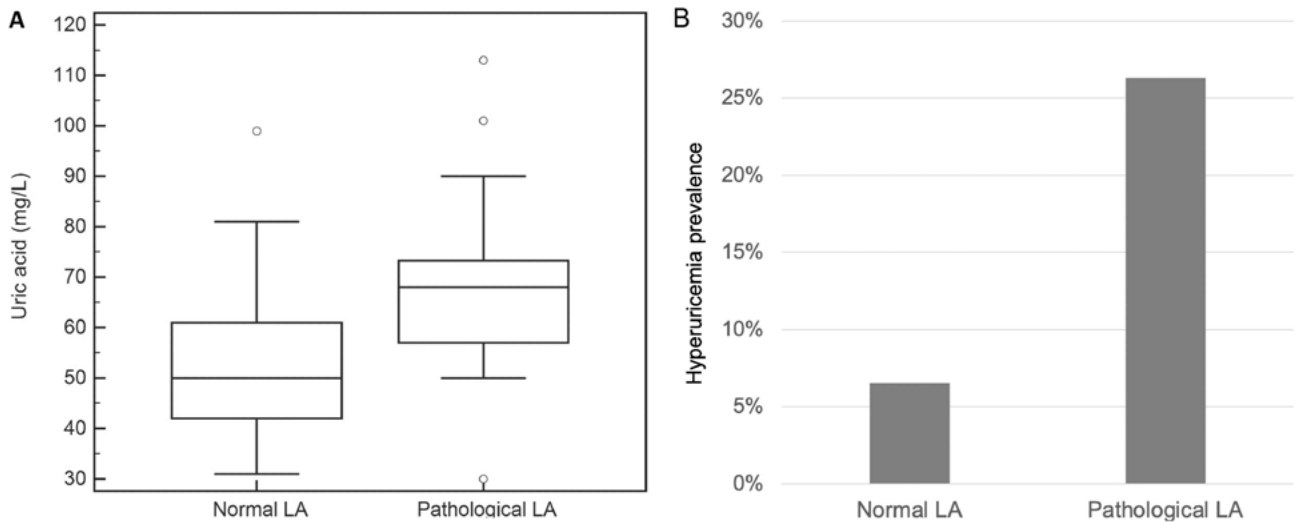
Background and aims: Interest in the role of atrial substrate in maintaining Atrial Fibrillation (AF) is growing. Fibrosis is the culprit in the electrical derangement of the myocites. Many cardiovascular risk factors are known to be linked to atrial scarring; among them Uric Acid (UA) is emerging. The purpose of our study is to evaluate whether UA is associated with atrial fibrosis in AF patients.

Methods and results: 81 patients who underwent radiofrequency transcatheter ablation for nonvalvular AF at the cardiological department of the Niguarda Hospital were enrolled. UA levels were analysed before the procedure as well as known predictors of atrial fibrosis. High density electroanatomic mapping of the left atrium was performed and patients were divided according to the presence or not of areas of pathological substrate (bipolar voltage < 0.5mV in sinus rhythm). 19 patients showed a pathological atrial substrate. The population of patients with pathological atrial substrate was older (64.7±1.6 vs 58.2±10.9 years, p=0.032) and had more often a persistent phenotype of AF (84.3 vs 35.8%, p<0.001). UA levels were significantly higher in the pathological group (6.8±1.9 vs 5.3±1.4, p<0.001) as well as the prevalence of hyperuricemia (26.5 vs 6.5%, p=0.021). The association between uric acid and pathological atrial substrate remains significant even after correction for confounding factors (age, left ventricular dysfunction, valvular disease, AF phenotype and furosemide use).

Conclusions: In a population of patients who underwent atrial fibrillation's ablation, higher uric acid's levels were significantly associated with pathological left atrium's substrate at electro-anatomical mapping



EP.02.11

BIOMARKERS OF MYOCARDIAL INJURY DURING CELLULAR ELECTROPORATION BY MEANS OF PULSED-FIELD ABLATION OF ATRIAL FIBRILLATION

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Background: Several authors implemented different biomarkers to evaluate and quantify the size of effective atrial fibrillation (AF) ablation lesions after pulmonary veins isolation (PVI) with thermal energy source. However, limited data have been reported on the effects of a new form of non-thermal energy such as electroporation obtained by means of a pulsed-field ablation (PFA, Farapulse) system.

Purpose: Our analysis aims to compare acute myocardial injury through different biomarkers variation after PVI performed with different technologies (PFA vs radiofrequency, RF).

Methods: All consecutive patients (pts) undergoing AF ablation with PFA at our center were included. A PFA protocol-directed PVI was applied using 2kV with 8 applications per vein. RF deliveries were deployed according to a wide antral lesion set around the PVs at 50W. Pre- and post-procedure samples of cardiac troponin I (hs-TnI, ng/l), creatinine kinase-MB (CK-MB, ng/dl), fibrinogen (FB, mg/dl), myoglobin (MY, ng/ml), N-terminal (NT)-pro hormone B-type natriuretic peptide (NT-ProBNP, pg/ml) and C-reactive protein (CRP, mg/dl) values were collected before PFA ablation and at 24h after ablation. Ablation endpoint was PVI.

Results: Fourty-nine pts were included (62±12 years, 63% male, 84% with paroxysmal AF). PFA cases were 35 (71.4%) whereas RF cases were 14 (28.6%). Evaluating the kinetic of each cardiac biomarker, no differences were found between baseline and 24h for both FB (363±93 at baseline vs 387±112 at 24h, p=0.4513) and NT-ProBNP (137[61-462] at baseline vs 227[157-423] at 24h, p=0.0544). On the contrary kinetics of remaining biomarkers differed and significantly increased from baseline to 24h: 61±22 to 112±101 for MY level, p=0.0017; 0.38±0.2 to 1.45±2.2 for CRP values, p<0.0001; 1.5±0.7 to 19.4±14 for CK-MB level, p<0.0001 and 11.2±20 to 6177±5765 for hs-TnI level, p<0.0001. By looking at the effect of the ablation strategy on cardiac biomarkers, hs-TnI level, CRP level and CK-MB were significantly different between groups at 24h after PFA/RF (hs-TnI: 7556±6025 for PFA vs 2038±1257 for RF, p<0.0001; CRP: 1.6±2.3 for PFA vs 0.9±1.2 for RF, p=0.0297; CK-MB: 23.7±12 for PFA vs 6.3±9.6 for RF, p<0.0001). PVI was achieved in all patients (100%) using only RF or PFA. No major procedure-related adverse events were reported.

Conclusion: Our preliminary results showed that cardiac troponin I enzyme level, C-reactive protein and creatinine kinase-MB increased after PVI by means of both radiofrequency and pulsed-field ablation and were higher after cellular electroporation by PFA than RF.

EP.02.12

GENERAL ANESTHESIA IN SPONTANEOUS RESPIRATION WITH INTRAVENOUS KETAMINE IN PATIENTS UNDERGOING PULSED-FIELD ABLATION

S. Iacopino [1], P. Filannino [1], P. Artale [1], J. Colella [1], F. Cecchini [1], G. Statuto [1], A. Di Vilio [1], D. Dini [1], L. Mantovani [1], P.F. Sorrenti [1], G. Fabiano [1], G. Campagna [1], E. Fabiano [2], M. Malacrida [3], A. Petretta [1]

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Background: Thermal ablation of atrial fibrillation (AF) by means of radiofrequency or cryo-balloon is usually performed under general anesthesia, deep sedation, or conscious sedation at operator's discretion and based on the general condition of the patient. However, a standardized sedation protocol when performing a non-thermal ablation, such as pulsed-field ablation (PFA) through irreversible cellular electroporation, has not been well established.

Purpose: We report our preliminary experience of a general anesthesia in spontaneous respiration protocol with ketamine used at a high-volume center during ablation of AF with a new PFA system (Farapulse).

Methods: All consecutive patients (pts) undergoing AF ablation with PFA at our center were included. Our sedation protocol consists of intravenous administration of midazolam (1+1 mg), fentanyl (25+25+25+25 mcg/kg) at low doses before local anesthesia with lidocaine (200mg) administration. Patients underwent sedation under spontaneous respiration by administering oxygen (4-6 l/min) through a face mask with nasal cannula. Local anesthesia was performed before the percutaneous femoral venous access. Soon after the trans-septal puncture, heparin (1 mg/kg) and atropine (1 mg, to mitigate anticipated bradycardia) were injected, followed by a second bolus of midazolam (1 mg). Ketamine adjunct (1 mg/kg) was then injected about 5 minutes before the first PFA delivery which was titrated to effect based on patient's condition, response and changes in vital signs (total ketamine adjunction of 2 mg/kg). For quantitative assessment the Numeric Rating Scale for Pain (NRS) was applied. For qualitative assessment a 3-levels satisfaction evaluation was retrieved. The ablation endpoint was PVI as assessed by entrance and exit block.

Results: Forty-two pts were included in this analysis (mean age of 66±9 years,72% were male, CHA2DS2VASc score=2 [IQR 1–3], median body mass index 24[20-48]kg/m2, 35% had respiratory diseases – e.g. asthma, OSAS, COPD –). At baseline, before sedation, mean systolic blood pressure was 140.5±20.1mmHg and mean oxygen saturation was 97.9±2.1%. PVI was achieved in all the patients. The number of PFA applications to reach PVI was 33.4±3 (time to PVI = 25±4min). In two cases additional PFA lesion sets were deployed outside the PVs. Lab occupancy time was 122±32min, skin-to-skin time was 78±35min and fluoroscopy time was 23±14min. All the patients achieved a NRS <= 3. Satisfaction level was found to be acceptable in all procedures by both the patient and the primary operator (Score equal to 0). No major procedure-related adverse events were reported.

Conclusion: The PFA procedure has a short execution time. The standardized anesthetic protocol with the administration of drugs with rapid onset and pharmacological offset at low doses was effective and safe with an optimal degree of patient and operator satisfaction.

EP.02.13

DETECTING RESIDUAL CONDUCTION GAPS IN REDO-PROCEDURE OF PULMONARY VEIN ISOLATION

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Background: Pulmonary vein isolation (PVI) is the cornerstone of the interventional catheter-based treatment of atrial fibrillation. Unfortunately, persistent pulmonary vein isolation is difficult to achieve, and up to 70% of pulmonary vein reconnection rate has been documented (1). Atrial mapping during pacing from coronary sinus (CS) in combination with LAT (local activation time) mapping may help to identify these residual gaps (2).

Methods: We analyzed data from consecutive re-do procedures of PVI performed in a single institution in 2022, from January the 1 st to December the 31 st . All procedures underwent pulmonary vein re-isolation based on both the bipolar map and the LAT mapping obtained during atrial pacing from distal CS. We compared the bipolar map and the LAT map of the procedures, looking for possible discrepancy between the two maps; then, we compared data from the re-do PVI procedures performed in 2022 to our historical single institution cohort of PVI re-do procedures performed from January 2011 to December 2021.

Results: In 2022 in our center 23 PVI re-do procedures were performed. In 6 out of 93 (6.45%) pulmonary veins mapped in these 23 procedures we observed discrepancy between the information provided by the bipolar map and the information provided by the LAT map. Radiofrequency (RF) time to PVI was 1061.00 +/- 611.52 sec, while in our historical cohort RF time was 1358.50 +/- 746.53 sec (p=0.049); no significant differences were found comparing skin to skin time and fluoroscopy time.

Conclusions: LAT mapping during pacing from distal CS may provide additional information, allowing better understanding of the residual gaps in PVI and reduction in RF time, without affecting the length of the procedure and Xray exposure.

EP.02.14

EVALUATION OF MYOCARDIAL CELLS INJURY AFTER PULMONARY VEIN ISOLATION WITH CRYOBALLOON AND PULSED-FIELD ABLATION

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Background: Many studies have used myocardial bound for creatinine kinase (CK-MB) and cardiac troponin I (CTpI) to evaluate myocardial cells injury after conventional thermal atrial fibrillation (AF) ablation such as cryoballoon ablation (CBA). To date, no data have been
available on these biomarkers after pulmonary vein isolation (PVI) with a novel non-thermal pulsed-field ablation (PFA) as compared to CBA.

Objective: To evaluate and quantify the lesions produced by CBA and PFA during PVI by means of cardiac biomarkers variation.

Methods: Between July to December 2022, data were collected from consecutive paroxysmal AF patients (pts) in whom either CBA (POLARx) or PFA (FARAWAVE) were performed to achieve PVI. A standard PFA protocol-directed PVI was applied using 2kV with 8 applications per vein (4 applications each in the basket and flower poses). Protocol-directed CBA was delivered for 180sec or 240sec according to operator's preference for isolation achieved in <=60sec, or 240sec if isolation occurred >60sec or when time to isolation was not available. The ablation endpoint was PVI as assessed by entrance and exit block. All pts underwent determination of CTpI and CK-MB. Only pts with normal baseline values for myocardial injury were included. Pre- and post-operative cardiac biomarkers were checked before CBA/PFA and at 24h after ablation.

Results: Seventy-seven pts were included in this analysis (50 (70%) CBA cases and 27 (35%) PFA procedures). The number of CBA applications to reach PVI was 5.0±1.4 and the number of PFA applications to achieve PVI was 32±4. All (100%) patients were in sinus rhythm at the time of the procedure. Evaluating the kinetic of these cardiac enzymes, both CTpI and CK-MB values significantly rose from baseline to 24h (CTpI: 6.9±2ng/L at baseline vs 9170±4993ng/L at 24h, $p<0.0001$; CK-MB: 1.1±0.6ng/dl at baseline vs 18.9±9ng/dl at 24h, $p<0.0001$, respectively). After CBA/PFA, CTpI values were similar between groups (8355±3510ng/L for CBA vs 10680±6783ng/L for PFA, $p=0.1141$), whereas CK-MB markers were significantly higher after PFA than CBA (16±8ng/dl for CBA vs 24.3±9ng/dl for PFA, $p=0.0003$). At the end of the procedure, PVI was achieved in all pts (100%) using only CB or PFA. No major procedure-related adverse events were reported.

Conclusion: In our study a significant increase of both cardiac troponin I and creatinine kinase-MB was observed at 24h of collection after PVI by means of both CB and PFA. PFA showed greater creatinine kinase-MB peak level after ablation compared to CBA.

EP.02.15

IL MAPPAGGIO MULTIPOLARE GUIDA L'ABLAZIONE DI SUBSTRATI COMPLESSI

B. Majocchi [1], F. Tundo [1], G. Fassini [1], S. Riva [1], M. Moltrasio [1], M.A. Dessanai [1], F. Pizzamiglio [1], G. Vettor [1], V. Ribatti [1], R. Sicuso [1], L. Bianchini [1], F. Schiattarella [2], S. Cellucci [1], C. Carbucicchio [1], C. Tondo [1]

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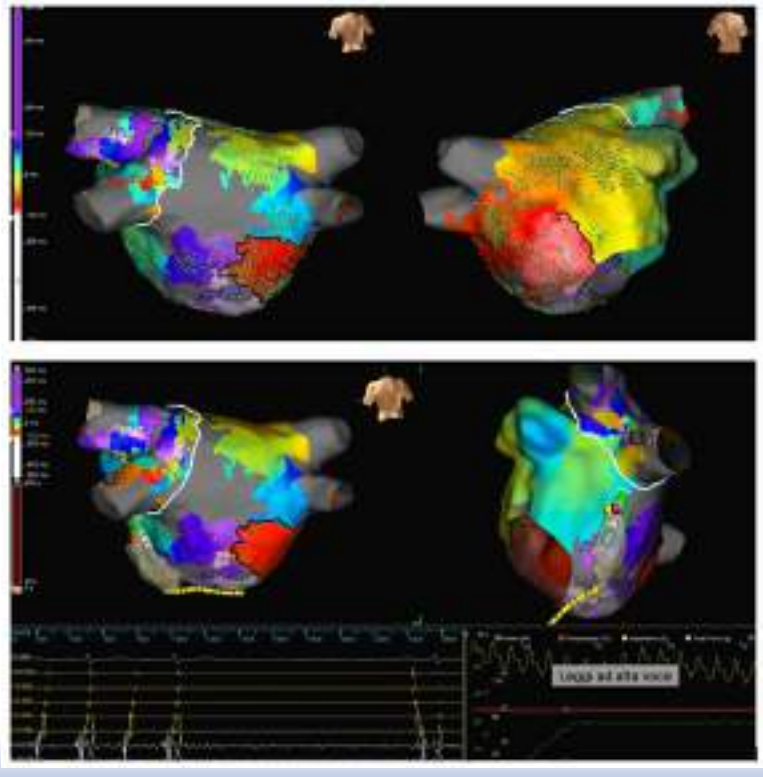
Presentiamo il caso di un paziente di 60 anni, con storia di fibrillazione atriale (FA) parossistica, sottoposto a prima ATC di FA nel 2008, con isolamento delle vene polmonari (VP) e blocco cavo-tricuspidalico (ICT) con RF. Per recidive di FA e FLA, nel 2009 si procedeva a nuova ATC con reisolamento di VP, linea sul tetto, linea posteriore e istmo mitralico (IMT). Successivamente tentata introduzione di amiodarone, sospeso per ipertiroidismo. Recidiva di aritmia nel 2014 con nuova ATC: deconnessione della vena superiore destra e conferma di isolamento delle restanti VP. Nel 2021 per FLA perimitralico nuova ATC con l'esecuzione di linea anteriore dalla VP superiore destra all'annulus mitralico e linea da un'ampia area di scar nella parete posteriore alla VP inferiore di sinistra. Nel 2022 nuove recidive sostenute: nonostante le pregresse 4 ablazioni la giovane età del paziente ci ha convinto a procedere ad un' ulteriore procedura, la prima presso il nostro centro.

L'ECG all'ingresso evidenziava un FLA atipico, con onda P positiva nelle derivazioni inferiori e nelle precordiali.

L' attivazione atriale disto-prossimale in seno coronarico (CS), suggeriva l'origine da AS. Si effettuava mappa dell'AS con sistema Velocity Ensite e catetere multipolare ad alta densità (Advisor HD Grid, Abbot). Le mappe di attivazione e di substrato mostravano la presenza di una compartimentalizzazione atriale, con FA presente nelle due VP sinistre, ampia scar posteriore e un FLA perimitralico nel resto dell' AS. L'analisi della velocità ha permesso di mostrare un'area a lenta conduzione a livello di IMT e un'altra della parete anteriore sotto alla VP superiore di destra, in presenza di linee incomplete. E' stato utilizzato catetere da ablazione (Tacticath Abbot) con lesioni guidate da lesion index (LSI): 30 Watt, 43°C max, LSI >5. L'ablazione è iniziata con erogazioni a livello della linea di IMT, nell'area con la più bassa velocità di propagazione, ottenendo il completamento della linea ma senza ripristino di ritmo sinusale (RS). Una nuova mappa confermava la persistenza di propagazione lungo l'IMT. Le manovre di entrainment confermavano il coinvolgimento di entrambe le aree nel circuito aritmico (linea anteriore e gap di linea mitralica). Abbiamo proseguito sul versante epicardico all'interno del CS, iniziando ad erogare (20W, 43°) in regione esattamente prospicente i precedenti polsi di RF endocardici, ottenendo immediata interruzione dell'aritmia. Mediante pacing dall'auricola sinistra si confermava la presenza di blocco di IMT. Veniva completata linea anteriore con erogazioni in AS al di sotto della VP superiore destra sulle aree di lenta conduzione già identificate, confermato da successiva mappa di voltaggio e attivazione. Al termine si osservava la persistenza di FA nell'area compartimentalizzata delle due VP sinistre, con restante AS in stabile RS.

Ad un controllo a sei mesi il paziente era in RS senza recidive, in terapia con sotalolo.

Conclusioni: Ampie alterazioni del substrato per esecuzione di numerose ablazioni, con linee incomplete, possono generare FLA con pattern complessi, di difficile analisi e identificazione del target ablativo. Le mappe multipolari ad alta densità e i nuovi algoritmi di analisi della propagazione aiutano a identificare la strategia corretta.



E-POSTER 3

GIOVEDI' 21 SETTEMBRE

AREA E-POSTER

18:00-19:00

SESSIONE E-POSTER 3
TELEMEDICINA, MONITORAGGIO REMOTO

Moderatori: G. Arena (Massa), D. Pecora (Brecia-BS)

EP.03.01
LA DIAGNOSI ELETTROFISIOLOGICA DELLO STROKE CRIPTOGENETICO

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Introduzione: In ambito neurologico una delle patologie non ancora completamente chiarite da un punto di vista eziopatogenetico è lo stroke criptogenetico. Questa definizione si applica a tutte quelle forme di ictus in cui le indagini clinico-strumentali non sono state in grado di definire il "primum movens". In letteratura una percentuale significativa di ictus criptogenetico è il risultato fi Fibrillazione Atriale Parossistica (FAP). Attualmente il riconoscimento di forme asintomatiche ed a rapida evoluzione di FA possono essere indagate con l'utilizzo di registratori elettrocardiografici impiantabili (Loop Recorder o ILR) che aumentano il tasso di riconoscimento della FA rispetto alle indagini standard. I Loop Recorder, monitorando l'attività elettrica del cuore, si attivano automaticamente e registrano l'evento. Questo dato grazie ad un sistema di trasmissione, oltre che essere conservato nella memoria del registratore e quindi essere interrogabile, è inviato ad un server centrale che a sua volta lo trasmette alla control room che memorizza a distanza il paziente e gli eventi. Lo scopo dello studio è quello di diagnosticare attraverso l'impianto dell'ILR con monitoraggio a lungo termine, fino a 36 mesi, la causa dello Stroke criptogenetico.

Metodi: Tutti i pazienti ricoverati nella Stroke Unit con ictus criptogenetico sono stati valutati con l'ESUS SCORE. I pazienti risultati positivi alla somministrazione dello score sono stati sottoposti all'impianto di Loop Recorder (ILR) per monitoraggio cardiaco prolungato nel sospetto clinico di FAP come causa di ictus criptogenetico. I risultati di tale monitoraggio sono stati documentati insieme alla durata del monitoraggio cardiaco ospedaliero.

Risultati: In tutto sono stati identificati 210 pazienti con diagnosi di ictus ischemico o attacco ischemico transitorio (TIA). Degli ictus, 22 (10,4%) sono stati classificati come criptogenetici. Questi pazienti sono stati sottoposti ad impianto di Loop Recorder e monitorati per 12 mesi. 6 pazienti su 22 (27,2%) sono risultati affetti da fibrillazione atriale e sono stati trattati con Warfarin.

Conclusione: Il monitoraggio continuo del Loop Recorder ha cambiato il trattamento farmacologico del 27,2% dei pazienti con ictus criptogenetico a causa del rilevamento di FA intermittente nonostante il mancato rilevamento di FA all'elettrocardiografia e al monitoraggio telemetrico ospedaliero.

EP.03.02

EMERGING TRIGGERS OF VENTRICULAR ARRHYTHMIA EVENTS IN REMOTE MONITORED PATIENTS: RESULTS FROM THE ETERE STUDY

F. Ballacci [1], M.L. Narducci [2], M.C. Nurchis [3], R. Scacciavillani [1], F. Giordano [1], A. Telesca [1], G. Bencardino [2], G. Pinnacchio [2], G.M. Raspolini [4], D. Pascucci [4], G. Damiani [4], F. Crea [2]

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Background: Air pollution has been associated with many adverse cardiovascular events related to oxidative stress, systemic inflammation and cardiac autonomic imbalance, as these biological effects are known to be proarrhythmic factors. This study was aimed at assessing the relationship between chronic exposure to air pollutants and ventricular tachyarrhythmias (VAs) in remotely monitored patients.

Methods: In this prospective, observational, longitudinal study, we analysed the exposure to air pollution between 2017-2021 in 164 remotely monitored patients, carriers of loop recorder, pacemaker or defibrillator. Residential addresses were obtained from medical records and confirmed during follow-up visits. Pollutant levels were defined by matching each participant's residential address with data from the closest pollutant monitoring station according to European Environmental Agency. The primary endpoint was the occurrence of sustained and non-sustained VAs, appropriate shocks or anti-tachycardia pacing (ATP) therapy. Secondary endpoint was identified as atrial fibrillation (AF)>30 seconds in 2021.

Results: Of 164 patients enrolled in this study, 51 patients died prior to the end of the follow-up; 19 patients decided not to undergo further remote monitoring after device replacement, and 8 patients were lost to follow-up. Data from 86 patients (58 male, median age age 70.2 years, IQR 56.2-78) were available at follow-up.
Regarding the primary endpoint, VA events occurred in 17 patients (19.8%). A lower baseline left ventricular ejection fraction was found, compared to the group without VAs (40.3±12.2% vs 51.5±13.5%, p=0.005). No other baseline clinical differences were found between the two groups. No significant association was found between the occurrence of VAs in 2021 and the annual mean of the air pollutants measured in 2021.
The two patient groups (VAs vs noVAs) were also compared in terms of chronic air pollutants exposure. Cumulative benzene exposure (the average of mean pollutant values over the study years) was significantly higher in patients who met the primary endpoint in 2021 (mean 1.12±0.48 mcg/m3 in noVAs vs 1.64±0.82 mcg/m3 in VAs, p=0.001). A statistically significant difference was found in the average of mean PM 2.5 values and in the average of mean benzene values over the five-study year between noVAs and VAs (12.5±2.14 mcg/m3 in noVAs vs 13.7±2.8 mcg/m3 in VAs, p=0.04; 1.10±0.48 mcg/m3 in noVAs vs 1.4±0.4 mcg/m3 in VAs, p=0.04, respectively). A significant correlation between the average of mean PM 2.5 values over the five years of study and primary endpoints was found (R 0.22, p=0.04). The average benzene concentration over the five-year period of study was a strong independent predictor at multivariate analysis (OR=6.52, CI 1.08-39.31, p=0.041). Regarding the secondary endpoint, no differences were found between patients with AF and without AF in 2021 and air pollutants concentration in 2021 and over the five-year study period.

Conclusions: Chronic exposure to air pollution may have a crucial role in ventricular arrhythmogenesis. While these findings need confirmation in subsequent studies, every effort should be made to control this modifiable, population-based risk factor.

EP.03.03

LA RIPROGRAMMAZIONE A DISTANZA DEI LOOP RECORDER DI ULTIMA GENERAZIONE, UN'INNOVAZIONE GIÀ PRESENTE. CASO CLINICO, ESPERIENZA MONOCENTRICA

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Background: Il loop recorder (ILR) è un dispositivo impiantabile, utilizzato per rilevare possibili cause cardiache di anomalie del ritmo associate o meno ad una sintomatologia in particolare, con una longevità di quasi 5anni.
Le ultime novità tecnologiche apportate su questi dispositivi comprendono l'applicazione dell'intelligenza artificiale (IA) e la riprogrammazione a distanza tramite monitoraggio, senza che il paziente debba recarsi in ospedale.

Materiali e metodi: Dal 2020 abbiamo avuto la possibilità di usufruire di ILR di ultima generazione dotati di IA e della possibilità di essere riprogrammato a distanza attraverso la piattaforma CarelinkNetwork. In particolare, un paziente di anni 78M, affetto da rettocolite ulcerosa(RU), storia di sincope, edema polmonare e tamponamento cardiaco di NDD, è giunto alla nostra attenzione per visita cardiologica. Presentava in anamnesi sincope di NDD ed un singolo breve episodio di FA, in telemetria durante la fase acuta del ricovero presso altro Ospedale. Poiché, impossibilitato all'assunzione di NAO a causa della RU con frequenti episodi di sanguinamento, è stata posta indicazione ad impianto diILR, sia per ricercare la possibile causa della sincope, sia per valutare la presenza di episodi di FA nonchè il burden di FA, per eventuali azioni da intraprende (es chiusura dell'auricola sinistra). Al paziente è stato impiantato RevealLinqII e si è programmata la gestione del followup tramite monitoraggio remoto. A 3mesi dall'impianto, riferisce episodi lipotimici con assenza di riscontro di episodi registrati all'interrogazione. Si pone indicazione ad ulteriori accertamenti neurologi senza riscontro di patologie che potessero giustificare tali episodi. All'ultimo episodio riferito dal paziente, particolarmente sintomatico, si decide di rivedere la programmazione delILR, rivalutando la finestra dedicata alle pause, rilevabili se maggiori o uguali a 5 sec. Si decide, quindi, di riprogrammare ILR con una finestra più bassa pari a 2.5 sec. Poiché il paziente è portatore di linqII, che consente la riprogrammazione a distanza,si decide di non convocare il paziente in Ospedale. Abbiamo ricevuto subito la trasmissione con la nuova programmazione. A distanza di 3gg, la trasmissione giornaliera riporta la registrazione di una pausa di 3sec. Si decide di contattare il paziente e rimodulare la terapia B-bloccante. Il paziente rimane in follow-up, asintomatico per nuovi episodi lipotimici, senza riscontro di altre pause al monitoraggioremoto.

Risultati: Grazie all'avvento della nuova tecnologia presente nel dispositivo LinqII siamo riusciti ad eseguire una riprogrammazione di un dispositivo a distanza in tempo praticamente reale, senza far rientrare il paziente fragile in Ospedale, esponendolo ad eventuale pericolo di infezioni (COVID). Il paziente, inoltre, si trovava fuori regione ed avendo con se il monitor dedicato non è stato necessario recarsi presso altra struttura o attendere il rientro in sede per seguire la nuova programmazione. Grazie alla riprogrammazione remota siamo riusciti a fare diagnosi ed implementare un'azione clinica rapida ottenendo il risultato atteso.

Conclusioni: La programmazione da remoto rappresenta oggi un'innovazione indispensabile per i pazienti portatori diILR che oltre a consentire una gestione personalizzata ci ha consentito di ridurre il numero di visite ambulatoriali, le difficolta di pianificazione e le liste d'attesa, nonché in era Covid, garantire maggiore sicurezza ai pazienti.

EP.03.04

IMPIANTO DI LOOP RECORDER IN SOGGETTO DI ETÀ PEDIATRICA CON SINDROME DI DANON ED ARITMIA EXTRASISTOLICA VENTRICOLARE

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Introduzione: La sindrome di Danon è una rara malattia da accumulo X-linked causata da mutazione del gene LAMP2, che si esprime a livello cardiaco con cardiomiopatia ipertrofica, scompenso cardiaco ed aritmie.

Caso clinico: La piccola C. giunge alla nostra osservazione all'età di 3 anni per extrasistoli ventricolari. La nonna materna è deceduta improvvisamente a 36 anni, con riscontro all'esame autoptico di cardiomiopatia ipertrofica. La mamma, deceduta a 28 anni per scompenso cardiaco, era affetta da sindrome di Danon con cardiomiopatia ipertrofica non ostruttiva ad evoluzione dilatativa, episodi di fibrillazione atriale e tachicardia ventricolare sostenuta, sindrome di WPW, già sottoposta ad impianto di ICD e in lista per trapianto cardiaco. La piccola presenta alla nostra prima valutazione un ecocardiogramma normale; l'Holter documenta numerose extrasistoli ventricolari isolate, monomorfe. Viene avviata analisi genetica che accerta la presenza della mutazione germinale nel gene LAMP2 c.928G>A (correlata in letteratura alla malattia di Danon). Nel corso del follow up la paziente, sempre asintomatica per sincope e/o cardiopalmo, presenta comparsa di lieve ipertrofia concentrica del ventricolo sinistro; all'Holter persistenza di extrasistoli ventricolari monomorfe, non ripetitive. All'età di 5 anni si esegue impianto di loop recorder iniettabile; la procedura risulta ben tollerata e priva di complicanze. Ottimo il sensing dell'onda R (1,03 mV). Viene inoltre intrapresa terapia con betabloccante. Al monitoraggio a distanza si osservano nel primo mese dall'impianto alcuni falsi episodi di tachiaritmie dovuti a doppio conteggio per la presenza di onde T di elevato voltaggio; dopo riprogrammazione del guadagno non si verificano falsi allarmi. Nel corso di circa 3 anni il monitoraggio con loop recorder ha permesso di documentare l'assenza di episodi bradi e tachiaritmici sostenuti. Al follow up clinico si è osservata riduzione del burden aritmico, con scomparsa pressocchè totale delle extrasistoli ventricolari.

Conclusioni: L'impianto di loop recorder è una procedura sicura ed affidabile in età pediatrica per il monitoraggio di pazienti a rischio aritmico che non abbiano indicazione all'impianto di defibrillatore. La sindrome di Danon si esprime fenotipicamente con cardiomiopatia ipertrofica nella seconda-terza decade di vita; è quindi necessario identificare i soggetti di età pediatrica che possano essere più a rischio di eventi aritmici improvvisi.

EP.03.05

PROGNOSTIC VALUE OF VENTRICULAR ARRHYTHMIAS IN ATHLETES: THE KEY ROLE OF ECG ARRHYTHMIA MORPHOLOGY

P. Compagnucci [1], M. Casella [1], M.L. Narducci [2], E. Conte [3], M. Cammarano [2], G. Pelargonio [2], D. Andreini [4], V. Palmieri [2], F. Coretti [1], G.V. Lo Russo [4], G. Volpato [1], F. Crea [2], C. Tondo [4], P. Zeppilli [2], A. Dello Russo [1]

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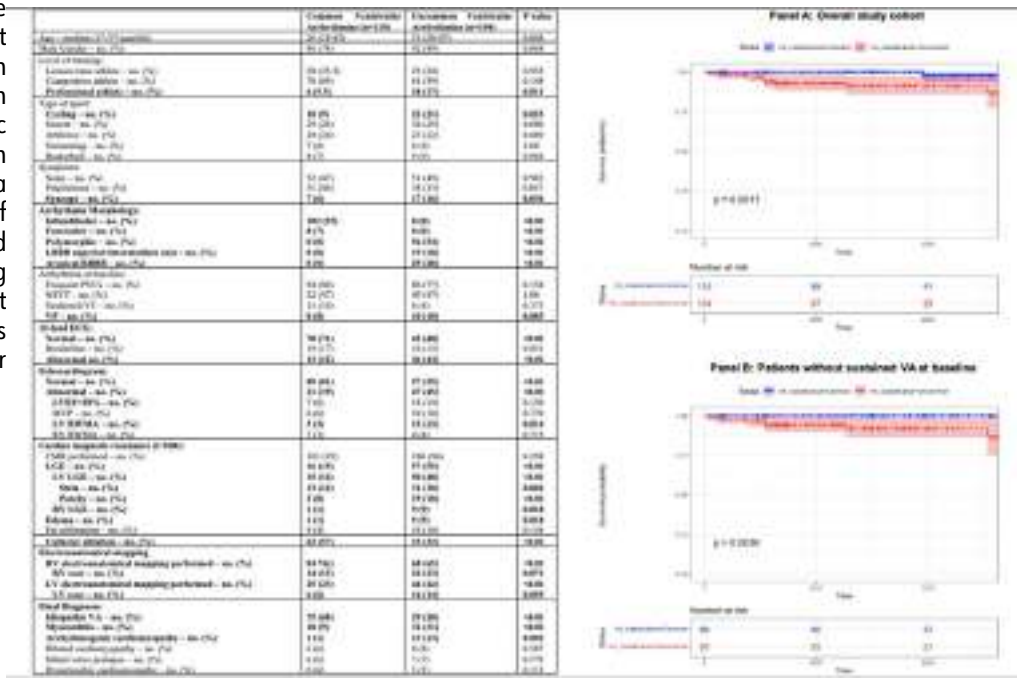
Background: Infundibular and fascicular ventricular arrhythmias (VAs) are common in healthy athletes without structural heart disease, and are generally considered benign. By contrast, VAs of multiple morphologies or with right bundle branch block and intermediate/superior axis configuration are uncommon and may be the only clinical sign pointing to a concealed cardiomyopathy in athletes, therefore requiring careful assessment. Athlete-specific data on the clinical meaning of different VA morphologies are scarce.

Purpose: In the present study, we investigate both the myocardial substrate and the long-term clinical outcomes in a cohort of athletes presenting with complex ventricular arrhythmias, aiming to validate the prognostic roles of arrhythmia ECG morphology and cardiac magnetic resonance imaging findings.

Methods: we conducted a multi-center, observational, prospective study enrolling competitive and leisure-time athletes who were referred for further evaluations because of complex VAs, defined as >500 PVCs/24 h, exercise-induced VAs, nonsustained or sustained ventricular tachycardia detected during exercise testing or ambulatory Holter monitoring. Patients underwent a comprehensive diagnostic assessment, which included cardiac magnetic resonance imaging, with liberal use of electroanatomical voltage mapping and endomyocardial biopsy in case of diagnostic uncertainty. According to 12-lead ECG morphology, VAs were classified as common (i.e., infundibular or fascicular VAs) or uncommon (polymorphic, left bundle branch block superior/intermediate axis, or atypical right bundle branch block). The primary outcome was survival free from all-cause death or sustained ventricular arrhythmias during a long-term follow-up.

Results: 214 athletes with complex ventricular arrhythmias were included in the present analysis; baseline clinical characteristics, results of diagnostic tests, and main final diagnoses according to VA morphology are resumed in the Table. The prevalence of signs of structural heart disease by echocardiography, cardiac magnetic resonance imaging, and electroanatomical mapping was higher in uncommon compared to common VAs. A final diagnosis of idiopathic VA was more frequent in common compared to uncommon VAs and, accordingly, catheter ablation was more commonly performed in the former group. Over a median follow-up of 51 (30-76) months, there were 15 primary outcome events, 7 of which among patients without sustained VAs at baseline assessment. Remarkably, all events occurred among patients with uncommon VAs (log-rank p=0.001 in the overall cohort, and p=0.004 in the subgroup of patients without sustained VTs at baseline, Figure).

Conclusion: our data confirm that the prevalence of an underlying structural heart disease substrate is lower in athletes with common VAs than in athletes with uncommon VAs. Furthermore, all major adverse cardiac events occurred in athletes with uncommon ventricular arrhythmias. Nevertheless, a comprehensive workup with liberal use of cardiac magnetic resonance imaging and selective use of electroanatomical mapping allowed the identification of structural heart disease in a substantial minority of athletes with common VAs, with clear implications for sports eligibility assessment.



EP.03.06
FOLLOW-UP DEI PAZIENTI SOTTOPOSTI AD IMPIANTO DI LEADLESS PACEMAKER POST-ESTRAZIONE

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Introduzione: L'impianto di device di stimolazione tradizionali comporta numerose complicanze, a breve e lungo termine, tra cui una delle più importanti è rappresentata dalle infezioni. La maggior parte dei pazienti che vanno incontro a questa complicanza sono sottoposti a procedura di estrazione di elettrocateteri. Spesso, nei pazienti pacemaker dipendenti vi è il problema di dover effettuare un reimpianto precoce dopo l'estrazione. Questo studio si pone l'obiettivo di valutare l'esito dell'impianto di Micra in pazienti precedentemente sottoposti a TLE, confrontandoli con pazienti che presentano un Micra come primo impianto.

Materiali e Metodi di studio: Da gennaio 2017 a novembre 2022 nel nostro centro sono state eseguite 190 procedure di impianto di leadless pacemaker. Di questi pazienti 24 sono andati incontro a procedura di estrazione. Per valutare il rendimento tecnico dei leadless pacemaker nei pazienti post-estratti, è stato fatto un confronto tra questi ed i leadless impiantati "de novo", così da valutarne l'efficacia delle specifiche tecniche. In particolare, sono state considerate tutte le caratteristiche di base dei vari pazienti, i dati dell'estrazione e della procedura di impianto. Successivamente, sono stati confrontati i valori dei parametri di sensing, soglia, impedenza e percentuale di stimolazione raccolti nei follow-up eseguiti dai due gruppi di pazienti ad 1 mese dall'impianto, 6 mesi e ogni anno.

Risultati dello studio: Una prima analisi del follow-up delle suddette classi di pazienti dal 2017 ad oggi ci fornisce già alcuni dati importanti: nei pazienti che hanno impiantato un leadless pacemaker in seguito ad estrazione in nessun caso si è manifestata una recidiva di infezione; il successo dell'impianto di Micra è stato del 100%. L'analisi delle statistiche dei parametri elettrici, inoltre, ha dimostrato l'assoluta efficacia del dispositivo leadless in entrambe le classi di pazienti messi a confronto, senza mettere in evidenza grandi differenze.

Conclusioni: L'impianto di leadless pacemaker in pazienti post-estratti, si è dimostrato una scelta efficace come alternativa all'impianto di un pacemaker tradizionale, per permettere la riduzione del rischio di complicanze infettive, garantendo comunque una performance ottimale.

EP.03.07

MACHINE-LEARNING PHENOTYPING OF PATIENTS WITH FUNCTIONAL MITRAL REGURGITATION UNDERGOING TRANSCATHETER EDGE-TO-EDGE REPAIR

G. Gobello [1], F. Angelini [1], F. D'Ascenzo [1], P. Bocchino [1], P. Boretto [1], S. Pidello [1], C. Raineri [1], V. Dusi [1,2], E. Cavallone [1,2], G. Biondi-Zoccai [3], N. Morici [4], G. Crimi [5], L. Perl [6], A. Mandurino Mirizzi [7], C. Templin [8], G. Patti [9], G.M. De Ferrari [1,2]

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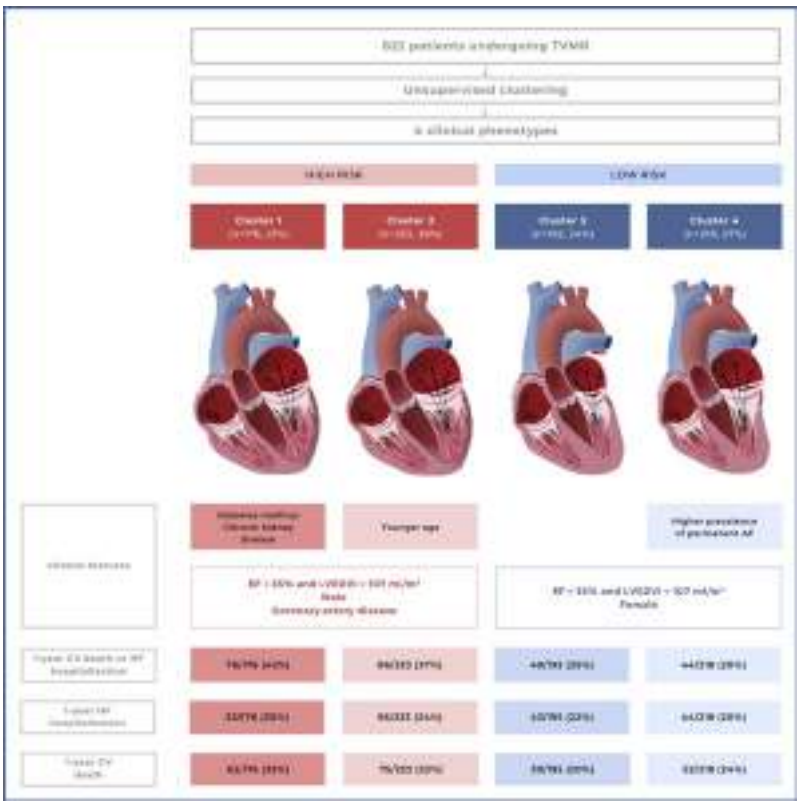
Background: Severe functional mitral regurgitation (FMR) may benefit from transcatheter mitral valve repair (TMVR), but selection of patients remains to be optimized.
Objectives. The aim of this study was to use Machine-Learning (ML) approaches to uncover concealed connections between clinical, echocardiographic, and hemodynamic data potentially associated with patients' outcomes.

Methods: Consecutive patients undergoing TVMR in 10 International Centres from 2009 to 2020 were included in the MITRA-AI registry. Eleven relevant clinical and echocardiographic variables were included in a clustering-based model. The optimal number of clusters was chosen based on the maximum of a composite metric based on the silhouette coefficient score together with the elbow method. The primary endpoint was a composite of cardiovascular death or heart failure hospitalization at one year.

Results: 822 patients were included in the present analysis. The composite primary endpoint occurred in 250 (30%) patients. Four clusters with increasing risk of the primary endpoint were identified (20%, 25%, 37% and 42% from cluster 4 to cluster 1, respectively). Clusters were combined into a high-risk (clusters 1 and 2) and a low-risk phenotype (clusters 3 and 4). Compared to clusters 3 and 4, patients in clusters 1 and 2 had more dilated left ventricles (left ventricular end-diastolic volume index 120.7 and 120.2 ml/m2 vs. 81.0 and 102.6 ml/m2), were younger (74 and 66 vs. 79 and 78 years) and more frequently males (72% and 80% vs. 56% and 46%) and had lower left ventricular ejection fraction (30% and 26% vs. 45% and 46%).

Conclusions: We proposed a novel machine-learning analysis to identify meaningful clinical phenotypic presentations in FMR undergoing TVMR. We determined four clusters with increasing risk of cardiovascular death or heart failure hospitalizations.



EP.03.08

ATTITUDINE ALLE NUOVE TECNOLOGIE TRAMITE SMARTPHONE: ALFABETIZZAZIONE DIGITALE IN ETÀ GERIATRICA E NON. ESPERIENZA MONOCENTRICA AL SUD ITALIA

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L'utilizzo di tecnologie digitali da parte degli anziani è notevolmente aumentata; complice l'isolamento sociale molti anziani hanno superato la reticenza verso la Rete e comprendendo che usare i social network le app e i motori di ricerca non è poi così complicato. In letteratura non riscontriamo dati che mostrino l'adozione in età geriatrica delle nuove tecnologie come l'utilizzo dello smartphone o l'uso di App per la salute. L'idea priva di dati scientifici è che il superamento del digital divide tra le generazioni è ancora lontano. La pandemia ha evidenziato disuguaglianze in termini di utilizzo dei servizi di informazione. Il nostro obiettivo è testare il livello di attitudine all'utilizzo di uno smartphone e all'uso di App per la salute, nella popolazione dei pazienti (pz) ricoverati c/o la nostra U.O.C. attraverso la somministrazione di un questionario dedicato. Abbiamo somministrato in 4 mesi a 64 pz giunti nella nostra U.O.C. (30 Maschi e 32 Femmine età media 69±9 anni) un questionario di 7 domande stratificando la popolazione per età sesso e scolarizzazione; l'utilizzo o meno di uno smartphone; lo scopo di utilizzo dello smartphone (chiamata, sms, internet, app); l'uso di un APP per la gestione della salute. Tutti i pz che hanno partecipato all'indagine conoscitiva erano ricoverati per HF o impianto di ILR. Il questionario è stato somministrato dal nostro personale infermieristico. Analizzando le risposte dei 64 questionari è emerso che la popolazione afferente al nostro reparto demograficamente è costituita nel 60 % da donne. L'età media della popolazione è di 59,5 anni e che il grado di istruzione medio è secondario/superiore. Il 56% della popolazione utilizza uno smartphone per inviare sms, telefonare, utilizzare internet per accedere ad app social. Solo 1 pz aveva già utilizzato un APP per la gestione della propria salute. Il 31% dei pz non ha uno smartphone ma avrebbe piacere di coinvolgere un familiare o Caregiver per l' utilizzo di un App dedicate alla salute. Nella nostra esperienza, i pz utilizzatori di uno smartphone e delle varie applicazioni appartengono alla fascia di età 70 anni. Infine 7 pazienti con ILR Linq IITMMedtronic aderenti all'indagine hanno scelto l'APP My Carelink Heart per il controllo remoto del proprio dispositivo impiantabile. Anche se la casistica non è ampia la nostra esperienza ha mostrato come la resistenza degli anziani verso il digitale deriva soprattutto da fattori psicologici e culturali. Infatti la maggior parte degli anziani non è ancora capace di fare un uso adeguato della tecnologia. Ciò li rende vulnerabili alle insidie della Rete. L'utilizzo di un programma strutturato di training del paziente grazie all'aiuto di diverse professionisti presenti in reparto e il coinvolgimento dei Caregiver qualora il pz non possieda uno smartphone ha dimostrato la possibilità di un aumentato utilizzo delle nuove tecnologie digitali. Grazie all'aumento di nuove tecnologie nell'ambito dei dispositivi cardiaci impiantabili 7 pz in cura presso la nostra struttura stanno già utilizzando un APP salute (My Carelink Heart). L'obiettivo è quello di far sì che questo progresso della tecnologia si possa estendere ad una popolazione maggiore.

EP.03.09

THE ECONOMIC IMPACT OF PATIENTS REMOTE MONITORING WITH IMPLANTABLE CARDIOVERTER DEFIBRILLATORS OR CARDIAC RESYNCHRONIZATION THERAPY DEFIBRILLATORS: SINGLE CENTER EXPERIENCE

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Remote monitoring (MRI) technologies potentially improve the care of patients with implantable cardiac devices (CIED) by increasing compliance, providing early indications of any worsening heart failure (HF) and potentially allowing optimization of therapy to prevent hospitalizations for HF. Aim of this observational and retrospective study was to evaluate the clinical and economic consequences of MRI compared to standard monitoring (MS) performed through in-office cardiology visits, in patients with CIED.

The clinical and resource consumption data of this retrospective analysis were extracted from the Electrophysiology Registry of the Cardiology Unit of Trento, which systematically collected information on patients from January 2011 to February 2022. From a clinical point of view, it was conducted an analysis of survival and the incidence of hospitalization events for cardiovascular (CV) causes by measuring the number of hospitalizations made. From an economic perspective, direct costs for the management of MR and MS patients were collected to compare the cost per patient treated over a 2-year time horizon. Propensity score matching (PSM) was used to reduce the effect of confounding biases and imbalance of baseline patient characteristics.

