Correlation Of Left Ventricular Lead Pacing By Electroanamic Voltage Mapping And Response To Resynchronization Therapy In Patients With Refractory Heart Failure.

Cardiovascular Implantable Electronic Devices

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Background - Introduction
Cardiac resynchronization therapy is a therapy with high efficiency in heart failure, reducing the number of hospitalizations and mortality, improving quality of life and ventricular remodeling. However, up to 30% of patients did not respond to this therapy, postulating some studies that possibly myocardial fibrosis secondary to the underlying heart disease modifies the conduction system, as well as the stimulation of the resynchronization device by implantation of tissue electrodes fibrotic.

Objectives
To evaluate the correlation of myocardial fibrous tissue with the response to cardiac resynchronization therapy in patients with heart failure refractory to pharmacological treatment.

Methods
A transversal, observational, retrolective study of a correlational type is proposed. The CMN "November 20" cardiac electrophysiology service patient record can select the clinical records of patients who meet the selection criteria. The image file in the 3D Electroanatomic Mapping equipment will obtain the images to determine the degree of myocardial fibrosis.

Results
We analyzed 16 patients divided into 2 groups, sometimes guided CRT (n = 6) and unguided CRT (n = 10) with electromechanical mapping (MEM). The age in the group of guided and unguided patients with MEM was 66 ± 8 years and 61 ± 10 years respectively (p = 0.84). The bivariate analysis identified strong and significant correlation in the anatomical parameters of the left ventricle. The response to the global CRT and especially the guided MEM used a strong and significant correlation with the improvement in the functional class according to the NYHA classification (r = 0.58 and 0.57, p = 0.01 and 0.02 respectively. The post CRT evaluation was similar between groups of patients sometimes to this guided therapy or not with MEM p = 0.81).

Conclusions
The 3D Electro-Anatomic Voltage Mapping guided cardiac resynchronization
implant has a strong and significant correlation with the response to Cardiac Resynchronization Therapy.
Medición de área de cicatriz mediante mapa de voltaje en proyección oblicua izquierda, Carto 3.
Catheter Ablation Without Fluoroscopy: Safe And Effective In All Cardiac Chambers

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Ionizing radiation use in interventional cardiac procedures is associated with significant risks for patients and health care professionals

Objectives
Evaluate the safety and efficacy of ablation for different types of arrhythmias using a non-fluoroscopic technique, guided by intracardiac echo (ICE) and 3D electroanatomica mapping (Zero Fluoro).

Methods
181 pts (age 60 ± 18 years, 65% male) undergoing ablation for: AF (127 pts - 80 (46%) paroxysmal AF and 47 (27%) persistente AF), SVTs (34 pts (20%) – 24 AVNRTs, 10 WPWs, 3 atrial tachycardias), CTI flutters (10 pts (6%)), RV and LV outflow tract PVCs (4 pts (2,3%)) and VT with structural heart disease (3 pts (2%)). Both CARTO and NAVx as well as Acunav and ViewFlex catheters were used. ICE guided the positioning of wires and sheaths as well as CS canullation, transeptal punctures, catheter positioning and tissue contact.

Results
All 4 cardiac chambers were adequately mapped and ablated, including adjacent sites such as inside the CS, aortic cusps, left and right atrial appendages and the SVC. The ICE catheter was positioned to obtain the higher definition as possible of the region of interest, for which it was positioned in the RV, pulmonary artery, left atrium and LV (via transeptal).
11 pts had implantable cardiac electronic devices (mean 2.1 electrodes/pt). No abnormalities in electrical parameters were detected upon device interrogation after the procedures.
No pericardial effusions or other complications were recorded in this series. All the steps as well as the ablation targets could be reached and adequately visualized.
Fluoro was not used in any case.

Conclusions
Ablation without fluoroscopy (Zero Fluoro) is safe and effective in different types of arrhythmias when guided by the appropriate utilization of 3D mapping and ICE.
Multiple sites in all cardiac chambers can be reached and adequately treated, even in the presence of permanent device electrodes.