In the enrollment period, N=402 patients carrying CIED met the inclusion criteria and were included in the analysis (N=189 patients -47.0%- followed through SM; N=213 patients -53.0%- followed through RM). After PSM, comparison was limited to N=191 patients in each arm. After a follow-up of 2 years since CIED implantation, mortality rate for any cause was 1.6% in the RM group and 19.9% in the SM group (log-rank test, $p<0.0001$). Also, a lower proportion of patients in the RM group (25.1%) were hospitalized for CV-related reasons, compared to the SM group (51.3%; $p<0.0001$, two-sample test for proportions). Overall, the implementation of the RM program in the Trento territory was cost saving in both payer and hospital perspectives. The investment required to fund RM (a fee for service in the payer perspective, and staffing costs for hospitals), was more than offset by the lower rate of hospitalizations for CV-related disease. RM adoption generated savings of -€4,771 and -€6,752 per patient in 2 years, in the payer and hospital perspective, respectively.

EP.03.10

WORK-UP DIAGNOSTICO DELL'ARRESTO CARDIACO EXTRAOSPEDALIERO SECONDO LE NUOVE LINEE GUIDA SULLE ARITMIE VENTRICOLARI E LA MORTE CARDIACA IMPROVVISA: UN CASO CLINICO

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Caso clinico: donna di 43 anni, ex-fumatrice, portatrice di bicuspidia aortica trattata chirurgicamente mediante itervento secondo Ozaki qualche anno prima, sincopava improvvisamente mentre eseguiva attività fisica di media intensità in palestra. La paziente, priva di coscienza e senza polso, veniva prontamente trattata con manovre rianimatorie e con il defibrillatire semiautomatico che ha erogato 3 shock su un ritmo da fibrillazione ventricolare, con successivo ROSC. In Pronto Soccorso i parametri erano stabili e le indagini strumentali (TC total body) evidenziavano fenomeni consolidativi polmonari, per cui si decidiva di intubare la paziente, previa sedazione profonda, e di avviare terapia antibiotica. All'ECG eseguito all'ingresso si evidenziava ritmo sinusale, 60 ppm, PR nei limiti, QTc di 554 msec, in assenza di alterazioni del tratto ST. Veniva eseguito studio coronarografico con evidenza di coronarie esenti da lesioni emodinamicamente significative.
Alla ripresa della coscienza, si trasferiva la paziente presso la nostra Unità di Terapia Intensiva Cardiologica. Veniva eseguito ecocardiorgamma transtoracico con riscontro di ventricolo sinistro lievemente dilatato, FE ai limiti inferiori di norma (55%) esiti di riparazione valvolare aortica con tecnica di Ozaki con gradienti max/med 33/21 mmHg, disfunzione diastolica di terzo grado ed iperrifrangenza dei foglietti pericardici in sede infero-postero-laterale. A completamento diagnostico veniva eseguita RMN cardiaca con riscontro di lieve dilatazione ventricolare sinistra, lieve disfunzione sistolica (FE 49%), acinesia della parete inferiore medio-basale e ipocinesia della parete laterale medio-basale, con LGE subendocardico omosede con alcuni tratti di transmuralità.
Ricostruita un'attenta analisi familiare mediante esecuzione di albero genealogico risultata negativa per morte cardiaca improvvisa ma positiva per CAD. Previa raccolta di consenso informato, veniva eseguito prelievo per l'analisi genetics dei geni implicati nelle cardiomiopatie e cardiopatie aritmiche, tutt'ora in corso.
Si procedeva a impianto di ICD sottocutaneo in sede intermuscolare, in prevenzione secondaria.
Al follow-up di 4 mesi, nessun evento aritmico registrato dal S-ICD.

Discussione: La prima causa di arresto cardiocircolatorio nell'adulto è la sindrome coronarica acuta, ma non meno importanti e impattanti sono le cardiomiopatie su base genetica o da accumulo e/o le canalopatie. Per questo motivo, oltre ad impiantare in prevenzione secondaria l'ICD per mettere in protezione i pazienti da eventuali recidive aritmiche, è fondamentale eseguire un attento work up diagnostico al fine di stratificare il rischio aritmico ad personam e di identificare eventuali mutazioni genetiche da estendere ai familiari di primo grado.
Nelle nuove linee guida del 2022 sulle aritmie ventricolari e la morte cardiaca improvvisa, viene proposto un algoritmo per il work-up diagnostico nei pazienti sopravvissuti ad ACC. Viene fornito un approccio step-by-step che comprende, in primis, l'esecuzione di coronarografia e il rule-out delle cause extracardiache e inserisce in classe IB l'esecuzione della RMN cardiaca e dei test genetici.

EP.03.11

AMBULATORIO 100% VIRTUALE DEI DISPOSITIVI ELETTRONICI CARDIACI IMPIANTABILI: MODELLO ORGANIZZATIVO E RISULTATI DI UN'ESPERIENZA TRIENNALE DI UN SINGOLO CENTRO.

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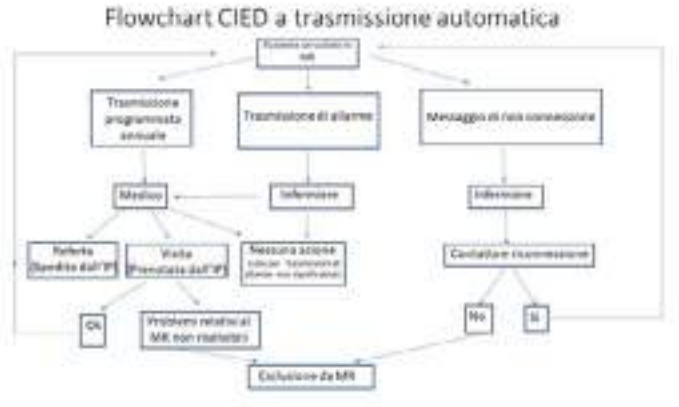
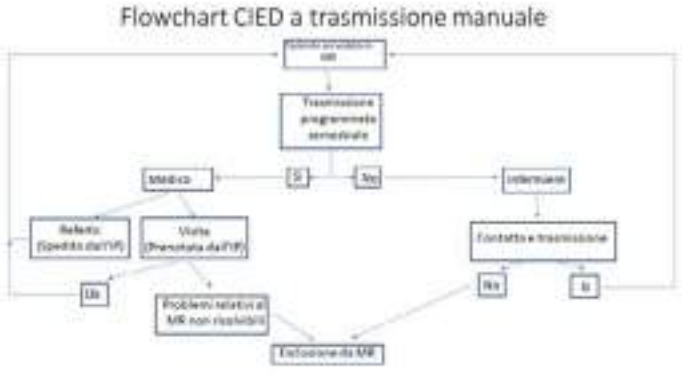
Introduzione: Durante la pandemia COVID-19 da SARS-CoV-2 il sistema sanitario globale ha dovuto rivedere processi profondamente radicati nella routine quotidiana come le attività ambulatoriali all'interno dell'ospedale, fra cui le visite di follow-up dei dispositivi elettronici cardiaci impiantabili (CIED), pacemaker (PM) e defibrillatori impiantabili (ICD) svolte in persona. Terminata la fase acuta della pandemia, visti i buoni risultati del modello organizzativo pianificato, abbiamo mantenuto in essere il cosiddetto ambulatorio 100% virtuale, senza ritornare ai controlli in presenza, se non in casi particolari. Obiettivo di questo studio è stato valutare prospetticamente il tasso di successo delle trasmissioni in remoto di tutti i dispositivi seguiti dall'ambulatorio controlli CIED e quindi verificare i modelli organizzativi adottati.

Metodi: Tutti i pazienti con sistema di monitoraggio remoto sono stati considerati nello studio e seguiti soltanto in remoto tra aprile 2020 e febbraio 2023. I dati riportati si riferiscono a tale periodo, anche se lo studio è ancora ongoing. I pazienti sono stati divisi in due gruppi: con Sistema di Trasmissione Manuale (STM) e Automatico (STA) sulla base della tecnologia a disposizione e sono stati seguiti i modelli organizzativi riportati in figura 1. Il gruppo STA, oltre a garantire una trasmissione giornaliera degli eventuali allarmi gialli e rossi e una trasmissione programmata annuale, permette una verifica almeno ogni 14 giorni delle mancate trasmissioni. Il gruppo STM prevede una trasmissione manuale ogni 6 mesi.

Risultati: Alla fine di febbraio 2023 un totale di 1271 pazienti risultano seguiti in remoto dal nostro centro. Di questi 236 del gruppo STM e 1035 del gruppo STA. Sono state prodotte 5377 impegnative relative ad attività svolte da remoto che hanno generato 252 (4.6%) visite ambulatoriali non programmate principalmente dovute a mancate trasmissioni per periodi prolungati, necessità di controllo in persona per riprogrammazione o per disattivazione delle auto-catture. Il tasso di successo globale delle trasmissioni col modello organizzativo adottato è stato del 96.6% (indice di connettività). Il tasso medio mensile di dispositivi manuali non connessi è stato 12.8±7.7%, mentre per quelli automatici 4.0±1.1% ($p<0.001$). La mortalità su base annua è stata del 7.7%.

Conclusioni: Adottando un modello organizzativo adeguato con la attuale tecnologia a disposizione è possibile mantenere elevati tassi di successo di trasmissione e passare ad un ambulatorio 100% virtuale in sicurezza. La tecnologia a trasmissione automatica consente un controllo più frequente dei pazienti portatori di CIED, e dovrebbe essere preferita a quella manuale. Rimane da valutare l'impatto sulla clinica.





EP.03.12

L'IMPATTO DELLA RISONANZA MAGNETICA SULL'INTEGRITÀ FUNZIONALE DEI DISPOSITIVI CARDIACI IMPIANTABILI

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Parole chiave: CIED Cardiac Implantable Electronic Devices, CRTCardiac Resynchronization, Therapy, ICD Implantable Cardioverter Defibrillator, Interferenze elettromagnetiche, CM Campi Magnetici, Device cardiovascolari, Pacemaker (PMK), Risonanza Magnetica Nucleare (MRN).

Introduzione: L'introduzione sul mercato dal 2009 di dispositivi compatibili con la risonanza magnetica (Magnetic Resonance-conditional, MRconditional) consente l'esecuzione, in condizioni controllate, di questa metodica diagnostica che utilizza i CM generati da un grande magnete per creare immagini tridimensionali ad alta definizione. Tale diagnostica è preclusa ai portatori di device con sistemi non MRI condicional, cosiddetti unsafe. Perché un sistema sia safe è necessario che device ed elettrocateteri siano della stessa marca e MR conditional e che non ci siano elettrocateteri abbandonati.
Questi pazienti possono ora essere sottoposti a tale metodica utilizzata per la diagnosi, la gestione e il follow-up di numerose malattie. La capacità di costruire le immagini in tre dimensioni e con un'elevata risoluzione garantisce un impiego sempre più ampio non solo come strumento diagnostico ma anche come monitoraggio nel tempo di numerose patologie.

Obiettivo: Lo scopo della ricerca è quello di valutare eventuali variazioni dei parametri elettrici (sensing, soglia di stimolazione e impedenza degli elettrocateteri atriale e ventricolare) dei CIED nei pazienti sottoposti a RMN,sia essa toracica che extra toracica.

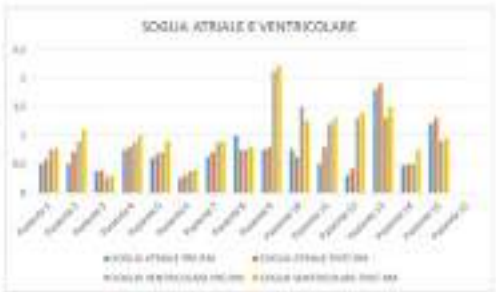
Metodo: Lo studio è stato condotto per un periodo di 6 mesi da Ottobre 2022 a Marzo 2023 presso l'Ospedale S. Pertini dove è stato esaminato un gruppo consecutivo di 15 pazienti (8 uomini con età media 74 ± 3 anni; 7 donne con età media 67 ± 1 anni). Tra questi, 3 pazienti portatori di ICD,di cui 2 monocamerali e 1 bicamerale, 1 pz con CRT-P ed 11 pazienti portatori di pacemaker di cui 10 bicamerali e 1 monocamerale
L'intero campione è stato sottoposto a MRN in diversi distretti corporei, toracica ed extratoracica.
Dai dati raccolti, 9 pazienti sono stati sottoposti a RM cranio-encefalica (60%), 2 a RNM addominale (13%), 2 a RNM toracica (13%), una RMN prostatica ed una RMN spalla destra (con percentuale rispettivamente pari al 6,7%).

Risultati: Descritti in Tabella 1

Conclusioni: Analizzando nel dettaglio le variazioni tra pre e post MRN relativamente agli EC atriale e ventricolare non si evidenziano variazioni significative dei parametri di sensing, soglia di stimolazione e impedenza. Nessuna variazione significativa ha coinvolto l'impedenza di shock.
Le modificazioni dei parametri elettrici registrati tra il pre e post RM sono indipendenti dal distretto in cui viene effettuato l'esame.
Dallo studio emerge inoltre che la RM non mina l'integrità né il corretto funzionamento del dispositivo, escludendo la possibilità che l'interazione elettromagnetica provochi interferenze elettriche tali da determinare eventi clinici avversi.
E' interessante notare come i moderni device utilizzano nuove tipologie di materiali biocompatibili, quindi meno dannosi per i pazienti ed inoltre non comportano modificazioni elettriche significative dei parametri, come dimostrato nello studio condotto.

Tabella 1.	PRE-RM	POST-RM
SENSING ATRIALE (mv)	4.4 ± 1.7	2.96 ± 1.66
SENSING VENTRICOLARE (mv)	11.22 ± 4.27	10.89 ± 4.37
IMPEDENZA ATRIALE (Ohm)	488.87 ± 122.91	523.87 ± 104.96
IMPEDENZA VENTRICOLARE (Ohm)	557.75 ± 187.70	564.75 ± 159.42
IMPEDENZA SHOCK (Ohm)	75 ± 2	76 ± 3
SOGLIA ATRIALE (V)	0.69 ± 0.41	0.76 ± 0.41
SOGLIA VENTRICOLARE (V)	0.89 ± 0.44	1.05 ± 0.39

mv = millivoltmetri V= Volt



EP.03.13

WHEN IMPEDANCE TREND LIES, REMOTE MONITORING HELPS FOR DIAGNOSIS|||QUANDO IL TREND DELL'IMPEDENZA MENTE, IL CONTROLLO REMOTO PUÒ AIUTARE PER LA DIAGNOSI

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ICD lead failure may cause electrical artifacts, which could result in loss of sensing, and generate inappropriate shocks or pacing issues. Since the past few years most manufacturers offer remote monitoring (RM) for the follow up of patients. Several studies reported on its impact on earlier detection of arrhythmias, and lead failures. We present the case of a lead fracture with normal electrical parameters detected through RM alert for interference.

An 82 yo female patient with history of dilatative cardiomyopathy with normal coronary arteries and permanent atrial fibrillation was implanted with a dual chamber implantable cardioverter defibrillator, Guidant Ventak Prizm DR as a secondary prevention of sudden cardiac death in 2002. The ICD was electively replaced in 2005 and in 2010 with a Guidant, Vitality 2.

In 2016, despite an optimized therapy, the patient experienced an episode of palpitation due to an AF with high ventricular response. Considering the difficulties of the heart rate management with the pharmacological therapy the patient underwent to an ablation of AV node. In 2017 we performed a third replacement of the ICD downgrading the system to a single chamber ICD, Fortify Assura VR and providing the patient with a bedside transmitter Merlin@home.

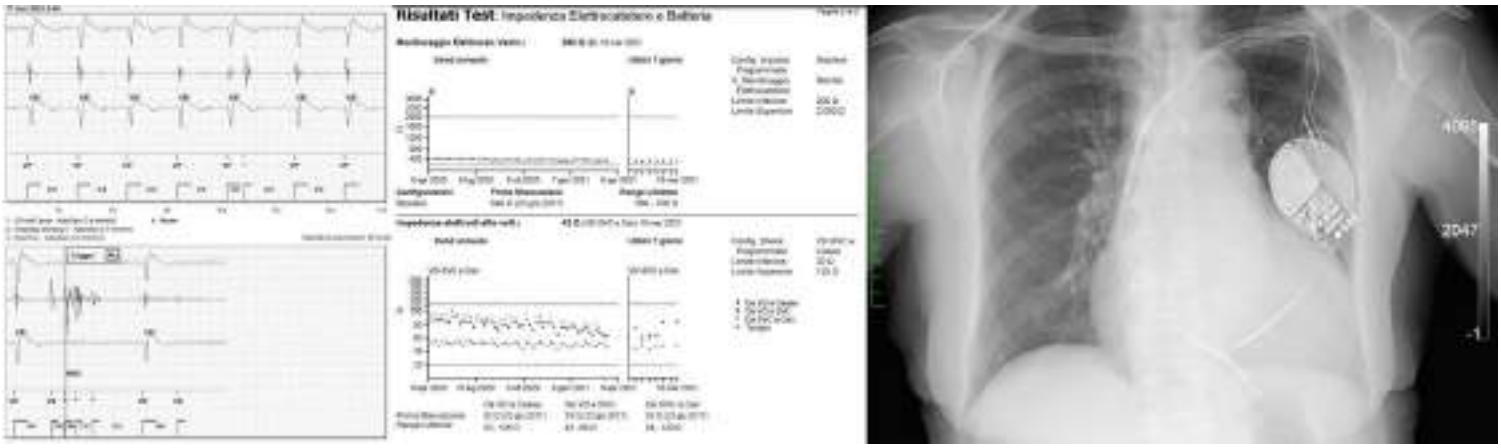
The patient, followed for 4 years remotely, did not experience ventricular arrhythmias and the ventricular lead electrical parameters, including pacing and shock impedance, were stable and in the normal range. In March 2021 an alert of the Merlin system triggered an unscheduled transmission that showed several episodes of ventricular oversensing. The episodes revealed that an electrical interference inhibited the ventricular pacing causing episodes of asystole with a maximum duration of three seconds.

Unexpectedly electrical parameters such as the pacing and shock impedances showed a stable and normal measurements, while the chest X rays showed that the ventricular lead was kinked at 90 degrees below the clavicle evidencing a lead fracture.The patient was therefore implanted with a new ventricular lead avoiding inappropriate shocks and further episodes of asystole.

Remote monitoring has become a common strategy to manage patients with cardiac implantable electronic devices, and it allows early detection of device or lead malfunction. In this case, the alert of interference led us in verifying patients lead although the normal trends of electric measurements could mislead our decision. The IEGM showed interferences that clearly highlighted a lead fracture and confirmed by the X-Ray image.

It is the first time that an alert inform physicians of a possible fracture with stable impedances. Furthermore, this case showed that the only electric measurements check in an old lead could led to a misleading diagnosis of its status, pointing the attention on a more careful evaluation of the leads implanted since years.

This emphasizes the role of remote monitoring in the continuous improving of the patient quality of care avoiding clinical adverse and life-threatening events. The diagnosis of a lead failure is not easily predictable but our case highlighted how remote monitoring is extremely helpful even more in this case of apparently correct functioning based on electric measurements.



EP.03.14

SINCOPE NEL PAZIENTE CON PACEMAKER: CASI CLINICI DI PARTICOLARI E NON SEMPRE REALI MALFUNZIONAMENTI

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La sincope è il sintomo più debilitante della bradiaritmie sintomatiche e l'impianto di pacemaker è una terapia ormai consolidata per migliorare i sintomi, la qualità della vita e la sopravvivenza dei pazienti.
Ma nonostante ciò, una percentuale non trascurabile di pazienti con pacemaker continua a presentare episodi sincopali.
La sottoanalisi del registro SYNCOPACED ha indagato le cause di recidive sincopali in questa popolazione e identificato le categorie di pazienti più a rischio di recidiva ma le cause di malfunzionamento del dispositivo risultano di gran lunga inferiori e piuttosto rare.
Presentiamo tre brevi casi clinici di pazienti con pacemaker accomunati tutti da sincope occorsa dopo l' impianto o sostituzione del pacemaker e associati in un caso ad un particolare tipo di malfunzionamento legato al sensore ventilazione minuto e in due casi a pseudo-malfunzionamento dipendente dalla particolare programmazione del pacemaker.

EP.03.15

FATTIBILITÀ E COMPLIANCE D'UTILIZZO DI UNA SMARTPHONE APP PER LA GESTIONE REMOTA DEL PAZIENTE CON SCOMPENSO E DISPOSITIVO CARDIACO IMPIANTABILE

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Introduzione: Predire il peggioramento dello stato di compenso è cruciale per evitare il ricovero dei pazienti con scompenso cardiaco (SC). I dispositivi cardiaci impiantabili (DCI) registrano alcuni parametri fisiologici che possono anticipare tale peggioramento, ma ad oggi non ci sono evidenze chiare su come le informazioni sulla sintomatologia del paziente e la sua aderenza alla terapia possano essere utili per determinare il tipo di intervento necessario e il momento in cui effettuarlo.

Obiettivi: Valutare, in un'ampia popolazione con SC real-world, la fattibilità e la compliance d'utilizzo di un'applicazione per smartphone (APP) dedicata ai pazienti con SC per ricevere informazioni settimanali sui loro sintomi/segni di SC e sulla compliance alla terapia.

Metodi: Tra Gennaio2021-Luglio2022, 10 ospedali italiani hanno sottoposto i loro pazienti con SC e DCI ad un questionario sul loro utilizzo di Smartphone ed APP. I pazienti (o i loro caregiver) che hanno accettato di partecipare, hanno scaricato la APP dedicata allo SC sul loro smartphone. É stata calcolata la compliance media d'utilizzo della APP a 1 anno.

Risultati: 495 pazienti con SC e DCI (67±13 anni, 79% maschi, 26% NYHA III-IV, FEVS 35±11%) hanno risposto al questionario: l'84% ha accesso alla tecnologia Smartphone o direttamente o tramite un caregiver; il 73% si è mostrato disponibile a usare la APP per lo SC settimanalmente e il 63% ha scaricato la APP. Questi ultimi sono stati i più giovani con un grado di istruzione più elevato. La compliance media di utilizzo della APP è diminuita nel tempo, dal 63.3% (settimane 1-13) al 42.1% (settimane 40-52), p<.001. I pazienti più anziani (più di 60 anni) hanno avuto una compliance media annuale maggiore (53%) di quelli più giovani (42%; p<.001), così come quelli con classe NYHA III-IV (66%) rispetto a quelli in NYHA I-II (46% p<.001). I pazienti seguiti da centri con staff dedicato al controllo remoto hanno avuto una compliance media annuale maggiore (64%) degli altri centri (33%, p<.001).

Conclusioni: L'utilizzo di APP per smartphone per raccogliere informazioni sui segni/sintomi e la compliance alla terapia dei pazienti con SC e DCI è fattibile. I pazienti più giovani e con grado di istruzione più elevato sono più disposti a utilizzare la APP, ma i pazienti più anziani e più sintomatici sono più costanti nell'utilizzo a lungo termine.

E-POSTER 4

GIOVEDI' 21 SETTEMBRE

AREA E-POSTER

18:00-19:00

SESSIONE E-POSTER 4
MISCELLANEA

Moderatori: A. Scopinaro (Alessandria), A. Viggiano (Caserta)

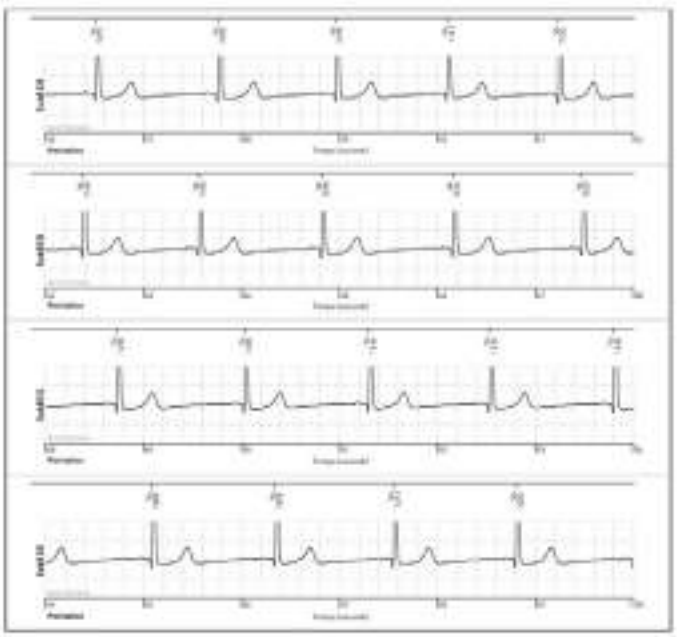
EP.04.01
TROPPO SPORT FA MALE? UN CASO DI ALLUNGAMENTO DEL QT CORRELATO ALL'ECCESSIVA ATTIVITA' FISICA IN ATLETA D'ELITE

D. Avenoso, F. De Vecchi, G. Dell'Era, C. Ghiglieno, M. Santagostino, S. Porcellini, G. Patti
AOU Maggiore della Carità di Novara - Università del Piemonte Orientale, Novara, ITALY

Introduzione: Negli ultimi anni la pratica sportiva è in aumento. I cardiologi italiani, per valutare l'idoneità degli atleti, si attengono al protocollo del COCIS e alle linee guida europee. Entrambi i documenti segnalano come non idonei alla pratica sportiva gli atleti con allungamento del QT all'ECG. Tale reperto è una condizione patologica associata ad aritmie ventricolari maligne e arresto cardiaco. Le cause di QT allungato possono essere congenite, le cosiddette sindromi del QT allungato (LQTS), o indotte da farmaci, patologie o disionie.

Case Report: Ragazzo di 37 anni senza fattori di rischio nè famigliarità per morte improvvisa. Sempre asintomatico per cardiopalmo o sincopi, eseguiva periodicamente visite per ottenere l'idoneità sportiva. Praticava attività fisica a livello agonistico con allenamenti intensi (nuoto, corsa e ciclismo per un totale di più di 10 ore/settimana). Durante l'ultima valutazione all'ECG riscontro di QT allungato (>500msec). Escluse cause iatrogene (disionie, farmaci o disfunzione epato-renale e tiroidea), si richiedeva Test Ergometrico e Holter ECG a 12 derivazioni. Al TE costante presenza di valori di QTc allungati che non si normalizzavano durante sforzo e all'Holter si confermava il QT allungato soprattutto nelle ore notturne. Ecocardiogramma nella norma. Veniva quindi costretto a un completo detraining e si avviava bassa dose di nadololo, titolato alle successive visite. Venivano inoltre eseguiti prelievi per la ricerca di mutazioni genetiche. Tre mesi dopo si è assistito a normalizzazione dei valori di Qtc. Alla luce della negatività delle ricerche genetiche e dell'assenza di altre cause è stata proposta graduale ripresa dell'attività fisica con attenta monitorizzazione inizialmente con ECG Holter e test ergometrico e successivamente con impianto di loop recorder (Biomonitor III- - Biotronik) con monitoraggio remoto e calcolo del QTc mensilmente al termine dell'allenamento. Attualmente il Qtc si mantiene in range e il paziente asintomatico in terapia con nadololo praticando allenamenti trisettimanali non superando le 8 ore a settimana.

Discussione: L'allungamento del QT può essere para-fisiologico negli atleti d'élite. Un QTc compreso tra 480 e 500 msec rappresenta la zona grigia tra patologico e fisiologico. In questi casi fondamentale è la storia familiare ed eventuale sintomatologia sincopale. Quando il Qtc risulta maggiore di 500msec, una volta escluse le cause farmacologica e genetica, la gestione deve sposare la necessità di prevenire aritmie con la capacità di non patologizzare persone sane. Attualmente la gestione di questi pazienti prevede il de-training e il watch and wait. Nel nostro caso, vista la completa normalizzazione del valore e l'assenza di una causa precisa se non l'eccessivo stress fisico, abbiamo concesso la ripresa controllata e graduale dell'attività fisica con un monitoraggio costante. Sulla base di studi che hanno dimostrato come il Qtc calcolato dall'EGM registrato tramite un Biomonitor III si sovrapponibile a quello ottenuto con un ECG tradizionale, abbiamo optato per eseguire l'impianto di tale dispositivo così da ridurre i controlli eseguiti in office, ma ottenendo valori di QT in tempo reale. Contemporaneamente il loop recorder ci permette di monitorizzazione possibili aritmie. Nei casi di QT allungato correlati ad intensa attività fisica questa potrebbe dimostrarsi una strategia vincente.



EP.04.02

A PROJECT OF BLSD TRAINING FOR SCHOOL PEOPLE IN THE CUNEO'S GEOGRAPHIC AREA: FIRSTS RESULTS AND DEVELOPMENTS

G. Bricco [1], A. Coppolino [1], L. Valeri [1], G. Amoroso [1], C. Iacovino [1], A. Scollo [1], S. Dogliani [1], D. Pancaldo [1], A. Battisti [1], L. Correndo [1], U. Barbero [1], C. Moncalvo [1], L. Braschi [2], E. Cavallero [1], M. De Benedictis [1]

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Background: Early external cardiac massage (ECM) and defibrillation (EAD) are the only tools to improve the survival morbidity-free in cardiac arrest (CA) outside the hospital.
This project aims to spread through students of our geographic area the BLSD certification in case of CA.
We have open a BLSD's trainig centre, with both health workers and non trainers. Among non-healthcare we have trained school teachers.

Results: In 4,5 years we trained 1444 students and 24 teachers by 9 different schools. Teachers received initial formation as "rescuers" and then the formation as "trainers" with 'IRC comunità' program .
In these 5 years, with the exception of 2020 where there is a drop due to covid, there has been a progressive increase in the number of teachers involved and students trained..
We have extended the project to 4 new schools. At the end of this year we will overcome 1500 trained.

Conclusions: With the collaboration of the teachers, the number of health workers needed for each meeting can be drastically reduced and this will allow less effort to implement the project, making it less likely to continue in the future.
Our next effort will be to train all high school students with BLSD certification and more schools and teachers.

Years	Number of students	Number of Schools	Number of teachers	Number of courses	Mean number of students for course
2019	256	5	5	9	28,4
2020	46	3	5	4	12 (Covid)
2021	247	6	15	15	16,5
2022	505	7	15	24	21
2023	390	9	24	16 (may)	24

EP.04.03

LONG QT SYNDROME: A BIG FAMILY WITH A KCNQ1 MUTATION

A. Didomenico, L. Canovi, A. Merani, G. Azzolini, M. Bertini, F. Vitali, C. Balla
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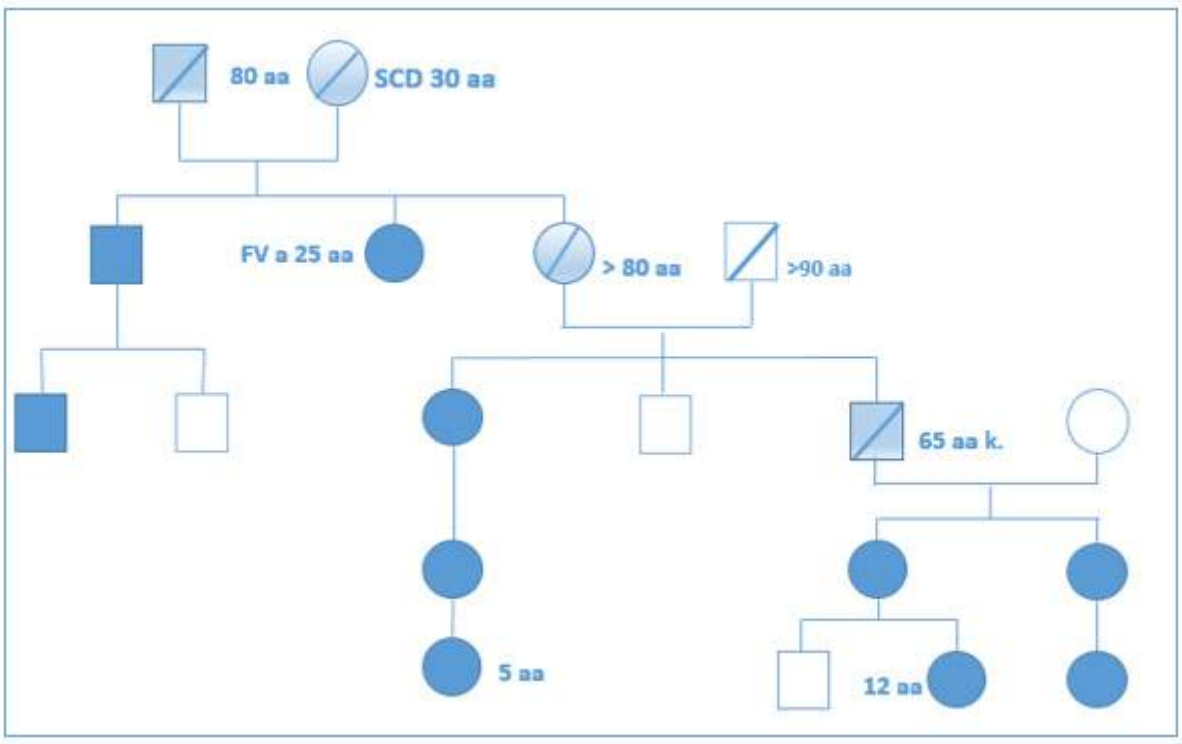
Introduction: Congenital long QT syndrome (LQTS) is characterized by prolongation of the QT interval that can trigger life-threatening arrhythmias leading to syncope and sudden death. Mutations in genes encoding for ion channels have been identified in 75% of LQTS cases. Long QT syndrome type 1 (LQTS1) is one of three subtypes of LQTS identified based on genetic substrate. LQTS1 is linked to a 'loss-of-function' mutation in the gene encoding the potassium channel KCNQ1, and arrhythmias tend to occur during childhood with prevalence in the male sex. Adrenergic triggers are the most important trigger for arrhythmic events.

Clinical Case: Extensive family with long QT syndrome with positive genetics for mutation in the KCNQ1 gene. The index case in the family appears to be a woman who at the age of approximately 30 years died suddenly after surgery. The first patient subjected to genetic analysis, with positive result, was the daughter of this woman who, at the age of about 25 years has experienced a ventricular arrhythmia during induction of anesthesia for surgery with baseline ECG finding of prolonged QTc. Set beta-blocker therapy, arrhythmias no longer occurred. Subsequently, a cardiological screening including electrocardiogram, transthoracic echocardiography and genetic analysis was undertaken in first-degree relatives and, in cases of positivity, this screening was progressively extended to second-, third- and fourth-degree relatives. All the women in the family analyzed, eight in total, including two girls aged 5 and 12 years, tested positive for genetic analysis, and one of the women had a syncopal episode at the age of 50 years. Of the men analyzed, four in total, only two (father and son) tested positive on genetic analysis. In all patients with positive genetics a QTc >480 msec was detected on ECG in clinostatism and/or orthostatism, for which a diagnosis of LQTS1 (mean Schwartz-score 4) was made and beta-blocker therapy was started.

Conclusions: This clinical case describes an entire family with LQTS with positive genetics for KCNQ1 with phenotypic manifestations different from those described in the literature, in particular with prevalence in the female sex and with onset of arrhythmias in adulthood.



EP.04.04

CONVERSION OF PERSISTENT ATRIAL FIBRILLATION TO SINUS RHYTHM AFTER LAA LIGATION WITH THE LARIAT DEVICE

C. Carfora, Z. Palamà, P. Scialpi, A.R. Schirinzi, M. Rillo
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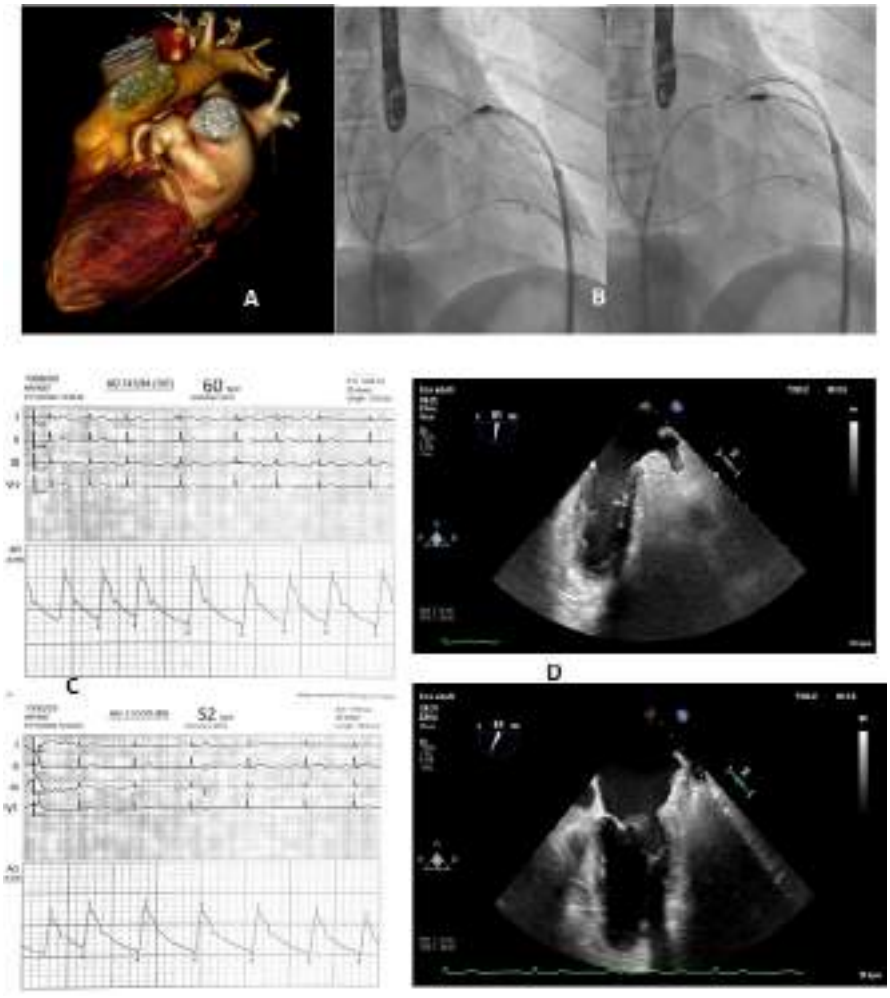
Clinical Case description: We present the case of a long persistent atrial fibrillation man of 75 years, who came to our observation for episodes of intestinal bleeding from IBD (inflammatory bowel disease) and anemia due to oral anticoagulant therapy.
He was a candidate for LAA (left atrial appendage) occlusion. Due to the high risk of bleeding even in the course of dual antiaggregation antiplatel theraphy, closure using the Lariat system was opted for.
The patient had been in long persistent atrial fibrillation for 3 years, paucisymptomatic due to heart failure Initial work up: At the admission: the patient was in normofrequent atrial fibrillation. Echocardiographic parameters were LVEF 65%, left atrium area was 34 cmq.

Management: The patient underwent closure using an epicardial and transseptal approach of the left auricle using the Lariat system. The ligation of the left appendage resulted in a surprisingly stable sinus rhythm restoration. The procedure ended in the absence of complications. During monitoring in cardiology, the patient maintained a stable sinus rhythm, but an antiarrhythmic prophylaxis with amiodarone was opted for.
Follow up: at one month persistence of sinus rhythm with patient in excellent circulation compensation, without anticoagulant and further episodes of anemia.

Conclusions: Our first experience with Lariat has clearly demonstrated the role of the left appendage in sustaining atrial fibrillation, epicardial LAA exclusion leads to electrical isolation of the LAA with sinus rhythm restoration. The epicardial LAA exclusion should therefore be considered in the rhythm control strategy of persistent and long standing persistent atrial fibrillation, beyond the prophylaxis of thromboembolic risk1-2.



EP.04.05

MUTAZIONE R222Q DEL GENE SCN5A IN ETÀ PEDIATRICA: FENOTIPO E RISPOSTA ALLA TERAPIA FARMACOLOGICA

S. Catucci, M. Lombardi, U. Vairo
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Introduzione: Alcuni studi hanno dimostrato l'associazione tra aritmie, prevalentemente ventricolari ma anche atriali, cardiopatia dilatativa e mutazione R222Q del gene SCN5A, che codifica per la subunità alfa del canale cardiaco del sodio. La mutazione missense causa un'alterata attivazione del canale del sodio generando una corrente di maggior ampiezza e di insorgenza più precoce. Questo favorisce la genesi di extrasistolia soprattutto a partenza dalle fibre di Purkinje e lo sviluppo di cardiopatia dilatativa; entrambe rispondono soprattutto alla terapia antiaritmica rispetto alle convenzionali terapie antiscompenso.

Scopo dello studio: Osservare le caratteristiche cliniche e la risposta alla terapia farmacologica di soggetti in età pediatrica portatori della mutazione R222Q del gene SCN5A.

Materiali e metodi: Abbiamo osservato soggetti pervenuti al nostro Centro per aritmie (atriali e ventricolari), portatori della variante R222Q. I pazienti sono stati sottoposti a valutazione cardiologica con ECG, Ecocardiogramma, Holter ECG, test da sforzo e regolare follow up.

Risultati: Sono stati osservati 4 pazienti, 3 maschi e una femmina, con età compresa alla prima osservazione tra 0 e 12 anni. Il primo paziente aveva familiarità per morte improvvisa, cardiomiopatia dilatativa e disturbi del ritmo; presentava aritmia cardiaca in età fetale, successivamente BAV di I e II grado, ritmo giunzionale, extrasistolia ventricolare e salve di TVNS polimorfa. L'ecocardiogramma e il test da sforzo erano nella norma. Con flecainide a basso dosaggio si è ottenuto controllo del profilo tachiaritmico. La stessa mutazione genetica è stata riscontrata nel padre, affetto anche lui da extrasistolia ventricolare complessa, e nel nonno, affetto da cardiopatia dilatativa, disturbi della conduzione e aritmie ventricolari maligne. La seconda paziente, con familiarità negativa, dall'età di 8 anni è in osservazione per extrasistolia ventricolare polimorfa, isolata e ripetitiva, scarsamente responsiva alla terapia con propafenone, flecainide, flecainide associata a nadololo, sotalolo. Al'ecocardiogramma e alla RMN cardiaca si evidenziava minima compromissione della funzione contrattile del ventricolo sinistro. Le extrasistoli ventricolari non scomparivano durante sforzo. A 15 anni veniva impiantato un defibrillatore in prevenzione primaria e si associava terapia con idrochinidina. Il terzo paziente presentava familiarità per aritmie (tachicardia atriale e ventricolare); era stata riscontrata tachiaritmia già dall'epoca fetale. All'età di 6 anni, in assenza di sintomi, è stata rilevata tachicardia atriale poco sensibile alla flecainide ma ben controllata da sotalolo, successivamente anche extrasistolia ventricolare isolata. L'ecocardiogramma non mostrava anomalie. Il quarto paziente, cugino del precedente, ha sviluppato extrasistolia ventricolare monomorfa isolata e ripetitiva all'età di 12 anni. L'ecocardiogramma era normale, al test da sforzo presentava aritmie ventricolari ripetitive nel recupero e l'Holter ECG documentava anche periodi di ritmo atriale e giunzionale. Ha risposto in maniera soddisfacente alla terapia con flecainide.

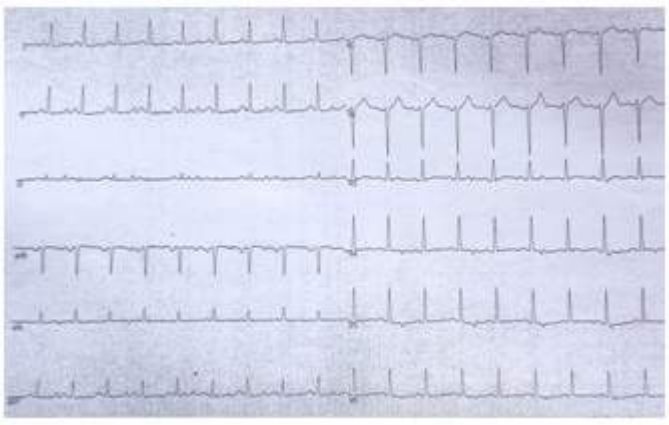
Conclusioni: Dal nostro studio emerge che la mutazione R222Q del gene SCN5A è responsabile di aritmie maligne già dall'età pediatrica e si esprime con un fenotipo variabile, anche nella risposta alla terapia. Solo un paziente con aritmia resistente alla terapia farmacologica presentava lieve disfunzione contrattile. La cardiopatia dilatativa in questi soggetti potrebbe dunque essere conseguenza di un elevato burden aritmico e presentarsi perciò in età successive. Fondamentale una diagnosi e un inquadramento genetico.

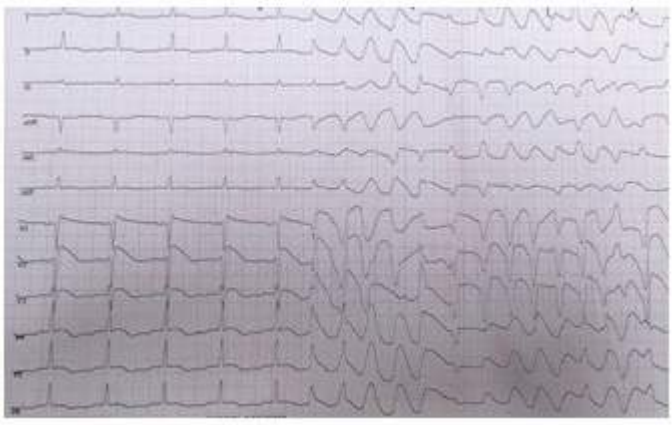
EP.04.06

A TRICKY BRUGADA PATTERN IN AN UNEXPECTED CLINICAL CONTEXT

F. Coretti, L. Brugiatelli, S. Sfredda, F. Coraducci, L. Torselletti, S. Belleggia, G. Bastianoni, M. Alfieri, F. Paolini, S. Principi, G. Ciliberti, A. Barbarossa, G. Stronati, A. Dello Russo, F. Guerra
Università Politecnica delle Marche, Ancona, ITALY

We present the case of a 35-year-old male affected by mild hypertension. He had a transitory loss of consciousness episode during a SarsCov2 infection symptomatic for fever, headache and myalgia.
An ambulance was immediately called and the patient was transferred to the emergency department.
On arrival he was in a non-responsive state with stable hemodynamics, initial respiratory failure and metabolic markers of peripheral hypoxia.
ECG showed only an asymmetric T wave inversion in V4-V6 leads. The cardiac echocardiogram did not show any major alterations. In the meantime, due to worsening of respiratory function, the patient underwent orotracheal intubation and he was sedated with propofol, midazolam and fentanyl. Subsequently, an episode of atrial fibrillation was documented. Amiodarone infusion was started and the patient reverted to sinus rhythm after a few hours.
Then he developed severe hypokalemia, refractory to medical treatment, together with a prolonged QTc (660 msec). Amiodarone was immediately interrupted and the patient started continuous renal replacement therapy.
Shortly after the ECG showed a pattern highly resembling the Brugada pattern type 1 in the right precordial leads and two episodes of Torsade de Pointes during prolonged QTc occurred. These arrhythmias were treated successfully with magnesium sulfate infusion.
Then CPK, myoglobin, high sensitivity troponin I levels started to rise, along with creatinine, triglycerides and markers of hepatic injury.
Since propofol was administered continuously for eight days, it was suspected as the cause of this clinical scenario: Propofol infusion syndrome (PRIS) was highly suspected and propofol infusion was immediately interrupted.
Thereafter, the patient gradually improved and was extubated. As soon as the patient's hemodynamic conditions allowed it, a coronary CT and a cardiac MRI were performed. They did not show any relevant coronary obstruction, myocardial oedema or late gadolinium enhancement. To further evaluate the case, a flecainide challenge test was performed, but no significant ECG change was induced.
Propofol infusion syndrome is a rare but potentially lethal side effect of propofol. Its clinical presentation can be characterized by several signs such as unexplained metabolic acidosis, rhabdomyolysis, hepatomegaly, renal failure, hypertriglyceridemia, malignant arrhythmia and rapidly progressive cardiac failure. The first sign of cardiac instability can be the electrocardiographic development of a coved ST elevation in the right precordial leads, similar to that seen in the type 1 Brugada syndrome. PRIS does not have a specific treatment. A successful management consists of an early recognition of its signs followed by a prompt propofol infusion termination.





EP.04.07

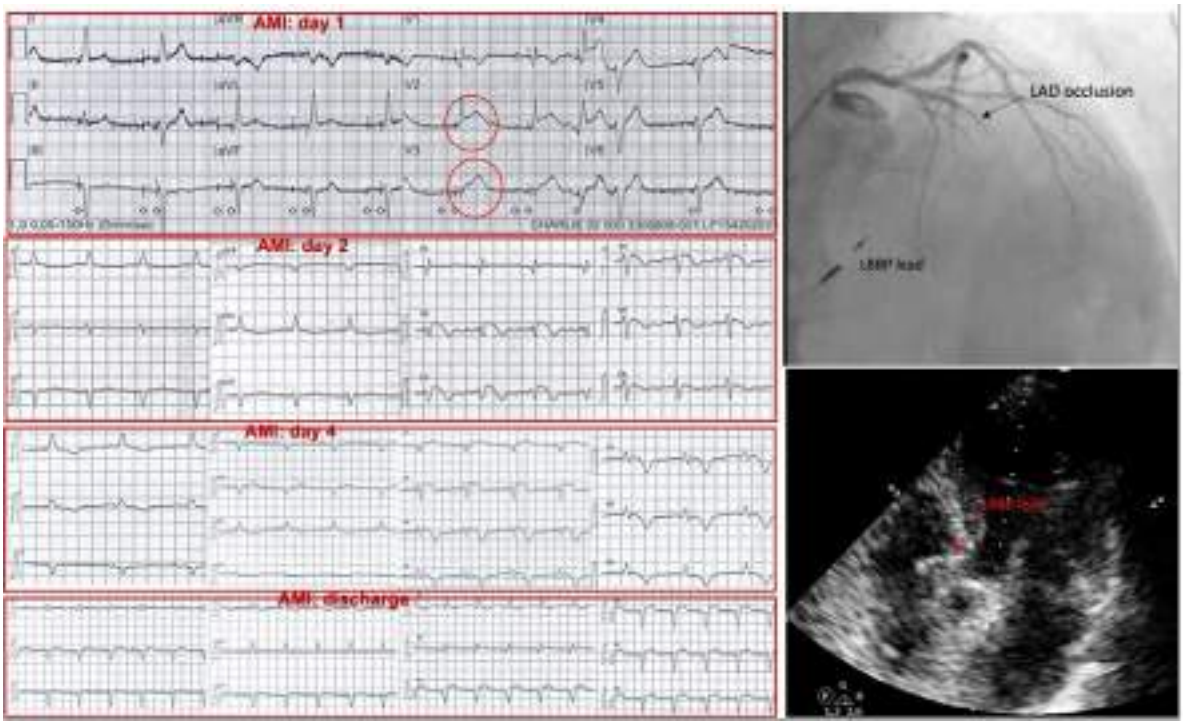
ACUTE MYOCADIAL INFARCTION IN A PATIENT WITH LEFT BUNDLE BRANCH PACING: CASE REPORT

F. Deluca [1], L. Marcantoni [1], A.A. Follesa [2], S. Valenza [1], G. Pastore [1], E. Baracca [1], C. Picariello [3], F. Zanon [1]
[1] *Ospedale S. Maria della Misericordia, Elettrofisiologia, Rovigo, ITALY*
[2] *Università di Cagliari, Cagliari, ITALY*
[3] *Ospedale S. Maria Della Misericordia, Cardiologia, Rovigo, ITALY*

Introduction: The electrocardiographic diagnosis of acute myocardial infarction (AMI) in the setting of cardiac pacing represents a diagnostic challenge. The classical ST-segment pattern of myocardial ischemia can become obscured by the abnormal repolarization changes caused by ventricular pacing. Consequently, longer door-to-balloon reperfusion times could be expected in these patients due to a delayed diagnosis.

Case report: A 96-year-old male was admitted to hospital with typical acute chest pain for 30 minutes. He had a medical history positive for dual chamber pacemaker (PM) implantation in 2018 due to complete AV block; the ventricular lead (3830-59 cm Medtronic) had been placed in the left bundle branch via intraseptal screwing (LBBP). Preserved ejection fraction (EF) and absence of significant valvular disease were found at last echocardiographic evaluation in 2021. The ECG on first contact showed sinus rhythm and anterior ST segment elevation clearly evident despite ventricular pacing. The patient underwent emergency coronary angiography documenting thrombotic sub occlusion of the left anterior descending artery (LAD), whereas no significant stenosis was observed in the left circumflex artery and the right coronary artery. Percutaneous coronary intervention (PCI) was performed after initiating standard drug therapy that included dual antiplatelets, statin, bisoprolol and diuretics. Laboratory test revealed significant rise of the troponin T hs levels up to 17989 ng/l and severe worsening of renal function (creatinine levels up to 2,89 mg/dl; eGFR 18 ml/min/1). Echocardiography revealed severe left ventricular dysfunction with EF 33% and large akinetic area involving the apex. The clinical course was complicated by pulmonary edema with the need for non-invasive ventilation. The ST segment on ECG persisted elevated the second day after AMI, and then slowly declined with appearance of Q waves and inverted T waves in the anterior leads. The PM showed constant effective ventricular capture and possibly transient loss of LBB capture (loss of R' in V1) during the acute phase of AMI. The presence of the lead in the conduction system permitted to follow the ECG-graphic patterns throughout evolution of the AMI as in patients without PM.

Conclusions: The electrocardiographic diagnosis of acute occlusional myocardial infarction in the setting of cardiac pacing is often challenging. Conduction system pacing maintains normal depolarization and repolarization, thus may facilitate a timely diagnosis and treatment.



EP.04.08

COMPARISON BETWEEN THORACIC ULTRASOUND AND CHEST X-RAY IN NON-INFECTIVE EARLY COMPLICATIONS DETECTION AFTER CARDIAC IMPLANTABLE ELECTRONIC DEVICES IMPLANTATION PROCEDURES

R. Floris [1], F. Guerra [2], G. Dell'Era [3], L. Pimpini [4], C. Ghiglieno [4], L.M. Fais [1], A. Cucco [3], A. Faggioni [2], C. Claretti [2], F. Orru [1], M.V. Demontis [1], A. Dello Russo [2], G. Delogu [1]

[1] *Nostra Signora di Bonaria Hospital, Division of Cardiology, San Gavino Monreale, ITALY*

[2] *Marche Polytechnic University of Ancona, Ancona, ITALY*

[3] *Hospital Maggiore Della Carita, Division of Cardiology, Novara, ITALY*

[4] *INRCA Marche Hospitals, Division of Cardiology, Ancona, ITALY*

Background: In the immediate postoperative of cardiac implantable electronic devices (CIED) implantation, the use of chest radiography (CXR) is the gold standard diagnostic tool of early complications, accompanied by the control of the electrical parameters for diagnostic of early catheters dislodgement. However the ability to detect thoracic complications using CXR is limited, and it requires radiation exposure. Thoracic ultrasound (TUS) is an easy and highly appropriate technique for detect thoracic pathologies although its use in cardiac stimulation is not yet validated.

Purpose: The purpose was to evaluate the rate of early complications after CIED implantation and to compare the diagnostic power of the two methods alone and in association with electrical control.

Methods: 397 patients who underwent CIED implantation or upgrade were prospectively enrolled in a multicenter observational study from November 1, 2021 to September 30, 2022. Following surgery, all patients underwent CXR and TUS at the patient's bed and the electrical parameters were tested with the device programmer.

Results: Total mechanical complications were 21 (5.3%), of which the most presented were pneumothorax (3.3%) and pericardial effusion (2%). The diagnosis of mechanical complication was made by TUS alone in 18 cases (86%), by CXR alone in 2 (9.5%) and in 1 case (4.8%) by both. TUS demonstrated a diagnostic sensitivity for mechanical complications of 90% and for total complications of 87% (associated with electrical control) compared to CXR which had a sensitivity of 20% and 57% respectively ($p<0.0001$), both had a specificity of 100%.

Conclusion: In our experience TUS has a diagnostic power superior to CXR to detect early mechanical complications. Our results suggest TUS may be used as the primary technique in association with standard electrical control to search for postoperative non-infective complications after CIED implantation.

EP.04.09

ANALISI DEL BURDEN DI ARITMIE VENTRICOLARI IN PAZIENTI PORTATORI DI ICD, PRIMA E DOPO L'INIZIO DI TERAPIA CON GLI INIBITORI DEL COTRASPORTATORE SODIO-GLUCOSIO (SGT2I)

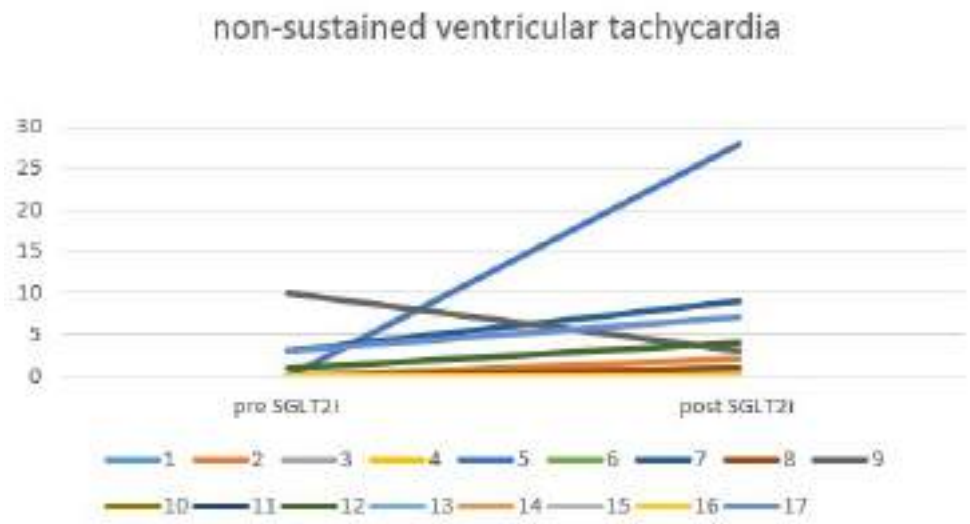
M. Giannotti Santoro, A. Vecchi, F. Lapira, E. Talini, E. Puccioni, A. Menegato, B. Okunuga, S. Sardella, K. Ujka , A. Genovesi, E.M.G. Pasanisi
Cardiologia UTIC Ospedali Riuniti di Livorno, Livorno, ITALY

Background: il ruolo degli inibitori del cotrasportatore sodio-glucosio (SGLT2i) è ben definito nei pazienti con severa disfunzione ventricolare sinistra. Tuttavia, al momento non è ancora stabilita la tempistica di tale farmaco sull'indicazione all'ICD in prevenzione primaria. In letteratura una piccola case-series ha dimostrato shock appropriati in pazienti poco dopo l'inizio della terapia con SGLT2i. Un'analisi più ampia sugli effetti a breve termine in termini di aritmie ventricolari al momento non è presente in letteratura.

Metodo: lo scopo di questo studio è quello di analizzare il burden di eventi ventricolari nei 3 mesi successivi l'inizio della terapia con SGLT2i in pazienti portatori di ICD e in monitoraggio remoto (HM). Per fare questo, abbiamo analizzato retrospettivamente gli eventi aritmici ventricolari durante i 3 mesi precedenti ed i 3 mesi successivi l'inizio della terapia con SGLT2i.

Risultati: un totale di 17 pazienti è rientrato nei criteri dello studio. Al baseline le caratteristiche cliniche erano le seguenti: 13 maschi (76%), 9 ischemici (53%), 2 valvolari (12%), 6 con cardiomiopatia dilatativa idiopatica (35%). Il volume telediastolico medio del ventricolo sinistro era di 203 ±90 ml, la frazione d'eiezione media del ventricolo sinistro era 0.36 ± 0.09. Tutti i pazienti erano in terapia con beta bloccanti, 14 (82%) con sacubitril-valsartan, 13 (76%) con antagonisti dell'aldosterone, 16 (94%) con furosemide e 5 (29%) con amiodarone. La molecola di SGLT2i iniziata è stata il dapagliflozin per 13 pazienti (76%), empagliflozin per 3 pazienti (18%) e canagliflozin per 1 paziente (6%). Dieci pazienti erano portatori di ICD mono o bicamerale e 7 avevano una CRTD.
Durante i 3 mesi precedenti l'inizio della terapia con SGLT2i, 4/17 pazienti avevano avuto tachicardia ventricolare non sostenuta (TVNS) vs 8/17 pazienti che hanno avuto TVNS nei 3 mesi successivi (23% vs 47%, P value 0.23). Sette pazienti (41%) hanno avuto in incremento del numero di TVNS nei 3 mesi successivi all'inizio della terapia suddetta. Inoltre, nei 3 mesi prima dell'inizio della terapia con SGLT2i nessun paziente aveva avuto ATP o shock appropriati, mentre nei 3 mesi successivi un paziente ha avuto una TV interrotta da ATP (110 giorni dopo l'inizio della terapia) e 2 pazienti hanno avuto TV interrotta da shock (2 e 25 giorni dopo l'inizio della terapia con SGLT2i).

Conclusioni: questa analisi ha dimostrato un peggioramento del burden aritmico nei 3 mesi immediatamente successivi all'inizio di terapia con SGLT2i. Visto il piccolo numero di pazienti analizzati, questo dato è esploratorio, in quanto è necessaria un'analisi su casistiche maggiori per verificare una significatività statistica.



EP.04.10

DALLA DISCREPANZA TRA I BASSI VOLTAGGI ELETTROCARDIOGRAFICI E AUMENTO DEGLI SPESSORI PARIETALI, ALL'ECOCORDIAGROMMA, ALLA DIAGNOSI DI AMILOIDOSI CARDIACA

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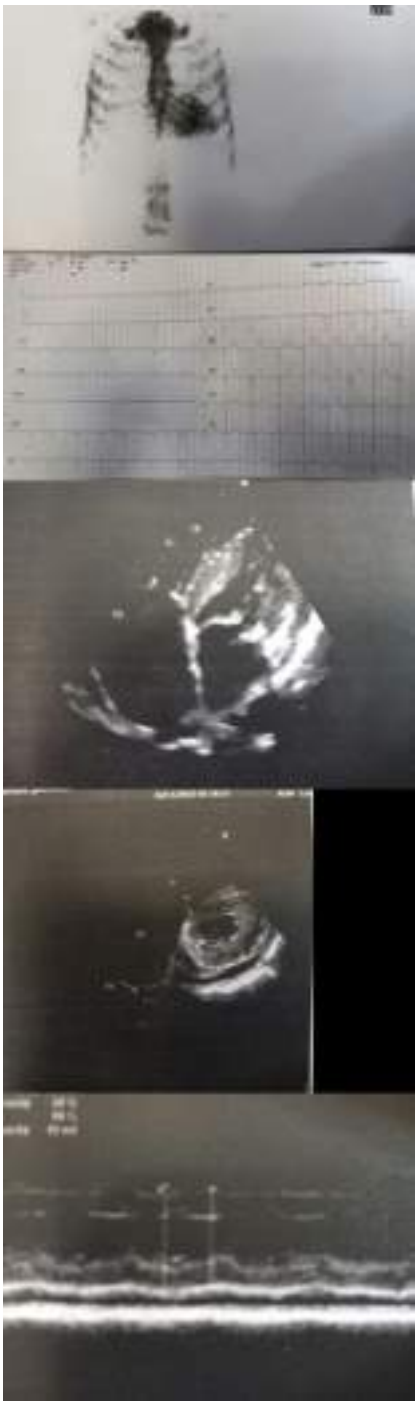
Introduzione: L'amiloidosi è una patologia sistemica che può avere un interessamento cardiaco. E' una patologia caratterizzata da depositi di proteine alterate all'interno dei tessuti. Man mano che queste proteine si depositano, creano delle disfunzioni negli organi interessati. Nell'amiloidosi cardiaca riconosciamo una forma AL: con depositi di catene leggere di anticorpi e una amiloidosi da transtiretina (TTR) che si divide in due sottogruppi:
a) forma non mutata geneticamente b) forma geneticamente determinata L'amiloidosi deve essere sospettata particolarmente nello scompenso cardiaco diastolico a funzione ventricolare sinistra preservata.

Caso clinico: Paziente 83 anni, affetto da diabete mellito tipo II, fibrillazione atriale permanente in NAO, epatopatia non meglio precisata, giunge in PS per dispnea e segni clinici di scompenso congestizio. ECG evidenzia una fibrillazione atriale con fvm 95 b/m e bassi voltaggi diffusi del QRS. Gli esami ematochimici evidenziano una lieve anemia Hb 10 g/dl, bilirubina tot 3.85 mg/dl, gamma GT 341iu/l, ed un proBNP 12376 pg/dl. Si procede pertanto al ricovero e all'esecuzione dell'ecocardiogramma che evidenzia una dilatazione biatriale, una radice aortica calcifica senza un gradiente all'efflusso, un ventricolo sinistro con severo ispessimento delle pareti ad aspetto granulomatoso e una ridotta funzione contrattile globale con una EF stimata di circa il 38%. Presenta inoltre un notevole ispessimento delle valvole atrioventricolari, con insufficienza mitralica moderata e tricuspidale severa con paps stimata70 mmhg e un versamento pericardico circonferenziale di max 1.3 cm. Rx torace evidenzia un versamento pericardico bilaterale di maggior grado a destra con ombra cardiaca ingrandita. La discrepanza tra bassi voltaggi elettrocardiografici e ispessimento dello spessore ventricolare ci portano al sospetto clinico di amiloidoisi . Si procede pertanto alla richiesta di una scintigrafia ossea, eseguita con somministrazione di AMDP radiomarcato, con valutazione semiquantitativa dell'intensità di captazione miocardica, mediante rapporto cuore/mediastino (h/mratio) e Perugini score. L'esame evidenzia moderato incremento dell'uptake del radiofarmaco in regione cardiaca (uptake del mediastino sinistro maggiore dell'uptake del mediastino destro).
Perugini visual score = 3 (intensa captazione cardiaca con scarsa o assente captazione ossea) e un h/m ratio =2 (positivo per amiloidosi se >1.21). Si conclude quindi per evidenza scintigrafica di incremento di uptake del radiotracciante in sede cardiaca, in accordo al sospetto diagnostico.
Durante la degenza vengono inviati inoltre prelievi ematici per sequenze geniche mediante next gererat presso la cardiologia molecolare (Istituti Maugeri Pavia). L'analisi molecolare ha permesso di identificare due varianti a carico dei geni ANKRD1 e AKAP9. ANKRD1 codifica per la proteina CARP coinvolta nella contrazione muscolare e nel mantenimento dell'integrità strutturale dei sarcomeri. Il gene AKAP9 codifica per la proteina A-chinasi 9 coinvolta in sindromi cardiache geneticamente determinate quali QT lungo e casi isolati di sdr di Brugada.



Conclusioni: Ci troviamo dunque di fronte ad un caso di amiloidosi cardiaca da TTR di verosimile forma geneticamente determinata. Questo ha portato a consigliare la cosegregazione nel resto della famiglia e ad invitare noi clinici di porre attenzione ad un elettrocardiogramma che si presenta con bassi voltaggi, soprattutto se associato ecocardiograficamente ad un aumentato spessore parietale del ventricolo sinistro.

EP.04.11

PRIMA DIAGNOSI DI APNEA DEL SONNO TRAMITE HOLTER CARDIORESPIRATORIO (SPIDER-SAS) IN SOGGETTI CON ARITMIE CARDIACHE E IPERTENSIONE ARTERIOSA

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La sindrome dell'apnea ostruttiva del sonno (OSAS) è un noto fattore di rischio per le malattie cardio-cerebrovascolari, in quanto ripetuti episodi di ipossia possono favorire aritmie cardiache, ipertensione e ictus. L'OSAS è presente nell'8-16% degli adulti, particolarmente negli uomini e negli obesi, ma purtroppo nella maggior parte dei casi non è diagnosticata e quindi non viene trattata.
Abbiamo quindi utilizzato il sistema SpiderSAS (Microport CRM), poligrafo registratore di categoria III, che registra in un solo dispositivo sia 2 derivazioni Holter ECG, che flusso aereo nasale, sforzo toracico, posizione del corpo, saturazione d'ossigeno, pletismografia nelle ore notturne Le registrazioni vengono analizzate con l'opzione SAS del software SyneScope, che oltre alle classiche analisi del ritmo cardiaco computa l'Indice Apnea/Ipopnea (AHI), l'Indice di Desaturazione d'Ossigeno (ODI), e SpO2 burden (distribuzione %SpO2).
Abbiamo studiato 110 pazienti (64 uomini, 58%; età media 65±13 anni), affetti da aritmie cardiache (90%), ipertensione arteriosa (71%) prevalentemente non dipper. Nessun paziente era affetto da scompenso cardiaco o disfunzione ventricolare severa. Nessun paziente era stato mai studiato per OSAS. Tutti i pazienti avevano uno o più sintomi clinici sospetti per OSAS (russamento, sensazione di soffocamento, sonnolenza diurna, apnee notturne riferite dal partner, calo della memoria, ridotta capacità di concentrazione, cefalea al risveglio, calo del desiderio), mai indagati in precedenza.
Tutte le registrazioni SpiderSAS esclusa una (totale 109 registrazioni) sono risultate idonee all'analisi. Alla registrazione Holter, la maggior parte dei pazienti erano in ritmo sinusale (98%), con battiti prematuri ventricolari (66%) o sopraventricolari (91%), mentre due pazienti erano in fibrillazione atriale.
Alle registrazioni SAS, solo 3 pazienti erano negativi per OSAS, con Indice di Apnea e Ipopnea per ora (AHI <5), mentre 106 pazienti (97%) erano positivi per OSAS almeno di grado lieve, con AHI medio 24.2±14.5. Specificamente, 25 pazienti (23%) avevano OSAS di grado lieve (AHI 5-14), 49 pazienti (31%) OSAS di grado moderato (AHI 15-30), e ben 32 pazienti (25%) OSAS di grado severo (AHI >30).
L'indice medio di desaturazione ossiemoglobinica (ODI), dato dal numero di desaturazioni >=4% per ora di registrazione utile, era normale (ODI<5) in 21 pazienti (19%), lieve (ODI 5-14) in 31 pazienti (29%), moderato (ODI 15-30) in 31 pazienti (29%) e severo (ODI>30) in 25 pazienti (19%).
Tutti i pazienti con OSAS di grado lieve hanno ricevuto consigli per migliorare la qualità del sonno (calo ponderale, evitare la posizione supina), mentre i pazienti con OSAS moderata o severa sono stati indirizzati a un Centro di Medicina del Sonno per proseguire l'iter diagnostico e terapeutico.
In conclusione, tramite un semplice monitoraggio Holter poligrafico cardiorespiratorio con il nuovo sistema SpiderSAS, che permette di registrare in un solo dispositivo le apnee/ipopnee e la saturazione di ossigeno, oltre al tracciato ECG con analisi del ritmo e delle aritmie, è stato possibile evidenziare la presenza di OSAS di grado almeno lieve, e in molti casi moderato o severo, in una popolazione di pazienti con ipertensione arteriosa ed aritmie cardiache, con stomi suggestivi di OSAS, in cui tale problema non era mai stato indagato né tantomeno diagnosticato.

EP.04.12

COME OTTIMIZZARE L'EFFICACIA DELLA TERAPIA CCM: VALUTAZIONE MULTIPARAMETRICA E CASE REPORT

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Nel novembre 2021, abbiamo impiantato nella nostra U.O.C. un dispositivo di modulazione della contrattilità cardiaca (CCM) in un uomo di 66 anni con insufficienza cardiaca acuta congestizia (AHF) refrattario alla terapia medica ottimizzata e non responsivo alla CRT-D dal 2015. Il paziente è stato valutato più volte e dichiarato non idoneo per un nuovo cuore da diversi centri di trapianto di cuore. I trattamenti periodici con Levosimendan, prima dell'impianto, sono stati efficaci nell'alleviare la mancanza di respiro e gli altri sintomi associati allo SC acuto. Tuttavia, i ricoveri avvenivano ancora mensilmente ed era necessario l'uso quotidiano dell'Ossigeno terapia. L'esame ecocardiografico, il giorno dell'impianto, ha mostrato una frazione di eiezione ventricolare sinistra (LVEF) del 25%, PAPS di 30 mmHg, e E/E' di 26. L'interrogazione del CRT-D ha rivelato diversi episodi di Tachiaritmia, con un carico di FA del 35% e diversi episodi condotti ai ventricoli ad alta frequenza (130 bpm). I benefici della terapia CCM sono stati pressoché immediati con la scomparsa della dispnea, lo svezzamento dall'ossigeno terapia e l'assenza di ospedalizzazione e di visite cardiologiche urgenti per un arco di tempo di sette mesi. Solo nel giugno 2022 il paziente è stato ricoverato in Pronto Soccorso per riacutizzazione dello scompenso cardiaco. Al momento del ricovero la frequenza cardiaca era di 125 bpm ed effettuando il follow-up del dispositivo CCM, la percentuale di terapia erogata era piuttosto bassa (<20%) a causa dell'elevata frequenza cardiaca. L'interrogazione dell'ICD ha mostrato un ridotto AF Burden (19 %). Tuttavia, nelle due settimane precedenti il ricovero, sono stati registrati diversi episodi di tachicardia sopraventricolare organizzata (SVT) condotta 1:1, con una frequenza di circa 140 bpm, che hanno impedito al CCM di erogare qualsiasi impulso, nel periodo refrattario assoluto. Nella diagnostica HF implementata nell'ICD, abbiamo anche notato un'indicazione di sovraccarico di liquidi coerente con una forte riduzione dell'impedenza intratoracica nello stesso identico lasso di tempo. Di conseguenza, abbiamo deciso di aumentare il dosaggio dei beta-bloccanti per ridurre la frequenza cardiaca e consentire al dispositivo di CCM di raggiungere una percentuale superiore all'80% nell'arco delle 24 ore. Lo stato clinico del paziente è migliorato immediatamente nei giorni successivi. La diagnostica HF dell'ICD, dopo tre settimane dalla dimissione, ha evidenziato un aumento dell'impedenza intratoracica e una diminuzione dell'ipervolemia coerenti con il miglioramento della sintomatologia riferita dal paziente. Infine, l'esame ecocardiografico a 6 mesi dall'impianto ha mostrato un EF (Simpson biplana) di 32%, PAPS di 30 mmHg, ed E/E' di 12 che giustificavano una diminuzione del punteggio del Minnesota Living with Heart Failure Questionnaire (MLWHF) da 80 (prima del CCM) a 36 dopo l'impianto. Queste osservazioni suggeriscono quindi che durante il follow-up del paziente deve essere eseguita una valutazione multiparametrica dell'erogazione del CCM per massimizzare l'efficacia della terapia stessa.

EP.04.13

AMULET LEFT ATRIAL APPENDAGE CLOSURE FOR TREATMENT OF INCOMPLETE ATRICLIP CLOSURE

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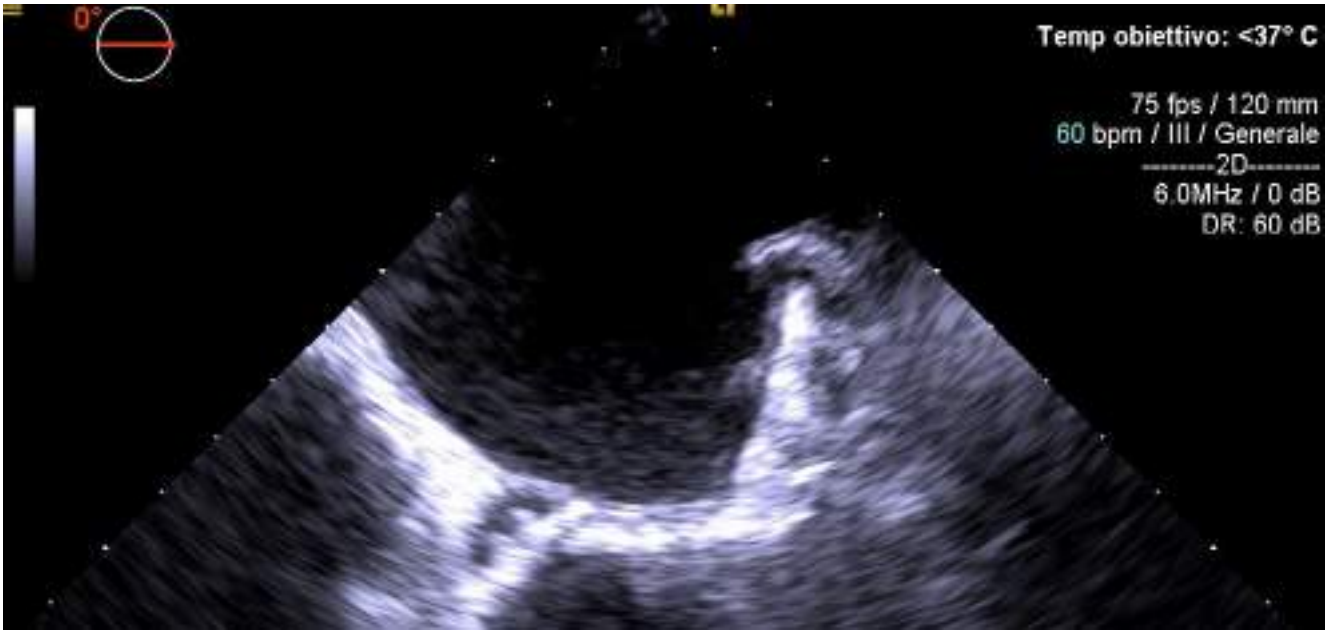
Left atrial appendage exclusion is a viable alternative to anticoagulation for stroke risk reduction in patients with atrial fibrillation and contraindications for long-term anticoagulant treatment.
The AtriClip device (AtriCure, Mason, OH) has emerged as a feasable and safe operative method to occlude the left atrial appendage (LAA) in patients undergoing cardiac surgery or as a stand-alone procedure. However, residual stump formation can occur after AtriClip use.
Previous reports demonstrated feasibility of Watchman device (Boston Scientific, Natick, Massa-chusetts) and Amplatzer PFO Occluder (Abbott, Santa Clara, California) use for a residual appen-dage stump after AtriClip. On our knowledge, there are no published reports of Amulet device (Abbott, Santa Clara, California) to treat incomplete LAA closure due to a malpositioned AtriClip.

A 73-year-old male with a past medical history of permanent atrial fibrillation, coronary artery bypass graft surgery, mitral and aortic valve replacement with a residual moderate mitral stenosis, and surgical ligation of his LAA with an AtriClip ligation clip 1 year prior, was hospitalized four times in a year for heart failure precipitated by multifactorial anemia. Multiple endoscopic investigastions were performed, without relevant findings. He was on anticoagulation with warfarin. His CHADS-VASc score was 4.
A transesophageal echocardiogram was performed to evaluate the possible worsening of the known mitral stenosis. The stenosis was confirmed to be moderate, but the presence of a residual nonoccluded stump of the appendage with a maximum ostium of 1.6 cm and depth of 1.8 cm was demonstrated. In the literature, a residual stump should be <10 mm to be considered a successful occlusion, even though the association between the depth of the residual stump and the risk of a cardioembolic event needs to be better established.
In consideration of the need to discontinue the oral anticoagulation, a left atrial appendage closu-re procedure with Amulet device was scheduled. Atrial appendage angiography confirmed the re-sidual, and a 22 mm Amulet device was successfully deployed. The procedure was uneventful and the patient was discharged on Clopidogrel 75 mg and Enoxaparin at a prophylactic dose, becouse of his high-bleading risk.
A transesophageal echocardiogram performed after 45 days demonstrated the absence of significant leaks or clots, so Enoxaparin was discontinuated.

In conclusion, surgical AtriClip device use has previously been shown to have a high success rate with regards to safe, complete, and durable LAA occlusion, but when the clip is placed too distally, a residual large stump or missed secondary lobe leads to incomplete LAA closure, hindering the device's role in stroke prevention. This is the first case of a Amulet device use to occlude the resi-dual stump after closure attempt with AtriClip: the procedure is feasible and safe in selected LAA anatomies and should be considered in high-bleeding risk patients with contraindications for long-term anticoagulant treatment. The device choice is fundamental, as well as the evaluation of residual nonoccluded stump. Amulet device's specific features (double disc and short internal part) were found to be the most appropriate in these particular situations, limiting the device exposition in left atrium.



EP.04.14

VALUTAZIONE ELETTROCARDIOGRAFICA E STUDIO HRV IN UN POOL DI MARATONETI: RISULTATI PRELIMINARI DI UNO STUDIO CASO-CONTROLLO

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La Heart Rate Variability (HRV) è un fenomeno fisiologico che consiste nella variazione dell'intervallo RR. Diversi studi hanno dimostrato l'importanza di questa metodica in numerose situazioni cliniche, oltre che per la valutazione dei pazienti che hanno ricevuto un intervento terapeutico di esercizio fisico.

L'obiettivo dello studio è fare chiarezza sulla relazione tra HRV e carico di allenamento aerobico in un pool di atleti con differente grado di allenamento.

Si vuole altresì indagare la presenza di differenze tra individui allenati (gruppo caso) e non (gruppo controllo).

I pazienti oggetto di studio sono stati selezionati tra le principali società podistiche romane.

La valutazione preliminare dei dati ottenuti include 79 individui: 42 atleti, appartenenti al gruppo caso e 37 non-atleti.

Ogni individuo è stato valutato tramite anamnesi cardiologica/sportiva e sottoposto ad ECG a 6 derivazioni della durata di 4 minuti, eseguito con dispositivo portatile KardiaMobile6L. I tracciati ECG sono stati analizzati mediante il software Kubios, al fine di ottenere parametri riguardanti l'HRV, tono simpatico e parasimpatico.

Lo stato di training è stato categorizzato per quantità di kilometri percorsi nel mese precedente la registrazione elettrocardiografica.

I due gruppi sono stati confrontati per le variabili: durata dell'intervallo PR, QRS, QT e QTc, PNS index, SNS index, RR medio, HR medio, HR minimo, HR massimo, SDNN, RNSSD, NN50, PNN50, picco e potenza nelle VLF, picco e potenza nelle LF, picco e potenza nelle HF, potenza totale e rapporto LF/HF.

I gruppi caso e controllo sono risultati comparabili per età, sesso e BMI.

L'ECG ha permesso di identificare 4 atleti con BAV di I grado, uno affetto da fibrillazione atriale asintomatica, 8 individui con EAS ed uno con EPS. Un paziente presentava extrasistoli sopraventricolari frequenti ed uno extrasistoli ventricolari monomorfe frequenti (>10/5min).

In tutti gli atleti si è riscontrata la presenza di aritmia sinusale respiratoria.

Tra i controlli sono stati identificati due casi di EAS.

Tra i parametri elettrocardiografici le caratteristiche ECG sono risultate comparabili tra i gruppi ($p>0,05$), ad eccezione dei valori del QT con $p<0,01$ e del QTc con $p=0,02$ (QT pari a 362,27 e 382,59 ms nei due gruppi, rispettivamente, QTc 392,25 e 403,98 ms, rispettivamente).

L'analisi dei parametri HRV ha mostrato valori dei picchi nelle HF pari a 0,25 e 0,19 Hz, rispettivamente nel gruppo caso e controllo ($p<0.01$).

Sono state effettuate delle comparazioni dividendo gli atleti in funzione della distanza percorsa nell'ultimo mese (cut-off: 100km), dell'età (cut-off: 50aa), del BMI (cut-off: 25 kg/m2) e del sesso.

I valori del QT sono risultati maggiori tra atleti che percorrevano >100km al mese (386,35 e 366,57 ms; $p<0,01$); nessun'altra differenza significativa è stata rilevata tra sottogruppi.

Dai dati preliminari si evince uno stato ipervagale negli atleti di endurance con un incremento dei parametri HRV che potrebbero correlarsi allo stato di training, e un aumento dei valori medi di QTc, indice di possibile rischio aritmico.

Ulteriori dati su una popolazione più ampia sono necessari per ottenere dei dati statisticamente rilevanti.

EP.04.15

AN ECG CHAMELEON FROM THE AV NODE

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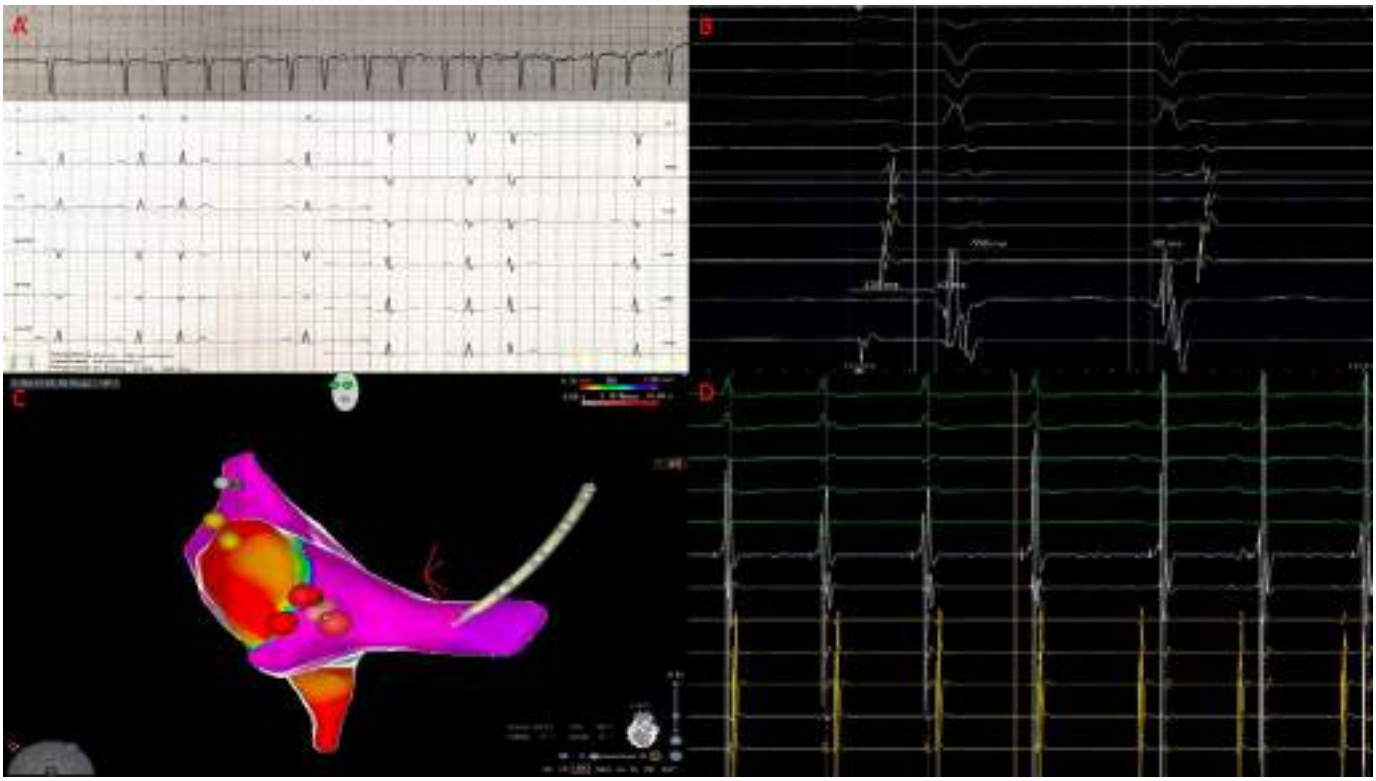
A 45-year-old female was referred to our center for a highly symptomatic paroxysmal atrial fibrillation. The patient was on bisoprolol and flecainide for a rhythm control strategy associated with anti-coagulation on the basis of her CHADSVASC score because of a probable transitory ischemic attack. A transthoracic echocardiogram (TTE) showed a normal biventricular function with mild-moderate mitral regurgitation and mild left atrial dilation. An ECG Holter strip where atrial fibrillation has been identified is reported in Figure A. However a careful evaluation of the ECG disclosed an irregular rhythm due to sinus rhythm conducted both with a 1:1 and 1:2 ratio rather than atrial fibrillation.
In the suspect of dual atrioventricular nodal non-reentrant tachycardia, the drugs therapy was discontinued, no pulmonary vein isolation but rather a electrophysiology study was scheduled.
At EPS the hissian catheter disclosed a dual AV conduction trough a fast (AH 129 msec) and 'super-slow' (AH 556 msec) pathway (Figure B). A programmed decremental atrial stimulation was not perform since a double AV pathway was already clinically manifest with a frequent ventricular 'double firing'. Moreover, the diagnosis of dual AV conduction was further defined by the documentation of a fixed interval between His and ventricular activation (HV 42 msec, Figure B).
The slow pathway ablation was carried out (Figure C), resulting in immediate cessation of the dual-response beat with loss of the H2V2 component (Figure D). A post ablation EP study did not induce any tachycardia.
Dual atrioventricular nodal non-reentrant tachycardia is a rare form of tachycardia characterized by a sinus beat that leads to consecutive double antegrade conduction via the fast and slow pathways, resulting in two ventricular depolarizations. This phenomen, also known as 'double fire', was demonstrated to mimic more common arrhythmias such as atrial premature beats, atrial fibrillation and ventricular tachycardia 1. This case highlights the clinical relevance of this "ECG chameleon from the AV node", that should always be accounted since mistaken differential diagnoses result in long-time therapeutic decisions leading to potentially severe consequences for the affected patients.



EP.04.16

THE TWIDDLER'S SYNDROME: A SIGN OF EFFECTIVENESS OF THE CCM THERAPY

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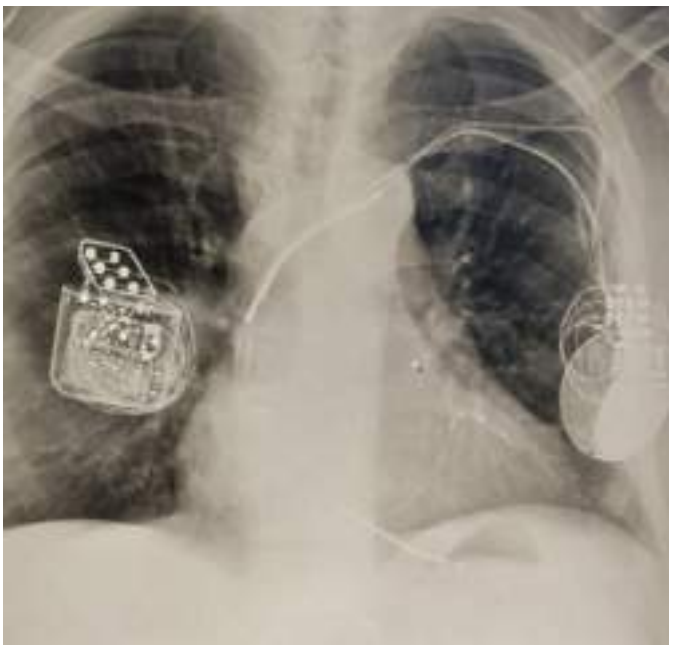
CCM therapy is part of non pharmacological therapy for patients affected with heart failure with reduced EF, symptomatic despite optimal medical therapy. Twiddler's syndrome is an infrequent and potentially letal cause of pacemaker malfunction. It was first described in 1968 by Bayliss, and it is mostly due to the patient's manipulation of a implanted device. Elderly age, pediatric age, obesity, female gender, psychiatric illness, cognitive dysfunction and the large pocket size relative to the device size are the risk factors for this condition I describe the case of a very obese 57-year-old male patient suffering from non-ischemic dilated cardiomyopathy, treated with optimal medical therapy and implantation of a CRT-D system. Furthermore, the patient underwent numerous ablations of TVS foci and sympathectomy. Despite maximal medical therapy and CRT-D implantation, the patient continued to be symptomatic because of decompensation symptoms.
In May 2022 the patient underwent to the implantation of a device for the CCM. After 3 weeks, the patient reported a marked improvement in symptoms, as evidenced by a reduction in the score on the Minnesota Living With Heart Failure Questionnaire, a reduction in NT-proBNP and an improvement of the total path to the 6MWT. After 5 weeks from the operation, the patient contacted the doctor reporting that, during the recharging of the device, he had noticed the appearance of a 'number with a dot' on the induction battery charger and that the device was not consuming battery since the total duration of the recharge was about 20 minutes. In addition, for about 8 days he noticed a worsening of symptoms, reported similar to the pre-implantation. With great surprise, no signal from both channels (LV / RV) was detected. Due to this finding, was deduced that, probably for about 8 days, the device, not detecting intrinsic ventricular activity, did not synchronize the R wave and therefore did not deliver the programmed therapy. Consequently, it was not consuming battery, so that the charging time was very short. Patient underwent a chest X-ray in order to check the position of the leads. The diagnosis was easy; the patient was hospitalized and underwent the reimplantation of the device. Fifteen days after reoperation, the patient noticed a reduction in dyspnea and an improvement in the quality of life,
Conclusions: This experience shows both the effectiveness and the safety of CCM therapy. The behavior of the device is worthy of mention, indeed. Not delivering therapy in the absence of both two valid ventricular signals, it demonstrates its absolute safety so that the very dangerous spike on T phenomenon is impossible to occur.



E-POSTER 5

VENERDI' 22 SETTEMBRE

AREA E-POSTER

08:30-09:30

SESSIONE E-POSTER 5
DEVICE 2

Moderatori: A. Mignano (Palermo), C. La Greca (Brescia)

EP.05.01
PERMANENT HIS BUNDLE PACING: DESCRIPTION AND COMPARISON OF FOUR IMPLANTATION TECHNIQUES

A. Dell'Aquila [1], A. Fundaliotis [1], M. Moretti [1], E. Cantù [1], G. D'Ardia [1], F. Filippelli [1], G. Arabia [2], A. Curnis [2], L. Bontempi [1]

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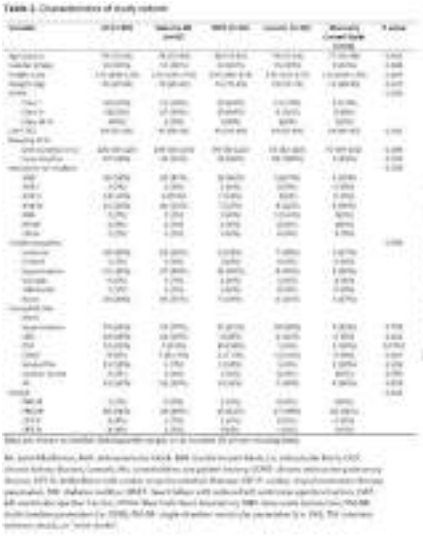
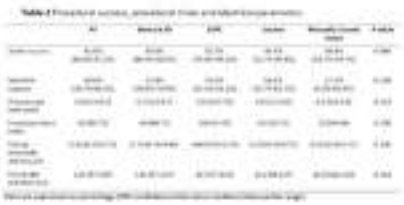
Introduction: Permanent His bundle pacing (HBP) is the most physiological pacing modality, and new implantation systems are now available. The aim of the present study was to describe and compare four different techniques to perform HBP.

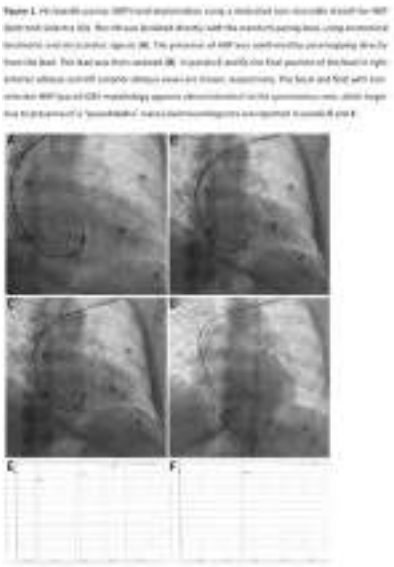
Methods: We included all consecutive patients who underwent a HBP attempt in our initial experience between June 2020 and May 2022. The success and characteristics of the procedure were compared among four implantation techniques: the Biotronik Selectra 3D sheath with Solia S60 lead (Selectra 3D), the Boston Scientific Site Selective Pacing Catheter with Ingevity lead (SSPC), the Abbott steerable stylet locator with Tendril lead (Locator), and the use of a standard stylet manually pre-shaped with a conventional pacing lead (Curved stylet).

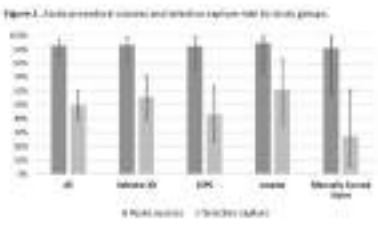
Results: Ninety-eight patients (median age 79 years [interquartile range, 73-83], 83% men) were identified. The Selectra 3D technique was used in 43 procedures, SSPC in 26, Locator in 18 and Curved stylet in 11. The groups had similar clinical characteristics. Overall, procedural success was achieved in 91 patients (93%) with similar proportions among groups (p=0.986). Fluoroscopy and procedural times were 6.0 (4.4-8.5) and 60 (45-75) minutes, respectively, without significant differences (p=0.333 and p=0.790). The rate of selective capture, the pacing threshold, and the paced QRS duration were also comparable. There was one pre-discharge HBP lead dislodgment (1%) that required implant revision.

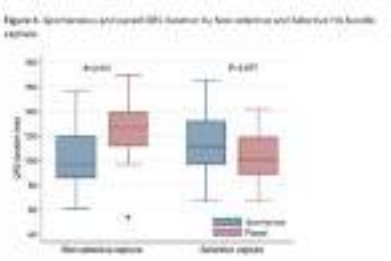
Conclusion: In our experience, four techniques for HBP achieved comparable results in terms of safety and effectiveness. The availability of different systems may lead to widespread use of physiological pacing.











EP.05.02

SCOMPENSO CARDIACO ACUTO DA FIBRILLAZIONE ATRIALE, TRATTATO CON ABLATE & PACING FISIOLOGICO

F. Deluca [1], L. Marcantoni [1], S. Valenza [1], G. Pastore [1], A. Follesa [2], E. Baracca [1], E. Manzato [1], M. Fornasaro [1], E. Cappato [1], C. Pigaiani [1], S. Marsiglia [1], F. Zanon [1]

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Presentiamo il caso di una paziente di 87 anni, ricoverata nella nostra UOC in marzo 2022. In anamnesi: pregressa paralisi di Bell, fibrillazione atriale parossistica, obesità. Pregressa reazione allergica ad amiodarone (ipotensione con eritema del volto). In terapia con Flecainide RP 200 mg, Dabigatran 110 mg BID sospeso autonomamente per epistassi.

La paziente accede in PS per dispnea ingravescente e cardiopalmo da tre giorni. Alla presentazione: PA 92/49 mmHg, FC 120 bpm, R-R 30/min. All'EO: cute fredda e sudata, non edemi declivi. Toni cardiaci tachiaritmici, in assenza di soffi di rilievo. Crepitazioni polmonari medio-basali bilateralmente. L'ECG mostrava fibrillazione atriale con elevata risposta ventricolare condotta con blocco di branca sinistra (QRS 200 ms). All'RX del torace segni di congestione del piccolo circolo e versamento pleurico destro. L'EGA in aria ambiente mostrava acidosi respiratoria con rialzo dei lattati (pH7,27 PaO2 55 mmHg, PaCO2 57 mmHg, SO2 87%, lac 2,9 mmol/mol, HCO3- 22 mmol/mol). Esami di laboratorio: Hb 10,2 g/dl, creatinina 1,9 mg/dl, eGFR 19 ml/min, azotemia 126 mg/dl, Na+ 133 mEq/L, K+ 5,7 mEq/L, NTproBNP 27350pg/mL, TnHS 38 ng/L. Veniva sospesa la flecainide, impostata terapia con noradrenalina titolata fino a 0,35 mcg/kg/min, furosemide fino a 40 mg/h.