AE - Left Atrium VE - Left Ventricle
QT Interval Greater Than 460 Ms In Multiple Electrocardiograms During Follow-Up In Patients With Brugada Syndrome: What Does It Contribute?

Electrocardiography/Holter monitoring/Syncope

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Background - Introduction
Brugada syndrome (BrS) is a channelopathy associated with syncope or sudden cardiac death (SCD) due to malignant ventricular arrhythmias (MVA). Risk stratification in those who have presented aborted sudden death presents a significant challenge for medical personnel, who need to decide between conservative treatment, pharmacological therapy with quinidine, or placement of an implantable cardioverter-defibrillator (ICD). Prolongation of certain electrocardiographic parameters that reflect ventricular depolarization-repolarization, such as corrected QT interval (QTc) or T peak-T end interval, has been associated with an increased risk of MVA.

Objectives
This study was designed to assess the presence of QTc>460 ms in multiple electrocardiograms (ECGs) during follow-up, as a predictor of recurrence of MVA in patients with BrS.

Methods
A retrospective study was performed at the Institute of Cardiology and Cardiovascular Surgery, Havana, Cuba, which included patients between June 2000 and January 2018.

Results
A total of 289 ECGs were performed, 63% of them in Group 1. In Group 3 the proportion of ECGs with coved-type pattern was greater, with a statistically significant difference (p=0.002). In the overall sample 41 ECGs were obtained with QTc>460 ms from 16 patients (Groups 2 and 3), accounting for 49% of the ECGs in these two groups (105 ECGs), meaning an ECG with QTc>460 ms appeared in one in two ECGs performed. On the Kaplan-Meier curve for cumulative event-free survival (Figure 2), 67% of BrS patients in Group 3 had events during follow-up, as opposed to only 22% of Group 1 and 14% of Group 2 (Group 1 vs. Group 2, p=0.33015; Group 1 vs. Group 3, p=0.04295; and Group 2 vs. Group 3, p=0.04155).

Conclusions
QTc interval >460 ms on more than one ECG during follow-up enhances the risk of MVA in patients with BrS.
Figure 2 Kaplan-Meier analysis of arrhythmic events during follow-up depending on number of ECGs with QTc>460 ms during follow-up. Group 1: patients with no ECGs with QTc>460 ms; Group 2: patients with only one ECG with QTc>460 ms; Group 3: patients with two or more ECGs with QTc>460 ms.
A Case Of Incessant Ventricular Tachycardia In Cardiac Sarcoidosis

Case reports

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Background - Introduction
Cardiac involvement occurs in up to 5% of cases of sarcoidosis and can manifest clinically as heart failure, arrhythmias, or sudden cardiac death. We present to you a case of incessant ventricular tachycardia (VT) in a patient with a prior diagnosis of cardiac sarcoidosis.

Objectives
This patient is a 34-year-old Caucasian male with a past medical history significant for sarcoidosis with pulmonary and cardiac involvement, and pulseless VT that presented with multiple shocks from his ICD. He was found to have incessant VT. Attempts at managing medically with amiodarone, propranolol, and mexiletine were unsuccessful at suppressing the episodes. He was followed by rheumatology and his biologic medications were adjusted. The decision was made to proceed with endomyocardial VT ablation.

Methods
Intracardiac US as well as 3D voltage mapping was performed. Voltage map showed a significant amount of RV scar with only a small amount of dense car at the mid septal tricuspid anulus. There were low-amplitude fractionated signals, late potentials, and isochronal crowding noted in this area. VT was induced with triple extra-stimuli and noted to be the same as his observed clinical rhythm. We then performed pace mapping and obtained a 93% pace match anterior and cranial to the scar of interest. After marking the HIS, the region of interest was ablated at 35W with irrigated saline. Following the ablation, we were unable to re-induce the clinical VT with pacing and drug stimulus.