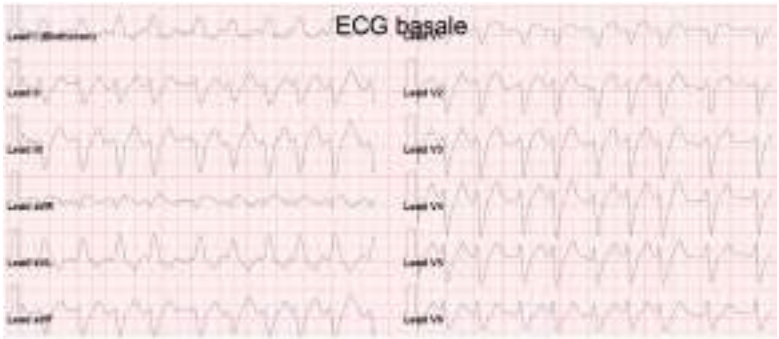
Per la mancata risposta alla terapia diuretica nonostante buona perfusione periferica veniva sottoposta a ultrafiltrazione lenta continua (SCUF). Si assisteva a una ripresa graduale della diuresi con decongestionamento facilitato anche dalla somministrazione di Levosimendan 0,1mcg/kg/min.

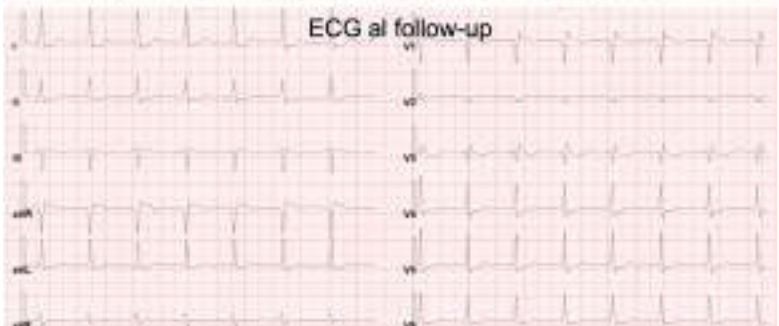
In decima giornata, svezzata da vasopressori, inotropi e furosemide IV, veniva titolata la terapia con bisoprololo fino a 10 mg/die e digossina 0,125 mg/die con persistenza di fibrillazione atriale con FC > 110 bpm a riposo e incremento importante da sforzo con associata dispnea.

Veniva pertanto proposta strategia di ablate and pace fisiologico. Da accesso venoso ascellare sinistra si posizionava elettrocatetere Medtronic 3830-59 cm con introduttore C315 in setto sottotricuspidalico con tecnica extrabeat-guided e ottenimento di stimolazione non selettiva della branca sinistra (LVAT 68 ms). In EGM endocavitario si visualizzava il potenziale di branca. Durante test di soglia, la transizione LBBP–LVSP con aumento del LVAT a 84 ms confermava la cattura del sistema di conduzione. Il QRS stimolato era 80 ms (QRS ingresso 200 ms). Nella medesima procedura veniva sottoposta ad ablazione TC-RF della giunzione AV. Si procedeva pertanto al posizionamento di elettrodo di back-up in setto interventricolare medio-distale. Connessione dell'elettrodo in LB su canale atriale, dell'elettrodo RV su canale ventricolare in PM bicamerale, programmato DDI con intervallo AV minimo. Decorso peri e post procedurale privo di complicanze con progressiva migliore tolleranza allo sforzo fisico della riabilitazione, che ha permesso la rapida dimissione a domicilio.

Il controllo a un mese dell'impianto mostrava buoni parametri elettrici con AP(LB) 99%. Clinicamente stabile anche al controllo dopo sei mesi dalla dimissione.

La stimolazione della branca sinistra è una tecnica sicura nella terapia delle bradiaritmie e dello scompenso cardiaco, applicabile anche in ottica di ablate and pace. Nel caso descritto, il pacing fisiologico ha garantito un QRS stretto (80 ms) in una paziente stimolata 99% dopo ablazione della giunzione A-V intraprocedurale.





EP.05.03

LEADLESS PACEMAKER IMPLANTATION IN THE EMERGENCY BRADYARRHYTHMIA SETTING: RESULTS FROM A MULTICENTER EUROPEAN REGISTRY (I-LEAPER)

M. Schiavone [1], A. Filtz [1], A. Gasperetti [1], G. Mitacchione [2], P. Palmisano [3], A. Breitenstein [4], G.B. Chierchia [5], E. Montemerlo [6], F. Tundo [7], D. Ruggiero [1], M. Moltrasio [7], M. Bertini [8], A. Dello Russo [9], E.C.L. Pisanò [10], P. Della Bella [11], G. Rovaris [6], M. Biffi [12], A. Curnis [2], C. Tondo [7], G.B. Forleo [1]

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[5] *Heart Rhythm Management Centre, Universitair Ziekenhuis Brussel, Brussel, SWITZERLAND*
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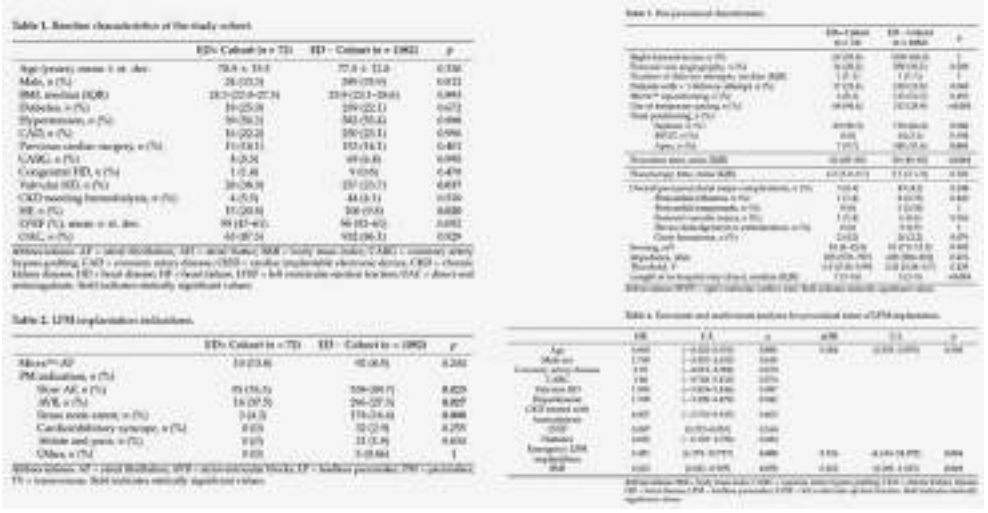
Background: Traditional transvenous pacemakers (TV-PMs) are a well-established therapy for the treatment of bradyarrhythmia, even in acute and emergency settings. However, data on leadless pacemaker (LPM) implantation in the same setting are currently lacking.

Objective: We aimed to investigate the feasibility of LPM implantation for emergency bradyarrhythmia, in patients referred for urgent PM implantation, in a large, multicenter, real-world cohort of LPM recipients.

Methods: Two cohorts of LPM patients, stratified according to the LPM implantation scenario (patients admitted from the emergency department (ED+) vs. elective patients (ED-)) were retrieved from the iLEAPER registry. The primary outcome of the study was a comparison of the peri-procedural complications between the groups. The rates of peri-procedural characteristics (overall procedural and fluoroscopic duration) were deemed secondary outcomes.

Results: A total of 1154 patients were enrolled in this project, with patients implanted due to an urgent bradyarrhythmia (ED+) representing 6.2% of the entire cohort (Table 1). In the ED+ cohort patients, the most common bradyarrhythmia leading to an LPM implantation was slow atrial fibrillation (AF) (76.3% for ED+ vs. 49.7% for ED-, p=0.025), while in the elective setting, the sinus node arrest rates (4.2% for ED+ vs. 16.4% for ED-, p=0.008) were higher (Table 2). Complete and AV blocks were more frequent in the ED+ cohort (37.5% vs. 27.3%, p=0.027). No differences in the underlying rate of cardioinhibitory syncope was found between the groups. The overall procedural times were longer in the ED+ cohort (60 (45–80) mins vs. 50 (40–65) mins, p<0.001), showing higher rates of temporary pacing (94.4% for ED+ vs. 28.9% for ED-, p<0.001). Emergency LPM implantation was not correlated with an increase in the rate of major complications compared to the control group (6.9% ED+ vs. 4.2% ED-, p=0.244), even in the elderly population (Table 3). The rates of septal (90.3% for ED+ vs. 66.4% for ED-, p=0.086) and right ventricular outflow tract (RVOT) positioning did not show statically significant differences between groups. At multivariate analysis (Table 4), only implanting the LPM due to urgent bradyarrhythmia (ED+ setting: OR 5.156, CI (4.610–24.872), p=0.004) and BMI remained significantly associated with longer procedural times.

Conclusion: LPM implantation is a feasible procedure for the treatment of severe bradyarrhythmia in an urgent setting. Urgent LPM implantation was not correlated with an increase in the rate of major complications compared to the control group, but it was associated with longer procedural times. Furthermore, although the procedure was performed in an emergency setting, the proper septal targeting of the LPM deployment, known to be associated with a narrower paced QRS, was not undervalued. Whenever appropriate for the underlying arrhythmias and the patient's baseline clinical characteristics, our results show that LPMs may represent a valuable alternative to TV-PMs whenever implanted in referral centers by experienced and qualified operators, even as an urgent treatment.



EP.05.04

LEFT BUNDLE BRANCH AREA PACING (LBBAP) AUTO THRESHOLD ALGORITHMS EVALUATION FOR CONDUCTION SYSTEM PACING: THE LATECS PILOT TRIAL

C. Ghiglieno [1], G. Dell'Era [1], A. Veroli [2], F. De Vecchi [1], M. Santagostino [1], S. Porcellini [1], G. Patti [2]
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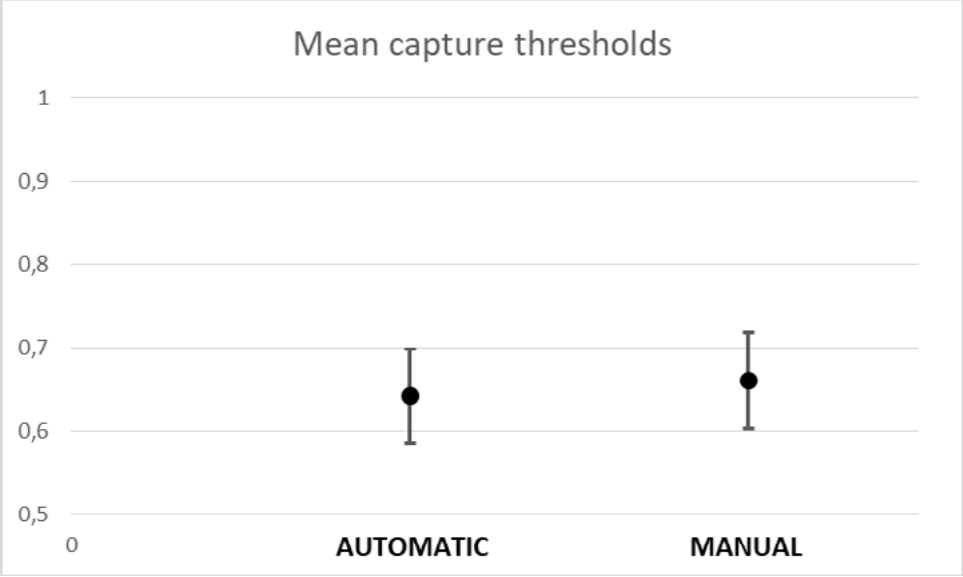
Background: Automated threshold measurements (ATM) and output adaptation improved safety and follow-up of cardiac implantable devices (CIED) in the last years. They were validated for conventional cardiac pacing; however, they were not usable in permanent His Pacing. Left bundle branch area pacing (LBBAP) is an emerging technique to obtain physiologic cardiac stimulation; we tried to assess if ATM may be applied to this setting.

Methods: Consecutive patients receiving ATM capable CIEDS and LBBAP in our hospital were enrolled in this prospective, observational trial; they were evaluated 3 months after implant, comparing pacing thresholds manually assessed and obtained via ATM. Subsequent remote follow-up was carried on when available.

Results: Forty-five patients (32 males) were enrolled. ATM for LBBA lead provided consistent results in all the patients and was therefore activated; mean value of manually obtained LBBAP capture threshold was 0,66 V (stdev 0,19V) vs ATM of 0,64V (stdev 0,19V). TOST analysis showed equivalence of the two measures (p=0,66). At subsequent follow-up (average: 7 months), ATM was effective in assessing pacing thresholds and no clinical adverse event was observed.

Conclusions: ATM algorithms proved equivalent to manual test in determining capture threshold, and were reliably employed, in patients receiving LBBAP CIED.



EP.05.05

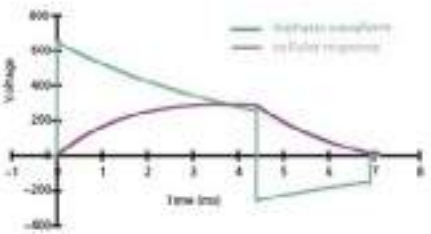
SUCCESSFUL DEFIBRILLATION THRESHOLD TESTING USING PROGRAMMABLE SHOCK DURATION OPTIMIZATION IN A PATIENT WHO RECEIVED INEFFECTIVE ICD THERAPY DURING VENTRICULAR TACHYCARDIA: A SINGLE CASE

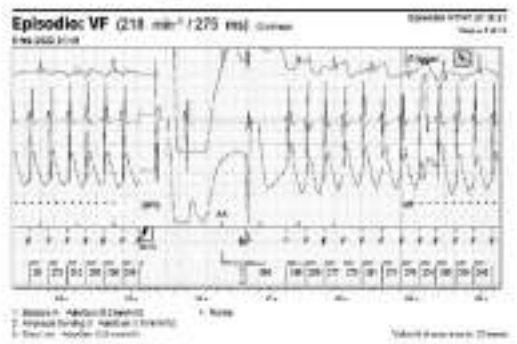
D. Gianfrancesco, P. Vitti, F. Bartolomucci
Ospedale Lorenzo Bonomo, Andria, ITALY

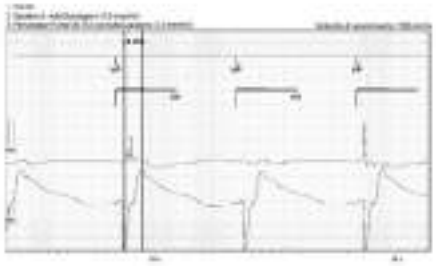
Introduction: Nowadays Defibrillation Threshold (DFT) testing as a routine step during Implantable Cardioverter Defibrillators (ICD) implant procedures has been abandoned and has led, in some cases, to manage ineffective shocks in patients turning out to have high DFT. The effectiveness of the defibrillation therapy is a function not only of the shock energy but also of its duration. This is a single case of a 61 years old man, implanted with a biventricular ICD in 2003 that received six ineffective shocks during an episode of Ventricular Tachycardia (218 ppm). A new DFT test was performed and we demonstrated the effectiveness of programming a fixed pulse width waveform rather than standard fixed tilt optimizing the duration with patient's intrinsic cellular response.

Case presentation: A 61 years old man, implanted with a biventricular ICD in 2003 received 6 shocks during an episode of Ventricular Tachycardia (218 ppm): all the shocks were ineffective, also at the maximum delivered energy of 40J. Fortunately, the arrhythmia self-extinguished and the patient was safe. The patient came to clinic and had his ICD reprogrammed and tested.
Defibrillation effectiveness is maximized when the shock brings the membrane potential to a maximum in the first phase and then returns the membrane potential near to zero in the second phase. Abbott's ICDs offer the possibility to reprogram shock waveforms to either Fixed Tilt or Fixed Pulse Width. When programmed to fixed pulse width, the shock will be delivered over the programmed time regardless of voltage drop. In this case we reprogrammed the patient's ICD from fixed tilt to fixed pulse width. The optimal pulse duration needs to be calculated as it is a function of HV lead impedance, device capacitance and the cell membrane time constant which is a value which can be evaluated following the following procedure. The membrane time constant represents how rapidly energy moves within the patient's cardiac tissue. We derived the time constant delivering a pacing train to the Right Ventricle and measuring the time a spike takes to travel to the Right Ventricle lead coil. Specifically, we measured the time from the deepest negative deflection to the next highest positive deflection of the second to last paced complex, which was, for this case,72 ms. This value must be compared with the following scheme which classifies patient's depolarization times into three classes:
1) t< 75 ms TYPICAL
2)t<40 ms FASTER
3) t>75 ms SLOWER
The Kroll's table is a summary of suggested pulse duration to be programmed for each phase of a shock (P1 and P2) waveform upon patient's HV impedance and time constant.
The patient was induced a VF with a DC fibber and the first shock was effective with only 26.7 J and a fixed pulse width of 5.5 ms and 3.0 ms for the two phases.

Conclusions: We believe that the possibility to reprogram shock waveforms from fixed tilt to fixed pulse width can be an effective, non-invasive and time saving procedure to be used when managing high defibrillation thresholds.







EP.05.06

RIMOZIONE DELLA VITE DI FISSAGGIO DI UN PACEMAKER TRAMITE L'UTILIZZO DI UN TRAPANO ORTOPEDICO DURANTE UNA PROCEDURA DI SOSTITUZIONE E RECUPERO SENZA DANNEGGIAMENTO DELL'ELETTROCATETERE

M.R. Gualtieri [1], D. Melissano [1], A. Marzo [1], F. Tridici [2], L. D'Asaro [1], T. Indraccolo [1]
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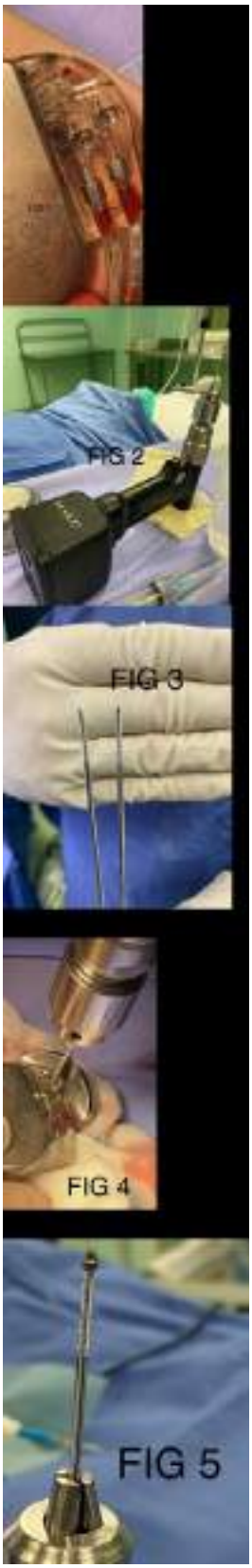
[2] *Abbott, ITALY*

Introduzione: Presentiamo il caso clinico di una donna di 80 anni con storia di blocco atrio-ventricolare totale, impiantata nel gennaio 2020 con pacemaker bicamerale ABBOTT (mod. Assurity 2272) e cateteri atrio/ventricolare a fissazione passiva ABBOTT (mod. Isoflex 1944-52 e Isoflex 1948-58).
A luglio 2022 ABBOTT ha pubblicato una nota tecnica relativa alle prestazioni della batteria in una ridotta percentuale di dispositivi cardiaci impiantati. Nello specifico, ABBOTT ha informato in merito ad un possibile malfunzionamento del dispositivo, che potrebbe interessare un sottoinsieme specifico di numeri di serie dei pacemaker Assurity TM ed Endurity TM. L'impatto clinico segnalato includeva perdita della stimolazione, durata della batteria ridotta, riprogrammazione del dispositivo in modalità di back-up e/o perdita della telemetria/comunicazione. Tra le raccomandazioni della casa produttrice, per la gestione del paziente veniva riportata: "Valutare una terapia personalizzata arrivando a considerare anche la sostituzione del generatore per i pazienti ad alto rischio in caso di interruzione del funzionamento del pacemaker."
In considerazione di quanto riportato dalla nota tecnica e della valutazione del rischio per la paziente portatrice di pacemaker sottoposto a richiamo, si poneva l'indicazione a sostituzione del generatore.

Descrizione: Durante la procedura per la sostituzione del dispositivo è stato fatto emergere il ritmo spontaneo della paziente con infusione di Isoprenalina Cloridrato Monico. Tramite apposita chiave dinamometrica è stato svitato e scollegato l'elettrocatetere atriale dalla testa del PM, senza la possibilità di scollegare il catetere ventricolare per arrotondamento della scanalatura esagonale della vite di fissaggio (fig. 1); il danneggiamento della vite è stato probabilmente causato durante la procedura d'impianto.

Metodo: Dopo vari tentativi di rimozione della vite di fissaggio del PM con metodi tradizionali, abbiamo deciso l'utilizzo di un trapano ortopedico mod. Hall Power Drill con filo guida per viti cannulate da 4.0mm diametro 1,25 da 16cm (fig.2-3). Il trapano è stato utilizzato in modalità Reverse antiorario, con il filo guida posizionato all'interno della cavità della vite(fig.4), la completa rimozione della vite è stata ottenuta dopo 40 secondi (Fig.5).

Conclusioni: La procedura di sostituzione PM è stata portata a termine senza nessun rischio per la paziente. Tutti i test elettrici sugli elettrocateteri sono risultati nella norma e sovrapponibili ai test pre-procedura. L'utilizzo di questa tecnica è risultata risolutiva e ha scongiurato procedure aggiuntive più invasive come l'aggiunta di un ulteriore elettrocatetere o l'estrazione.



EP.05.07

EFFETTI BENEFICI DELLA STIMOLAZIONE AD ALTA USCITA DEL FASCIO DI HIS IN PAZIENTI CON INSUFFICIENZA CARDIACA E QRS STRETTO

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La terapia di risincronizzazione cardiaca (CRT) riduce i ricoveri e la mortalità per insufficienza cardiaca (HF) e aumenta la frazione di eiezione ventricolare sinistra (EF) nei pazienti con cardiomiopatia dilatativa, blocco di branca sinistra e QRS>130msec. Tuttavia, la CRT non è utile nei pazienti HF con QRS stretto.
Obiettivo: Abbiamo eseguito stimolazione del fascio di His (HBP) con output elevato (3,5 V / 1 msec) in pazienti HF con cardiomiopatia dilatativa o ischemica e QRS stretto per valutare il beneficio emodinamico indipendentemente dalla durata del QRS o dall'accorciamento del ritardo AV.
Metodi: 10 pazienti maschi con cardiomiopatia dilatativa (7 pazienti) o ischemica (3 pazienti) (EF<35%) e QRS stretto (<110ms) sono stati indirizzati per l'impianto di un defibrillatore. Abbiamo impiantato un defibrillatore "biventricolare" con HBP e abbiamo raccolto dati clinici, ecocardiografici ed elettrocardiografici.
Risultati: Abbiamo ottenuto HBP in tutti i 10 pazienti con successo. L'EF basale media è stata del 30±4% ed è aumentata al 42±6% (P<0,001) dopo un follow-up mediano di 100 giorni. Il diametro telediastolico ventricolare sinistro e il volume telediastolico ventricolare sinistro sono diminuiti rispettivamente da 63±5 a 60±7 ml (P=0,004) e da 188 ±78 a 143 ±38 ml (P= 0,029). Il volume telesistolico ventricolare sinistro è diminuito da 136±69 a 84±31 (P = 0,009). La classe NYHA è diminuita di una classe in ogni paziente dopo solo un mese. La durata del QRS basale è rimasta stabile dopo il pacing da 107±7 a 118 ±15. In un paziente è stato creato un blocco di branca destra iatrogeno che è stato parzialmente corretto dalla stimolazione del fascio di His. L'intervallo PQ dopo l'impianto era più corto (da 167 ±23 a 121 ±14 (P=0,030) affinché si potesse stimolare il ventricolo. La soglia HBP era 1.24V ±0.50/1msec, l'impedenza era di 529±116 Ohm mentre l'onda R era di 3.81±7mV. In un solo paziente dei 10, la soglia è aumentata da 1 a 2V/1msec in 6 mesi e poi è rimasta stabile. Negli altri nove pazienti, la soglia è rimasta stabile.
Conclusioni: HBP in pazienti HF con cardiomiopatia dilatativa o ischemica e QRS stretto migliora la funzione emodinamica e diminuisce la classe NYHA. Questo beneficio sembra essere prodotto da una maggiore intensità di stimolazione. Abbiamo escluso che un ritardo AV molto breve potrebbe essere favorevole, ottenendo i cambiamenti EF acuti solo dopo l'aumento dell'output di stimolazione e senza modificare il ritardo AV. A nostra conoscenza, questi sono i primi casi di HBP benefico nei pazienti HF con QRS stretto. Abbiamo già iniziato uno studio randomizzato per ottenere una risposta clinica definitiva.

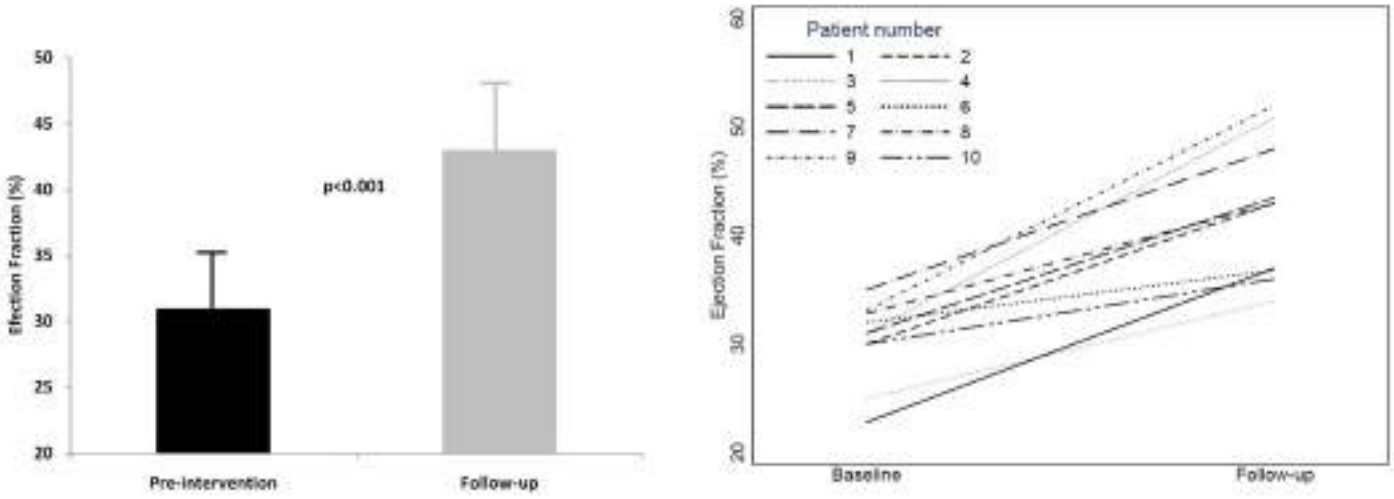

Fig: EF increase in all 10 patients after high output HBP p<0.001

EP.05.08

A CASE SERIES OF UNANTICIPATED SUBCUTANEOUS ICD PREMATURE BATTERY DEPLETION IN A SINGLE-CENTRE EXPERIENCE

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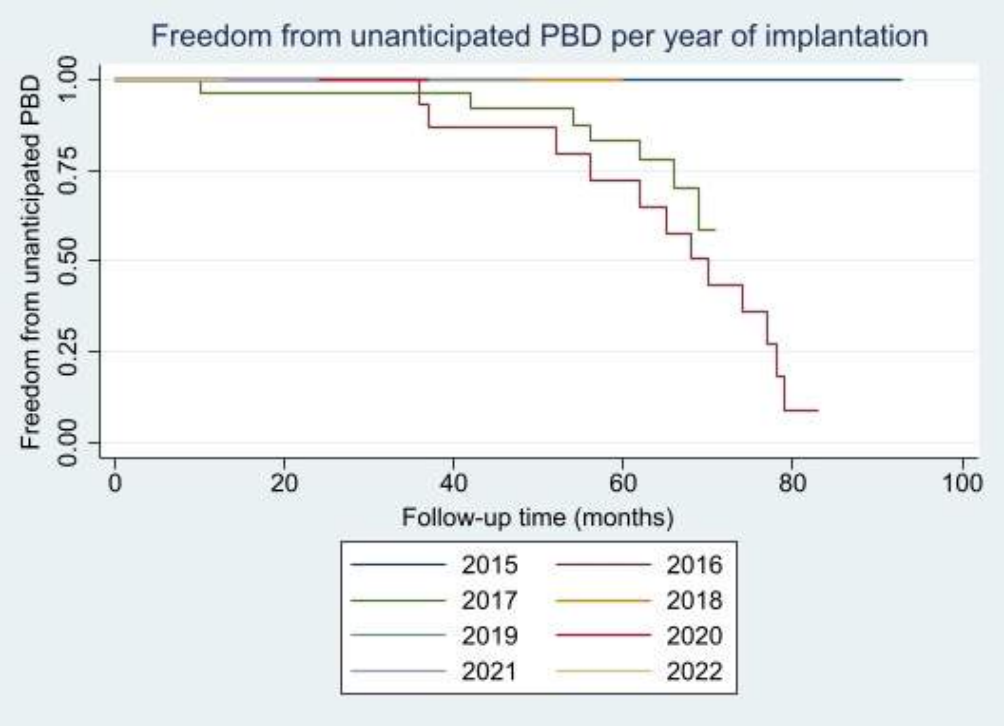
Background: Subcutaneous ICDs (S-ICD) are a valuable option in sudden cardiac death prevention. The main advantage over conventional transvenous ICDs is the absence of intravascular hardware for patients without the need for cardiac stimulation, resynchronization therapy or anti-tachycardia pacing. The claim of reduced lead-related complications has on the contrary been challenged by recent warnings of unexpected lead fracture. Moreover, concerns related to premature battery depletion (PBD) leading to unanticipated device replacement are increasing.

Purpose: To evaluate retrospectively the incidence of unanticipated S-ICD premature battery depletion in a single-centre experience.

Method: 168 consecutive patients implanted with S-ICD from February 2015 to November 2022 in our tertiary cardiology centre were included in this study. 4 patients moved to other sites and were thus lost to follow-up, leaving a total of 164 patients. PBD was defined as the occurrence of battery depletion requiring generator replacement earlier than 60 months post-implantation in the absence of therapy being delivered, or as a result of manufacturer recommendations.

Results: Most patients were implanted for primary prevention (101 patients, 60%). The main aetiology was hypertrophic cardiomyopathy (47 patients, 28%), followed by arrhythmogenic (35, 21%) and dilated idiopathic cardiomyopathy (24, 14%). Mean age and left ventricular ejection fraction at baseline were 46±18yrs and 51±16%, respectively.
Over a total follow up period of 44±25 months, at 58±17 months following implantation 19 (11,6%) patients needed early replacement due to PBD, while 2 (1.2%) patients had lead fracture after respectively 41 and 26 months, for a total of 12,8% of patients with system-related complications. In addition to those patients requiring early replacement due to PBD or lead fracture, two underwent S-ICD extraction due to infection. Analysis of freedom from unanticipated PBD for individual years of implantation showed higher rates in years 2016 and 2017, with 67% and 27% of all implanted patients, respectively (Figure 1).

Conclusions: In this study, the incidence of PBDs appear to be higher than reported in literature though confined to a limited device series. However, if on the contrary the trend should remain remarkably high, that would not only endanger patients health due to repeated replacements, but also pose a huge economic burden to health systems.



EP.05.09

DO THE BEST WITH LESS: FIRST IN THE WORLD EXPERIENCE IN CONDUCTION SYSTEM PACING WITH BACK-UP LEAD, AUTOCAPTURE AND OPTIMIZED STIMULATION...WITH JUST TWO LEADS!

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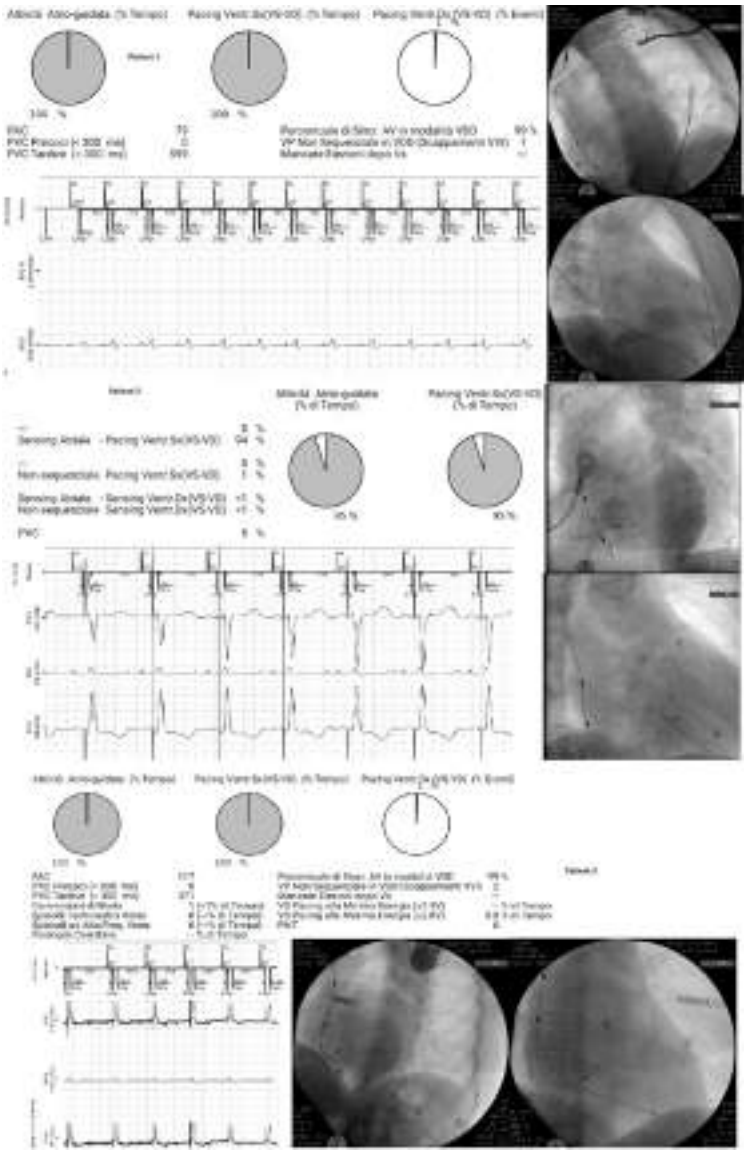
Background: Conduction system pacing (CSP) is consistently emerging as the most physiological cardiac stimulation. Main issues (exspecially with His bundle Pacing) are: need of a RV back-up lead (guidelines recommendations) with need for a three leads-system in sinus rhythm; inefficacy of autocapture algorithms based on evoked potentials for CSP lead and absence of algorithms to spare unnecessary RV pacing after CSP capture.

Objective: We aim to show feasibility of treating patient with AV conduction disease by implanting a two leads newly produced VDD pacing system with specific algorithm to determine CSP Pacing Threshold by variations inTrans Valvular Impedence (TVI - due to geometric and structural modification during cardiac cicle) and in theend programmed to retain RV pacing in case of RV sensed event provoked by ventricular activation by CSP lead.

Methods: We implanted 4 patients (3 women 1 man, mean age 73 yo, EF > 50%) with normal sinus node function and AV conduction disease (2 with 2nd degree AV block, 1 with paroxysmal 2:1 AV block and RBBB and 1 with 3rd degree AV block) with a dedicated CRT-P device, connected to a VDD passive fixation lead and a CSP exposed screw lead (2 on His bundle and 2 on proximal LBBA). Devices were programmed without RV pacing in case of sensed event from 20 (to avoid crosstalk) to 120 msec after CSP. CSP automatic threshold based on TVI measure was activated. Follow-up was performed one day, one week and one month after implantation.



Results: Mean fluoroscopic time was 8,5 minutes. CSP thresholds at implantation were respectively 2.5V@1,0 msec and 0,4V@1,0 msec for His Bundle and 0,7V@0,43 msec and 0,2V@0,43 msec for proximal LBBA. No acute or late complications at one month follow-up. Sequential ventricular pacing was respectively 95 (5% of PVC), 99, 99 and 100% with > 99% of sparing of RV pacing. In all three cases CSP threshold was effectively automatically detected (stable at one month) and output programmed +0.6V above threshold. In these conditions, mean exstimated device life was 8 ,5 years (from 7.1 to 10 years).

Conclusion: Perform CSP with two leads and a dedicated device is a feasible and efficient solution to treat AV conduction diseases. It preserves AV sinchrony and ventricular physiological activation; minimizes hardware and optimizes energy drainage (automatically regulating CSP ouput and avoiding RV unnecessary pacing).
Last, but not least, the variation in TransValvular impedence could let the device to effectively identify different kind of CSP capture and transitions among them. We are increasing our study population to confirm these results.

EP.05.10

NON C'È DUE SENZA TRE: UNO SFORTUNATO CASO DI PNEUMOTORACE E PERFORAZIONE CARDIACA

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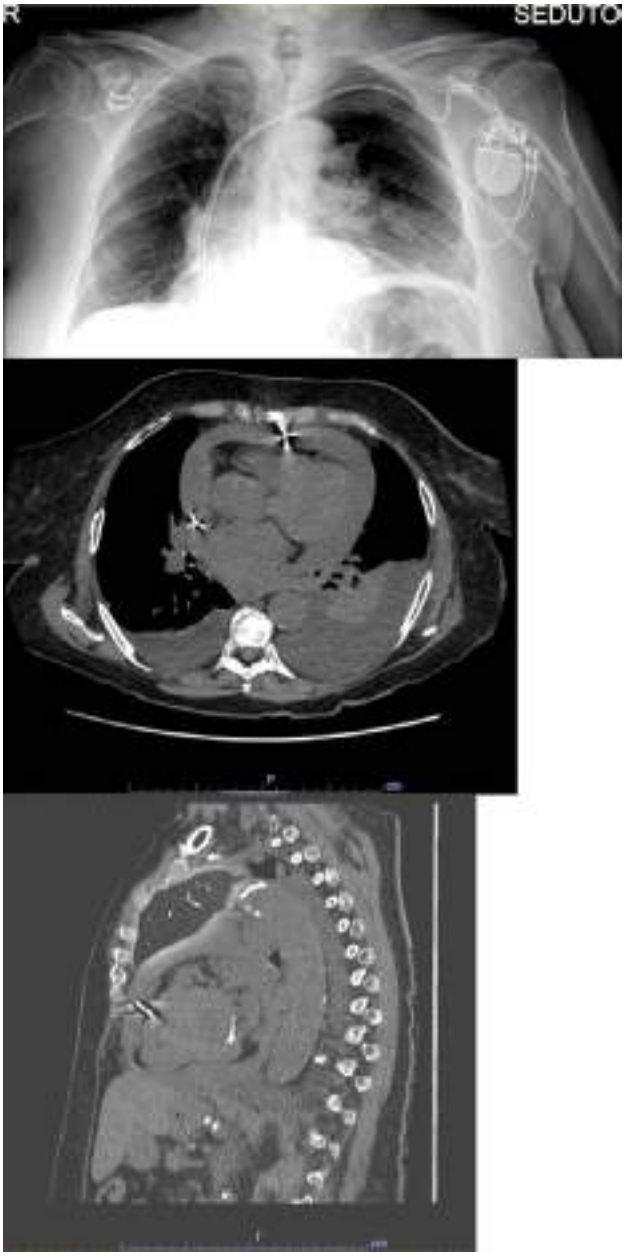
Background: l'impianto di pacemaker è una procedura ormai routinaria sebbene non scevra da complicanze, sebbene rarissime, alcune delle quali mortali.

Case report: donna, 84 anni, con cardiopatia ipertensiva e fibrillazione atriale in terapia anticoagulante (dabigatran), veniva sottoposta a impianto di PM (29.09.22) per malattia del nodo del seno in seguito ad episodio sincopale. Il giorno successivo all'impianto veniva eseguito RX torace che mostrava un PNX apicale sinistro senza iniziale indicazione chirurgica (fig1).In seguito al peggioramento delle condizioni cliniche per la comparsa di dispnea, desaturazione e dolore all'emitorace sx, veniva eseguita TC torace (03.10.22) con riscontro di idropneumotorace massivo per cui veniva posizionato drenaggio toracico. Ripetuta la TC toracica di controllo dopo 5 giorni (09.10.2022) mostrava quasi completo riassorbimento del PNX ma documentava abbondante falda di versamento pericardico circonferenziale (3 cm) "meritevole di rivalutazione specialistica cardiologica"; nel frattempo la paziente si manteneva emodinamicamente stabile.Al controllo ecocardiografico: presenza di versamento pericardico (15 mm). In seguito alla rivalutazione delle immagini TC da parte del Cardiologo, nel sospetto di perforazione miocardica, veniva centralizzata la Paziente d'urgenza in Cardiochirurgia. All'eco-transesofageo evidenza di falda di versamento pericardico (19 mm) con iniziali segni di impatto emodinamico e visualizzazione dell'elettrocatetere sporgente nel sacco pericardico di 15mm. La paziente veniva sottoposta (11.10.22) in sala operatoria ibrida aritmologica e cardiochirurgica ad intervento di estrazione dell'elettrocatetere ventricolare in sternotomia mediana e reimpianto epicardico.



Conclusioni: La perforazione cardiaca e il PNX sono due complicanze gravi ma rare dell'impianto PM con una incidenza rispettivamente di 0,1% e 1%, ma solo aneddoticamente descritte insieme in letteratura. L'iniziale riscontro del PNX a cui era stata attribuita la sintomatologia è stato un fattore confondente che ha ritardato la diagnosi della perforazione miocardica. La non disponibilità di un programmatore per l'interrogazione del device non ha permesso di documentare precocemente l'alterazione dei parametri elettrici. Nella prima TC del 03.10 non erano segnalati versamento pericardico né perforazione miocardica, ma da una analisi retrospettiva le immagini erano già suggestive mentre non lasciano dubbi nel secondo esame radiologico (fig 2; 3)

EP.05.11

LEADLESS PACEMAKER IMPLANTATION FOLLOWING TRANSVENOUS LEAD EXTRACTION: DATA FROM THE I-LEAPER REGISTRY

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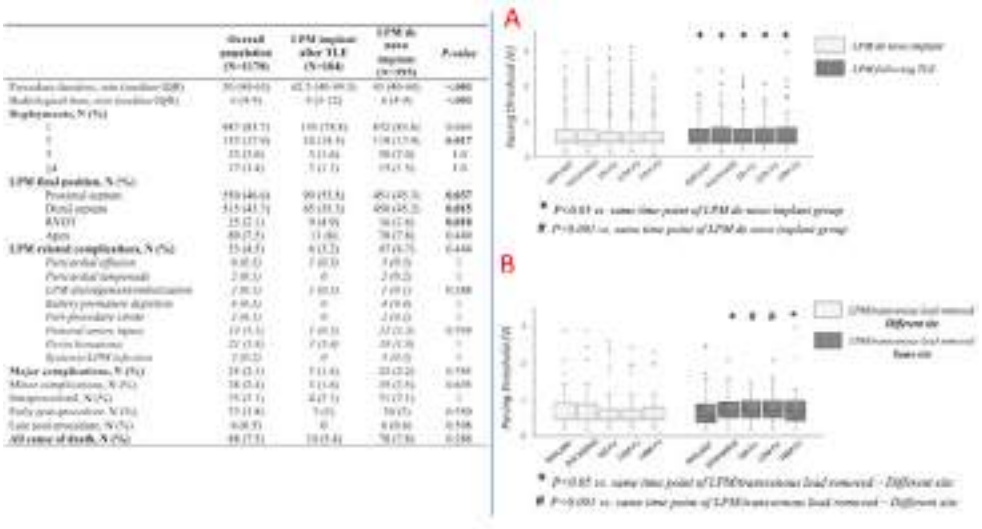
Background: transvenous (TV) pacemakers are negatively associated with local and systemic device-related infections, often requiring transvenous lead extraction (TLE). Moreover, patients reimplanted with a TV device after TLE, exhibit substantial mortality (10%-24.2%) and reinfection rates (3.9%-13.5%) at one year follow-up. In this setting, leadless pacemakers (LPMs) are appealing as a first-choice for TLE patients requiring a pacemaker reimplantation. To date, limited data on real-world safety and efficacy of LPMs in patients who underwent TLE are available.

Purpose: The present study aims to assess long-term safety and efficacy of LPMs implantation in patients who previously underwent TLE of a transvenous pacemaker, compared with LPM de novo implantation.

Methods: consecutive patients who underwent LPM implantation in 12 centers joining the International LEAdless PacemakEr (i-LEAPER) registry were enrolled. Patients receiving LPM following TLE (n=184) were compared with patients implanted with a LPM as first device choice, not experienced TLE (n=995). The primary endpoint was LPM-related major complications rate at implant and during follow-up (FU). Additionally, differences in electrical performance were assessed between the two groups.

Results: 1179 patients were enrolled in this study and followed for a median of 33 [IQR 24-47] months. Clinical characteristic were balanced between groups, apart from a higher prevalence of heart failure in recipients of LPM following TLE (16.8% vs 9.4%, p=0.013) and a lower left ventricular ejection fraction (55% [IQR50%-60%] vs 57% [IQR 52%-61%], p<.001). LPM related major complications and all-cause mortality did not differ among the two groups (1.6% TLE group vs. 2.2% de novo group, p=0.785, and 5.4% TLE group vs. 7.8% de novo group, p=0.288, respectively) (Table).
Pacing threshold (PT) resulted higher in the TLE group throughout the FU (Figure-panel A).
Higher PTs were recorded in LPMs implanted at same location from where the previous transvenous lead was removed, as far as 24-months postimplant (Figure-panel B), with a higher proportion of patients with high PT (>1 to 2V @0.24ms) in the first group at implant, 1-month, and 12-month FU.

Conclusion: In this real-world registry, LPMs showed a satisfactory safety and efficacy profile after TLE. In the post-TLE cohort, better electrical parameters were obtained when LPMs were implanted at a different location from where the previous transvenous lead was extracted.



EP.05.12

LEFT BUNDLE BRANCH PACING VS. BIVENTRICULAR PACING FOR CARDIAC RESYNCHRONIZATION THERAPY: A DATA META-ANALYSIS

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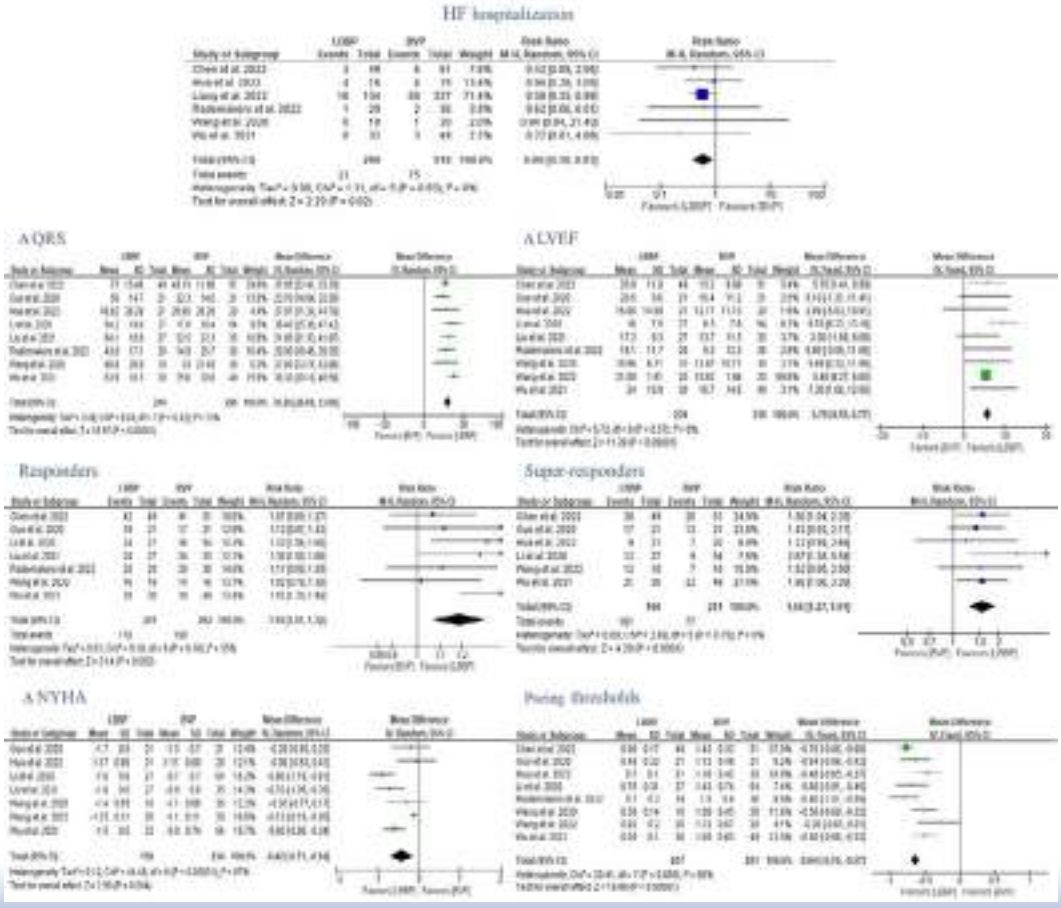
Introduction: Cardiac resynchronization therapy (CRT) reduces heart failure (HF) hospitalization and all-cause mortality in HF patients with left bundle branch block (LBBB). Biventricular pacing (BVP) is the gold standard for achieving CRT, but about 30-40% of patients do not respond to BVP-CRT. Recent studies showed that left bundle branch pacing (LBBP) provided remarkable results in CRT. A randomized trial showed that LBBP compared with BVP provides an increase in LVEF of about 6%. Despite this, no statistically significant difference was found in the improvement of New York Heart Association (NYHA) class and in the number of responder patients. Furthermore, because the follow-up was only 6 months, no clinical events occurred.
Instead, several observational studies showed improvement in NYHA class, QRS duration (QRSd) and in responder and super-responder patients. In addition, a recent retrospective study was unable to demonstrate an increase in hospitalizations of LBBP-CRT patients compared with BVP-CRT patients.
Therefore, still considering the lack of strong evidence in favour of LBBP-CRT, we conducted a meta-analysis aiming to compare LBBP-CRT versus BVP-CRT in HF patients.

Methods: We systematically searched the electronic databases for studies published from inception to 29th December 2022 and focusing on LBBP-CRT versus BVP-CRT in HF patients. The primary endpoint was HF hospitalization. The effect size was estimated using a random-effect model as Risk Ratio (RR) and mean difference (MD).

Results: Ten studies enrolling 1063 patients met the inclusion criteria. Compared to BVP-CRT, LBBP-CRT led to significant reduction in HF hospitalization [7.9%vs.14.5%; RR: 0.60 (95%CI: 0.39–0.93); p=0.02], QRSd [MD: 30.26 ms (95%CI: 26.68–33.84); p<0.00001] and pacing threshold [MD: -0.64 (95%CI: -0.70 – -0.57); p<0.00001] at follow up. Furthermore, LBBP-CRT improved LVEF [MD: 5.78% (95%CI: 4.78–6.77); p<0.00001], the rate of responder [88.5%vs.72.5%; RR: 1.19 (95%CI: 1.07–1.32); p=0.002] and super-responder [60.8%vs.36.5%; RR: 1.56 (95%CI: 1.27–1.91); p<0.0001] patients and the NYHA class [MD: -0.42 (95%CI: -0.71 – -0.14); p<0.00001] compared to BVP-CRT.

Conclusion: In HF patients, LBBP-CRT was superior to BVP-CRT in reducing HF hospitalization. Further significant benefits occurred within the LBBP-CRT group in terms of QRSd, LVEF, pacing thresholds, NYHA class and the rate of responder and super-responder patients.



EP.05.13

CIED-RELATED ENDOCARDITIS AND LEFT-SIDED HEART VEGETATION: A COMBINED APPROACH BETWEEN TRANSVENOUS LEAD EXTRACTION AND TRANSAPICAL ANGIOVAC

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A 58-year old male, smoker and diabetic , had a non-ischemic cardiomyopathy with severe left ventricular dysfunction. Because of complete left bundle branch block, a CRT-D device was implanted in 2011. Ten years later, he presented weakness and fever of indeterminate cause for a month so was admitted on our Department. The transtoracic ecochardiography revealed mitral and tricuspid valve vegetations, with subspicion of atrial lead endocarditis. The blood cultures, in fact, resulted positive for Streptococcus sanguinis. The patient was started on Ciprofloxacin and Vancomicin. Therefore, the transesophageal echocardiogram confirmed mitral, tricuspidalic and CIED-related endocarditis. The angio-CT documented spleen and right kidney embolization and, as collateral finding, showed a malignant rectal mass. After a multidisciplinary evaluation, we planned an AngioVAC tailored system configuration. We used a micro-invasive transapical access on beating heart and, finally , the AngioVAC system has proven effective in aspiration of vegetation. After vegetation debulking on left-sided heart, he was submitted to transvenous lead extraction using bidirectional rotational mechanical sheaths. Furthermore, an epicardial lead was implanted on postero-lateral left ventricle wall in order to achieve cardiac resincronization. No complications was seen, obtaining a complete procedural success. After two weeks, a right-sided implantation of transvenous ICD was performed.

Conclusion: The AngioVAC system is a useful tool for aspiration of intravascular and intracardiac masses. Moreover, a transapical micro-invasive approach represents a novel approach to avoid cardioplegic arrest and bleeding risk due to full heparinization. This case highlights the role of multidisciplinary collaboration in order to improve patient outcome. The management of CIED-related endocarditis represents a challenge for endocarditis team, balancing need for surgery, timing of intervention and continuation of antibiotic treatment.

EP.05.14

OUTCOMES OF TRANSVENOUS LEAD EXTRACTION IN OCTOGENARIANS USING BIDIRECTIONAL ROTATIONAL MECHANICAL SHEATHS

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Background: Outcomes of transvenous lead extraction (TLE) are well reported in the general population, However, data on safety, efficacy of TLE in octogenarians with a long lead dwell time, using powered extraction tools are limited.The aim of this multicenter study was to evaluate the safety, effectiveness of TLE in octogenarians using the bidirectional rotational mechanical sheaths and mid-term outcome after TLE.

Methods: The study population comprised 83 patients [78% male; mean age 85±3 years; (range 80–94 years)] with 181 target leads. All the leads (mean implant duration 112±77 months [range 12–377) were extracted exclusively using the Evolution RL sheaths (Cook Medical,Bloomington,IN,USA).

Results: the main indication for TLE was infection in 84.3% of cases. Complete procedural success rate, clinical success rate, per lead were 93.9% and 98.3% respectively. Failure of lead extraction was seen in 1.7% of leads.The additional use of a snare was required in 8.4% of patients. Major complications occurred in one patient (1.2%). Thirty-day mortality after TLE was 6%. During a mean time follow-up of 22±21 months, 24 patients (29%) died. No procedure-related mortality occurred. Predictors of mortality included ischemic cardiomyopathy (HR 4.35;95%CI 1.87-10.13;P=0.001), LVEF < 35% (HR 7.89;95%CI 3.20-19.48;P<0.001), and TLE for systemic infection (HR 4.24;95%CI 1.69-10.66;P=0.002).

Conclusions: At experienced centers bidirectional rotational mechanical sheaths combined with different mechanical tools and femoral approach allows reasonable success and safety in octogenarian with long lead dwell time Patient's age should not influence the decision to extract or not the leads, although the 30-day and mid-term mortality are significant, especially in the present of specific comorbidities.

EP.05.15

TRICUSPID VALVE REGURGITATION AFTER TRANSVENOUS LEAD EXTRACTION: WE NEED TO KNOW MORE

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Since 2003 a 73-year-old man was submitted to a pacemaker implantation because of atrio-ventricular block. After fourteen years, upgrading to CRT-D was made due to recovery for acute heart failure in a dilated cardiomyopathy with severe left ventricular systolic dysfunction. In 2019 and 2020 he presented pocket erosion therefore underwent to a submuscular reimplantation. After one year, he came to Arrhythmology outpatient appointment with inflammatory signs of the CRT-D pocket. The patient was started on Meropenem and Vancomicin. Transthoracic (TTE) and transesophageal echocardiogram didn't reveal any vegetation on valvular apparatus or on leads. The patient was submitted to transvenous lead extraction (TLE) with bidirectional rotational mechanical sheats and a epicardial lead on postero-lateral left ventricular wall was implanted. The post-procedural TTE showed a moderate to severe organic tricuspid valve regurgitation with annular dilatation despite the patient was asymptomatic. There weren't flail leaflets or tricuspid valve damage. The reimplantation of right atrial and ventricular leads was hindered by complex venous anatomy documented by intraprocedural phlebography. After Heart Team discussion, we agreed to tricuspid valve repair with annuloplasty ring and other two epicardial leads - right atrial and ventricular - was implanted. We achieve a successful result without complications. The patients was discharged without symptoms; the device interrogation showed good assessment of lead impedances, sensing thresholds, and capture thresholds.

Conclusion: The mechanisms of tricuspid valve regurgitation following TLE are complex. There isn't a standardized best practice to approach this phenomenon. It's important after TLE to assess tricuspid valve structure and function with TTE in order to understand the incidence of underlying potential mechanism and how to prevent it. Complex venous anatomy could direct the choice toward epicardial leads implantation.

EP.05.16

SINDROME DELLA VENA CAVA SUPERIORE DOPO IMPIANTO DI PACEMAKER TRANSVENOSO

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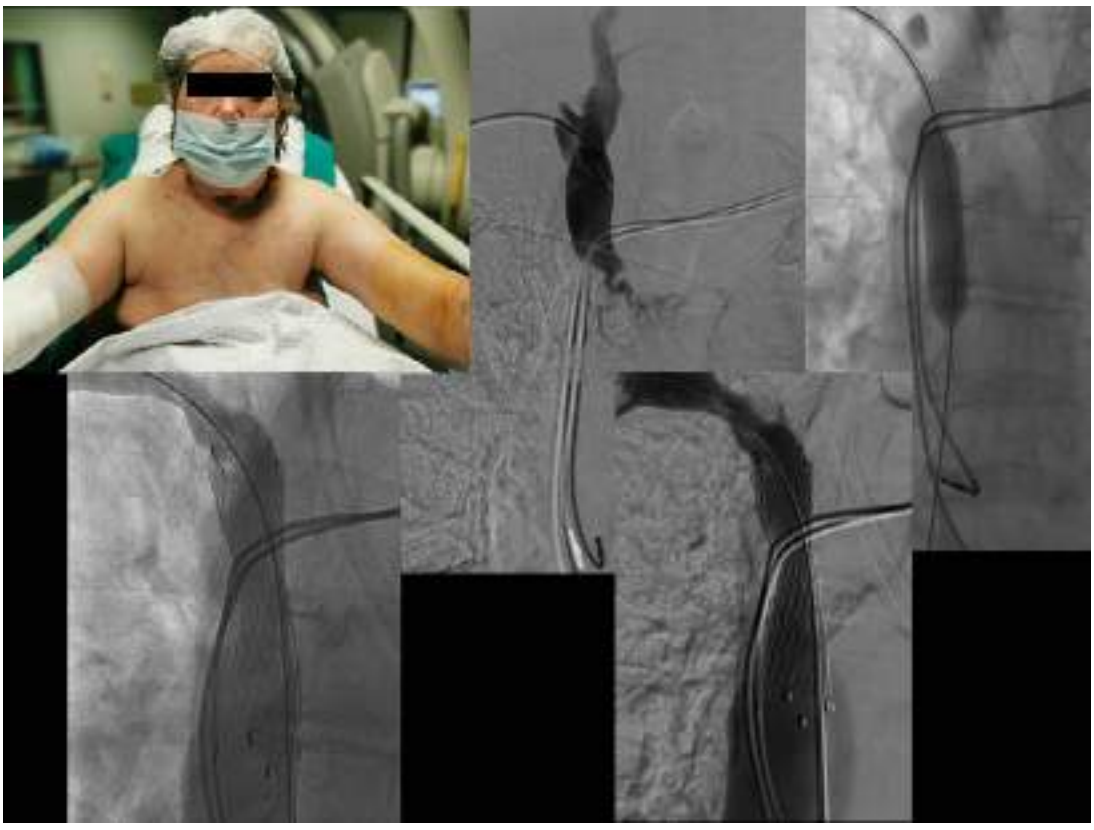
Descriviamo il caso di una paziente di 91 anni sottoposta ad impianto di pacemaker bicamerale per malattia del nodo del seno (sindrome bradi tachicardica) complicato a distanza da sindrome della vena cava superiore.
Nel 2018 impianto di pacemaker bicamerale da vena succlavia sinistra per sindrome braditachicardica.
Nel 2019 sottoposta a mastectomia radicale destra e di dissezione linfonodale di primo livello per adenocarcinoma infiltrante mammario.
La paziente veniva ricoverata per comparsa di edema ingravescente a mantellina. Un mese prima del ricovero posta diagnosi di trombosi venosa profonda al passaggio tra succlavia sinistra e vena cava superiore in corso di terapia con dabigatran per fibrillazione atriale permanente: sospeso dabigatran in favore di warfarin.
All'ingresso l'ecodoppler venoso degli arti superiori mostrava congestione venosa dei tronchi giugulari ed apposizione trombotica endoluminale in entrambe le vene succlavie. La tac torace collo con mezzo di contrasto escludeva focalità polmonari o segni di pneumopatia infiltrativa.
La paziente veniva sottoposta a flebografia dal tronco anonimo destro con accesso venoso omerale destro che mostrava l'occlusione della vena cava superiore e del tronco anonimo di sinistra. Si procedeva pertanto a rivascolarizzazione della vena cava superiore dilatando l'occlusione con palloncini di diametro crescente: 6, 8,12 mm. Si procedeva quindi a posizionamento di stent 16 x 60 mm autoespandibile (dilatato con un palloncino da 14 mm) ripristinando così il normale flusso venoso. La procedura è stata ben tollerata e non ha presentato complicanze. Nelle ore successive l'edema a mantellina si è progressivamente risolto fino ad una normalizzazione del quadro clinico.
La sindrome della vena cava superiore è una rara complicanza dopo impianto di pacemaker: questo caso mostra come la presenza di una successiva problematica vascolare controlaterale possa essere stata un fattore determinante l'insorgenza di questa sindrome dopo impianto di pacemaker bicamerale. È importante una diagnosi precoce per valutare un trattamento trombolitico oppure, se controindicato come nel caso descritto, un trattamento meccanico di angioplastica con stent.



EP.05.17

LEFT VENTRICULAR SIZE MAY PREDICT A BETTER CARDIAC RESYNCHRONIZATION THERAPY RESPONSE

A. Prezioso [1], C. La Greca [1], S. Zanchi [1], J. Kheir [2], D. Pecora [1]
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Background: We know that women have better responses to cardiac resynchronization therapy (CRT) (1). A possible explanation for this greater benefit has been attributed to sex difference in left ventricular (LV) size: sex-specific differences disappear when we normalize QRS duration to left ventricular end-diastolic volume (LVEDV) (2). QRS narrowing index (QI) has been showed predicting reverse left ventricular remodelling following CRT (3; 4).

Purpose: We sought to analyse the relationship between LV dimensions pre-CRT and QRS narrowing index, as a predictor of LV remodelling, and the relationship between LV dimensions pre-CRT and echocardiographic response 1 year after CRT.

Methods: We collected data from our Cardiovascular Implantable Electronic Device (CIED) outpatients' database, selecting patients who underwent CRT, with analysable echocardiographic images in our local PACS, and with clinical, electrocardiographic, and echocardiographic data pre-CRT and at 1-year follow-up. Results. We reviewed electrocardiograms and echocardiograms of 203 patients (M=120, 59,11%) who underwent CRT from 2015 to 2020. A higher QRS/LVEDV ratio and a higher QRS/LV mass ratio were associated with higher QI ($p=0.03$ and $p<0.001$, respectively). A higher QRS/LVEDV ratio was associated with higher LVEF ($p<0.001$), lower LVEDV ($p<0.001$) and lower LVESV ($p<0.001$) at follow up. Similarly, a higher QRS/LV mass ratio was associated with higher LVEF ($p=0.04$), lower LVEDV ($p=0.02$) and lower LVESV ($p=0.01$) at follow up.

Conclusions: LV size seems to have a role in prediction of a better response to CRT. Both the QRS/LVEDV ratio that the QRS/LV mass ratio may predict better electrocardiographic an echocardiographic response.

E-POSTER 6

VENERDI' 22 SETTEMBRE

AREA E-POSTER

08:30-09:30

SESSIONE E-POSTER 6
ELETTROFISIOLOGIA INTERVENTISTICA 2

Moderatori: A. Madeo (Castrovillari-CS), A. Piro (Roma)

EP.06.01
ABLATION INDEX-GUIDED CAVOTRICUSPID ISTHMUS ABLATION VERSUS UNIPOLAR-RECORDED POTENTIAL INVERSION: PROSPECTIVE NON-RANDOMIZED STUDY

A. Matteucci [1], M. Galeazzi [1], M. Russo [1], G. Schiaffini [1], C. Cappuccio [1], S. Aquilani [1], A. Meo [1], B. Magris [1], C. Pignalberi [1], E. Lombardi [2], C. Pandozi [1], F. Colivicchi [1]

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Background: Ablation of the cavotricuspid isthmus (CTI) for typical atrial flutter (AFL) is a widely used procedure. The ablation index (AI), which guides contiguous lesions through electroanatomical mapping on fluoroscopy, considers contact force, time, and power in a weighted formula for effective treatment. Previous studies have shown that unipolar signal inversion during radiofrequency catheter ablation (RFCA) is predictive of transmural lesion, and AI-guided ablation is effective in common flutter with an inter-lesion-distance (ILD) less than 6mm. While both strategies target CTI block, the relationship between AI and the inversion of the negative unipolar signal component remains to be investigated. This study aims to assess the effectiveness of ablation based on unipolar recorded potential inversion and corresponding AI values.

Methods: Our study enrolled thirty consecutive patients diagnosed with AFL to undergo CTI ablation in our centre. Patients were assigned to either the control or experimental group. Contiguous lesions were applied according to the current AI standards until values of 500 were reached in the control group. In contrast, contiguous lesions were dispensed until unipolar recorded potential inversion was achieved in the experimental group, while simultaneously recording AI values. After successful CTI ablation, a 30-minute monitoring period was performed to evaluate the efficacy of the treatment and possible inducibility of AFL.

Results: Ablation procedures were successfully performed in all patients. High-density mapping was obtained with an average of 2766±1767 points in the experimental group, and 2930±2177 points in the control group (p=0.82), with a mean mapping time of 10.3±4.9 min vs. 13.4±5.8 min (p=0.13). The procedural time was comparable between the two groups (77.9±27.6 min vs. 78.3±22.4 min, p=0.96). Both treatment strategies effectively reduced the mean local potential in CTI (2.42±1.09 mV vs. 2.71±1.26 mV, p=0.51). The experimental group showed significantly lower ablation index values compared to the control group (405±41.1 vs. 500, p<0.0001), along with unipolar recorded potential inversion.

Conclusions: The use of unipolar recorded potential inversion is a safe and effective strategy for the ablation of the cavotricuspid isthmus. This technique allows for a reduction in the amount of radiofrequency delivery compared to ablation index-assisted lesions while maintaining the same efficacy.

EP.06.02

ACUTE PERFORMANCE OF LEFT BUNDLE BRANCH AREA PACING IN LBBB AND NON-LBBB PATIENTS: A SINGLE-SITE EXPERIENCE

M. Volpicelli [1], O. Munciguerra [1,2], S. Ambrosino [1], A. Laezza [1], N. Luigi [1], P. Merone [1,3], C. Muto [1], L. Caliendo [1]

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Background: Left bundle branch area pacing (LBBAP) has emerged as an innovative conduction system pacing strategy for providing physiological ventricular activation. We aimed to assess acute performance of LBBAP both in left bundle branch block (LBBB) and non-LBBB patients with bradyarrhythmia and CRT indications.

Methods: Consecutive patients who received LBBAP for pacing and cardiac resynchronization therapy (CRT) indications were enrolled at our institution between October 2022 and February 2023. LBBAP was performed using both stylet-driven and lumen-less leads from all major manufacturers. Implant success rates, procedural duration and complications, and acute electrophysiological and electrocardiographic parameters were assessed.

Results: A total of 30 patients (median age 72.5 [65-81] years, male 66.7%) were analyzed. Pacing indications included CRT in 53.3%, atrioventricular block in 30%, and AV node ablation in 16.7% of cases. There were 19 (63.3%) and 11 (36.7%) patients in the LBBB and non-LBBB groups, respectively. Overall, implant success rate was 97% with a fluoroscopic time of 10 (5.3-16) min and total procedure duration of 67.5 (60-85) min. At implant, pacing threshold and R-wave amplitude were 0.8 ± 0.3 V at 0.4 ms and 9.1 ± 2.6 mV. The mean paced QRS duration (QRSd) vs spontaneous QRSd in the overall cohort was 123 ± 17.8 ms vs 146.6 ± 27.2 ms ($p = 0.001$). Similarly, a significant reduction in QRSd was observed in LBBB patients for paced vs spontaneous QRS (119.9 ± 17.8 ms vs 154.1 ± 22.2 ms, $p < 0.001$). In non-LBBB group, paced vs spontaneous QRSd was 128.1 ± 17.4 ms vs 128.4 ± 31.4 ms ($p = 0.73$). Pacing stimulus to R-wave peak time in V6 was 70.1 ± 26.4 ms and 64.5 ± 9.4 ms in the LBBB and non-LBBB groups, respectively. The V6-V1 interpeak interval was 49.5 ± 15.5 ms and 51.7 ± 15.3 ms for LBBB and non-LBBB patients, respectively. Two minor acute LBBAP lead-related complications were reported: 1 perforation into the LV cavity and 1 helix damage during screwing requiring lead replacement.

Conclusions: Our single-site experience showed a successful LBBAP both in patients with pacing and CRT indications. LBBAP provided good electrocardiographic parameters with significant QRS narrowing in LBBB patients and no QRS widening in non-LBBB group.

EP.06.03

THE NOVEL RADIOFREQUENCY BALLOON CATHETER: IMPACT OF ABLATION PARAMETERS ON SINGLE SHOT ISOLATION

I. My [1], S. Bordignon [2], L. Rottner [1], M. Lemoine [1], F. Moser [1], J.P. Wenzel [1], J. Obergassel [1], R. Schleberger [1], J. Moser [1], L. Dinshaw [1], P. Kirchhof [1], B. Reissmann [1], F. Ouyang [1], K.J. Chun [2], B. Schmidt [2], A. Rillig [1], A. Metzner [1]

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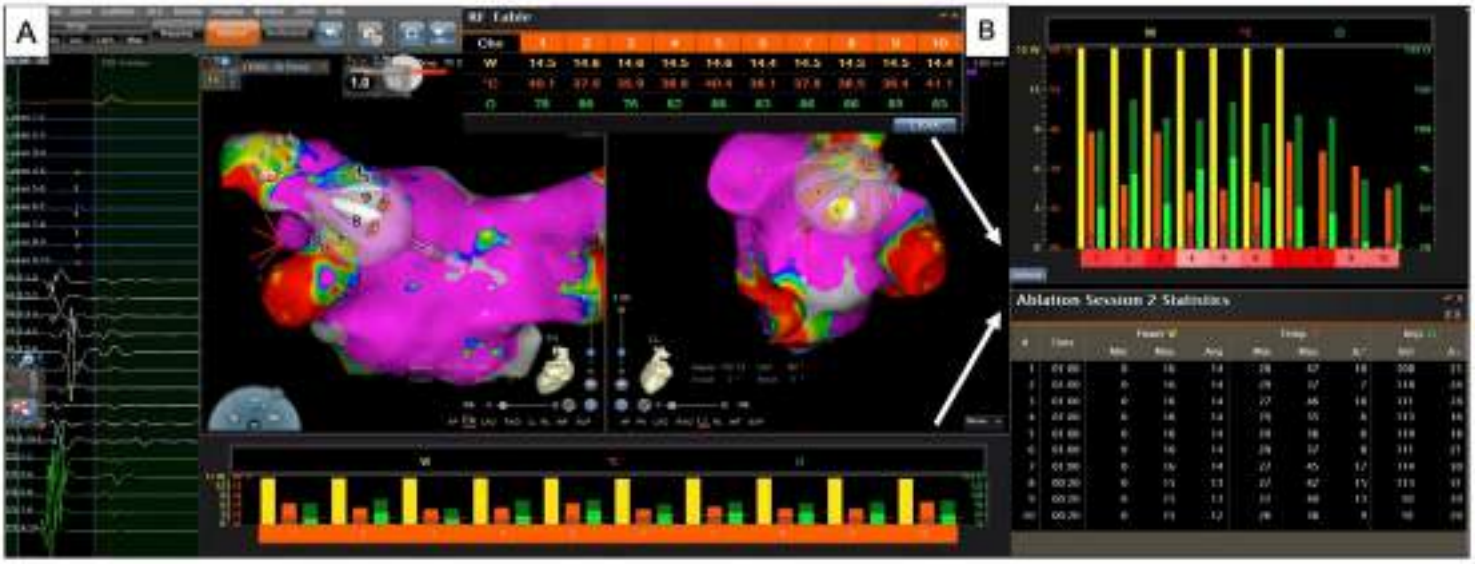
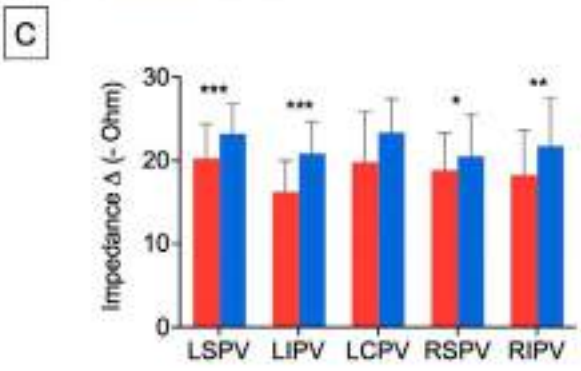
Introduction: A novel multi-electrode radiofrequency balloon (RFB) catheter has been released for pulmonary vein isolation (PVI).

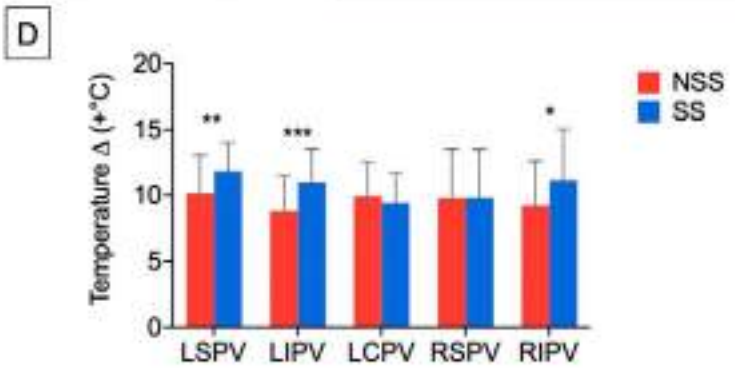
Methods: In this observational study consecutive patients with drug refractory paroxysmal or persistent atrial fibrillation (AF) undergoing first-time PVI were enrolled in two high-volume ablation centers. All procedures were conducted in conjunction with a 3D-mapping system. Clinical, procedural and ablation parameters were systematically analyzed.

Results: 105 patients (58% males; 52% paroxysmal AF, 68 ± 11.3 mean age, left atrial volume index 38.6 ± 14.8 ml/m2) were included. 241/412 (58.5%) pulmonary veins were successfully isolated with a single shot (SS), with a time to isolation of 11.6 ± 8 s. Total number of radio frequency applications was 892 (mean 2.2/PV), resulting in successful isolation of 408/412 (99%) PVs at the end of the procedure. Mean electrodes' impedance drop was significantly higher in the SS-PVI compared to the non-SS applications (21.5 ± 6.6 vs. 18.6 ± 6.5 Ohm). Concordantly, higher temperature rise was observed in the SS versus non-SS applications (10.9 ± 4.9°C vs. 9.6 ± 4.7°C).

Conclusion: In this multicenter real-world study, mean impedance drop and temperature rise were associated with successful SS-PVI applying the novel RFB catheter. These parameters may help to guide efficient usage of the new RF balloon.







EP.06.04

HIGH DENSITY MAPPING IN PATIENTS UNDERGOING PULMUNARY VEIN ISOLATION BY MEANS HELIOSTAR RF BALOON: EXTENSION OF SCAR LESION

S. Poggi [1], T. Strisciuglio [1], A. Iuliano [1], G. Spiniello [1], P. Zannella [1], V. Schillaci [2], A. Arestia [2], G. Shopova [2], A.M. Salito [2], G. Marano [2], V. La Rocca [3], A. Agresta [3], R. Ricciolino [3], A. De Simone [3], F. Solimene [2], G. Stabile [1,2,3,4]

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Background: Since larger pulmonary vein isolation (PVI) areas are thought to result in lower atrial fibrillation (AF) recurrence rates, during AF ablation, circumferential PVI typically incorporates attempts to include the PV antrum.

Aims: We evaluated the extent/area of antral scar lesion after electrical PVI performed by Heliostar radiofrequency Balloon ablation using a multielectrode Octaray catheter.

Methods. Five patients with paroxysmal (one) and persistent (4) AF underwent first catheter ablation aiming at PVI. A single transseptal puncture was performed. In patients in AF, sinus rhythm was repristinated after electrical cardioversion. Pre-ablation high density bipolar (0.1 – 0.5 mV) and anatomical map was performed during continuous coronary sinus pacing using Octaray catheter (Biosense Webster, Irvine, CA, USA). A multi-electrode esophageal temperature monitoring device was inserted before starting ablation (ESOTHERM MULTI; Fiab, Inc.). Ablation was performed by the multi-electrode radiofrequency (RF) balloon catheter (HELIOSTAR, Biosense Webster, CA, USA) and was delivered at 15 Watts to each PV for 60 seconds (electrodes adjacent to the posterior wall limited to 20 seconds). Target parameters for PVI are 1) time to isolation less than 12 s; 2) impedance drop>12 Ohms; 3) temperature rise>6 °. Post ablation high density bipolar map was performed.

Results: The overall procedural time was 90 ± 30 min, with a mean fluoroscopy time of 7.5±0.7 min. All PV were isolated with a mean of 7.6±3 RF application. The extension of the left atrial area < 0.1 mv, increased from 1.7%±1.53 to 14.0%±0.7. In the posterior left atrial wall, the distance between left and right antral lesions was 28.3±3.2 mm at upper posterior wall and 33.5±6.4 mm at lower posterior wall.

Conclusions: Antral lesions created with RF balloon catheter were effective in achieve PV isolation and covered about 14% of left atrium area outside the PV antrum.

EP.06.05

MAPPING AND ABLATION OF A HIDDEN RIGHT POSTERO-LATERAL ACCESSORY PATHWAY USING CONTINUOUS INFUSION OF ADENOSINE

G. Ricciardi, L. Checchi, L. Perrotta, G. Bambagioni, T. Girasole, F. Genovese, F. Vanni, L. Persiani, A. Michelucci, P. Pieragnoli
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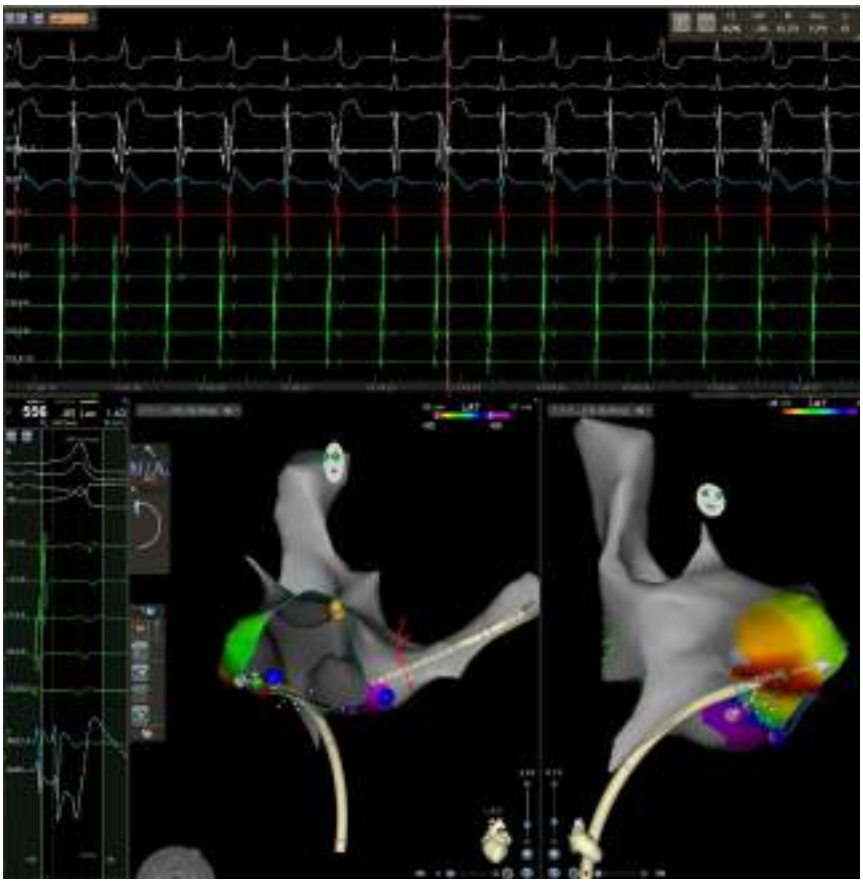
Introduction: We present a case of right postero-lateral latent accessory pathway (AP) in which mapping and ablation was performed under continuous adenosine infusion.

Methods: A 55 years woman with a long-standing history of palpitations underwent an electrophysiological study (EPS). An Holter 24h ECG recorded before the EPS evidenced the presence of an intermittent right located AP.

Results: At the admission ECG showed a sinus rhythm with no overt preexcitation. The procedure was performed under standard sedation. Multipolar diagnostic catheters were introduced and positioned at the His bundle region and coronary sinus. A quadripolar catheter was positioned alternatively in the right ventricle, and the right atrium. AH and HV interval were respectively 100 and 40 msec. Atrial and ventricular asichronous and programmed stimulation did not reveal antegrade or retrograde conduction through a AP and isoproterenol was ineffective in evidencing conduction through the AP. Only asynchronous stimulation of right ventricle, during isoproterenol infusion, induced episodes of brief nonsustained supraventricular tachycardia (narrow QRS 180/min) suggesting a right location of AP. Therefore 12 mg adenosine bolus was injected with the appearance of 3 preexcited beats whose P-delta interval remained constant. Preexcited QRS was superimposable to that recorded before EPS. Mapping could not be performed during the transient effect of adenosine and therefore was performed under continuous adenosine intravenously infusion (140 micrograms/kg/min). Infusion induced an alternance of preexcited and non-preexcited sinus rhythm (P-delta interval remained constant in preexcited beats). Preexcitation morphology was superimposable to that evidenced before EPS. In the upper part of the figure, from top to the bottom are showed: ECG leads (D1, avF, V1), mapping catheter potentials (MAP) in bipolar and unipolar mode, right ventricular electrogram (RV), coronary sinus electrograms (CS: from 1-2 to 9-10). Mapping and ablation procedure were performed through 3D-CARTO, fast anatomic mapping (Biosense Webster). An ablation catheter (Smartouch SF, Biosense Webster) was used for mapping and ablation. Radiofrequency energy was delivered at the site of interest (35W, 48 seconds). In the lower part of the figure, CARTO map with the location of AP (right posterolateral) and of ablation catheter. On the left side of the mapping figure are present: ECG leads, mapping catheter potential (MAP) in bipolar and unipolar mode, and coronary sinus electrograms. After ablation and interruption of continuous infusion of adenosine a persistent sinus rhythm without preexcitation and with an 1:1 AV conduction was always present. Asinchronous and programmed atrial and ventricular stimulation (even with isoproterenol infusion) was performed without any sign of conduction through an AP or induction of tachycardias. An adenosine bolus after catheter ablation did not evidence antegrade or retrograde conduction through AP at 30 minutes post ablation. An Holter 24h ECG one month after ablation did not show evidence of AP.



Conclusion: Hidden AP could represent a difficult target due the complexity to find the correct ablation site, continuous adenosine infusion can be safely used to make mapping and ablation of the AP possible.

EP.06.06

AVNRT E IDENTIFICAZIONE DELLA VIA LENTA: COHERENT E MAPPAGGIO AD ALTA DENSITÀ DEL TRIANGOLO DI KOCK

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Introduzione: l'attuale pratica clinica nel trattamento delle AVNRT consiste nell'eseguire un mappaggio bipolare (0.1-1 mV) del triangolo di Kock e la ricerca del segnale target a livello del voltadge bridge.

Obiettivo: Lo scopo del lavoro è di mostrare come il software Coherent integrato al mappaggio del voltadge bridge possa identificare in modo preciso e univoco la localizzazione della via lenta nel triangolo di Kock.

Metodi: Sono stati arruolati 10 pazienti, sottoposti ad ablazione transcatetere con sistema CARTO 3® e divisi in due gruppi diversi. Nel primo gruppo, è stato eseguito un semplice mappaggio bipolare (voltadge bridge 0.1-1 mV) del triangolo di Kock con catetere ablatore SmartTouch® SF (Biosense Webster, curva D/F). Nel secondo gruppo, invece, è stato effettuato un mappaggio ad alta densità di punti (maggiore di 2000) elettroanatomici tramite catetere multipolare Pentaray® NAV (Biosense Webster, spacing 2-6-2), integrando l'informazione bipolare con il software Coherent (Figura 1). In particolare, è stato valutato il primo rallentamento locale individuato dal Coherent a livello del voltadge bridge.

Risultati: Sono stati analizzati 3 parametri principali e considerata la mediana, il valore minimo e massimo per analizzare le differenze tra gruppi (Tabella 1).
Il numero di applicazioni di radiofrequenza (RF) per eliminare la via lenta erano maggiori nel primo gruppo rispetto al secondo (6 vs 2). Il tempo di RF era minore nel secondo gruppo rispetto al primo (60 sec vs 234 sec). Il numero di punti elettroanatomici acquisiti era minore nel primo gruppo rispetto al secondo (198 vs 1537).

Conclusioni: il mappaggio bipolare ad alta densità con l'applicazione del software COHERENT consente di identificare in modo puntuale la localizzazione della via lenta rispetto ad un'area più estesa identificata con il solo mappaggio del voltadge bridge. Ciò, permette di eliminare la presenza della via lenta con un numero di applicazioni e tempi di RF minori.

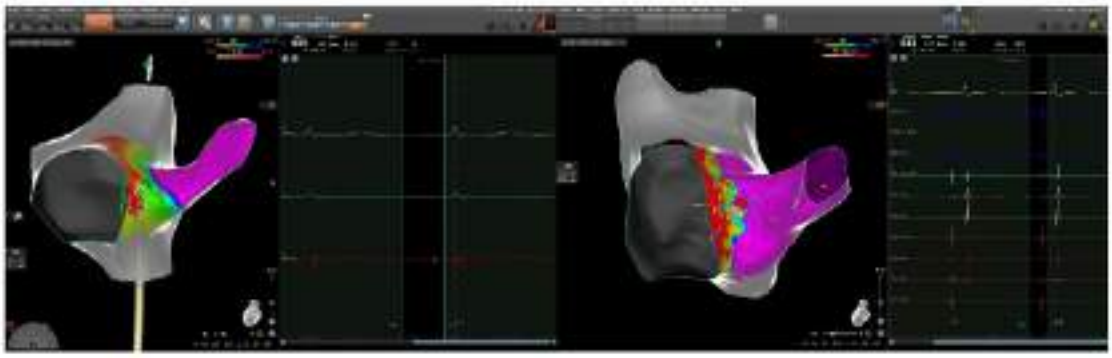

Figura 1: a sinistra mappaggio bipolare (0.1-1 mV) atrio destro con catetere ablatore e a destra con catetere Pentaray

PARAMETRI	MEDIANA_1GRUPPO	MAX_1GRUPPO	MIN_1GRUPPO	MEDIANA_2GRUPPO	MAX_2GRUPPO	MIN_2GRUPPO
Num. di applicazioni di RF	6	7	4	2	2	1
Tempo di RF (Sec)	234	338	177	60	120	60
Num. Punti	198	364	80	1537	2100	1360

Figura 2: risultati di mediana, valore massimo e minimo tra i 2 gruppi

EP.06.07

PULSED-FIELD ABLATION: ANALYSIS OF A NEW ABLATION TECHNIQUE FOR ATRIAL FIBRILLATION. A SINGLE CENTRE EXPERIENCE

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Centro Cardiologico Monzino - Milano, ITALY

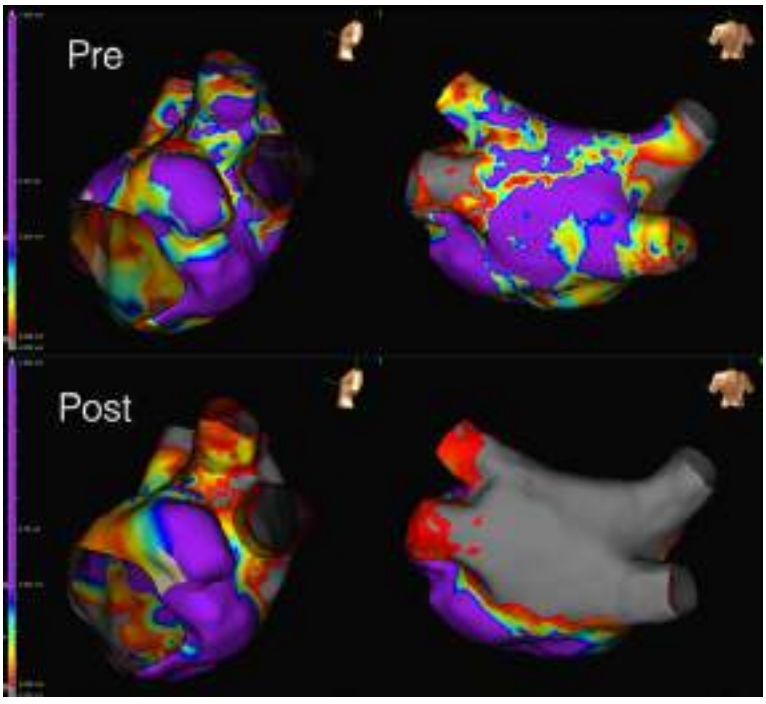
Introduction: Pulsed-field ablation (PFA) is a new non-thermal, tissue-specific ablation technique. Through the application of a local electric field, it is possible to induce a selective electroporation of cardiomyocytes membranes, resulting in myocytic apoptosis and sparing of non-myocardial structures (nerves, connective tissue, esophagus, vessels).

Purpose: A new PFA system for atrial fibrillation (AF) ablation has recently been introduced in our hospital. The aim of this retrospective review is to share the initial results of our experience in terms of acute efficacy and safety.

Methods: A total of 41 adult patients suitable for AF percutaneous ablation underwent PFA between April and November 2022 in our Institute. PFA system consisted of a current generator, a deflectable sheath and a multielectrode PFA catheter. Once inside the left atrium (LA), the PFA catheter was directed to the pulmonary veins (PVs) ostia through an over- the-wire system. Then, 8 electric impulses were applied for each PV to achieve electrical isolation; in some cases, applications to the posterior left atrium wall (LAPW) were delivered to obtain LAPW isolation (LAPWI). A moderate-to- deep sedation was provided by an anesthesiologist during all the procedures.
Acute ablation efficacy was defined as absence of intracavitary signals at the electroanatomic mapping and local capture failure at the pacing maneuvers. Intra and peri-procedural safety was defined as the absence of major complications (pericardial effusion/ tamponade, stroke, vascular complications, death) during the procedure and the hospitalization period.

Results: Of the 41 patients included, 24 (58.5%) were treated for paroxysmal AF and 17 (41.5%) for persistent AF. In almost all cases (n=40, 97.6%) pulmonary veins isolation (PVI) was performed; in 14 cases (34.1%, almost all persistent AF patients) a LAPWI was performed with the application of a variable number of pulses (mean value = 13). In most of the cases (n=28, 68.3%) an electroanatomic mapping was acquired before and after the ablation.
Acute efficacy was observed in all PVI cases (n=40, 100%) and in all LAPWI cases (n=14, 100%).
No periprocedural major complications were observed (n=0, 0%).

Conclusions: PFA is a promising ablation technique capable of inducing selective myocytic apoptosis through electroporation, causing a thick damage across the muscle with no injury of other tissues, and could become a game changer in electrophysiology in the next future.
Our initial data report a combination of ease of use and high efficacy and safety profiles.



EP.06.08

ULTRA-HIGH-DENSITY MAPPING-GUIDED APPROACH TO OPTIMIZE REPEAT PAROXYSMAL AF ABLATION PROCEDURES

L. Segreti [1], M. Parollo [1], F. Solimene [2], G. Pelargonio [3], S. Bianchi [4], A. Ferraro [5], R. Calvanese [6], P. Di Donna [7], L. Perrotta [8], A. Giomi [9], G. Zingarini [10], V. Schillaci [2], M. Bura [11], M. Malacrida [11], R. Ricci Maga [11], G. Zucchelli [1]

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[5] *Degli Infermi Hospital, Rivoli, ITALY*
[6] *Del Mare Hospital, Napoli, ITALY*
[7] *San Martino Hospital, Genova, ITALY*
[8] *Careggi University Hospital, Firenze, ITALY*
[9] *Santa Maria Nuova Hospital, Firenze, ITALY*
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[11] *Boston Scientific, Milano, ITALY*

Background: Optimized RF deliveries after failed pulmonary vein isolation (PVI) targeting PV gaps (PVGs) and residual potentials (RAPs) through advanced mapping and ablation technologies may improve ablation efficiency.

Purpose: We sought to characterize and target PVGs and RAPs in patients (pts) indicated for repeat ablation of paroxysmal AF.

Methods: We included 81 consecutive pts from the CHARISMA registry who underwent repeat AF ablation and had complete characterization of PVG and RAP at 13 centers. Ablation was guided by a novel map analysis tool (Lumipoint) and continuous activation was used sequentially on each PV component, in order to better assess and target PVGs and RAPs. The ablation endpoint was PVI and electrical quiescence in the antral region.

Results: Two-hundred nine PVGs (2.6±1.6/pt after RF ablation; 2.6±1.8/pt after cryoablation, p=0.9039) and 42 RAPs (0.8±1.2/pt after RF ablation; 0.04±0.2/pt after cryoablation, p=0.0007) were detected. In the majority of cases (n=58, 71.6%), only PVGs were present whereas, in 19 (23.5%) pts, both PVGs and RAPs were detected (2 pts had only RAPS). In 2 (2.5%) pts nor PVG neither RAP was identified. Only 1 pt after cryoablation showed a RAP (at carina site), whereas the 41 RAPs after RF were fairly distributed across different sites. PVGs were most common at anterior sites (77, 36.8%), followed by posterior sites (59, 28.2%). In 20 (9.6%) cases, substrate mapping failed to detect any PVG around PVs. One-hundred seventy-eight PVGs had good quality information for deeper analysis. Using 3.5mm cutoff (ideally the tip of a cooled-tip ablation catheter), PVG boundaries identified through the Lumipoint tool were comparable to the ones acquired from voltage mapping substrate mapping in 77% of the PVGs (n=137). However, in 13 (7.3%) cases voltage mapping left at least 1 residual PVG whereas in 28 (15.7%) cases evaluated through voltage mapping only we overestimate of at least 3.5mm the PVG line to be ablated to close the PVG. At the end of the procedures, all PVs had been successfully isolated and electrical quiescence in the antral scar was achieved in all study pts.

Conclusion: The use of advanced mapping strategies enables a more targeted ablation approach with respect to voltage mapping techniques. Residual potentials within the antral scar were more frequently detected after RF ablation than after cryoablation, while PVGs were discernible after both failed RF and cryoablation.

EP.06.09

DIMISSIONE IN GIORNATA POST CRIOABLAZIONE PER IL TRATTAMENTO DELLA FIBRILLAZIONE ATRIALE: UN'ANALISI DI MICRO-COSTING

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Obiettivo: La pandemia COVID 19 ha messo in luce alcune criticità organizzative del sistema sanitario italiano rendendo quindi necessarie azioni che mirino alla realizzazione di modelli di cura più efficienti senza mettere in discussione la qualità e l'efficacia. In questo contesto le procedure di elettrofisiologia interventistica in elezione, si prestano a considerazioni in merito alla riduzione della durata della degenza. In particolare, considerando la procedura di crioablazione per il trattamento della fibrillazione atriale (FA) ad oggi in Italia è ancora molto diffuso il ricovero ordinario nonostante siano numerose le evidenze a supporto di un cambio del setting di ricovero come ad esempio il day hospital (1).
Questa analisi mira a valutare il consumo di risorse associate alla procedura quando eseguita in ricovero ordinario rispetto al day hospital.

Metodologia: La metodologia applicata per lo svolgimento dell'analisi è l'Activity-Based Costing. Sono state analizzate le fasi del trattamento di crioablazione dell'FA presso A.R.N.A.S. Ospedali Civico di Cristina Benfratelli, identificando il consumo di risorse e il tempo di lavoro dedicato dal personale sanitario per ogni fase.
Sono stati condotti colloqui con il medico e il personale coinvolto nelle sessioni di procedura. I dati sui costi unitari (es. farmaci, imaging, esami di laboratorio, materiali di consumo, procedure mediche, visite mediche), ove disponibili, provenivano dall'amministrazione dell'ospedale. I costi del personale per chirurghi, anestesisti e infermieri sono stati calcolati come costi al minuto. Per la stima dei costi del personale ospedaliero (personale non clinico) e dei costi generali sono stati utilizzati anche i dati della letteratura attualizzati a febbraio 2023. Ci si è concentrati sui costi del percorso paziente e non sui dispositivi, farmaci e materiali di consumo che risultavano essere utilizzati in ugual quantità in entrambi i setting di cura.