Results
Management of the cardiac manifestations of cardiac sarcoidosis can be complex and challenging. Ventricular tachycardias arise when sarcoid granulomas within the myocardium either become foci of automaticity or scar causing re-entrant arrhythmias. In this patient we were able to ablate a reentrant circuit resulting in elimination of his VT episodes.

Conclusions
VT ablation by experienced operators can be effective and efficient at managing this complex complication in cardiac sarcoidosis patients.
Anatomical Characteristics Of The Membranous Septum Are Predictive Of Pacemaker Requirement In Patients Undergoing Transcatheter Aortic Valve Replacement

Cardiovascular Implantable Electronic Devices

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Background - Introduction
Conduction abnormality requiring permanent pacemaker (PPM) implantation is a known complication of transcatheter aortic valve replacement (TAVR). In proximity to the aortic valve (AV), the membranous septum (MS) correlates with the location of the central fibrous body, where the His bundle penetrates the ventricles. Detailed evaluation of this region on computed tomography (CT) may identify anatomical risk for post-TAVR conduction abnormalities.

Objectives
We aimed to study the characteristics of the MS and its relationship with the AV and aortic annulus (AA) in patients who required PPM post-TAVR.

Methods
We performed a retrospective case-control study of 144 patients undergoing TAVR from 2016 to 2018. 34 patients, requiring PPM implantation, were compared with 34 matched controls who did not require pacing. The total MS length, supra-annular MS (SA-MS) length, infra-annular MS (IA-MS) length, angle between the plane of the AA and MS (AA-MS), and degree of AV calcifications (AVC) were obtained from preoperative CT. AV prosthesis implantation depth was obtained from intra-operative fluoroscopy.

Results
There were no significant differences in valve type (self-expandable: 23 cases vs 25 controls, and balloon-expandable: 11 vs 9, p=0.79), degree of AVC (0.65cm³ vs 0.82cm³, p=0.62) or implantation depth (7.76mm vs 7.28mm, p=0.83). Compared to controls, there was no difference in total MS length (6.68mm vs 6.06mm, p=0.97), but the IA-MS was significantly shorter (3.64mm vs 4.56mm, p=0.017) and the SA-MS was significantly longer (2.73mm vs 1.67mm, p=0.018) in patients requiring PPM. Patients requiring PPM also had a larger AA-MS angle (103.5° vs 96.7°, p=0.013).

Conclusions

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The position of the MS with respect to the AA and MS distance below the annular plane were more closely associated with post-TAVR conduction abnormalities requiring PPM than the absolute length of the MS. Patients undergoing TAVR with such anatomy have a higher risk of requiring PPM and should be monitored for developing these complications.

Figure: Case Comparison of the Membranous Septum (MS) in Patients Prior to Transcutaneous Aortic Valve Replacement (TAVR). 1A: Measurements of the MS in patient who received pacemaker post TAVR. Supra-aortic (SA-MS) and infra-aortic (IA-MS) membranous septum measured as 0.8 mm and 6.4 mm, respectively, and aortic-MS (AA-MS) angle measured as 107. 1B: Supra-aortic (SA-MS) and infra-aortic (IA-MS) membranous septum measured as 2.01 mm and 7.82 mm, respectively, and aortic-MS (AA-MS) angle measured as 87.4. 2A: Postop ECG of patient from panel 1A who received pacemaker after TAVR, showing complete heart block with ventricular escape rhythm on postop day 1. 2B: Post op ECG of control, showing normal sinus rhythm with narrow QRS
Postero-Lateral Intermuscular Transvenous ICD Insertion: A Novel Approach For Device Implantation In Challenging Scenarios

Case reports

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Background - Introduction
Transvenous ICD implantation can be challenging in very rare clinical scenarios where it is not feasible to accommodate a device due to extreme medical conditions. We present a novel approach for transvenous ICD implantation in challenging situations.