Risultati e Conclusioni: Dall'analisi è emerso che il consumo di risorse associato all'esecuzione della crioablazione in regime di ricovero ordinario (due notti di degenza in reparto di cardiologia) è pari a € 2.415,12 contro i € 1.921,89 che è, invece, il costo del percorso in day hospital. Il driver di costo principale per il percorso in degenza ordinaria è rappresentato dalla degenza ospedaliera pari al 36% del totale. Per quanto riguarda i costi del percorso day hospital il costo della degenza in ospedale rappresenta il 22%. L'impatto del costo del personale sanitario risulta essere simile per entrambi i setting.
Dal punto di vista della sostenibilità economica e del percorso paziente la procedura di crioablazione per FA risulta essere quindi ottimizzabile in termini di tempo. Sarebbe probabilmente auspicabile ricorrere più frequentemente al day hospital a seguito di un'accurata selezione del paziente per identificare il giusto target. Il risultato porterebbe ad una riduzione della durata della degenza e liberazione di posti letto (permettendone una riallocazione dove necessario); riduzione delle liste di attesa, accelerando l'accesso dei pazienti alle cure; riduzione dei costi di gestione dei pazienti ottimizzando il consumo di risorse.

EP.06.10

PROCEDURA DI ABLAZIONE TRANSCATETERE DELLA FIBRILLAZIONE ATRIALE E INFIAMMAZIONE PERI-ATRIALE STIMATA MEDIANTE L'ATTENUAZIONE DEL TESSUTO ADIPOSO ATRIALE ALLA TOMOGRAFIA COMPUTERIZZATA MIOCARDICA

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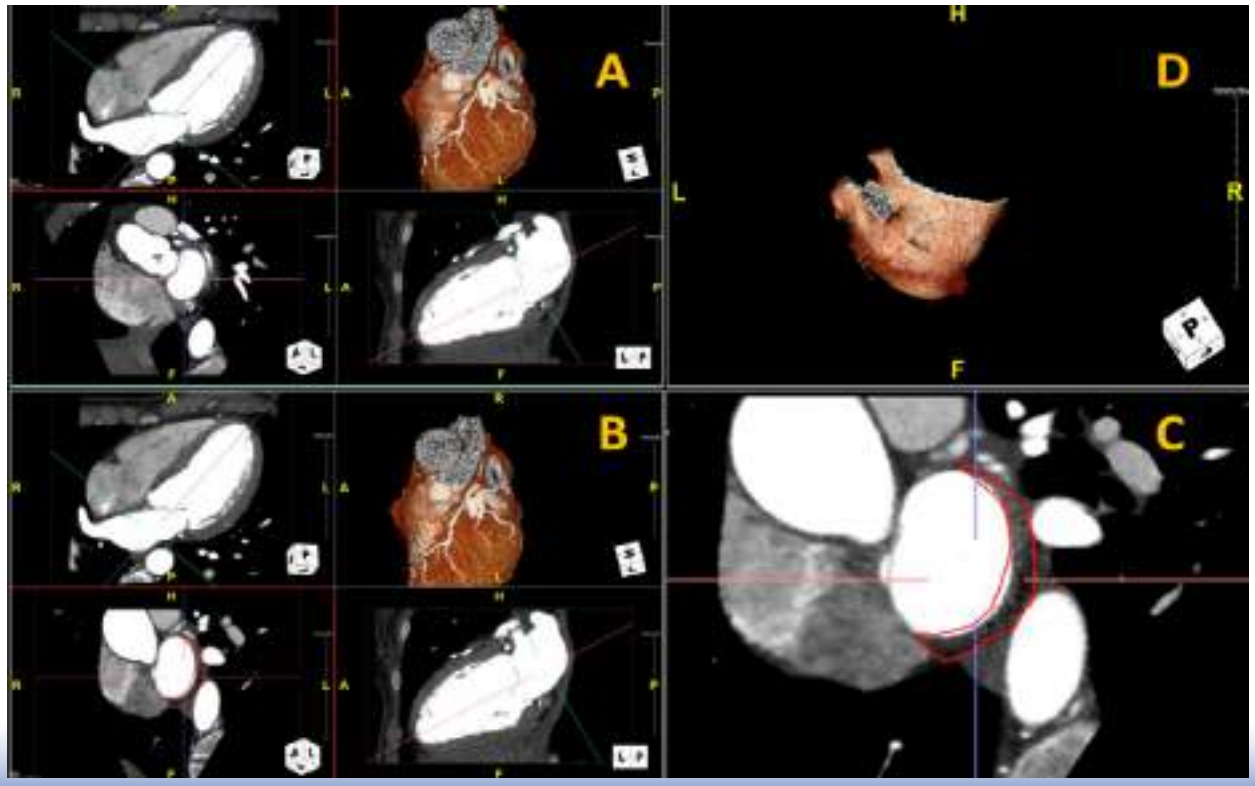
Background: i markers infiammatori (PCR, sICAM-1, fibrinogeno) giocano un ruolo primario nella genesi e nel mantenimento della fibrillazione atriale (FA). Le caratteristiche del tessuto adiposo epicardico peri-atriale sinistro (Fat-LA), quali il grado di infiammazione ed il rimodellamento fibroso, possono influenzare sia le proprietà morfologiche che la funzione atriale stessa.

Methods: sono stati selezionati 80 pazienti sottoposti a procedura di ablazione di FA che hanno eseguito CTA di controllo pre-procedura di ablazione di FA e 80 controlli negativi per storia di fibrillazione atriale che accedevano in Pronto Soccorso per dolore toracico atipico, con ritmo sinusale documentato, basso rischio di probabilità pre-test per patologia aterosclerotica coronarica ostruttiva (CAD) e markers di miocardiocitonecrosi (TnI h.s.) negativi, sottoposti a CTA al fine di escludere la genesi cardiaca dei sintomi. Criteri di esclusione: I) CAD significativa documentata alla CTA (la popolazione inclusa presenta albero coronarico indenne da lesioni aterosclerotiche o placche <30% al lume coronarico); II) patologie infiammatorie/neoplastiche; pregresso evento vascolare ischemico od emorragico; IV) storia di rivascolarizzazione o interventi di chirurgia cardiaca o vascolare. La stima del tessuto adiposo peri-atriale sinistro è stata eseguita mediante la quantificazione delle caratteristiche densitometriche del tessuto retro-atriale sinistro alla CTA con valori compresi tra -190 e -30 unità di Hounsfield (HU) e successivamente è stata valutato sia il grado di infiammazione medio (attenuazione) che il volume medio del Fat-LA.

Results: il volume del tessuto adiposo peri-atriale è risultato maggiore nei pazienti con diagnosi di FA (5,42 ± 2,94 ml) rispetto a quelli non affetti da FA (4,16 ± 2,55 ml, p = 0,007), ma dopo aver eseguito l'aggiustamento per la dimensione atriale non è stata riscontrata alcuna differenza statisticamente significativa. La densità media del Fat-LA è invece significativamente maggiore nei pazienti affetti da AF (-69,15 HU) rispetto ai controlli (-76,82 HU, p < 0,0001) in modo indipendente dalla dimensione dell'atrio sinistro. Nei modelli di regressione logistica solo l'aggiunta dell'attenuazione media di Fat-LA ha portato ad un miglioramento significativo del chi-square (modello clinico 22,89; modello clinico+attenuazione Fat-LA 31,69; p < 0,01) e della capacità discriminatoria (AUC da 0,775 a 0,829). Negli 80 pazienti sottoposti ad ablazione di FA sono state indagate le recidive di aritmia e pur essendo ancora in corso il follow-up i dati raccolti sull'attenuazione media di Fat-LA e la recidiva aritmica post ablazione appaiono promettenti.

Conclusions: L'infiammazione peri-atriale misurata in modo non invasivo attraverso l'attenuazione del tessuto adiposo retro-atriale sinistro alla tomografia computerizzata miocardica è associato con la fibrillazione atriale in modo indipendente rispetto dimensione dell'atrio sinistro differentemente dal volume del tessuto adiposo peri-atriale. La densità del Fat-LA fornisce un valore discriminatorio incrementale rispetto alle altre variabili associate alla FA.
Nel sottogruppo di pazienti sottoposti ad ablazione di FA l'attenuazione media di Fat-LA appare un parametro predittivo promettente rispetto alla recidiva aritmica.



EP.06.11

PULSED-FIELD ABLATION TECHNOLOGY FOR PULMONARY VEIN AND LEFT ATRIAL POSTERIOR-WALL ISOLATION IN PATIENTS WITH ATRIAL FIBRILLATION: INITIAL EXPERIENCE WITH 3D MAPPING VERSUS CONVENTIONAL APPROACH

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Background: In persistent and long-standing persistent atrial fibrillation (AF), more extensive ablation, including posterior wall isolation (PWI) has been advocated. Alternative catheter designs and energy sources than thermal energy have been developed in an attempt to simplify the ablation procedure and possibly improve outcomes.

Purpose: We present our initial experience of a novel pulsed-field ablation (Farawave) technology based on non-thermal ablation for pulmonary vein isolation (PVI) and PWI in a single-center clinical setting and describe procedural safety and effectiveness of all our patients.

Methods: All consecutive patients undergoing persistent AF ablation with the PFA system at our center were included. PVI was obtained using 2 kV with eight applications per vein, four for each catheter configuration in the basket and flower poses, as per standard protocol. Additional lesions were deployed at the operator's discretion. Procedural endpoint was PVI and PWI as assessed by entrance and exit block (within the PW area). When a mapping system was used (Carto system, NAVx system or Rhythmia mapping system), additional validation comprised voltage and activation mapping of the PW area.

Results: A total of 21 cases were included: 9 (43%) early persistent and 12 (57%) long-lasting persistent. Of them, the majority was de novo cases (18, 86%) whereas 3 (14%) were repeated AF procedures. A 3D mapping system was used in 11 (52%) procedures (mean mapping time = 6±1 min). In all cases (100%) intracardiac echocardiography guided the ablation. At the end of the procedure, PVI was achieved in all (100%) patients (number of PFA applications to achieve PVI = 35±3, time to PVI = 24±7 min). PWI was achieved in all patients (mean of 23±6 PFA deliveries) all validated through differential pacing or 3D mapping. No differences were found in terms of procedural and management parameters according with the use or not of mapping guidance and validation, that is 3D mapping vs conventional approach: 22[19-30] min vs 23[18-25]min for time to PVI, p=0.4999; 36[34.5-36] vs 32[32-38] for PFA deliveries at PVs, p=0.4147; 26[17-28] vs 23[20-28] for PFA deliveries at the PW area, p=0.9707; and 21[20-28]min vs 17[13-23]min for fluoroscopy time, p=0.0872, respectively. On the contrary, conventional approach resulted in shorter total procedure time (preparation plus skin-to-skin) and lab occupancy time (63[55-70]min vs 80[70-98]min, for total procedure time, p=0.0102; 105[90-110]min vs 140[130-148] min, p=0.0008, respectively). No major procedure-related adverse events were reported.

Conclusion: Our initial experience shows that the novel PFA technology for PW ablation is efficacious and safe. From a procedural workflow, this technology can be used either as a standalone, fluoroscopy-guided system or in combination with a 3D mapping system.

EP.06.12

SAFETY AND EFFICACY OF UNINTERRUPTED ORAL ANTICOAGULATION IN PATIENTS UNDERGOING AF ABLATION WITH DIFFERENT TECHNIQUES: A SINGLE CENTER EXPERIENCE

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Background: Uninterrupted anticoagulation (AC) is recommended to reduce thrombo-embolic events in patients undergoing atrial fibrillation (AF) catheter ablation (CA). Latter studies showed that direct oral anticoagulants (DOACs) were noninferior to vitamin-K-antagonists (VKAs) in thromboembolic prevention, carrying a significantly lower bleeding risk. These studied mostly included patients undergoing CA with radiofrequency. Aim of our study was to provide real-world clinical data on patients undergoing CA for AF with different techniques, carrying different embolic and bleeding risks, treated with an uninterrupted AC strategy.

Methods: We enrolled 147 consecutive AF patients undergoing CA, admitted to our institution between November 2019 to December 2022, managed with an uninterrupted DOAC strategy. We analyzed data from their clinical history, home therapy and ablation technique. Compliance to OAC was assessed at the first post-discharge clinic evaluation. Primary safety endpoints of our study were the freedom of post-procedural (within 3 months post-CA) thromboembolic events and major bleeding events in the post-procedural period. Minor bleeding events were deemed secondary outcomes.

Results: Among 147 patients enrolled, 97 were male. Median age was 65.5 ± 10.4 years. As for the underlying etiology, in 104 (70.7%) cases no structural heart disease was detected; on the other hand of the 43 (29.3%) cases with heart disease, 21 (48.8%) were ischemic cardiomyopathy patients.
Baseline median CHADSVASC and HASBLED were 2 [1-4] and 2 [1-2], respectively. 110 (74.8 %) were paroxysmal AF patients, while 17 (11.5 %) were persistent AF patients; 18 (12.2%) were redo CAs. When considering baseline AC therapy: 29 patients were on apixaban, 55 patients were on rivaroxaban, 10 patients were on dabigatran, 31 patients were on edoxaban. In 22 patients naive to OAC, OAC therapy was started 24 hours prior to CA to maintain an uninterrupted regimen. Median LVEF was overall within normal limits (LVEF 62%), while LA were overall dilated (LA volume 67mL). As for the used techniques, 27 were treated with cryoablation, 64 with radiofrequency ablation, 56 with laser. In all cases echo guidance was used to obtain femoral venous access, and ICE was used for transseptal puncture (TSP). Median procedural time was 120 mins [IQR 95 – 154], with a median target ACT of 350 [300-350] sec, achieved with a median IV heparin dose of 8000 [6000-9000] UI. In terms of primary endpoints, 1 cerebral thromboembolic event resulting into a stroke was detected, while on the other hand, no major periprocedural bleeding was detected. The only patient meeting the primary endpoint was treated with laser AF ablation + pre and post mapping with a multipolar catheter and single TSP, leading to three sheats and catheter exchange. As for the secondary endpoint, n=5 (3.4%) periprocedural femoral hematoma, not requiring any further therapy, were detected. No further primary or secondary-endpoint related events were detected in the subsequent 3-month follow-up; all patients were compliant to OAC therapy.

Conclusion: Uninterrupted AC in CA for AF is a safe strategy since it neither increased thromboembolic events nor is associated with significant major or minor bleeding complications. Avoiding several sheat changes minimized thomboembolic events.

SESSIONI WEB SHARING

SESSIONI NON ACCREDITATE ECM

(Poster senza discussione, consultabili su Totem elettronici per tutta la durata del Congresso)

ARITMIE

WS.01

REPETITIVE VENTRICULAR POSTERO-SEPTAL MACRORIENTRY INCREASED BY PROARRHYTMIC EFFECT OF AMIODARONE

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We describe a rare case of a 75 years old male affected by severe dilated cardiomyopathy with incessant monomorphic ventricular tachycardia (VT) after intravenous amiodaron. Previous aortic valve replacement was made and residual proximal aortic aneurysm was present. VT showed a posteroseptal origin from the outflow tract. Betablockers were not considered as first line, for bradicardia and low arterial values, so that Amiodaron infusion was begun. Arrhythmic events became more prolonged and incessant, even after the CRT-D implantation. In a first time, biventricular stimulation was stopped, but unsuccessful. Only the interruption of the drugs permitted the strong reduction of events while the VT ablation was the resolutive strategy.
In this case, Amiodaron was associated to prolongation of VT cycle and with a different PVC coupling interval that contributed to an undoubted increasing of the arrhythmic susceptibility to monomorphic ventricular tachycardia. The effects of amiodarone other than sodium channel blockade can affect initiating PVC, determining whether the arrhythmias is sustained or not. With his known effects on IKr inhibitor rathen then sodium and calcium channels, he swept the initiating PVC away indicating that the initiating PVC was due to re-entrant mechanism rather than abnormal automaticity and triggered activity which depended on mainly intracellular sodium and calcium ion concentrations.
Though amiodarone can be the first line drug to treat ventricular tachyarrhythmias in patients with left ventricular dysfunction, it is important to be aware of its proarrhythmic effect, able to triggering arrhythmic events other than TdP in patients with structural cardiac disease.

ARITMOLOGIA CLINICA

WS.02
NESSUNO DIMENTICHI QUANTO È IMPORTANTE L'ECG DI ARRIVO

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Abstract: In un momento storico in cui la tecnologia e l'informatica hanno arricchito enormemente la scienza medica, la registrazione dell''ECG con metodica tradizionale rimane il cardine diagnostico di molte condizioni aritmologiche ed, in aggiunta a ciò, uno strumento prezioso ai fini della stratificazione del rischio aritmico basale. Nonostante i numerosi sforzi gestionali, non sempre tuttavia, la traccia ECGrafica di un evento indice risulta recuperabile a posteriori.

Metodi: Abbiamo raccolto i dati di 1056 pazienti, giunti alla nostra osservazione per diagnosi di aritmia sintomatica. 663 soggetti (66% del tot) sono risultati maschi e di età media pari a 47±4 anni. Abbiamo recuperato le informazioni relative all'esordio del sintomo ed alla tempistica di diagnosi aritmologica. In 190 pazienti (18% del totale) la diagnosi aritmologica è stata fatta già alla prima valutazione cardiologica con un tempo medio di diagnosi inferiore alle 24h: di questi, nel 94% dei casi (179 pz), la diagnosi è stata fatta mediante ECG realizzato a domicilio o all'arrivo in DEA/PS e nel 6% (3 pz) è stata invece una diagnosi clinica, a prescindere dalla documentazione dell'ECG basale. Suddividendo i dati in base alla distribuzione negli anni, il numero di pazienti inquadrati all'esordio (<24h) per ciascun anno, aumenta nel tempo (progressivamente da 11% nel 2018, a 28% nel 2022). Le diagnosi effettuate sono state: fibrillazione/flutter atriale (67%), SSS (13%), TV (10%), pre-eccitazione nel (2%), tachicardia da rientro nodale nel (6%), sindrome aritmica (2%). Nel rimanente 64% dei casi invece, la diagnosi aritmologica è stata ottenuta con una valida registrazione dell'evento aritmico solo successivamente alla fase di arrivo, mediante ulteriori indagini diagnostiche e con un tempo medio di diagnosi pari a 9 mesi. In questo gruppo di soggetti è stata posta diagnosi di SSS nel 43%, pre-eccitazione (2%), fibrillazione atriale/flutter (28%), tachicardia da rientro nodale (12%), tachicardia da rientro ortodromico (3%), TV (5%), sindrome aritmica (7%).
Il principale motivo per cui il paziente è stato avviato al follow-up successivo, è stata la necessità di effettuare una registrazione dell'aritmia valida ai fini diagnostici: nel 64% dei casi si è trattato di pazienti con diagnosi generica di tachicardia parossistica sopraventricolare, nel 36% dei casi l'ECG durante sintomo, è stato ritenuto non completo ai fini di un giusto inquadramento diagnostico, oppure assente. In nessuno dei casi ambulatoriali elettivi, però, è stato possibile recuperare a posteriori l'ECG basale del paziente dall'archivio informatico.

Conclusioni: La realizzazione e dunque, la lettura Cardiologica di un ECG in coincidenza dell'evento indice rimane estremamente importante sia per la giusta diagnosi di malattia aritmica, sia per la eventuale determinazione del rischio aritmico del paziente, da cui derivano fondamentali scelte cliniche al punto che, essa dovrebbe essere considerata fondamentale nel percorso del paziente aritmologico. Tale considerazione andrebbe fatta in tutti i servizi che accolgono pazienti in urgenza e/o comunque sintomatici, soprattutto spoke, poichè il recupero di tali informazioni a posteriori, risulta di importanza fondamentale nell'inquadramento diagnostico e prognostico del paziente aritmico che spesso, è un soggetto giovane.

DEVICE

WS.03

RISONANZA MAGNETICA E DISPOSITIVI IMPIANTABILI: METODOLOGIA DI ELABORAZIONE, STESURA E ADOZIONE DI UNA PROCEDURA ESECUTIVA CONDIVISA TRA RADIOLOGIA, FISICA SANITARIA E CARDIOLOGIA PRESSO L' ASL CN1

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Nei pazienti portatori di dispositivi impiantabili attivi (pacemaker, defibrillatori, loop recorder) si rende spesso necessaria l'esecuzione della risonanza magnetica (RM). Infatti il ricorso a tale mezzo diagnostico ha visto in questi ultimi anni una crescita esponenziale in tutti i campi della medicina coinvolgendo di fatto anche questa parte della popolazione.
Pur essendo noti i potenziali effetti avversi del campo magnetico sui dispositivi impiantabili (dal reset elettrico ai difetti di sensing, dalla induzione di correnti con conseguente cattura miocardica, al riscaldamento della punta del catetere con possibile variazione delle soglie di cattura o addirittura alla perforazione cardiaca), l' introduzione sul mercato di dispositivi compatibili con la RM definiti MRI-conditional ha in realtà reso possibile l'esecuzione degli esami di RM estesi anche a tutto il corpo purchè vengano rispettate certe condizioni di utilizzo controllate e di sicurezza.
Le recenti linee guida europee sul pacing pongono l' esecuzione della risonanza magnetica in classe IA indicando che nei pazienti con sistemi di pacemaker RM-compatibili la RM può essere eseguita in sicurezza attenendosi alle istruzioni della casa produttrice.
In Italia anche l' attuale legislazione sanitaria in materia di radiologia ha aperto il campo alla possibilità di eseguire esami di risonanza magnetica ai pazienti portatori di device solo se rispettate le misure di sicurezza.
Tra le misure di sicurezza da adottare è caldamente suggerita la dotazione di una specifica procedura aziendale che assicuri un percorso sufficientemente sicuro per il paziente con dispositivo che dovrà avvalersi di esame di RM.
Qui desideriamo illustrare la metodologia seguita per la elaborazione, stesura e adozione operativa della procedura per i pazienti con dispositivo impiantabile da sottoporre ad esami di risonanza magnetica presso l' ASL CN1.
Il lavoro è stato il frutto della collaborazione tra le figure del cardiologo elettrofisiologo, del radiologo del sito di risonanza e del fisico sanitario quale responsabile della sicurezza dei siti radiologici.

WS.04

RUOLO DELL'INFERMIERE NELLO SCREENING DEL PAZIENTE CANDIDATO ALL'IMPIANTO DELL'ICD SOTTOCUTANEO

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Scopo: Il defibrillatore sottocutaneo detto S-ICD rappresenta ormai un'alternativa valida al tradizionale ICD transvenoso, raccomandato anche dalle linee guida. Particolarmente indicato per giovani con aspettativa di vita alta (maggiore di quella dei cateteri transvenosi tradizionali), pazienti con possibilità di recupero o con alto rischio di infezioni, che non necessitano di pacing.
Prima di preferire il defibrillatore sottocutaneo a quello tradizionale è necessario però eseguire uno screening sul paziente per valutare la piena compatibilità tra il segnale rilevato ed il dispositivo stesso. L'obiettivo principale dello screening è quello di escludere la possibilità di doppi conteggi legati ad onde T molto pronunciate, segnali cardiaci troppo deboli o a morfologie particolari.

Metodi: Presso il nostro centro lo screening viene eseguito regolarmente in autonomia dal personale infermieristico con l'ausilio di un programmatore e dell'Automatic Screening Tool, sotto la supervisione di un medico dove necessario. Individuata la posizione ottimale degli elettrodi si procede all'esecuzione del test con il paziente in posizione supina, seduta, in piedi. Lo screening è ritenuto positivo se viene superato in almeno una configurazione di sensing per entrambe le posture.
In caso di pazienti con Pacemaker viene ripetuto lo screening sia con ritmo spontaneo che con ritmo completamente stimolato.
Lo screening viene eseguito solitamente uno o due giorni prima dell'intervento.

Risultati: Un totale di 66 pazienti S-ICD sono stati sottoposti allo screening dal personale infermieristico tra cui 7 pazienti con PM. Di questi pazienti 63 hanno superato lo screening.
Dei pazienti senza PM il 70% ha superato lo screening in tutte e tre le derivazioni, il 5% ha superato lo screening in una derivazione, il restante 25% in due.
Nei pazienti con PM soltanto 3 superavano lo screening con più di una derivazione accettabile.
Al controllo a 24 mesi nessuno dei 63 pazienti ha registrato terapie inappropriate relative a doppi conteggi.

Conclusioni: Lo screening nei pazienti candidabili ad impianto di S-ICD ha dimostrato di ridurre significativamente il rischio di doppi conteggi e di terapie inappropriate. Il personale infermieristico appositamente istruito è in grado di gestire lo screening completamente in autonomia con l'utilizzo del software AST, anche nei casi più complessi.

WS.05

SAFER ALGORITHM DATA ANALYSIS IN DUAL CHAMBER ICD PATIENTS

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Introduction: Implantable cardioverter defibrillators (ICDs) are lifesaving devices, used to treat malignant ventricular arrhythmias (VAs) both in primary and in secondary prevention.
Although VAs are ICD main focus, atrioventricular (AV) conduction disorders in ICDs patients may often coexist. For this reason, ICDs are nowadays equipped with special algorithms able to minimize ventricular pacing while guaranteeing optimal VA detection.
SafeR (Microport CRM) is an algorithm able to optimally manage ventricular pacing, giving at the same time information about AV blocks type. It is available both in dual and triple chamber devices (pacemakers and ICDs), providing a complete data set of the number of blocked P-waves and the number of pauses and AV blocks during the considered follow-up (FU) period.
We report our experience with SafeR algorithm applied to dual chamber ICDs patients.

Methods: We retrospectively analyzed data of dual chamber ICDs equipped with SafeR implanted in our center over the last 5 years.
SafeR is an algorithm able to manage all AV blocks (first, second and third degree, both at exercise and at rest) and pauses (programmed by default at 3 seconds), switching from AAI to DDD when one type of AV block or pause is detected. It also provides a table with the number of AV blocks the patient experienced through time and the associated electrogram (EGM) related to AAI to DDD switch. Interestingly, it also provides the number of blocked p-waves day by day. We analyzed SafeR data, also comparing them with patient anamnesis at implant.

Results: We considered only those patients with at least 1-year full data set after ICD implantation. We excluded patients with SafeR found turned off and patients with incomplete data set. A total of 42 patients were found eligible for further analysis. Patient median age was 75 years and the majority were male (78%). Most of them (85%) were implanted for primary prevention. Median basic rate was 60 bpm; 65% of patients had rate response turned on.
Mean ventricular pacing was found at 1%. Data provided by SafeR were coherent with patient initial anamnesis. All the analyzed patients had at least one AV block episode. The most frequent was first degree AV block (85%), followed by second degree AV block (31%), third degree AV block (7%) and pause (2%). 65% of all AV blocks occurred at night, 25% during exercise and 10% at rest. Moreover, we also considered the number of blocked p-waves over time. Although our analysis cannot be conclusive, we found a trend towards a sort of seasonality, with May and December resulting as months showing an increase in blocked p-waves with respect to the other months.

Conclusion: AV conduction diseases are present in dual chamber ICDs at different levels and coexist with VAs. A full data set analyzing in detail all AV blocks, pauses and number of blocked p-waves through time can be helpful in supporting further medical therapy and ad hoc decisions.

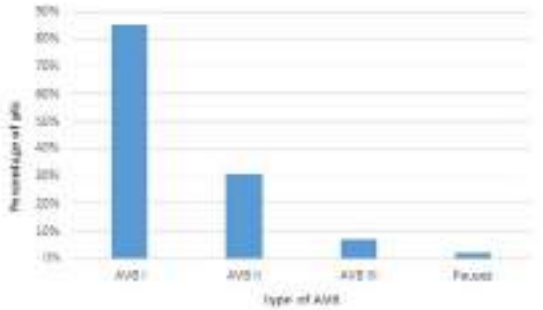
AVB episode table

	Day distr.		Night distr.	Total
	Day in exer	Day at rest		
Pause	-	-	-	-
AVB I	1 (100%)	-	-	1
AVB II	-	8 (57%)	6 (43%)	14
AVB III	-	1 (100%)	-	1
AVB Episodes	1 (6%)	9 (56%)	6 (38%)	16

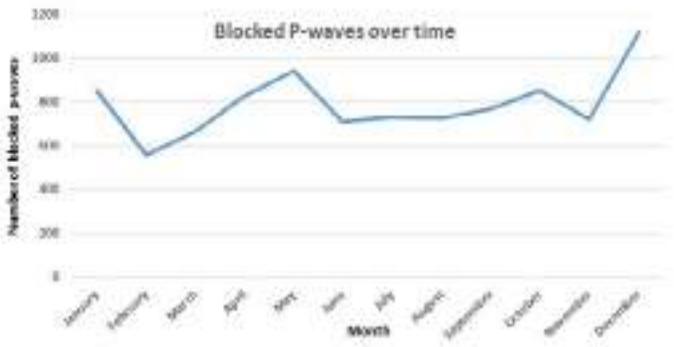
Total number of switches during the follow up: 16
One AVB episode can lead to several switches

Example of data provided by SafeR in terms of AV blocks and pause

Example of data provided by SafeR in terms of P-waves blocked



Percentage of ICD patients showing AV blocks



Blocked P-waves trend over time

WS.06

CASO CLINICO - STIMOLAZIONE DELLA BRANCA SINISTRA (LBBAP) IN PAZIENTE PRECEDENTEMENTE SOTTOPOSTA A RIPARAZIONE DELLA VALVOLA TRICUSPIDE MEDIANTE SISTEMA TRICLIP

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L'impianto convenzionale di PM prevede il ricorso ad almeno un elettrocatetere ventricolare che viene fatto avanzare attraverso il piano della valvola tricuspide. L'eventuale presenza di sistemi di correzione dell'insufficienza tricuspidalica può rendere la procedura di impianto del PM più difficoltosa.

Riportiamo il caso di una paziente di 80 anni ipertesa e affetta da FA permanente, che, a distanza di 4 mesi dalla riparazione percutanea dell'insufficienza tricuspidalica severa, mediante sistema TriClip (Abbott Medical), con posizionamento di 2 clip tra la cuspide anteriore e quella settale, è giunta alla nostra osservazione per episodio sincopale ed evidenza elettrocardiografica di FA a bassa risposta ventricolare.

Data l'indicazione ad impianto di PM definitivo e considerate le potenziali difficoltà tecniche procedurali, è stato deciso di ricorrere ad una stimolazione della branca sinistra, potendo così sfruttare la maggiore stiffness e la peculiare curva 3D del delivery (Selectra 3D, Biotronik) come ausilio al superamento del piano valvolare da parte dell'elettrocatetere e al suo impianto in ventricolo destro. Inoltre, la più fisiologica attivazione ventricolare, garantita dalla stimolazione del sistema di conduzione, ridurrebbe il rischio di scadimento della contrattilità ventricolare nonostante l'eventuale alta % di Vp.

Al termine della procedura, il controllo fluoroscopico ha evidenziato la corretta posizione dell'elettrocatetere nonché l'integrità del sistema di riparazione della valvola tricuspide, a fronte di buoni valori di sensing, impedenza e soglia di stimolazione e con tempistiche procedurali sovrapponibili a quelle di un impianto convenzionale.

WS.07

WHEN VEINS ARE NOT AN OPTION: SIMOULTANEOUS LEADLESS PACEMAKER AND S-ICD

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Introduction: The role of leadless devices to treat cardiac rhythm disorders and heart failure is emerging. Subcutaneous defibrillators (S-ICD) and leadless pacemakers (LP) were developed to reduce the risks associated with chronic transvenous leads. Among their potential benefits, we have a more favorable infection profile, reduced risk of venous stenosis or occlusion, and reduced risk of tricuspid valve insufficiency.

Case Description: We present a case of a 67 old patient with heart failure with reduced ejection fraction and third-degree AV block. Due to multiple lead dysfunctions, the patient underwent several interventions to replace the fractured lead resulting in an obstruction of the superior vein compartment. A new lead dysfunction with a capture defect brought us to proceed to lead extraction. We circumnavigated the impossibility to implant a new transvenous PMK-ICD by combination therapy with a leadless pacemaker and subcutaneous defibrillator. Appropriate programming was performed on both devices with no interference.

Conclusion: The combined implantation of leadless pacemakers and S ICD is a safe and well-working solution for selected categories of patients. However, more studies are necessary to evaluate this solution's time durability and long-term function.

WS.08

IL RUOLO DELLA FIGURA INFERMIERISTICA NELLA GESTIONE DEI LOOP RECORDER INIETTABILI IN SALA OPERATORIA

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Background: I loop recorder iniettabili (ILR) sono dispositivi indicati in vari tipi di disturbo cardiaco: i recenti processi di miniaturizzazione ne hanno semplificato impianto e gestione. Il primo monitor cardiaco iniettabile (ICM) è stato reso disponibile nel 2014 modello Reveal LINQTM di Medtronic; questo device ha dimensioni significativamente più ridotte rispetto agli ILR standard e può essere impiantato utilizzando un kit appositamente sviluppato, grazie al quale si riduce l'invasività della procedura e la formazione di cicatrici. Da circa 2 anni si è reso disponibile anche un nuovo programmatore SmartSync Device manager basato su tablet che grazie all'applicativo Linq Mobile Manager (LMM) ha reso ancora più semplice la procedura di impianto garantendo l'integrazione diretta dei dati nel sistema di controllo remoto Medtronic CareLink Network. Queste innovazioni tecnologiche hanno aperto la strada ad una nuova gestione sicura ed efficace del loop recorder ad opera dell'infermiere.

Materiali e metodi: In un arco temporale di 2 anni, abbiamo effettuato 81 procedure di impianto di loop recorder Linq II con il supporto del programmatore SmartSync e dell'applicativo LMM e arruolato XX pazienti nel sistema di controllo remoto Medtronic CareLink Network. Tutti gli impianti sono stati eseguiti secondo un workflow definito e condiviso tra medici e infermieri, secondo 4 step definiti: 1. l'infermiere prepara il paziente e inserisce i dati anagrafici nella scheda paziente disponibile in LMM; 2. il medico effettua l'impianto del dispositivo, contestualmente l'infermiere verifica la traccia dell'EGM e attiva il dispositivo grazie alla connessione Bluetooth del LINQ II, senza necessità di posizionare sull'ILR la testina. 3. l'infermiere conclude la programmazione e invia i dati del paziente e del ILR direttamente al sito Web Medtronic CareLink Network; 4. L'infermiere accede al CareLink Network e accetta l'arruolamento del paziente, senza dover inserire nuovamente le informazioni anagrafiche e del ILR.

Risultati: Con la procedura tramite programmatore 2090 il workflow era diverso e prevedeva numerosi passaggi aggiuntivi come compilare l'anagrafica del paziente, posizionare sopra il paziente la testina ad impianto concluso per la programmazione finale e inserire nuovamente i dati anagrafici del paziente nel CareLink Network, in questo modo il tempo medio del workflow di impianto era di 33 minuti, ora grazie alle nuove tecnologie il workflow di impianto ha una durata di circa 15 minuti, riducendo il tempo di permanenza del paziente in sala operatoria del 50%.

Conclusioni: Il connubio tra tecnologia SmartSync con LMM e l'iniettabilità dei dispostivi migliora l'efficienza all'interno della struttura sanitaria facendo non solo risparmiare tempo e costi, ma garantendo la possibilità di integrare i dati paziente all'impianto con la cartella clinica elettronica (EMR) e con il sistema di monitoraggio remoto CareLink Network.

ELETTROFISIOLOGIA INTERVENTISTICA

WS.09

REDUCED VASCULAR COMPLICATIONS USING ECHO-GUIDED PUNCTURE DURING CATHETER ABLATION OF ARRHYTHMIAS

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Background: Catheter ablation (CA) is routinely used for the treatment of arrhythmias. Vascular complications are the most common complications during these procedures. Previous data reported that ultrasound (US)-guided puncture is a useful method to avoid vascular complications. We reported our experience using US-guided puncture in patients undergoing CA for arrhythmias.

Methods: 273 patients (mean age 57 ± 17 years; 58% male) who underwent CA of arrhythmias using US-guided vascular puncture. Doppler sonography was performed the day after the procedure on all patients.

Results: Eighty-four patients (31%) underwent atrioventricular nodal reentrant tachycardia ablation, 49 patients (18%) atrioventricular reentrant tachycardia ablation, 14 patients (5%) atrial tachycardia ablation, 25 patients (9%) atrial flutter ablation, 63 patients (23%) atrial fibrillation ablation, and 38 patients (14%) ventricular tachycardia ablation. Vascular pseudo-aneurysms and arteriovenous fistula were defined as major complications; furthermore, venous thrombosis and inguinal hematomas were as defined minor complications. The percentage of major vascular complications was 0.3% (1 arteriovenous fistula) and the percentage of minor vascular complications was 0.3% (1 venous thrombosis).

Discussion: Ultrasound-guided vascular puncture in patients undergoing CA is useful to improve procedural success and reduce complications.

WS.10

UN INSOLITO CASO DI FLUTTER ATRIALE ATIPICO: CIRCUITO DI RIENTRO DUAL-LOOP ISTMO CAVO-TRICUSPIDALICO DIPENDENTE

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[3] *Abbott Medical Italia, Milano, ITALY*

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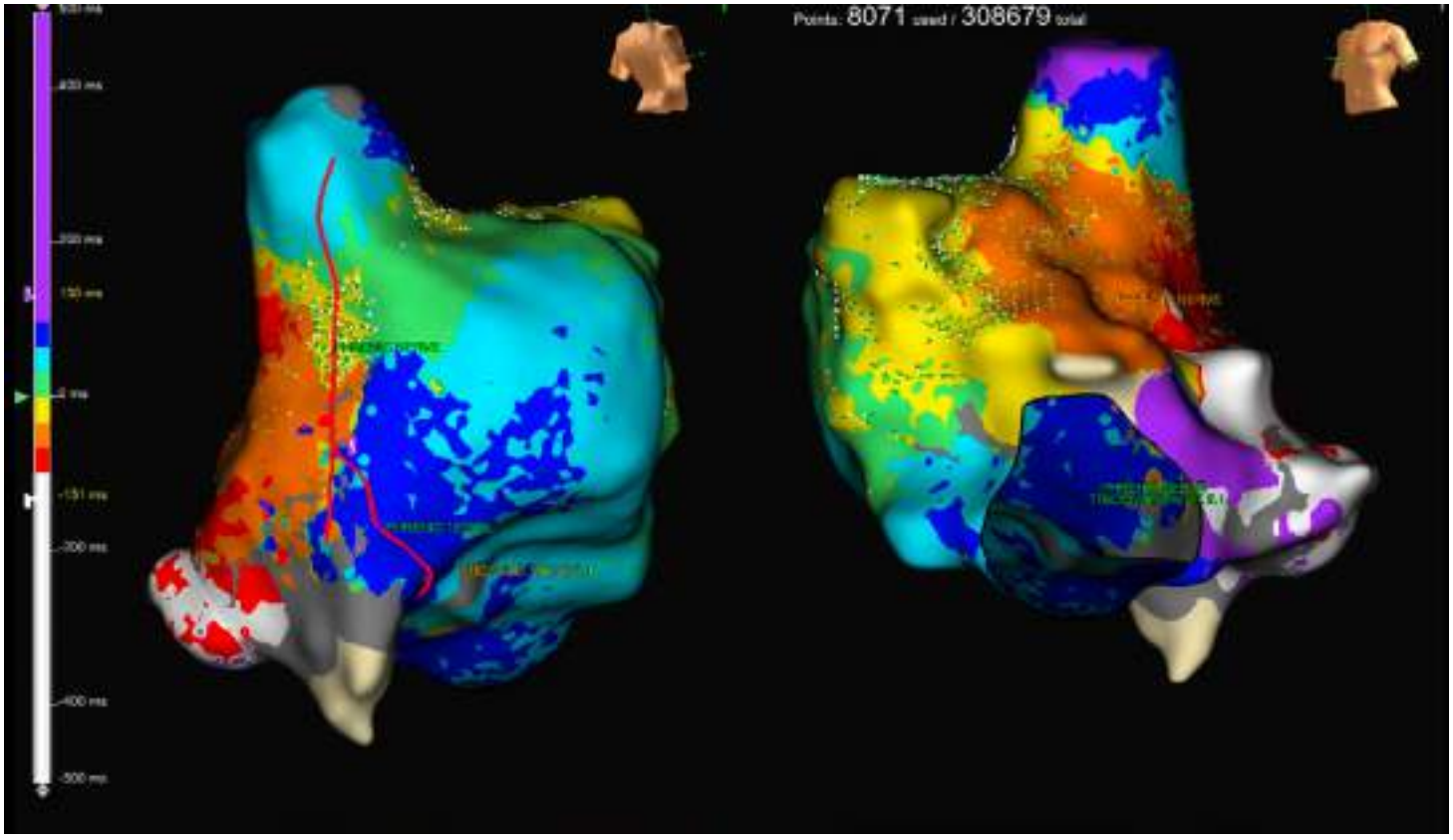
Si riporta il caso di un paziente di 70 anni, iperteso, con storia di fibrillazione atriale parossistica riscontrata nel 2012 e per la quale era in terapia anticoagulante con Dabigatran 110 mg bid. Nel 2016 veniva sottoposto ad intervento di Cox-Maze (in toracoscopia con successiva conversione a sternotomia). All'ultimo ecocardiogramma eseguito si riscontrava un ventricolo sinistro non dilatato, senza difetti di cinetica e con frazione d'eiezione conservata, dilatazione biatriale con insufficienza mitralica moderata in prolasso bilembo e sezioni destre nei limiti. Nell'agosto 2022 eseguiva una visita cardiologica di controllo durante la quale si riscontrava al tracciato ECG-grafico flutter atipico caratterizzato da onde di flutter positive nelle precordiali destre (V1-V2) e nelle derivazioni inferiori (DII-DIII e aVF). Alla luce di tale riscontro si dava indicazione ad ablazione transcatetere. Nel dicembre 2022 veniva dunque eseguito uno studio elettrofisiologico con ricostruzione elettroanatomica 3D dell' atrio destro con Sistema Abbott Abbott Ensite X con Omnipolar technology con evidenza di loop di rientro intercavale a livello della parete libera dell' atrio destro. Nella stessa sede si dimostrava, tramite pacing logo-regionale, stimolazione frenica. In considerazione del conseguente elevato rischio di lesione del nervo stesso, risultava impossibile procedere ad ablazione in tale regione. Si procedeva con tentativo di interruzione del circuito creando linea di ablazione in sede limitrofa, risultata però inefficace. Successivamente si identificava alla mappa di propagazione un ulteriore loop di rientro, in questo caso con istmo critico in sede istmo-cavo-tricuspidalica. Si procedeva dunque ad ablazione in tale regione con efficace interruzione dell'aritmia e conseguente dimostrazione di flutter atriale a doppio loop istmo cavo-tricuspidalico dipendente. Questa caratteristica ha permesso di portare a termine efficacemente la procedura nonostante l'iniziale impossibilità dovuta al rischio di lesione del nervo frenico omolaterale.

Conclusioni: Il mappaggio 3D ad alta densità e con elevata risoluzione spaziale ha permesso di delineare un inusuale circuito di rientro a doppio loop nell' atrio destro in paziente precedentemente sottoposto a procedura di ablazione chirurgica con tecnica Cox-Maze permettendo di portare a termine efficacemente ed in tempi relativamente rapidi la procedura.



WS.11

PRESSURE AND FLUOROSCOPICALLY GUIDED TRANSSEPTAL PUNCTURE WITH NOVEL ACQCROSS SYSTEM (MEDTRONIC) COMBINED WITH MEDTRONIC FLEXCATH ADVANCE FOR CRYOBALLOON PULMONARY VEIN ISOLATION

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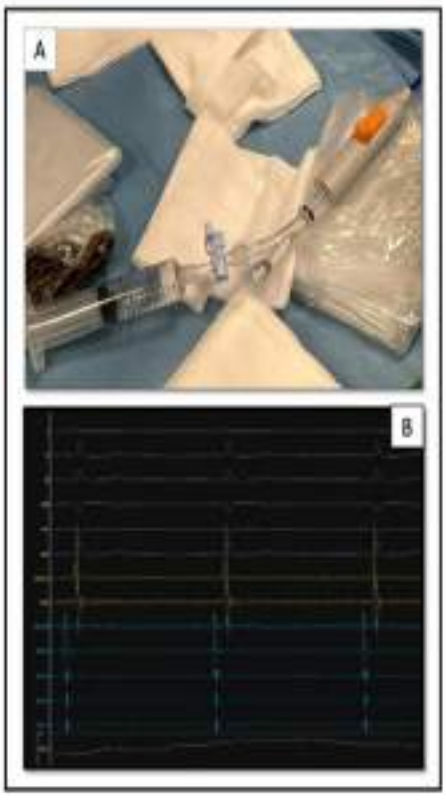
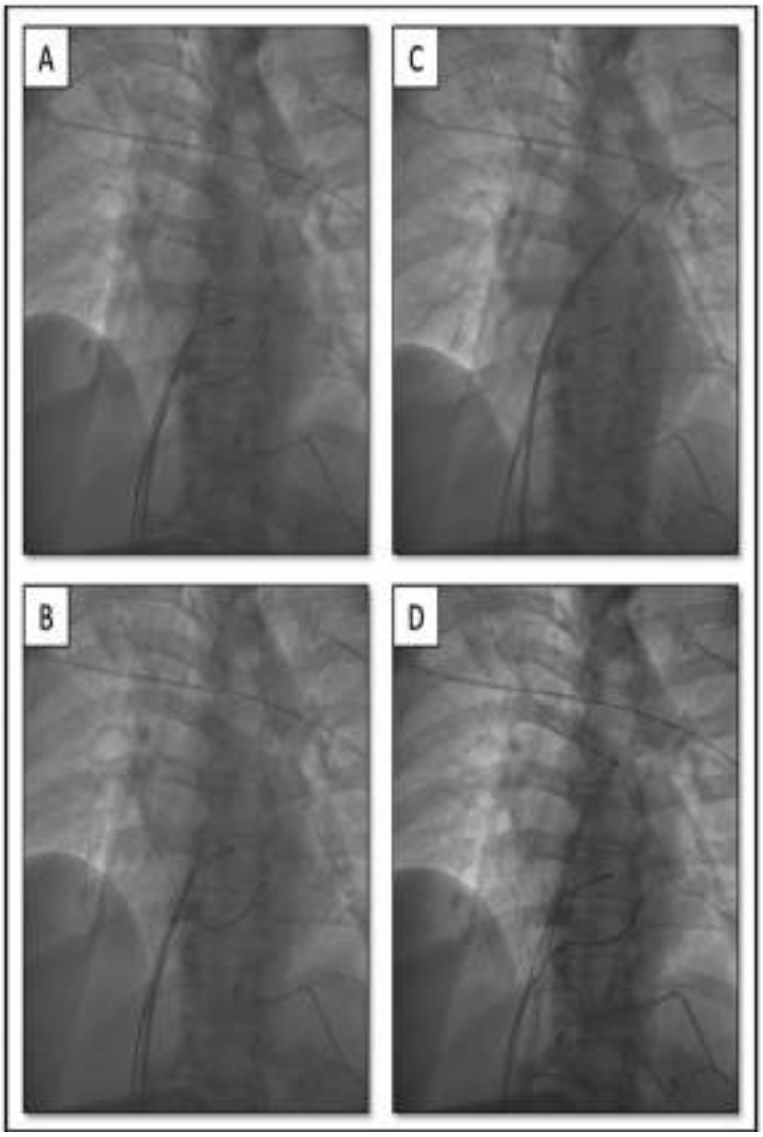
Transseptal puncture (TSP) is the crucial step in a variety of cardiac transcatheter procedures, including left side ablations. The technique was introduced into clinical practice during the late 1950s by Ross et al. and over the years the procedure has remained unchanged. TSP is a relatively safe procedure, even though complications related to it can be severe and life threatening. As a consequence new technologies have been developed in order to simplify the puncture and increase its safety. A novel transseptal crossing device (AcQCross, Medtronic) was recently introduced: it has an integrated needle/dilator design, which removes the need for needle and guidewire exchange after TSP, it fits with the different existing sheaths and the needle can also work with radiofrequency in case of need. We describe our first case of TSP with this new technology combined with Medtronic FlexCath Advance steerable sheath, guided by atrial pressure and fluoroscopy. The procedural data are displayed in the table of Fig.1. The main novelty of our approach consists in TSP monitoring with this new technology: the double check of LA pressure and fluoroscopically correct guidewire position before advancing the 15 F steerable sheath provides safety and reduces the need of cardiac imaging during the procedure. Further clinical studies need to be done to verify safety and feasibility outcomes and to finally assess the effective relevance of this new technology.

Total procedural time (min)	90
LA time (min)	45
AFL ablation time (min.)	15
Total Fluoroscopy time (min:sec)	6:07
TSP Fluoroscopy time (min:sec)	2:03
Total DAP (mGycmq)	31894





WS.12

ALCOLIZZAZIONE DELLA VENA DI MARSHALL NELLA STRATEGIA PROCEDURALE DELL'ABLAZIONE DI FIBRILLAZIONE ATRIALE PERSISTENTE: SINERGIA MEDICO-INFERMIERISTICA

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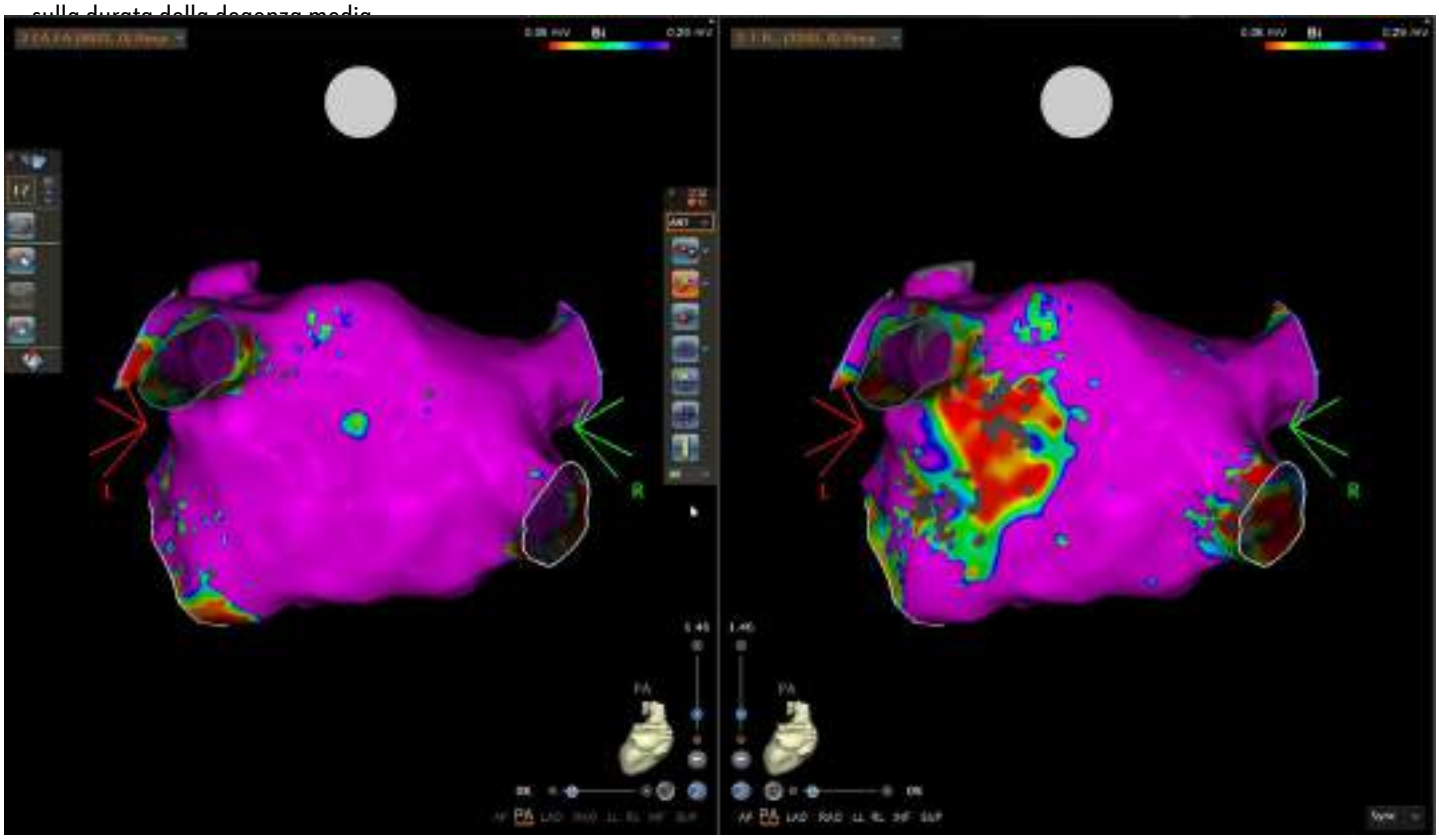
Fondazione Toscana Gabriele Monasterio, Pisa, ITALY

Abstract: La procedura ablativa della fibrillazione atriale persistente ha un successo ancora insoddisfacente.
Il substrato aritmogeno della fibrillazione atriale ha origine nelle vene polmonari che vengono trattate con isolamento elettrico mediante un ablazione circoonferenziale.
Recenti evidenze hanno dimostrato che infondere etanolo nella la vena di Marshall in aggiunta all'isolamento elettrico delle vene polmonari o al confezionamento di lesioni lineari in atrio sinistro offre vantaggi in termini di riduzione delle recidive aritmiche (fibrillazione atriale e flutter perimitralici) consentendo una maggiore probabilità di mantenimento del ritmo sinusale a lungo termine.
La vena di Marshall, che è un residuo embriologico della vena cava superiore sinistra, contiene innervazioni e focolai aritmogeni.
L'infermiere è protagonista nell' allestimento della sala, nella preparazione del paziente e dei materiali per l'approccio ablativo e anestesiologico e come co-operatore nelle fasi peri ed intraprocedurali di alcolizzazione e nel follow up per l'analisi del ritmo attraverso il monitoraggio remoto dei loop recorder impiantati durante la procedura.
Nel nostro centro sono stati arruolati per lo studio in oggetto 21 pazienti , dei quali sono state anche monitorate ed escluse complicanze insorte nelle fasi intra e post procedurali (versamento pericardico, accessi vascolari, comparsa di febbre etc) che non hanno influito sulla durata della degenza media.



WS.13

COUGH-INDUCED SUDDEN ACUTE CHEST PAIN AND MASSIVE LEFT HEMOTHORAX SOON AFTER PACEMAKER IMPLANTATION

N. Martini [1], G. Prete [1], S. Sottini [1], G. Porcelli [1], F. Migliore [1], E. Bertaglia [1], L. Leoni [1], A. Rizzo [1], G. Barbiero [3], G. Gerosa [2], S. Iliceto [1], M. De Lazzari [1]

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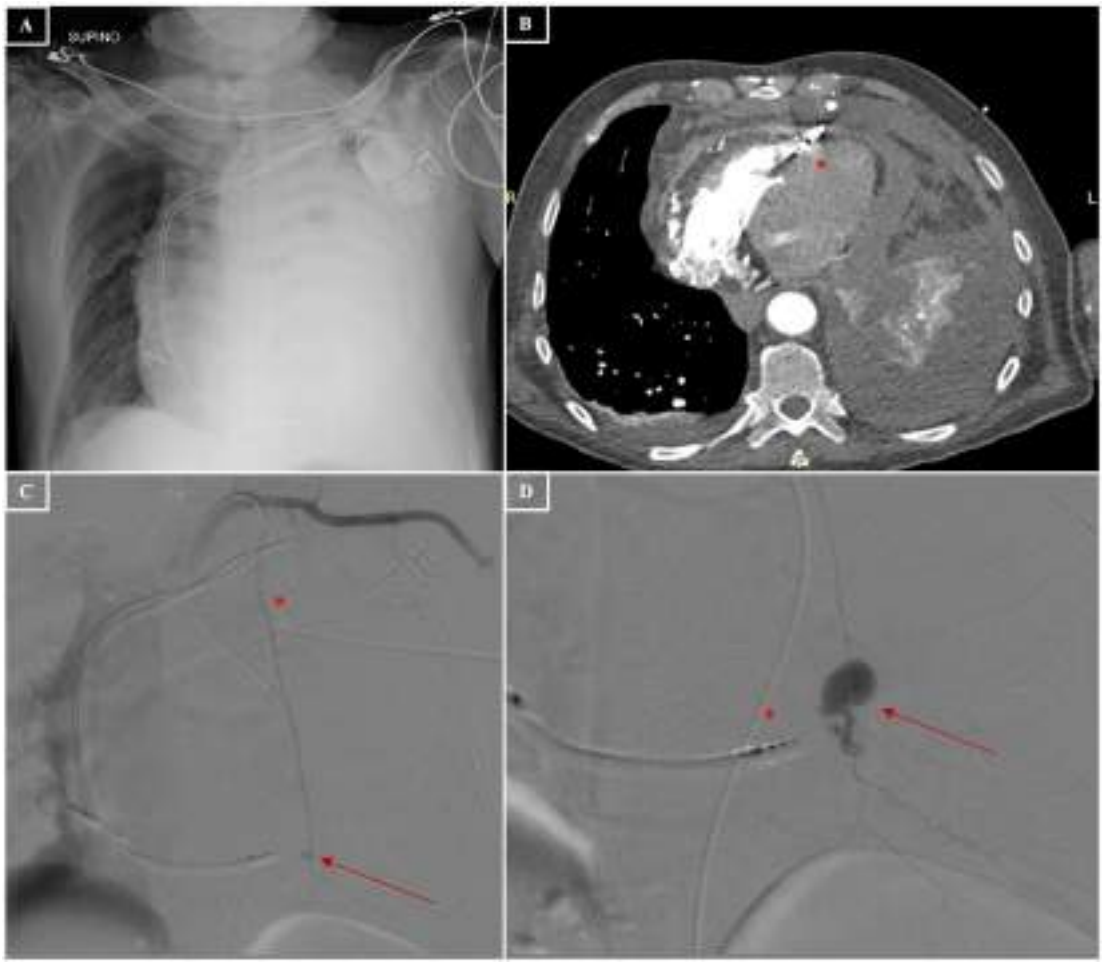
A 74-year-old man who recently undergone a definitive pacemaker implantation for a second-degree type II atrioventricular block presented to the Emergency Department because of a new-onset acute chest pain that began soon after cough episodes. At presentation he was tachypneic, sweaty and restless with a blood pressure of 90/50 mmHg, a pulse rate of 90 beats per minute and a slight reduced peripheral oxygen saturation (94%). Physical examination revealed muffled heart sounds and abolition of vesicular murmur at all left lung fields. Laboratory exams showed anemia (hemoglobin 8 g/dl) and increased values of both troponin (72 ng/L) and D-dimer (3051 micrograms/L). Chest X-Ray reported a wide opacity involving most of the left hemithorax, along with a partial contralateral shift of the mediastinal structures, and a mild opacity of the inferior right hemithorax (Figure 1, panel A). Echocardiogram and thoracic ultrasound showed normal biventricular volumes and function, a mild pericardial effusion, a mild inferior right pleural effusion and a severe and extended left pleural effusion, thus he underwent urgent thoracentesis that allowed the evacuation of blood. Pacemaker interrogation reported an increased bipolar pacing threshold (up to 3.25 V at 1 ms). He then underwent a contrast-enhanced chest CT scan followed by a percutaneous angiography that revealed the sequential perforation of the right ventricular apex and the left internal mammary artery (LIMA) by the ventricular pacemaker lead (Figure 1, panel B, C and D). Successful percutaneous embolization of the LIMA, blood transfusion and thoracentesis were then performed, and the patient subsequently underwent a percutaneous ventricular lead extraction followed by reimplantation, with an uneventful follow up after two years. This case report highlights the potential rare complication of the active fixation of the ventricular lead at the apical interventricular septum, as was in our patient's. It should lead the clinicians to keep in mind the right ventricular perforation, even without cardiac tamponade, in patients presenting to the emergency department for "cardio-pulmonary symptoms" soon after pacemaker implantation.



WS.14

ABLAZIONE DEI PLESSI GANGLIARI (CARDIONEUROABLAZIONE) IN ATRIO DESTRO IN UNA PAZIENTE AFFETTA DA SWALLOW SYNCOPE

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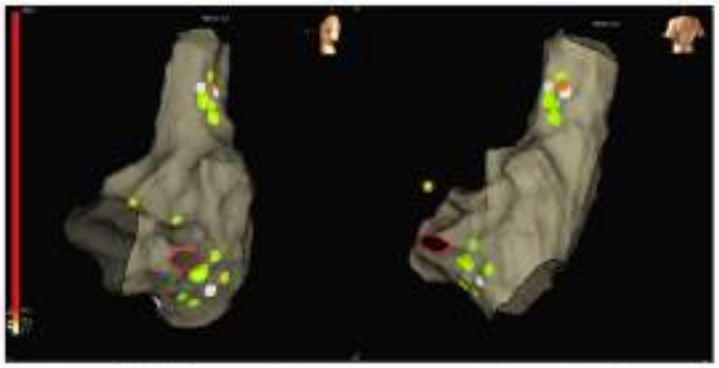
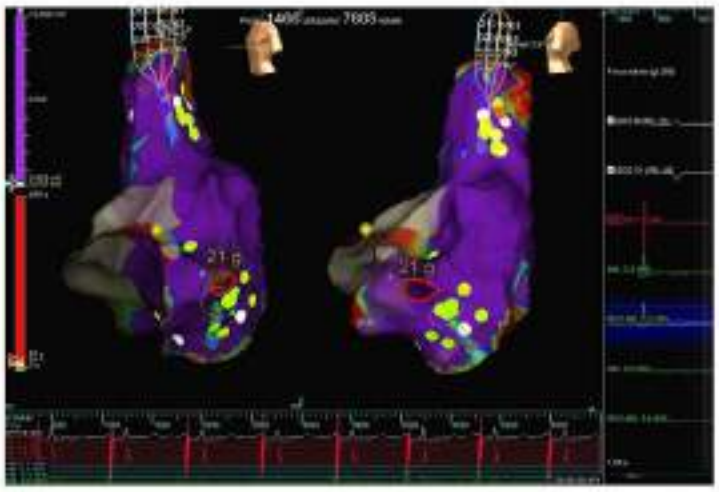
Introduzione: L'ablazione dei plessi gangliari dell'atrio destro, cosiddetta Cardioneuroablazione (CNA), è una metodica promettente per il trattamento dei pazienti < 60 anni affetti da forme severe di sincope cardioinibitoria neuromediata. La Swallow syncope è una rara forma di sincope riflessa, triggerata dall'ingestione di cibi o liquidi.

Case Report: Donna di 58 anni, esente da cardiopatia strutturale, sintomatica per frequenti episodi sincopali neuromediati mal tollerati (5 episodi/anno), con prodromi fugaci e trigger costituito dall'assunzione di liquidi. Accertamenti gastro-esofagei e studio non invasivo della sincope (stimolazione dei seni carotidei e tilt test) risultati negativi. E' stato quindi impiantato un ILR che ha documentato numerose pause diurne > 3" asintomatiche (tipo 1B "sinus bradycardia plus AV block" secondo la classificazione ISSUE), con diagnosi di sincopi neuromediate asistoliche. Alla luce dell'età < 60 anni e delle frequenti recidive sincopali, è stato proposto un tentativo di CNA in atrio destro secondo il protocollo sperimentale GIMSI "ItalianCNA", come alternativa all'impianto di un pacemaker rifiutato dalla paziente. La procedura è stata eseguita nel settembre 2022 mediante erogazioni di RF in atrio destro in prossimità dei due principali plessi gangliari, identificati mediante i cosiddetti HAFE (high amplitude fractionated electrograms). Successo in acuto con raggiungimento dei target ablativi (accorciamento intervallo AH > 20 msec, PTWb post-ablazione < 500 msec e PP post-ablazione < 70% del PP basale).
Nei 4 mesi post-ablazione si è osservata una significativa riduzione del numero di pause asistoliche > 3" (5 vs 15) rispetto al periodo precedente di durata analoga, associata alla modulazione della variabilità e della frequenza cardiaca. Tuttavia nel gennaio 2023 per una recidiva sincopale da asistolia diurna di 8" (tipo 1B ISSUE) durante assunzione di liquidi, si è deciso di impiantare un pacemaker DDD-CLS.

	Pre-ablazione	Post-ablazione
PTWb (msec)	360	340
AH (msec)	85	65
PP (msec)	890	625





Discussione: La "Swallow syncope" è una rara forma di sincope neuromediata, scatenata dalla deglutizione di cibi e liquidi anche in pazienti senza patologie esofagee organiche o funzionali sottostanti, che può determinare una significativa compromissione della qualità della vita.
Nei pazienti < 60 anni con forme severe di sincopi neuromediate cardioinibitorie, la CNA potrebbe rappresentare una valida alternativa all'impianto di un pacemaker.
Nel nostro caso, oltre al successo in acuto della CNA, è stata documentata una significativa riduzione del numero di pause > 3", in linea con l'endopint primario dello studio "ItalianCNA", confermato anche dalle variazioni dei trend di frequenza e variabilità cardiaca. Tuttavia a distanza di 4 mesi si è verificata una recidiva sincopale asistolica diurna (tipo 1B). Per tale motivo, essendo la CNA un protocollo ancora sperimentale, si è optato per l'impianto di un pacemaker DDD-CLS per la prevenzione degli episodi sincopali, con un tasso di recidive atteso del 5% a 21 mesi in accordo allo studio ISSUE3, alla luce della negatività del tilt test basale.

Conclusioni: Nei pazienti con forme severe di sincopi neuromediate cardioinibitorie la CNA sembra determinare una significativa riduzione delle pause patologiche. I risultati dello studio multicentrico "ItalianCNA" chiariranno se la CNA sia una metodica alternativa all'impianto di un pacemaker nei pazienti < 60 anni, anche in termini di riduzione delle recidive sincopali.

WS.15

SHOCK CARDIOGENO IN STORM ARITMICO DA CUSPIDE CORONARICA, UTILITA' DELL'ECOGRAFIA INTRACARDIACA IN UN CASO COMPLESSO

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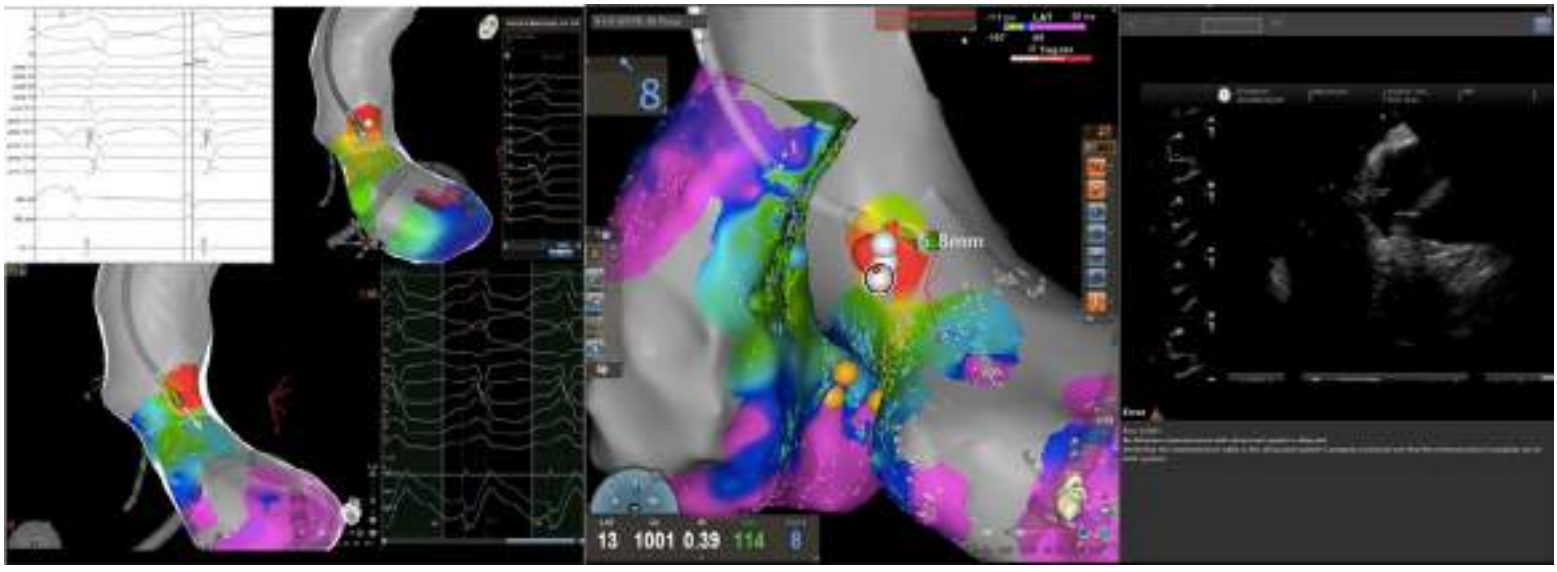
Presentiamo il caso di B.V., di anni 73, ricoverato presso il nostro reparto in seguito al rilievo di storm aritmico al monitoraggio remoto.
In anamnesi cardiopatia ischemica cronica post-infartuale ad evoluzione ipocinetico dilatativa in esiti di rivascolarizzazione percutanea su coronaria destra e portatore di resincronizzazione cardiaca (CRT-D) in prevenzione primaria per noto blocco di branca sinistra; successivo parziale recupero della funzione contrattile.
A dicembre 2022 comparsa di episodi ingravescenti di tachicardia ventricolare sostenuta (TV) con interventi efficaci dell'ICD sia con ATP che con shock. In PS TV con frequenza 149 bpm (morfologia BBS, asse inferiore e transizione in V2) sotto soglia di intervento ICD in paziente con buon compenso di circolo; interrotta con overpacing manuale. Al secondo giorno di degenza quadro di shock cardiogeno refrattario ad inotropi in corso di episodi subentranti di TVS con incessanti interventi ICD, non responsivo a Lidocaina ed Amiodarone ev. L'ecocardiogramma mostrava severa disfunzione ventricolare sinistra in assenza di valvulopatie di rilievo. Si eseguiva quindi studio coronarografico (quadro invariato) e si posizionava assistenza circolatoria artero-venosa ECMO e contropulsatore aortico, veniva in seguito avviato ad ablazione di TV urgente. Venivano reperiti sotto guida ecografica tre accessi venosi femorali a destra. Durante la procedura facile inducibilità di TV clinica con morfologia tipo BBS, transizione in V3 ed asse inferiore. Alla ricostruzione elettro-anatomica con sistema di mappaggio Carto3 e con mappante multipolare Pentaray evidenza di attivazione focale in corso di TV a livello della porzione settale distale del tratto di efflusso del ventricolo destro (RVOT) con piccola onda R al mappaggio unipolare e concordanza 85% al pace-mapping. Si è proceduto quindi a mappaggio del ventricolo sinistro per via trans-settale con anticipo maggiore nella porzione sotto-valvolare settale del tratto di efflusso del ventricolo sinistro (LVOT). Si avanzava quindi catetere da ecografia intracardiaca (ICE) in atrio destro e catetere mappante per via retro-aortica con accesso femorale destro dopo rimozione IABP. In corso di tachicardia evidenza di attivazione focale dalla cuspide coronarica destra con anticipo 25 ms, segnale QS all'unipolare e concordanza 97% al pace-mapping (Fig). La presenza dell'ICE ha consentito in tempo reale di visualizzare la distanza dell'ostio coronarico dal sito di ablazione (Fig). Veniva rilasciata RF (30 W) a livello della cuspide coronarica destra con immediata interruzione dell'aritmia. Al termine della procedura non più inducibili aritmie ventricolari sostenute .
Il paziente è stato svezzato dall'ECMO in III giornata con mantenimento di buona emodinamica in assenza di supporto inotropo. All'ecocardiogramma pre-dimissivo ventricolo sinistro con acinesia della parete inferiore con recupero della FE (44%) ai valori noti prima del ricovero. Al follow-up a due mesi non recidive aritmiche al controllo ICD.

Conclusioni: lo shock cardiogeno da storm aritmico è una sfida elettrofisiologica e richiede una gestione multidisciplinare complessa. Lo storm da cuspide coronarica non è un evenienza comune e la diagnosi in un paziente con cardiopatia post-infartuale non scontata. L'ecografia intracardiaca nell'ablazione delle TV da cuspide coronarica permette di eseguire in sicurezza l'ablazione e di evitare lo studio coronarografico intraprocedura soprattutto in un paziente complesso.



WS.16

HIGH DENSITY MAPPING IN ATYPICAL ATRIAL FLUTTER; THE ADDED VALUE OF OMNIPOLAR SIGNALS

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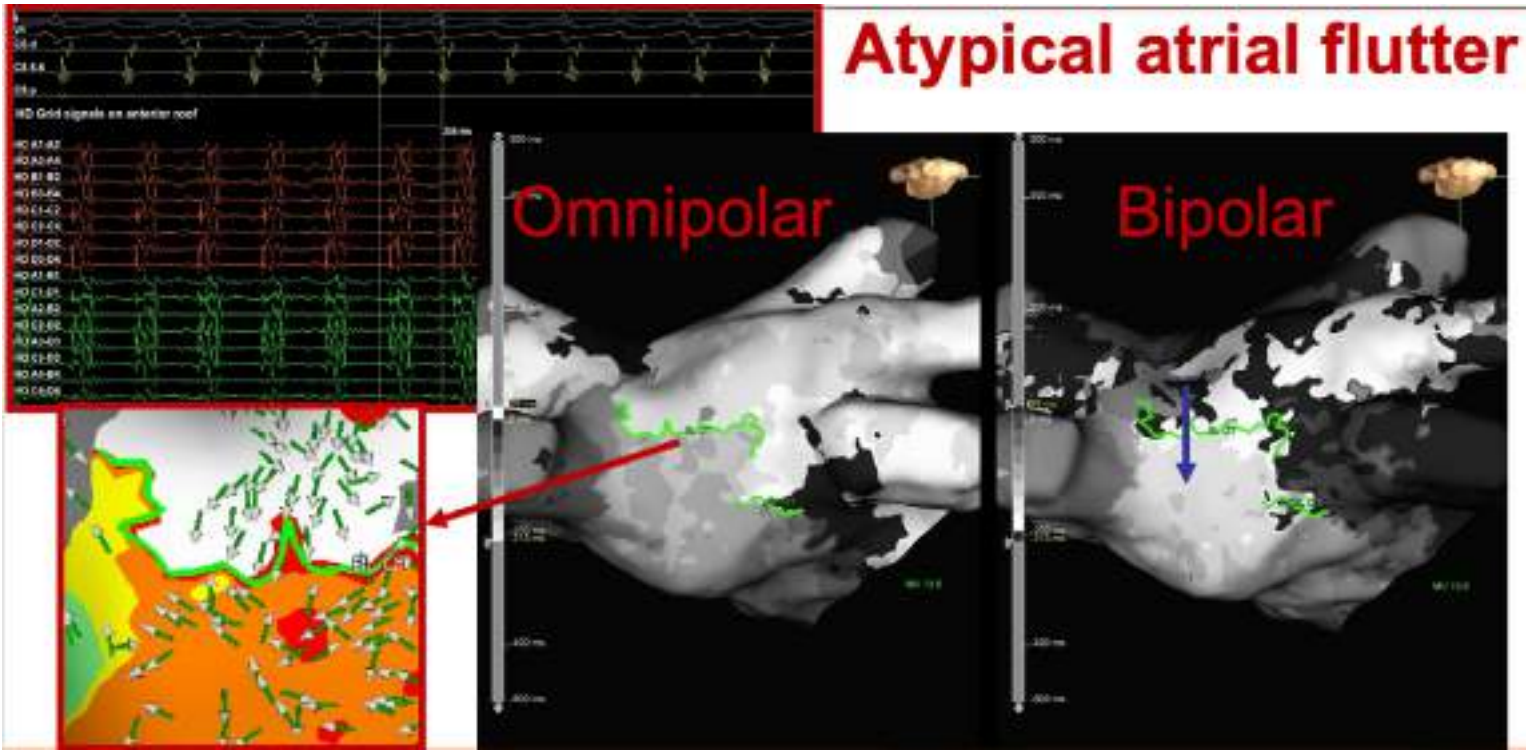
Characterizing atrial substrate and conduction properties is crucial to treat complex arrhythmias during catheter ablations. Unipolar and bipolar electrogram signals are routinely used with significant limits due to low detailed mapping, the impact of poor contact and far-field electrical signals. Moreover, signals morphology is dependent on the relative orientation of the catheter inter-electrode axis to the direction of activation. Omnipolar signals try to overcome this direction-dependence by using three adjacent electrodes to infer directional information about the local electric field.

Purpose: We compared omnipolar mapping (OM) signals with the traditional high-density bipolar mapping (BM) ones.

Methods: All the procedures were performed using a high-density grid-designed mapping catheter. The atypical left atrial flutters were mapped using both OM and BM configuration. All the analysis about voltage and potential duration are related to the entire left atrial surface excluding pulmonary veins.

Results: Ten atypical atrial flutters were mapped in the left atrium in seven patients (median age 70 y, 5 males). OM identified 7 double loops and 3 triple loops while BM identified 7 double loops, 2 triple loops and 1 single loop, missing 2 critical circuits (an example is shown in figure 1) Significant differences were present also in potentials amplitude (peak-to-peak voltage amplitude) in the critical isthmus with OM higher than BM (OM median 0.22 mV IQR [0.16 – 0.30] vs BM median 0.19 mV IQR [0.13 – 0.24], P= 0.002). Dense scar area (defined as voltage amplitude <0.05 mV) identified with OM was smaller compared to BM (1.3 cm2 IQR [0.13-1.73] vs 1.7 cm2 IQR [0.23-3.10]; P= 0.06). OM showed longer signal duration (+10.1%) compared to BM in the entire left atrium and in particular the mean signal duration in the critical isthmus (OM median 79.1 ms IQR [70.7 – 88.9] vs BM median 62.5 ms IQR [55.2 – 85.2], P= 0.006). Percentage of tachycardia cycle lenght (TCL) mapped at the critical isthmus (maximum signal duration at the isthmus/ TCL) was greater with OM than BM (OM mean 60% ± 11%, BM mean 54% ± 12% (P= 0.02)(a summary of the results are shown in table 1).

Conclusions: OM identifies higher amplitude and longer signal duration especially in the critical isthmus region also reducing the extension of dense scar area. This finding may be crucial in the definition of complex and localized reentrant activities, leading to a faster and more precise catheter ablation.



WS.17

PERSISTENT ATRIAL FIBRILLATION ABLATION WITH PULSED FIELD ABLATION (PFA) COMBINED TO ELECTROANATOMICAL MAPPING WITH HIGH DENSITY CATHETER IN A FEMALE PATIENT WITH MECHANICAL MITRAL PROSTHESIS

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A 62-year-old female patient previously subdued to atrial typical flutter ablation was referred to our hospital for persistent atrial fibrillation ablation. Transthoracic echocardiography observed normal ejection fraction with a mild biatrial dilatation and regular mechanical mitral prosthesis . Cardiac CT scan excluded left atrial appendage thrombus and observed a regular morphology of pulmonary veins (PVI).
The patient was hospitalized and underwent a persistent atrial fibrillation ablation with pulsed field ablation (PFA, Farapulse, Boston Scientific), combined to electroanatomical mapping performing with high density catheter (Rhytmia, Boston Scientific) to validate procedure. The adopted protocol consists in a four pulses in basket shape and four pulses in flower shape for each pulmonary vein and fourteen pulses in flower shape for posterior left atrial wall (PWI). At the end of intervention an high density voltage map was performed confirming electrical isolation of the PVI and of PWI. During last electrical stimulation has been induced atypical flutter. Activation map of both atria was performed and it showed septal right atrial microreentry with right isthmus blocked (figure 2). This arrhythmia was interrupted during the first single radiofrequency ablation pulse.
After a 24 hours of observation, the patient was discharged with antiarrhythmic and anticoagulant drugs. After a 6-months follow-up, the patient shows a regular sinus rhythm with no arrhytmias recurrence and no long-term complications.
We presented a case of a troubleshooting in atrial fibrillation ablation procedures, especially for "one shot" procedures. Mechanical mitral prosthesis remains a scarecrow for the use of mostly catheters in left atrium. Pulsed field ablation is a new way of treating persistent atrial fibrillation, because using alternative method it could promise lasting ablations in a time reduced. In our wide knowledge, there is still no more effective method to treat this arrhythmia in a long-lasting manner. Larger studies focusing on this topic and a long follow up are necessary to observe the management of atrial fibrillation ablations, especially in such delicate patients

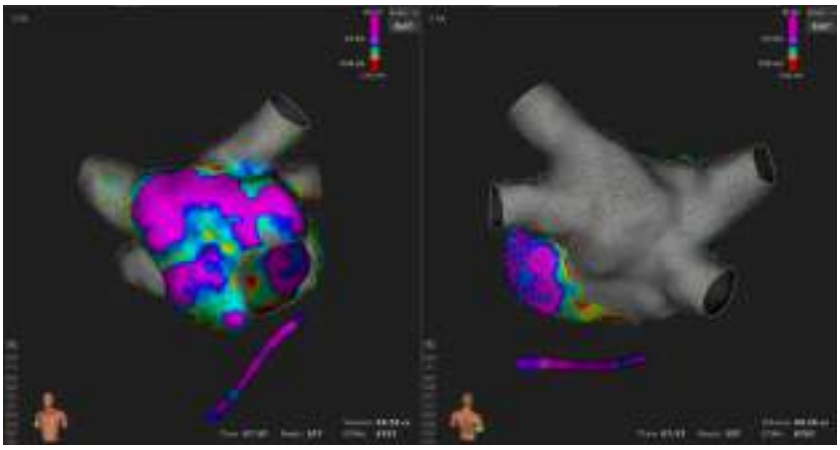

Figure 1 : Voltage high density voltage map validate PVI and PWI electrical isolation

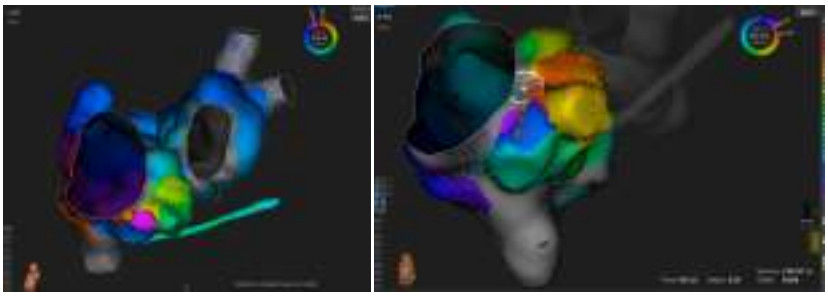

Figure 2: Both atria mapped during atrial atypical flutter and septal RA micro-reentry with CTI blocked, interrupted during a single RF pulse ablation

WS.18

IMPIANTO DI ICD VR-T DX IN PERSISTENZA DELLA VENA CAVA SUPERIORE SINISTRA

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Caso Clinico: Il paziente, un uomo di anni 74, si recava nel PS del nostro nosocomio per insorgenza di dolore toracico oppressivo e dispnea. Veniva successivamente ricoverato per quadro clinico e laboratoristico di sindrome coronarica in paziente con cardiopatia ischemica cronica. L'esame coronarografico documentava stenosi severa della coronaria destra distale sottoposto ad efficace angioplastica mediante impianto di due stent medicati. A fronte di un HCM risk score del 3,8%, tuttavia supportati da 2 criteri maggiori ACC/AHH per morte cardiaca improvvisa (TVNS+LGE esteso), nonché per la concomitante cardiopatia ischemica sottostante, pausa > 4 s, blocco AV di I grado con necessità di implementare la terapia betabloccante, NYHA II, FA parossistica, cardiopatia ipertrofica non ostruttiva, FE 49%, il paziente veniva segnalato per l'impianto di un defibrillatore bicamerale in prevenzione primaria.
Per l'impianto veniva effettuata la puntura della vena succlavia sinistra ma con l'inserimento dell'introduttore e della guida metallica si evidenziava alla fluoroscopia un decorso anomalo lungo il margine sinistro dello sterno. La venografia mostrava una vena cava superiore sinistra persistente (VCSSP) che aggettava in seno coronarico. Non essendo il paziente candidato alla stimolazione atriale, si optava per la tecnologia DX (VDD) scegliendo di impiantare un unico elettrocatetere che permettesse di conservare la sincronia atrio-ventricolare e la discriminazione delle aritmie tramite la presenza di un dipolo flottante in atrio destro. Si procedeva quindi all'impianto dell'elettrocatetere single coil a fissaggio attivo (Plexa ProMRI S DX 65/15, Biotronik) inserito attraverso la VCSSP dapprima in atrio destro (Fig.1). Per il suo posizionamento è stato utilizzato uno stiletto modellato a mano, dunque spinto attraverso la tricuspide e posizionato in tratto d'efflusso del ventricolo destro tramite loop in atrio destro (Fig.2).
Si procedeva con le misure elettriche che risultavano ottime, stabili ed in range. La traccia endocavitaria registrata dal defibrillatore risultava leggibile e non affetta da fenomeni di undersensing /oversensing. Infine si connetteva il catetere al generatore d'impulsi (Rivacor 7 VR-T DX, Biotronik).

Discussione: La VCSSP rappresenta l'anomalia più frequente del sistema cavale superiore. Essa è dovuta a un abnorme sviluppo del seno venoso, deputato a divenire seno coronarico, nei primi stadi della vita fetale. Di norma essa drena direttamente nel seno coronarico, che si presenta dilatato, e attraverso questo raggiunge l'atrio destro.
La presenza inaspettata di una VCSSP può complicare l'impianto di pacemaker o defibrillatori incrementando il tempo della procedura oppure obbligando l'operatore a re-iniziare la procedura a destra. Lo stiletto deve essere adattato all'anatomia cardiaca del paziente; un loop di 360° o un pigtail loop di 3-4 cm sono suggeriti in letteratura per facilitare l'inserzione dell'elettrocatetere nel ventricolo destro e direzionarlo attraverso la valvola tricuspide.
Nel nostro caso è stato sufficiente adattare la curva dello stiletto in modo da consentire la creazione di un loop del catetere per l'attraversamento della valvola tricuspide e il corretto posizionamento dello stesso in ventricolo destro. Inoltre per facilitare la procedura d'impianto si è optato per un defibrillatore monocamerale con discriminazione bicamerale, scegliendo di impiantare un solo catetere anziché due, consentendo di concludere l'intervento in pochi minuti.

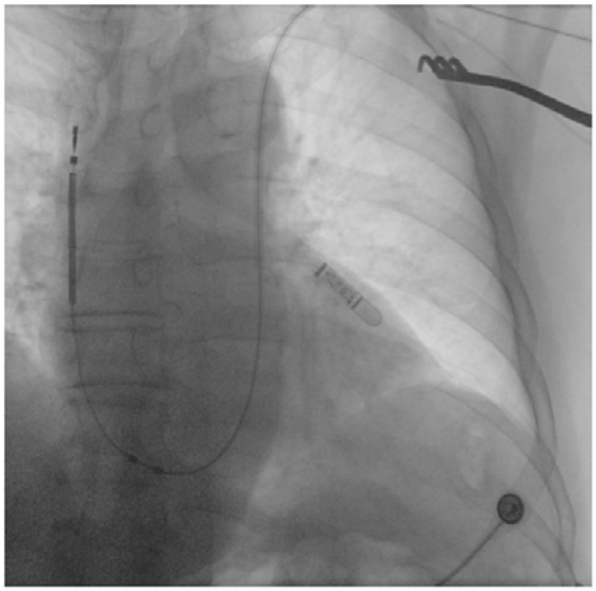

Fig.1 Decorso dell'elettrocatetere che, attraverso la VCSSP, viene inizialmente spinto in atrio destro

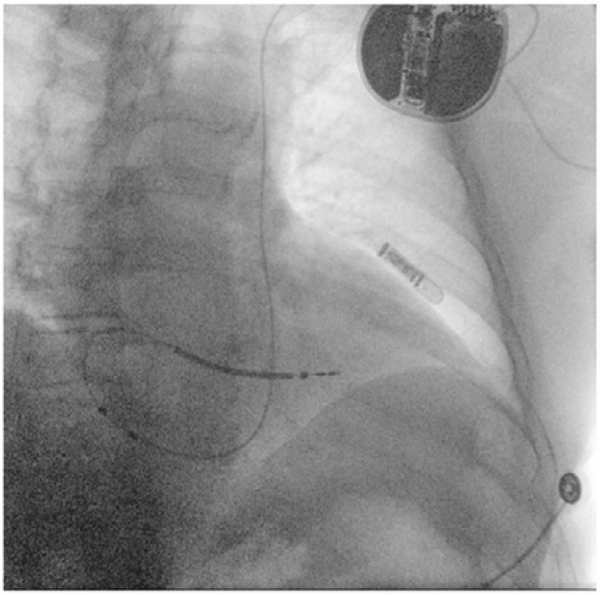

Fig.2 Posizionamento in tratto d'efflusso dell'elettrocatetere tramite stiletto appositamente modellato, con dipolo flottante in atrio destro

WS.19

ATRIAL FIBRILLATION RECURRENCES DURING THE BLANKING PERIOD AFTER CATHETER ABLATION FOR AF WITH THE LASER BALLOON TECHNIQUE

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Background: Regardless of the procedural characteristics and AF type, the role of early atrial tachyarrhythmias (ATAs) recurrences during the 3-month post-ablation timeframe – the so-called 'blanking period' (BP), is still unclear.

Purpose: The objective of this analysis was to evaluate ATAs recurrences during the BP after catheter ablation for AF with the laser balloon (LB) technique.

Methods: All patients undergoing catheter ablation for AF using the second (LB2) or third-generation (LB3) technique at three EP laboratories in Italy (Ospedale Luigi Sacco, Milan - Ospedale San Gerardo, Monza - Policlinico S.Orsola-Malpighi, Bologna) between February 2018 and July 2022 were retrospectively enrolled.

Results: 224 patients underwent AF ablation with the LB. Median age of the entire cohort was 63.0 [55.5 – 69.5] years and 74.1% of patients were males. Persistent AF was the underlying AF pattern in n=64 (28.6%) of cases. Seventy-eight (34.8%) patients were followed-up with an ILR. A LB3 was used in n=172 patients (76.7%). Median procedural and fluoroscopy times were 105 [87–140] mins and 24.3 [15–34] mins, respectively. A total of 10 (4.5%) periprocedural complications were observed in the study cohort: 3 phrenic nerve palsy, 5 groin hematoma, 1 periprocedural stroke and 1 pericardial effusion. As for the primary outcome (Figure: left panel), n=35 (15.6%) ATAs recurrences during the BP have been found; this rate remained consistent at 6-month follow-up, while increasing at 12-month follow-up, with n=66 (29.5%) detected recurrences. Survival analysis was plotted in Figure, right panel. Overall median AF burden at both 6- and 12-month follow-up was 0 [0-0] and 0 [0-0.1]%, respectively. Predictors of ATAs recurrences after the BP were investigated (Figure: right panel). At univariate analysis, male sex, chronic HF, persistent AF and recurrences during blanking period (HR 15.374, CI [4.807 – 49.175], p<0.001) were found to be significantly associated with ATAs recurrences. At multivariate analysis, only experiencing ATAs recurrences during the BP remained significantly associated with the outcome of interest, both in the entire cohort and in the paroxysmal AF patients' subgroup. 18 (8.0%) patients were readmitted during the BP: among those, all patients who presented with AF (n=10, 4.5%) were treated with electrical cardioversion, while no redo AF ablations were performed. However, n=4 (1.8%) patients underwent radiofrequency catheter ablation due to other ATAs detection: 1 isthmus-dependent AFl, 1 atypical left-sided AFl, 1 right-sided AT and 1 AVNRT.

Conclusion: This study represents the first assessment on the impact of recurrences during the BP after catheter ablation with a LB. After adjusting for confounders, ATAs recurrences during the BP appear to be the most significant predictor of ATAs recurrences after the BP, regardless of AF pattern. AF recurrences during the BP post-catheter ablation for AF may condition in-hospital readmission and are mostly treated with electrical cardioversion in common clinical practice.

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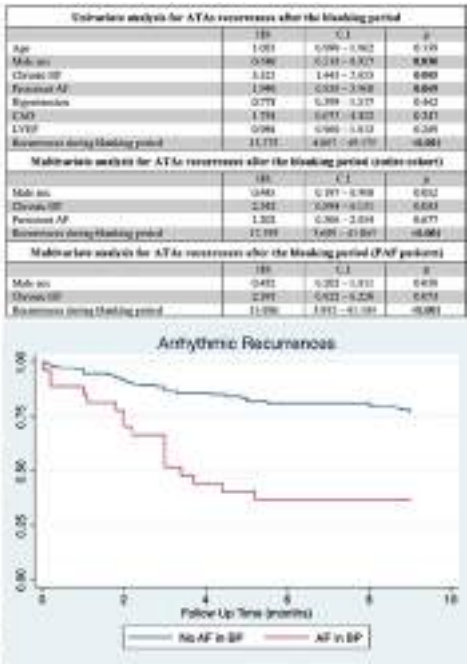
Time-sensitive ATAs recurrences in the entire cohort (n=224)	
Arrhythmic recurrence during blanking period, n (%)	35 (15.6)
Arrhythmic recurrences at 6-month follow-up	
Experiencing AF/AFl, n (%)	35 (15.6)
On AADs, n (%)	80 (35.7)
Arrhythmic recurrences at 12-month follow-up	
Experiencing AF/AFl, n (%)	66 (29.5)
On AADs, n (%)	91 (40.6)
Time-sensitive ATAs recurrences in the ILR subgroup (n=78)	
Arrhythmic recurrence during blanking period, n (%)	11 (14.1)
Arrhythmic recurrences at 6-month follow-up	
Experiencing AF/AFl, n (%)	19 (24.4)
Burden, median [IQR]	0 [0 – 0]
Burden if recurrence, median [IQR]	4.5 [0.1 – 30]
Arrhythmic recurrences at 12-month follow-up	
Experiencing AF/AFl, n (%)	27 (34.6)
Burden, median [IQR]	0 [0 – 0.1]
Burden if recurrence, median [IQR]	1 [1 – 5.4]
Outcomes during the blanking period	
In-hospital readmissions during blanking period n (%)	18 (8.0)
Electrical cardioversion for AF, n (%)	10 (4.5)
Catheter ablations, n (%)	4 (1.8)
AF, n (%)	0 (0)
Other ATAs, n (%)	4 (1.8)
TIA, n (%)	1 (0.4)
Bleeding events, n (%)	2 (0.9)
Tako-tsubo syndrome, n (%)	1 (0.4)



WS.20

CATHETER ABLATION OF VENTRICULAR TACHYCARDIA ARISING FROM THE LEFT VENTRICULAR ANEURYSM BORDER ZONE: A CASE REPORT

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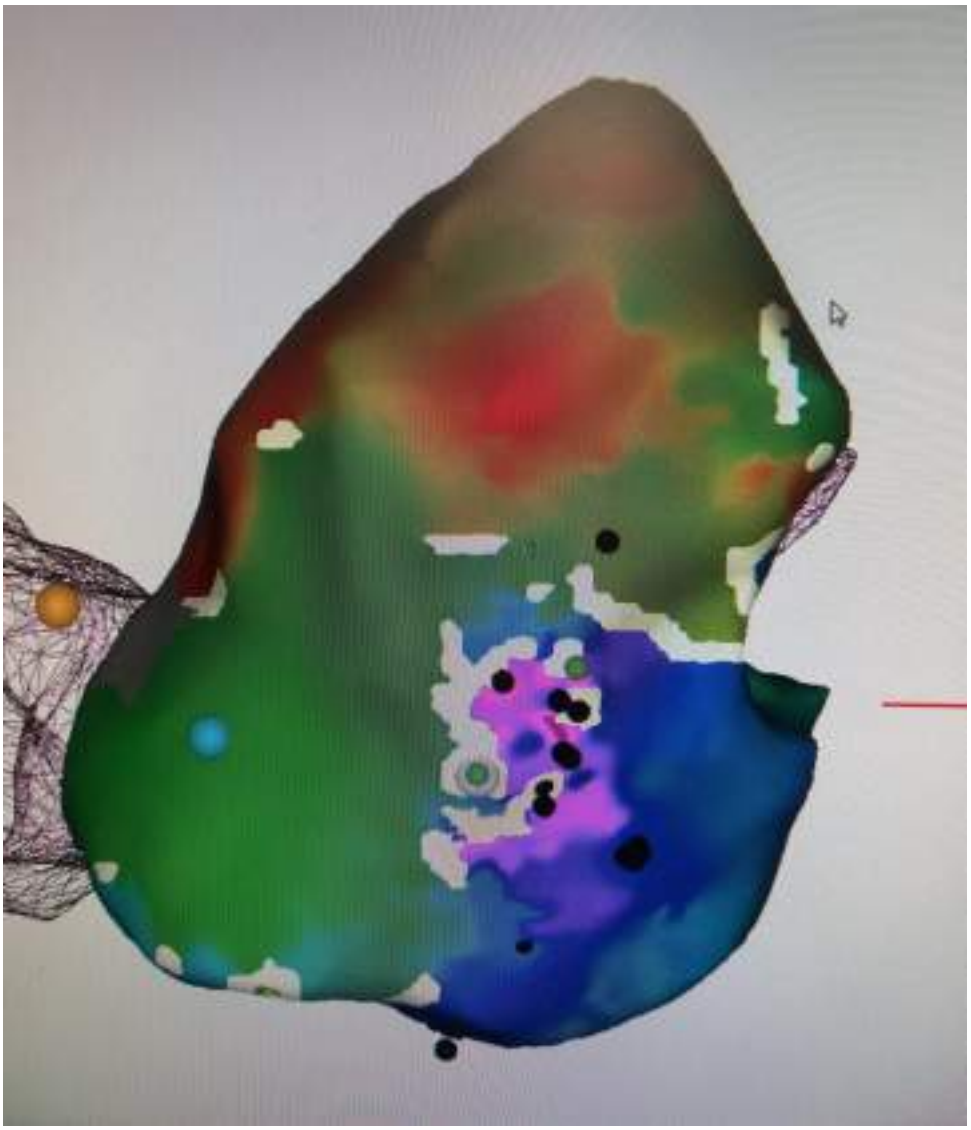
Introduction: Post-infarction left ventricular aneurysm (LVA) is a serious sequela of an extended transmural myocardial infarction. This can subvert both mechanical and electrical heart properties becoming a serious risk factor for ventricular arrhythmias. The substrate for LVA-related (ventricular tachycardia) VT is usually located in the aneurysm's border zone.

Case report: We report a case of a 70-year-old man with a history of ischaemic cardiomyopathy and reduced LV ejection fraction. The patient presented to our emergency department with sustained VT and hemodynamic instability. Recurrent episodes of VT requiring DC shock occurred during the hospitalization. Long QT and the patient's comorbidities brought us to perform a successful VT catheter ablation. By confronting the CRM scan with the 3D electroanatomical mapping made in the EP lab, we were able to identify the LV aneurysm border zone as the main critical isthmus for the genesis and maintenance of the VT.

Conclusion: In selected patients, VT catheter ablation may be the most efficient solution to improve patients' quality of life end reduce ICD shock. The presence of LVA should be investigated in all patients. LVA catheter ablation is a high-risk procedure and should be performed only in selected and experienced centers.