Results
A 30-year-old patient with hypertrophic cardiomyopathy, history of cardiac arrest with a secondary prevention ICD implanted 20 years ago and multiple episodes of ventricular tachycardia successfully terminated with ATP, developed multiple device pocket erosions due to low BMI in spite of device placement in the retro-pectoral plane (Fig. 1a). In 2012, he had a trans-atrial lead implantation via mini-thoracotomy and the device was tunneled to the abdominal wall [1]. In 2020, underwent generator replacement with inadvertent lead dislodgment. Due to surgical lead placement, reposition was not possible. Extremely scarred tissue in both sub-clavicular regions precluded new implantation in these areas. A new procedure was performed using a low pectoral incision and a contrast-guided low axillary venous puncture with abduction of the left arm (Fig. 1b, 1c). A 65 cm single-coil active-fixation defibrillator lead (Plexa ProMRI DF-1 S 65, Biotronik Inc., Germany) was advanced to the right ventricular apex where lead parameters were confirmed; it was then secured to the pectoral muscle. A second lateral incision along the border of the latissimus dorsi was made, and an intermuscular pocket between the latissimus dorsi and serratus anterior was created, in a higher location than that used for intermuscular S-ICD implant.

Conclusions
To the best of our knowledge, this is the first description of this approach and highlights the feasibility of performing transvenous implants with concomitant postero-lateral device placement using an intermuscular device pocket for larger generators such as ICD and CRT-D in patients with low BMI, patent vein anatomy and medical conditions in whom it is preferred to have both pacing and ATP capabilities.
Fig. 1a: patient with severe scarred tissue in both pectoral regions, b: venous angiography depicting axillary vein course, c: low axillary vein puncture d: antero-posterior x-ray projection showing final lead and device position, e: patient incisions and imperceptible generator in the intermuscular pocket position.
Accelerated Idioventricular Rhythm Before Therapy Reperfusion: What Does It Mean? A Case Report

Case reports

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Background - Introduction
Acute ST-segment elevation myocardial infarction (STEMI) is frequently associated with ventricular arrhythmias, being accelerated idioventricular rhythm (AIVR) the most frequent but due to its transitory nature it is rarely documented, traditionally it has been recognized as a marker of reperfusion, but this is not always true.

Objectives
To describe the significance of the AIVR in a patient who presented it before the reperfusion therapy.

Methods
We analyzed the case of a 48-year-old male who was admitted as a latecomer inferior STEMI, he presented transitory AIVR, the single positron emission tomography reported inferior wall transmural infarction, inferolateral and inferoseptal walls non-transmural infarction and ejection fraction of 35%. He was taken to catheterization, there was a severe lesion in the middle right coronary artery which underwent angioplasty. After that, he remained in sinus rhythm and did not present any complications.

Results
AIVR is defined as the presence of 3 or more beats that originate in the ventricles with a heart rate between 40 to 100 beats per minute. In this case, the AIVR had a rate of 71 beats per minute, near the sinus rate, so there was overlap between the QRS complexes and the P waves during the arrhythmia, it also presented a right bundle branch block pattern with superior axis, which suggests increased automatism of the left posterior fascicle. It has been traditionally considered as a marker of successful reperfusion however, the evidence around this is controversial. Previously one study found that it is associated with a later ST segment resolution and a larger infarct area. In our case, the reperfusion was late and the infarct area was significant.

Conclusions
Case reports with AIVR before reperfusion therapy are scarce. Most of the reports and studies include patients who presented it after angioplasty or thrombolysis. AIVR is not always a benign marker due to it can be associated with late reperfusion therapy and large areas of infarction, as in this case.
A. Sinus rhythm with inferior necrosis alternating with AIVR, the arrows indicate P waves that deform the initial part of the two first AIVR complexes. B. Ladder diagram of this arrhythmia.
Intermittent Pre-Excitation Pattern In A Patient With Ebstein's Anomaly And Wolff Parkinson White Syndrome

Case reports

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Background - Introduction
The relationship between the Wolff-Parkinson-White (WPW) Syndrome and the Ebstein's anomaly (EA) is well known. Approximately 30 to 40% of the patients with EA have WPW syndrome, but the classic features of preexcitation may not always present in these patients.

Objectives
To describe the electrocardiographic characteristics of the WPW syndrome in a patient with EA, through a representative case.

Methods
We present a case of a 33-year-old female. She was admitted with an episode of palpitations, at the admission she presented BP 95/55 mmHg and HR 155 bpm. The initial electrocardiogram (ECG) was compatible with preexcited AF (figure 1A). After 150 Joules she went into sinus rhythm (figure 1B). The echocardiogram showed septal leaflet indexed attachment of the tricuspid valve at 10 mm/m², a finding related to EA. We perform a brief analysis of ECG's

Results
In the initial ECG there was a wide QRS irregular tachycardia, the QRS was negative in leads V1 and DIII so it was compatible with preexcited AF due to a right posterior AP (figure 1A). In the sinus rhythm, there was an intermittent right bundle branch block (RBBB) pattern, this is explained by the anterograde conduction over a right AP that mask the RBBB which is a very common feature in patients with EA. Also it is important to note that in some leads there was not an obvious preexcitation pattern (figure 1B). In 2006 Iturralde et al., reported that the absent of the RBBB in patients with EA is strongly associate to the presence of an AP (98% of sensibility and 93% of specificity), the ECG of this case is a good example of that. Finally, the literature reports that some AP's in patients with EA could have different electrophysiological properties, which could explain why the PR interval is normal in some leads.

Conclusions
There is a strong association between the EA and WPW syndrome, in these patients
the most important electrocardiographic feature is the absent of RBBB and we must keep in mind that the PR interval can be normal in some leads.

A. Preexcited AF over a right posteroseptal AP
B. Sinus rhythm with an intermittent preexcitation pattern, note that when the anterograde conduction over the AP occurs the RBBB is masked (arrows), and in some leads there is a normal PR interval.
Applicability Of The PAINESD Risk Score For 30-Day Mortality Prediction Post Ventricular Tachycardia Catheter Ablation In Chagas Disease

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
The PAINESD risk score was developed in 2015 and validated in 2017 as a model for 30-day mortality prediction pre ventricular tachycardia (VT) ablation in structural heart disease patients. Although it is a very useful tool, the original cohort did not include Chagas disease (ChD) patients.

Objectives
Evaluate the applicability of the PAINESD risk score for 30-day mortality prediction post VT catheter ablation in ChD patients.

Methods
The PAINESD risk score gives weighted values for some characteristics (presence of chronic obstructive pulmonary disease, age > 60 years, ischemic cardiomyopathy, NYHA functional class of 3 or 4, ejection fraction less than 25%, presence of VT storm, and presence of diabetes) as a prediction tool for mortality. We evaluated the values of PAINESD score in a retrospective cohort of ChD VT ablations at a single tertiary center in Brazil. Data were collected by VT studies reports and patient record analysis, including comorbidities and clinical status at baseline and on follow-up.

Results
Between January 2013 and December 2018, we performed 157 VT catheter ablation procedures in 121 ChD patients. The mean±SD PAINESD risk score in this population was 5.02±4.25. The distribution within the three groups of risk was: 3 (1.8%) for high risk (score ≥ 15), 31 (19.6%) for medium risk (score between 9-14) and 124 (78.4%) for low risk (score ≤8). Overall 30-day mortality was 13.2%. The area under the receiver operating characteristic (ROC) curve was 0.602, suggesting a sub-optimal performance.