WS.21

PRIMO CASO UMANO DI TEMPESTA ARITMICA TRATTATA MEDIANTE IL NUOVO CATETERE ABLATORE HIGH-POWER-SHORT-DURATION TACTIFLEX

Y. Valeri, P. Compagnucci, G. Volpato, L. Cipolletta, Q. Parisi, A. Misiani, F. Guerra, M. Casella, A. Dello Russo
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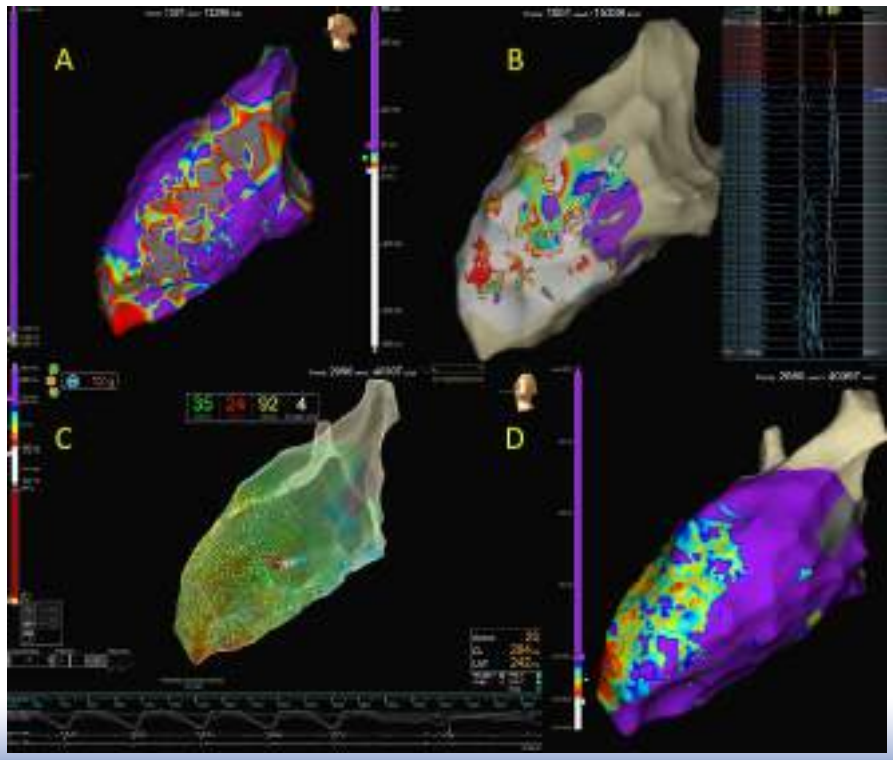
Background: negli ultimi anni il trattamento ablativo standard per le aritmie ventricolari è stato rappresentato dai sistemi a radiofrequenza standard-power-long-duration. Sono stati tuttavia recentemente introdotti sul mercato nuovi sistemi a radiofrequenza high-power-short-duration e il catetere ablatore TactiFlexTM è il più recente.

Obiettivo: presentiamo il primo caso in letteratura di tempesta aritmica trattata mediante il nuovo catetere ablatore high-power-short-duration TactiFlexTM.

Caso clinico: D.M., donna di 78 anni, accedeva al Pronto Soccorso per tempesta aritmica. Circa 30 giorni prima, causa infarto miocardico di tipo NSTEMI, fu sottoposta ad angioplastica e impianto di stent medicato su CD2; le frequenti aritmie ventricolari furono ben controllate dalla terapia medica. All'ingresso in Pronto Soccorso la paziente era soporosa, la pressione arteriosa era 80/50mmHg e il monitoraggio elettrocardiografico mostrava una tachicardia ventricolare monomorfa e sostenuta, a ciclo regolare, morfologia blocco di branca sinistro con concordanza negativa nelle derivazioni precordiali. Alla terapia d'ingresso (metoprololo, cordarone e mexiletina) furono aggiunte procainamide e lidocaina, con scarsi risultati nel controllo dell'aritmia. Fu deciso dunque di procedere con l'ablazione trans-catetere dell'aritmia.Con l'ausilio del catetere da mappaggio-ablazione TactiFlexTM, del catetere mappante ad alta densità AdvisorTM HDGrid, del nuovo sistema di mappaggio elettro-anatomico EnsiteX V2 e della tecnologia Omnipolare veniva eseguito il mappaggio della camera ventricolare sinistra mediante approccio sia transettale che retro-aortico. Fu ricostruita la geometria del ventricolo sinistro. La mappa di substrato di voltaggio evidenziava, a livello della parete postero-laterale medio-basale del ventricolo sinistro, una piccola area di scar densa (<0,5mV) circondata da un'estesa area di bassi potenziali (0,5-1,5mV) (Fig.A). Nella medesima regione, la mappa di substrato dei potenziali tardivi mostrava un'estesa regione con potenziali tardivi e multi-frammentati (Fig.B). All'ecografia intra-cardiaca, la stessa regione appariva assottigliata e iper-riflettente, come da pregresso danno ischemico. Mediante stimolazione ventricolare programmata la tachicardia ventricolare veniva facilmente indotta, in maniera riproducibile. Tuttavia, durante il mappaggio di attivazione, probabilmente per il coinvolgimento di regioni epicardiche nel circuito dell'aritmia, non venivano individuati né potenziali meso-diastolici né una regione di "early-meets-late".(Fig.C) La mappa di attivazione di velocità mostrava un rallentamento dell'aritmia (<1m/s) nella medesima regione dei bassi potenziali e dei potenziali tardivi (Fig.D). Mediante molteplici polsi di radiofrequenza (35W-25 secondi e 40W-20 secondi) nella regione postero-settale medio-basale del ventricolo sinistro si otteneva l'interruzione della tachicardia. Seguiva dunque l'omogenizzazione del substrato patologico. Al termine della procedura nessuna aritmia ventricolare risultava inducibile mediante stimolazione ventricolare programmata. Non è stata riscontrata nessuna complicanza procedurale o peri-procedurale.

Conclusioni: il nuovo catetere ablatore high-power-short-duration TactiFlexTM sembra essere sicuro ed efficace per il trattamento delle tachicardie ventricolari del ventricolo sinistro. Sono tuttavia necessarie ulteriori esperienze e studi per valutare Watts e secondi più appropriati per effettuare lesioni sicure ed efficaci nel ventricolo sinistro.



WS.22

THE STILL UNRESOLVED ISSUE ON WHAT IS THE BEST ABLATION STRATEGY IN REDO-ABLATION FOR RECURRENT ATRIAL FIBRILLATION: INSIGHTS FROM A SINGLE-CENTRE EXPERIENCE

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Introduction: Catheter ablation (CA) is the cornerstone treatment for atrial fibrillation (AF). Nevertheless, its efficacy is still suboptimal. Observational studies have shown that after an index CA, a redo procedure is associated with a reduction in arrhythmic burden compared to medical therapy alone. However, there is currently no standardized approach for redo procedures. The aim of our study was to evaluate the incidence of arrhythmic recurrences after a redo CA depending on the adopted procedural strategy.

Methods: In this observational, retrospective, single center study, consecutive patients who underwent a CA redo procedure for recurrent AF were enrolled. The primary endpoint was a documented recurrence of atrial tachyarrhythmia lasting more than 30 seconds in the first 12 months of follow-up. The population was divided into three groups, according to the procedural strategy adopted. The choice of the preferred ablation strategy was based on the evidence of pulmonary veins (PV)-reconnection and/or on the results of left-atrial voltage mapping. Hazard ratio (HR) and the relative 95% confidence interval (CI) were calculated for the different groups and compared to group 1 using the Cox method. In a sub-analysis, logistic regression was used to calculate odds ratio and the relative 95% CI for the risk of non-paroxysmal AF recurrences.

Results: Forty-five patients were included in the analysis (84% male, median age at redo 63 [54-68] years). The mean left ventricle ejection fraction was 57%±6%, 25 patients (56%) had paroxysmal AF, 20 (44%) had structural heart disease, and 32 patients (71%) had left atrial dilatation. The first procedure was performed with radiofrequency in 38 patients (84%) while cryoenergy was used in the remaining 7 (16%). At the time of redo 32 patients (71%) presented an electrical reconnection of the PVs. Twenty-two patients (49%) underwent PV re-isolation only (group 1), 10 (22%) PV re-isolation with the addition of further lesions in non PV targets (mostly posterior wall isolation) (group 2) and the remaining 13 (29%) were treated with only lesions on non PV targets only (group 3). Overall, primary outcome occurred in 20 patients (44%), without significant differences between the 3 groups (HRG2-1 1.10 95%CI 0.33-3.64; P=0.88; HRG3-1 2.27 95%CI 0.85-6.08; P=0.10). On the sub-analysis a higher risk of non-paroxymal recurrences was observed in group 2 vs group 1 (OR 14,0 95% CI 1,3-150,0, p=0,029). No other risk factors were identified as predictive for AF recurrence after a redo-procedure.

Conclusions: In our single center experience, no difference was found in the risk of AF recurrences after a redo CA when comparing different ablation strategies. Although patients who underwent non-PV targets ablation were more likely those with a greater extent of atrial disease, the use of non-PV lesions conferred no additional benefit and was also potentially associated with a higher risk of developing non-paroxysmal AF recurrences.

MAPPAGGIO ED IMAGING CARDIACO IN ARITMOLOGIA

WS.23

COMBINED USE OF VOLTAGE MAPPING AND SPECKLE-TRACKING ANALYSIS FOR THE CHARACTERIZATION OF ARRHYTHMOGENIC CARDIOMYOPATHY: A CASE REPORT

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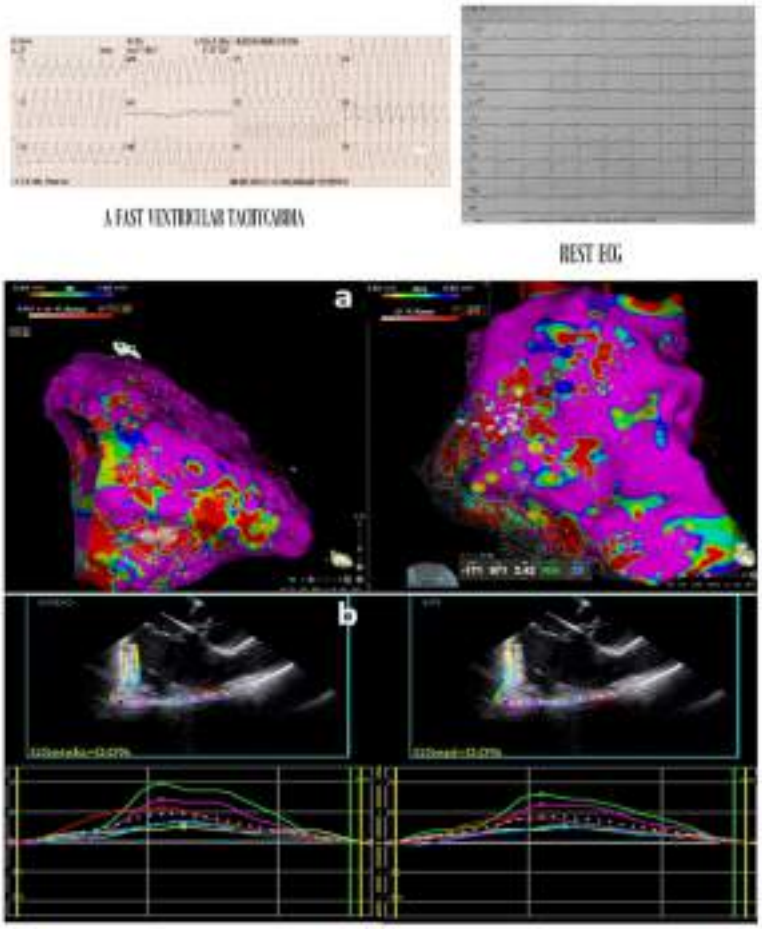
A 38-year-old man was admitted to our emergency department because of syncope caused by documented fast ventricular tachycardia with left bundle branch block morphology and vertical axis. After ventricular tachycardia treatment, a sinus ECG showed V1-V3 T wave inversion.
A cardiac magnetic resonance showed biventricular signs of Arrhythmogenic Cardiomyopathy. Subsequently, a 3D reconstruction of the right ventricle was performed, followed by a voltage map that identified two distinct low voltage areas.
In addiction, we performed an advanced speckle tracking echocardiography on RV intracardiac echocardiography slices, which documented a reduction of longitudinal ventricular strain in correspondence of the low voltage areas.
Electroanatomical voltage mapping is able to identify electroanatomical scars that correlate with the histopathological features pathognomonic of the disease. Several studies have addressed the ability of unipolar and bipolar electroanatomic mapping to identify dysplastic areas identified by echocardiography in an ACM population. Compared with TTE, ICE has better imaging resolution and can provide an optimal RV inflow/outflow view for RV anatomy and function evaluation and strain deformation assessment. In our case, the images we collected and the analysis we performed are consistent with the identification of dysplastic areas. In fact, we performed a sub endocardial, endocardial and global speckle tracking analysis. The sub-tricuspid valve region was mostly affected, and the RVOT area resulted in reduced epicardial longitudinal strain. This data was actually similar to the uni and bipolar voltage mapping data that suggested an epicardial affection of the RVOT.
The integration of ICE ventricular strain with voltage mapping could improve the sensibility of an early diagnosis of the ACM. The use of ICE, permits a precise definition of the RV boundaries and the ability to easily distinguish endocardial and epicardial layers, with a zero-fluoroscopy approach.
In this clinical case, an endocardial catheter ablation of the arrhythmic substrate was performed, and an implantable cardioverter defibrillator was placed. During the following year of follow up, no further sustained VT was identified by the S ICD.



MISCELLANEA

WS.24
RAZIONALE DELLA TERAPIA CON OAC A LUNGO TERMINE IN PAZIENTE AD ELEVATO RISCHIO TROMBOEMBOLICO E CHIUSURA PERCUTANEA DI AURICOLA SINISTRA

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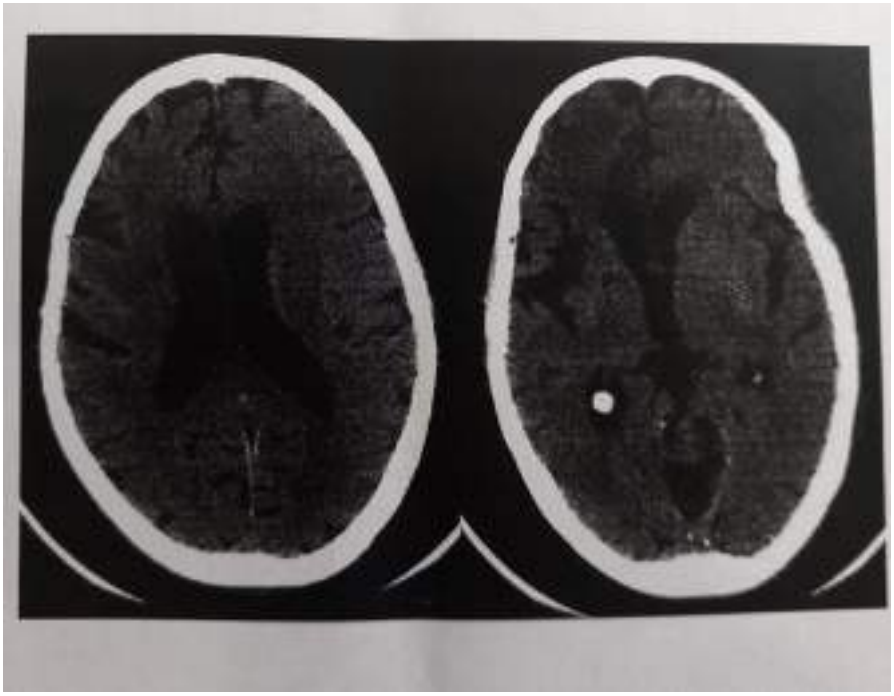
Introduzione: Gli anticoagulanti orali sono ormai il caposaldo per prevenire gli eventi tromboembolici. I NAO in particolare, offrono un dosaggio fisso, una farmacocinetica più prevedibile e minori interazioni con farmaci ed alimenti. Nonostante ciò, in alcuni pazienti con elevato rischio tromboembolico il loro profilo di efficacia/sicurezza risulta ancora debole.

Caso Clinico: Paziente di 67 anni, sottoposta nel 2019 ad intervento cardiochirurgico di plastica valvolare mitralica per via minitoracotomica destra, per insufficienza severa da prolasso P2 P1. Nella immediata fase postoperatoria insorgenza di episodi di fibrillazione atriale ad elevata risposta ventricolare, per cui viene impostata terapia con betabloccante. La paziente viene dimessa in betabloccante e Warfarin (da sospendere a 3 mesi dall'intervento in assenza di episodi aritmici). Le linee guida pongono in classe 2B il trattamento con OAC nella fibrillazione atriale postoperatoria. Ripetuti Holter cardiaci delle 24 h nei successivi 5 mesi dalla data dell'intervento non evidenziano episodi aritmici, pertanto viene sospeso Warfarin ed introdotta terapia con ASA. Nel 2021, per un episodio di TIA, viene introdotta terapia con NAO (Dabigatran 150 bid). Nonostante l'aderenza terapeutica da parte della paziente, nel 2022, per comparsa di deficit emisomatico sinistro, effettua accesso in PS, dove TAC cranio + AngioTAC evidenziano occlusione di arteria cerebrale media (ACM) e arteria cerebrale anteriore (ACA), per cui si procedeva a trombectomia meccanica primaria con esiti alla dimissione di emiplegia sinistra. Veniva confermato trattamento con Dabigatran 150 bid. La paziente evidenziava ad una TACcranio di controllo, eseguita in ottobre 2022, esito ischemico fronto-insulare destro, encefalopatia vascolare cronica, atrofia e con persistenza disegni clinici di plegia all'arto superiore sinistro, paresi arto inferiore sinistro.
Valutato l'elevato rischio tromboembolico, veniva inviata presso centro specialistico per chiusura percutanea di auricola sinistra. Dopo ricostruzione di auricola sinistra mediante sistema CARTO, si posiziona occlusore di auricola Amplazer Amulet. La procedura si conclude senza complicanze, confermando in dimissione medesima terapia.

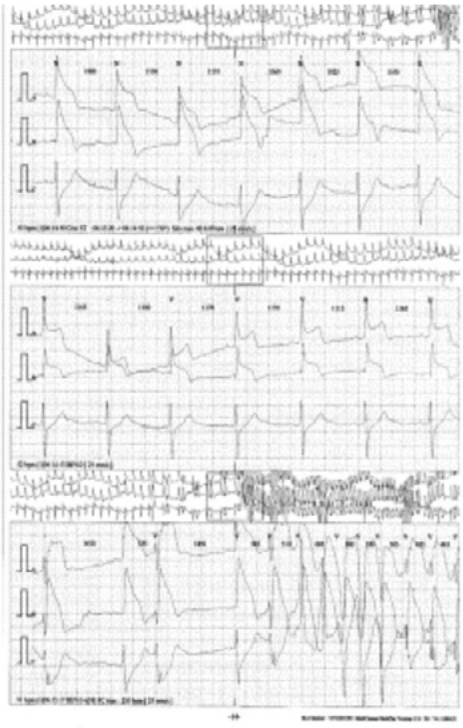
Conclusioni: Le linee guida pongono la terapia anticoagulante a lungo termine, nei pazienti sottoposti a chirurgia di fibrillazione atriale e chiusura dell'auricola, in classe di raccomandazione I, livello di evidenza C, in base al rischio tromboembolico del paziente valutato mediante il punteggio CHA2 DS2 VASC. La nostra paziente presenta un CHA2 DS2 VASC pari a 4 (donna, età 67, precedente stroke) e HAS-BLED pari a 2 (precedente stroke, età >65). In considerazione dell'elevato rischio tromboembolico e del moderato rischio emorragico è razionale continuare terapia con NAO oppure è preferibile terapia antiaggregante? Considerando che le linee guida indicano terapia con Aspirina 75-325 mgdie indefinitivamente o Clopidogrel e nessuna somministrazione di OAC. La chiusura dell'auricola sinistra rappresenta sempre una valida alternativa alla terapia anticoagulante orale a lungo termine?

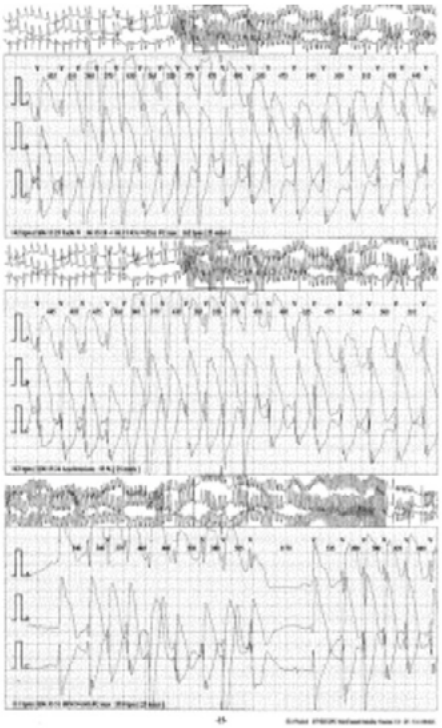


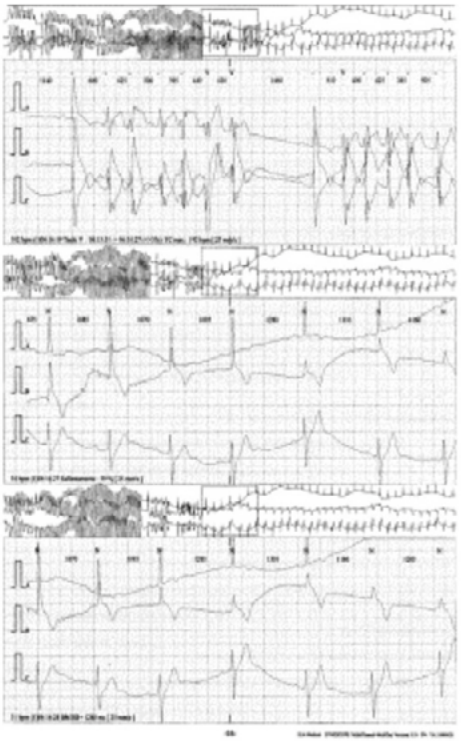
WS.25
UN CASO DI ANGINA VASOSPASTICA: POSSIBILE RUOLO DELLA RANOLAZINA

C. Uran
ASL Ce, S. Maria C. V., ITALY

La Ranolazina è un derivato della piperazina indicato per il trattamento dell' angina cronarica stabile, in aggiunta ad altri farmaci antianginosi come Atenololo, Amlodipina, Diltiazem. Agisce inibendo la corrente lenta in entrata del Sodio (iNa), riducendo gli effetti dannosi dell'accumulo intracellulare di Sodio e Calcio. MINOCA è definito un gruppo di sindromi definite come infarto miocardico o ischemia con lesioni coronariche non ostruttive (placche del 50% o meno) ed ha una incidenza di circa il 65% nelle donne e del 30% negli uomini. Un particolare tipo di MINOCA è l'angina variante di Prinzmetral. Con questo caso clinico, si intende mostrare l'efficacia della Ranolazina in questa particolare condizione. Si descrive il caso di un uomo di 40 anni, obeso, trasferito con diagnosi di NSTEMI, presso la nostra UTIC da un altro PS, dove era giunto riferendo dolore, vertigini e dispnea. L'ECG del paziente era nei limiti e gli esami ematochimici mostravano un lieve rialzo della troponina. All' anamnesi il paziente riferiva ipertensione e familiarità per diabete. La coronarografia, eseguita dopo 36 ore a causa del basso Grace score, mostrò arterie coronarie esenti da lesioni significative. Si fece diagnosi di MINOCA e venne iniziata una terapia con Metoprololo; ASA; Enoxeparina; Atorvastatina. Al fine di monitorare la FC al paziente venne montato un apparecchio Holter ECG. La notte il paziente richiamò l'attenzione dell'infermiera per dolore precordiale e vertigini. La sintomatologia si risolse spontaneamente nel giro di un minuto. Non si fece in tempo a registrare l'ECG, tuttavia venne rapidamente visionata la scheda del registratore Holter che evidenziò un soprallivellamento del tratto ST in corrispondenza delle derivazioni inferiori ed una TV sostenuta. A seguito di questo fu posto il sospetto di Angina Vasospastica e si propose al paziente un nuova coronarografia per poter eseguire test provocativi. Il paziente rifiutò e si iniziò una terapia 'empirica' a base di Diltiazem; Atrorvastatina; Nitroglicerina e venne sospesa la somministrazione di ASA per i suoi possibili effetti negativi sul vasospasmo. Il paziente venne dimesso in FU ambulatoriale. Dopo 6 mesi il paziente tornò alla nostra osservazione riferendo dolore toracico di breve durata accompagnato a lieve dispnea. Rifiutando qualsiasi esame diagnostico, vista la normalità dei parametri ECG ed ecocardiografici, venne aggiunta alla terapia in corso,Ranolazina 500 bid.
Al follow up a tre e sei mesi, il paziente è asintomatico.
Questo caso clinico mostra la possibile efficacia della Ranolazina nei casi di angina vasospastica. Tale efficacia è stata ipotizzata, alla luce anche dei seppur pochi dati presenti in letteratura in merito all'utilizzo in tale condizione, considerando il suo particolare meccanismo di azione estremamente complesso.







MONITORAGGIO REMOTO E TELEMEDICINA

WS.26
IL MODELLO TEORICO DEL PRIMARY NURSING NEL MONITORAGGIO REMOTO DEI DISPOSITIVI CARDIACI IMPIANTABILI

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I benefici del monitoraggio remoto come si è visto nel corso degli anni, intervengono a più livelli, economico, sociale e clinico. Numerosi studi hanno dimostrato come il monitoraggio remoto può sostituire i controlli ambulatoriali senza compromettere la sicurezza del paziente, riducendo drasticamente il consumo delle risorse pur programmando almeno un follow up ambulatoriale all'anno come raccomandato dalle linee guida internazionali. L'utilizzo del monitoraggio remoto permetti di limitare le visite non necessarie con notevole riduzione dei costi sociali, non intaccando i benefici clinici da esso determinati. Il monitoraggio automatico continuo fornisce alla struttura ospedaliera un flusso regolare di informazioni relative non solo al funzionamento del dispositivo ma anche alcuni eventi clinici quali aritmie e scompenso cardiaco, attraverso una tecnologia sempre più all'avanguardia e in continua evoluzione. I dati del dispositivo impiantati vengono trasmessi ad un sito web protetto del centro di riferimento che ha in carico il paziente. Con l'introduzione della telecardiologia e del monitoraggio remoto nella pratica clinica si sono implementati dei nuovi modelli organizzativi, che armonizzino e codifichino l'attività delle diverse figure professionali che intervengono nel processo diagnostico e terapeutico, quali elettrofisiologi, infermieri, tecnici, bioingegneri, aziende fornitrici del servizio, cardiologi clinici e specialisti dello scompenso. Questo modello deve garantire una precisa definizione di ruoli e responsabilità, tracciabilità delle azioni, continuità delle cure, basso consumo di risorse, gradimento e accettazione del paziente, integrazione con i tradizionali percorsi di diagnosi e cura ospedalieri ed extraospedalieri. Un modello che racchiude tutte queste peculiari caratteristiche è il PRIMARY NURSE MODEL, che dopo numerosi test in vari studi, è stato raccomandato nelle linee guida. Il primary nursing è un sistema di erogazione dell'assistenza basato sulle relazioni e guidato dalle risorse, la madre fondatrice di questo approccio è la professoressa statunitense Marie Manthey. Prevede quattro elementi costitutivi:
Attribuzione e accettazione da parte di ciascun individuo della responsabilità personale nel prendere decisioni;
Assegnazione dell'assistenza quotidiana secondo il metodo dei casi (case method);
Comunicazione diretta da persona a persona;
Una persona operativamente responsabile per la qualità dell'assistenza erogata ai pazienti .
Tutti e quattro i punti sono necessari alla completezza del modello ma il vero CORE è rappresentato dall'assegnazione della responsabilità per le decisioni assunte a un unico infermiere, chiamato Infermiere Primary o Infermiere di Riferimento. Quindi ogni paziente è assegnato ad un infermiere responsabile della continuità delle cure, i cui compiti includono educazione e addestramento del paziente, inserimento dei dati paziente nel sito web, revisione delle trasmissioni e valutazione dei casi critici, sottomissione dei casi critici al medico, contatto con il paziente, controllo della compliance del paziente e dei benefici della terapia. Ogni infermiere di riferimento riferisce al medico referente, responsabile del consenso informato, della supervisione e della refertazione delle trasmissioni e della gestione clinica dei problemi emergenti.

WS.27

MONITORAGGIO REMOTO NELLO SCOMPENSO CARDIACO: STRUMENTO EFFICACE PER RIDURRE LE OSPEDALIZZAZIONI E LA MORTALITÀ

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Background: La prevalenza dello scompenso cardiaco nella popolazione generale in occidente viene stimata intorno al 2%, prevalenza che aumenta con l'età fino ad arrivare al 10% ai 70 aa d'età. La malattia è gravata da un elevato tasso di mortalità e da un'alta spesa sanitaria legata soprattutto ai reiterati ricoveri. I pazienti con scompenso cardiaco a bassa frazione d'eiezione sono spesso portatori di device, che hanno la possibilità di essere monitorati a distanza. Il rapporto annuale 2017 del ministero della salute sull'attività di ricovero ospedaliero mostra dati drammatici: 60% dei pazienti con scompenso cardiaco viene riospedalizzato entro un anno dalla dimissione e nel 14% dei casi addirittura entro un mese dalla dimissione con tasso di mortalità annua del 18%.

Scopo del nostro studio è verificare se il monitoraggio remoto consente di migliorare l'outcome del paziente con scompenso cardiaco in termine di riduzione dei ricoveri e riduzione di mortalità per tutte le cause.

Materiali e Metodi: Nell'anno 2021 nel nostro centro sono stati monitorati a distanza 241 pazienti affetti da scompenso cardiaco e frazione d'eiezione ridotta portatori di device di età media 73 aa (+/- 11 aa); Altri dati della popolazione: vedi tabella 1.

In occasione di trasmissioni che presentano eventi di allarme la nostra flow chart operativa prevede: in primo luogo contatto telefonico ed eventuale successivo controllo ambulatoriale entro 24 h lavorative.

Risultati: Nel corso dell'anno 2021 la mortalità per tutte le cause della nostra popolazione è stata del 10,7% (26 pazienti), mentre le riospedalizzazioni sono state 70 (28,8%). A seguito di allarmi segnalati al monitoraggio remoto, sono stati contattati 83 pazienti ai quali è stata modificata la terapia o riprogrammato il dispositivo. Le cause di allarme sono state nell'ordine: riduzione dell'impedenza toracica, eventi aritmici, riduzione della percentuale di pacing biventricolare.

Conclusioni: L'utilizzo del monitoraggio remoto nei pazienti affetti da scompenso cardiaco e portatori di device consente di diagnosticare in maniera precoce e tempestiva i cambiamenti clinici che anticipano la riacutizzazione dello scompenso cardiaco e di intervenire attivamente modificando il decorso clinico evitando, spesso il ricovero, con un notevole impatto sociale ed economico. Grazie all'organizzazione operativa del nostro centro, la gestione del monitoraggio remoto ha permesso una bassa percentuale di ricoveri ed una bassa mortalità anno rispetto ai dati della letteratura.

TABELLA 1: CARATTERISTICHE DI POPOLAZIONE

Caratteristiche di popolazione	Numero (%)
Età	73 aa (±11)
Maschi	196 (81)
Cardiopatia Ischemica	144 (60)
FE<35%	84 (35)
Classe NYHA II	193 (80)
Classe NYHA III-IV	47 (20)
Prevenzione primaria	194 (89)
ICD	117 (48)
CRT-D	88 (37)
CRT-P	16 (7)

WS.28

HOW THE COVID-19 PANDEMIC CHANGED OUR ORGANIZATIONAL MODEL FOR ELECTIVE ELECTROPHYSIOLOGY PROCEDURES: THE ROLE OF TELEMEDICINE, REMOTE MONITORING AND NURSE CASE MANAGER

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Background: electrophysiological (EP) elective procedures were significantly curtailed during the peak of coronavirus disease 2019 (COVID-19) pandemic to conserve healthcare resource. We draw up a protocol to maintain adequate volume procedures while limiting healthcare resource utilization.

Aim: We aimed to evaluate the New Institution protocol for reboot EP activity during the COVID-19 pandemic.
Methods: Perioperative healthcare utilization and acute procedural outcomes were analyzed for consecutive patients undergoing EP procedure under COVID-19 protocols (2021 cohort) and compared to those of patients who underwent EP procedures during the same time period in 2019 (2019 cohort). This New Protocol was based on: 1)Telemedicine for an appropriate pre- and post-procedure monitoring in order to perform elective EP procedure in Day-hospital/Day surgery regimen; 2) Remote monitoring of cardiac implantable electronic devices (CIEDs). 3)A central role of the nurse case manager for the organization of patient hospitalization candidate for an elective EP procedure.

Results: we performed 225 EP procedures in 2021 and 216 in 2019 ($p>0,1$, +4%). The average hospital stay has been reduced (2 vs 2,52, $p<0,05$), as well as the the total days of hospitalization (291 vs 581, $p<0,059$). No major complications and early rehospitalization was observed in 2021 cohort.

Conclusions: Our findings demonstrate the feasibility of safe resumption of complex elective electrophysiology procedures during the COVID-19 pandemic, reducing healthcare utilization and maintaining high quality of care.

WS.29

IL RUOLO DELL'INFERMIERE NEL MONITORAGGIO REMOTO DEI DISPOSITIVI CARDIACI IMPIANTABILI: ATTIVITÀ DI TRAINING E SCREENING NELLA GESTIONE DELLE TRASMISSIONI NEL PAZIENTE PORTATORE DI CRTD

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Background: Lo scompenso cardiaco rappresenta la causa prevalente di ospedalizzazione negli ultimi anni e diversi sono gli strumenti a nostra disposizione che ci consentono di ridurlo: dai dispositivi impiantabili al monitoraggio remoto dotato di un algoritmo automatico in grado di identificare quali sono i pazienti a più alto rischio di ospedalizzazione nei trenta giorni successivi l'impianto. La sinergia tra queste tecnologie ci ha consentito di trattare più pazienti scompensati con indicazione all'impianto di un defibrillatore cardiaco impiantabile biventricolare (CRTD)

Materiali e metodi: 15 Pazienti afferenti presso la nostra cardiologia negli ultimi 20 mesi, affetti da CMD con bassa FE e BBSN, sono stati sottoposti ad impianto di CRT-D. Il sito target per la stimolazione ventricolare sinistra è stato raggiunto mediante il posizionamento di un catetere a fissaggio attivo (Attain Stability Quad, Medtronic) in vasi laterali o postero laterali. È stata possibile eseguire in sicurezza la sola stimolazione ventricolare sinistra attraverso l'algoritmo di stimolazione Adaptive CRT che ha consentito la re sincronizzazione tra i due ventricoli in maniera fisiologica. Prima della dimissione il paziente viene arruolato nel sistema di monitoraggio remoto Carelink e riceve da parte dell'infermiere dedicato un breve training sul monitoraggio per rimanere sempre connesso presso la nostra struttura. Nel corso dei 30 giorni successivi l'impianto è stato eseguito da remoto uno screening del grado di scompenso cardiaco attraverso lo score di rischio automatico Triage HF evidenziando in 5 paziente uno score di rischio alto; l'infermiere dedicato ha condiviso questo dato col medico referente il quale ha contattato telefonicamente i pazienti per le opportune modifiche terapeutiche, evitandone quindi l'ospedalizzazione. Dalle trasmissioni successive è emerso uno score di rischio basso con miglioramento del sintomo del paziente.

Risultati: L'azione combinata e contemporanea di più elementi al fine prognostico positivo dello scompenso cardiaco consistente in un impianto ottimale presso il sito target del ventricolo sinistro grazie ad un catetere dedicato, un algoritmo Adaptive che garantisce la stimolazione fisiologica del ventricolo sinistro, il Triage-HF per la validazione da remoto dello scompenso e un protocollo interno infermieristico di supporto allo staff medico ci ha permesso di ridurre il rischio di ospedalizzazione per questi pazienti.

Conclusioni: L'esperienza eseguita nella nostra cardiologia di Castrovillari ha mostrato come al fine di implementare la probabilità di risposta alla terapia di resincronizzazione cardiaca sia risultato un gold standard un'approccio combinato che consenta di seguire il paziente dal suo screening, all'impianto con sistemi che consentano di raggiungere il sito target indipendentemente dall'anatomia del paziente, un'algoritmo che consenta una stimolazione ventricolare sinistra fisiologica ed in particolare un protocollo strutturato e condiviso di collaborazione tra lo staff medico ed infermieristico con al centro il raggiungimento del benessere nei nostri pazienti. In particolare, nel contesto storico in cui ci siamo trovati a combattere una pandemia, ci ha aiutato a controllare il rischio di contagio da Covid-19 l'utilizzo di un sistema di gestione remota del paziente dotato di score di rischio automatico che consente una precoce diagnosi di eventuali recidive di scompenso cardiaco.

MORTE CARDIACA IMPROVVISA

WS.30

SINCOPE SENZA PRODROMI DURANTE EPISODIO FEBBRILE IN UN PAZIENTE CON PATTERN BRUGADA TIPO 1 INDOTTO: UNA PARTICOLARE SFIDA CLINICA

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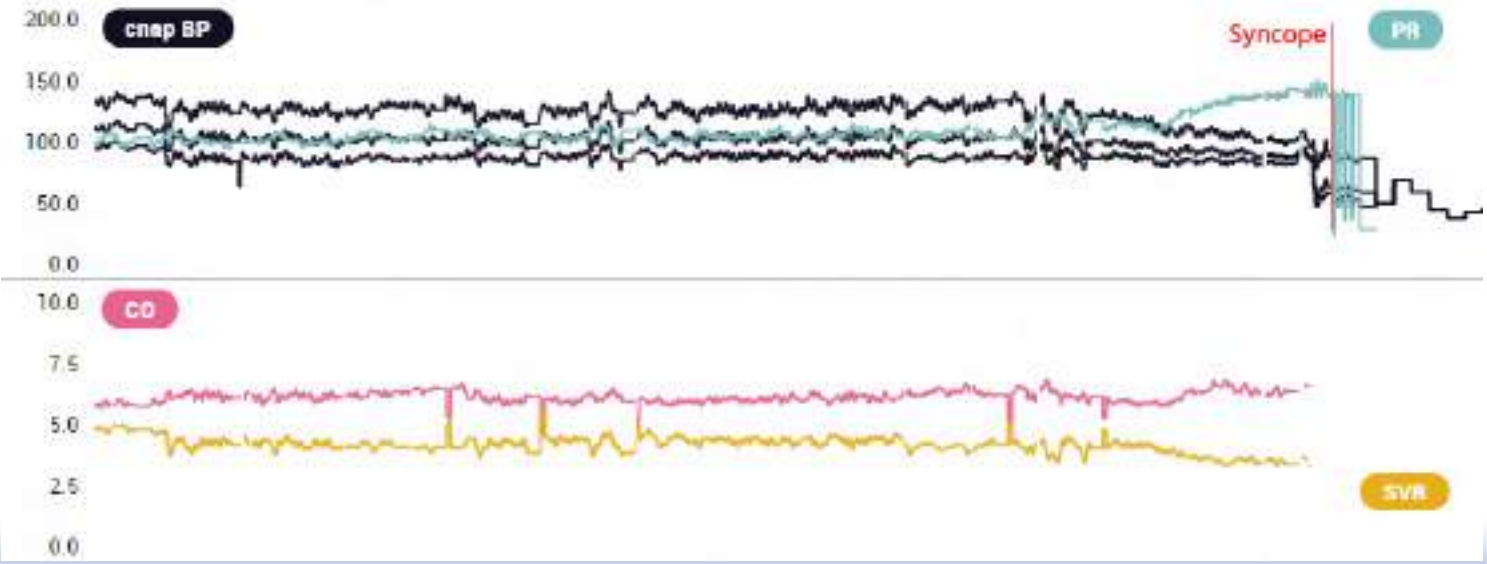
Introduzione: La presentazione clinica della sincope non è sufficiente a distinguere la sincope neuromediata da quella aritmica: entrambe le forme possono presentare prodromi tipici e specifici trigger. L'eziologia della sincope è difficile da determinare fino al 30% dei pazienti con sindrome di Brugada; la sincope aritmica dovuta a FV parossistica auto-limitante è rara e la sincope indeterminata di per sé è un fattore di rischio debole per morte improvvisa.
La sincope senza prodromi nei pazienti con BrS di tipo 1 indotta rappresenta una sfida clinica che necessita di un'attenta valutazione con l'obiettivo di escludere la correlazione tra evento aritmico e sintomi clinici.

Descrizione: Un uomo di 53 anni, senza familiarità per morte cardiaca improvvisa, si reca in PS per perdita transitoria di coscienza e trauma facciale. Gli esami ematochimici evidenziano elevati livelli di PCR e leucocitosi neutrofila. L'ECG mostra innalzamento del segmento ST a tenda in V1 e V2 seguito da un'onda T negativa, compatibile con un pattern di Brugada di tipo 1. Dopo due giorni di ricovero, con la scomparsa della febbre e normalizzazione dello stato infiammatorio, si verifica una transizione dal pattern Brugada di tipo 1 a quello di tipo 2. Per la stratificazione del rischio di morte improvvisa, viene costruita una mappa tridimensionale endocardica del ventricolo destro e viene eseguita la stimolazione ventricolare programmata in due siti, apice e tratto di efflusso del ventricolo destro, fino a un massimo di tre extrastimoli prematuri, prima e dopo flecainide 2 mg/kg per 10 minuti.
Il mappaggio elettroanatomico per alterazione del voltaggio dei potenziali e/o propagazione elettrica del ventricolo destro non mostra anomalie. Il PVS risulta negativo all'induzione di aritmie ventricolari.
L'Head up tilt test (HUTT), secondo protocollo italiano, risulta positivo per induzione di sincope vasodepressiva, caratterizzata da un'improvvisa caduta delle resistenze periferiche totali con aumento della frequenza cardiaca, senza prodromi. Infine, è stato impiantato un loop recorder.
A 3 mesi di follow-up non si sono verificati eventi sincopali, aritmie o evidenze elettrocardiografiche di BrS di tipo I intermittente.

Discussione: Nel nostro paziente, la presentazione clinica della sincope suggeriva una natura aritmica, essendosi verificato l'evento durante la febbre e con insorgenza improvvisa, senza prodromi e apparenti trigger.
Il valore predittivo relativamente basso della diagnosi clinica di sospetta sincope aritmica dovrebbe indurci a eseguire un'accurata valutazione multiparametrica per limitare l'uso di ICD.
La stimolazione ventricolare programmata mostra un elevato valore predittivo negativo tra i pazienti con BrS di tipo 1 indotta, ma più basso valore predittivo positivo, indipendentemente dalla storia di sincope.
L'HUTT può essere utile per confermare la diagnosi di sincope vasovagale, ma non può escludere una forma aritmica associata. L'uso dell'ILR dovrebbe essere preso in considerazione nei pazienti con BrS con sincope indeterminata e caratteristiche di basso rischio dopo un'attenta valutazione multiparametrica che includa le caratteristiche elettrocardiografiche, l'anamnesi familiare, i test genetici e il SEE.
L'impianto di ICD dovrebbe essere limitato ai pazienti con BrS di tipo I indotta con sincope aritmica documentata, poiché il rischio di infezione dell'elettrocatetere e di terapie inappropriate con ICD non è trascurabile.



SCOMPENSO CARDIACO

WS.31
MONITORAGGIO MULTIPARAMETRICO CON DISPOSITIVO LIFEVEST DEL PAZIENTE CON DISFUNZIONE VENTRICOLARE SINISTRA SEVERA NON ISCHEMICA

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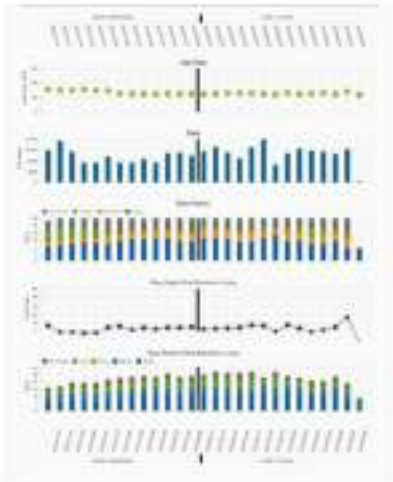
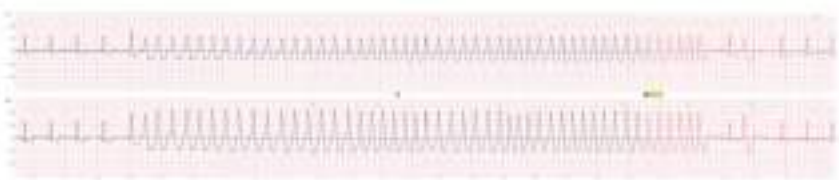
Paziente maschio di 65 anni, ricoverato per scompenso cardiocircolatorio in cardiopatia ipocinetico-dilatativa di primo riscontro (FEVS biplana 18%). Test provocativo di II livello (ECOstress dobutamina massimale) negativo per RRC.
Avviata terapia medica ottimizzata per il trattamento dello scompenso cardiaco (HFrEF): ARNI a bassa dose, SGLT2 (10 mg die), diuretico, betabloccante, MRA.
Alla dimissione impostata protezione antiaritmica con posizionamento di LifeVest ZOLL e avviato monitoraggio multiparametrico domiciliare.

Dopo 30 giorni giunta trasmissione ECGrafica di TVNS, sintomatica per vertigini: valutato ambulatorialmente il Paziente e ripetuto ECOcardiogramma.

Conferma di severa disfunzione ventricolare (FEVS 30%) seppur in lieve miglioramento. Avviato amiodarone in profilassi antiaritmica e titolato ARNI a media dose (49/51m g bis die). Non documentati ulteriori episodi aritmici.
Proseguito monitoraggio con ottima compliance di gestione da parte del Paziente: tempo di indossamento, partecipazione ai questionari settimanali e svolgimento del test del cammino.
Al controllo ECOcardiografico a 2 e 3 mesi evidenziato miglioramento della funzione contrattile ventricolare sinistra con recupero della frazione di eiezione (FEVS 40%); titolata posologia incrementale di ARNI (97/103 mg bis die) e ridotto progressivamente il diuretico (secondo LG AHA/ACC/HFSA 2022 per la gestione dello scompenso cardiaco) con stabilizzazione del quadro di compenso cardiocircolatorio.

Conclusioni: La presenza di un monitoraggio remoto attivo h 24 con assistenza tecnica continua, ha permesso di eseguire follow up ottimale del paziente con disfunzione ventricolare sinistra non ischemica, titolando fino alla massima dose tollerata la terapia farmacologica. Eseguito il trattamento precoce di evento aritmico maggiore (TVNS) con terapia antiaritmica efficace.





WS.32

DIABETE MELLITO E SCOMPENSO CARDIACO: UNA ASSOCIAZIONE PERICOLOSA

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Introduzione: Il diabete mellito rappresenta una frequente co-morbilità nei pazienti con scompenso cardiaco. La presenza di diabete si associa a più elevati tassi di morbilità e mortalità cardiovascolare. Negli ultimi anni, l'introduzione di sistemi di monitoraggio remoto dei pazienti con scompenso cardiaco ha permesso una più attenta gestione clinico-farmacologica degli stessi sebbene non vi siano ampi studi a riguardo. Scopo del nostro studio è stato quello di valutare la prognosi dei pazienti con diabete mellito e scompenso cardiaco sottoposti a monitoraggio remoto.

Metodi: Sono stati reclutati nello studio tutti pazienti sottoposti ad impianto di device per scompenso cardiaco nel nostro Centro ed è stata valutata l'incidenza di eventi (nuove ospedalizzazioni o ricoveri) durante il periodo compreso fra il 1 Gennaio 2021 e il 31 Dicembre 2021. I pazienti sono stati monitorati da remoto e per tutti è stato effettuato un contatto telefonico diretto o con uno dei familiari. Sono stati registrati i dati relativi alle caratteristiche cliniche ed alla terapia farmacologica.

Risultati: In totale sono stati arruolati nello studio 240 pazienti (73±11 anni, 81% maschi) di cui 74 diabetici (73±11 anni, 87% maschi) e 166 non diabetici (73±10 anni, p=0.82, 80% maschi, p= 0.198). I due gruppi non presentavano differenze statisticamente significative in termini di caratteristiche cliniche ad eccezione di una maggiore incidenza di coronaropatia nei pazienti diabetici (70%) e di malattica coronarica multivasale (67%) rispetto ai pazienti non diabetici (57% di coronaropatia p= 0.05, e 46% di multivasali p= 0.02). Non vi erano differenze significative in termini di terapia farmacologica ad eccezione di un maggiore impiego di statine nel gruppo dei pazienti diabetici (84%) rispetti ai non diabetici (64%, p= 0.002). I pazienti diabetici hanno presentato un tasso di mortalità di quasi 4 volte superiore rispetto ai pazienti non diabetici (22% e 6% rispettivamente, p< 0.0001). Differentemente i tassi di ospedalizzazione non sono stati significativamente differenti fra i pazienti diabetici (24%) rispetto ai non diabetici (28%, p= 0.58)

Conclusioni: L'associazione di diabete mellito e scompenso cardiaco rappresenta una combinazione particolarmente pericolosa associata ad un aumento dell'incidenza di morte. Nei pazienti diabetici dovrebbero essere quindi particolarmente implementate le strategie di monitoraggio clinico e l'intensità della terapia farmacologica.

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