Conclusions
The PAINESD risk score did not perform well in predicting 30-day mortality in ChD patients. This finding highlights that extrapolations of a score that is not validated for a specific population might draw inaccurate conclusions. There is a need for novel models for mortality prediction in this subset of patients.
Complete Atrioventricular Block In Pediatric Age Clinical And Electrocardiographic Characteristics In Isolated Presentation, Congenital Cardiopathy And Post-Surgical Presentation In 20 Years

Cardiovascular Implantable Electronic Devices

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Background - Introduction
The complete atrioventricular block (AVB) among its causes are anti-immune antibodies, structural abnormalities of the heart that leads to congenital heart disease, post-surgical, familial idiopathic

Objectives
Clinical and electrocardiographic characteristics of the patient with complete AVB in pediatric age with isolated presentation, associated with congenital heart disease and postoperative presentation in a period of 20 years.

Methods
A non-experimental, analytical, observational, retrospective study will be carried out in the period from January 1997 to December 2017

Results
Between 1997 to 2017, 51% were found to be female patients (n = 98). The study was divided into 3 groups of patients: Group 1: Congenital complete atrioventricular block without congenital heart disease. Group 2: Associated with congenital heart disease Group 3: Post-surgical presentation. In group 1, 46 cases were studied, the median age at admission was 54 months, and the pacemaker placement time was 3.5 months from the time of admission. In group 2, 25 cases were studied, the median age at admission was 17 months and the pacemaker placement time was 0.47 months. In group 3, 121 cases were studied, the median age at admission was 18 months and the pacemaker placement time was 0.8 months.

Conclusions
It presents in a higher percentage asymptomatic. In patients with complete atrioventricular block associated with congenital heart disease, there is a greater association with the ductus arteriosus and dilated cardiomyopathy. The surgical intervention most related to the development of complete atrioventricular block is the closure of the ventricular septal defect, followed by correction of the atrioventricular septal defect.
20-year experience at the Instituto Nacional de Cardiología with congenital presentation, associated with congenital and post-surgical heart disease

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Risk Factors For The Development Of Arrhythmias In Patients Operated By Fontan Surgery

Basic/Translational Science

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Background - Introduction
Fontan surgery is a palliative procedure for complex congenital heart diseases with univentricular function, without the possibility of biventricular surgical correction. About 70-75% of patients operated by Fontan surgery not survive, being heart failure and arrhythmias the main causes.

Objectives
to identify the pre, trans and post- surgical factors that may predispose arrhythmias in patients undergoing Fontan surgery.

Methods
We reviewed and analyzed the clinical records of 115 patients who underwent a total cavopulmonary bypass for the period from January 2003 to December 2018.

Results
51.3 % of the patients were female. The most frequent diagnosis was tricuspid atresia in 38.2 % (n = 44) of the patients, followed by pulmonary atresia in 15.7 % (n = 18) of the patients and double right ventricular outflow in 12.2 % (n = 14). Of the procedures performed, 93.9% (n = 108) were total extracardiac cavopulmonary bypass and 6.1% (n = 7) were intracardiac. 8.6% (n = 10) underwent fenestration, with a median size of 7 mm (minimum 3 mm, maximum 10 mm). Presence of arrhythmias during post surgical period was in 38.3% of the patients (n=44) and being the post surgical late time the most frequent period in 22% (n=22) .

Analysis between variables was performed to determine which ones are associated with arrhythmias using the Chi-square test, finding that intracardiac surgery presents an OR of 4.423 (95% CI 0.819 - 23.879, p> 0.05), the bidirectional cavopulmonary shunt anterior to Fontan surgery presented OR of 0.255 (95% CI 0.081 - 0.806, p <0.05).

Association was found between duration of QRS interval > 120 ms and the presence of postsurgery arrhythmias OR 2.99 (95% CI 1.2-4.2, P <0.05).

Conclusions
Bidirectional cavopulmonary bypass is a protective procedure for arrhythmias prior to total cavopulmonary bypass. A QRS interval duration > 120 ms by electrocardiography in the postoperative period should be a parameter that predicts the probability of arrhythmias in patients undergoing Fontan
Evaluación Y Validación Diagnóstica De Las Variables IQT, Razon IQTRR, Razon IRTRR Para El Diagnóstico Qtc Prolongado.

Electrocardiography/Holter monitoring/Syncope

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Background - Introduction

el intervalo QT representa la despolarización y repolarización ventricular, su prolongacion está asociada a un mayor riesgo de arritmias graves y muerte súbita. Depende de la frecuencia cardiaca y su rápida valoración es difícil de obtener en la práctica clínica, una forma que facilita este proceso es sólo medir el intervalo QT, sin embargo este no siempre se relaciona con un intervalo QT corregido prolongado, debido a esto se postula que una variab

Objectives

se desarrolló este estudio para describir la correlación de 3 variables electrocardiográficas; intervalo QT (iQT), razón del intervalo QT intervalo RR (%iQTRR) y razón del intervalo RT intervalo RR (%iRTRR), en relación a la variable intervalo QT corregido (iQTc), hicimos la evaluación diagnóstica y validación de las variables para establecer el diagnóstico de intervalo QTLargo y las propiedades diagnósticas de las mismas para el diagnóstico de iQTc prolongado utilizando la fórmula Bazett.

Methods

estudio transversal descriptivo-relacional, muestra no probabilística formada por 220 electrocardiogramas registrados en la base de datos del centro cardiovascular SS tomados en reposo con medición del intervalo QT y del intervalo RR en derivada D2 y/o V5, con caliper y en milisegundos, se excluye isquemia, preexcitación y repolarización precoz.

Results

Se obtuvo como resultado que la variable razón iQTRR tiene mejor correlación, concordancia, sensibilidad y valor predictivo negativo para el diagnóstico del iQTc prolongado, versus las variables iQT y razón iRTRR, principalmente en mujeres.

Conclusions

La variable razón iQTRR tiene una mejor correlación .concordancia, sensibilidad y VPN para el diagnóstico del iQTc prolongado, comparado con las variables iQT y razón iRTRR principalmente en mujeres. Utilizando ambas variables este efecto se potencia y permite concluir que si una
mujer tiene un iQT observado <470 ms, y una razon QTRR< 47,5%, estaremos frente a un intervalo QTc normal, con un VPN de 100%.

Tabla 1: Descripción de la población

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<th>Var</th>
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<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edad (años)</td>
<td>39,12</td>
<td>1,4</td>
<td>16,7</td>
<td>1,09</td>
<td>100</td>
<td>19</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Frecuencia Cardíaca (lpm)</td>
<td>76,85</td>
<td>1,1</td>
<td>76,5</td>
<td>1,1</td>
<td>100</td>
<td>70</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Intervalo PR (ms)</td>
<td>137,1</td>
<td>7</td>
<td>129,8</td>
<td>12,0</td>
<td>100</td>
<td>120</td>
<td>100</td>
<td>120</td>
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<tr>
<td>Intervalo RR (ms)</td>
<td>818</td>
<td>97</td>
<td>721</td>
<td>71,7</td>
<td>100</td>
<td>600</td>
<td>100</td>
<td>600</td>
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<tr>
<td>Intervalo QT (ms)</td>
<td>118</td>
<td>26</td>
<td>721</td>
<td>66,4</td>
<td>100</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Intervalo QTc (ms)</td>
<td>362,5</td>
<td>26</td>
<td>346,5</td>
<td>346,8</td>
<td>100</td>
<td>200</td>
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<tr>
<td>Intervalo QRS (ms)</td>
<td>94,8</td>
<td>7</td>
<td>94,8</td>
<td>7</td>
<td>100</td>
<td>80</td>
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<tr>
<td>Intervalo QTc (ms)</td>
<td>362,5</td>
<td>26</td>
<td>346,5</td>
<td>346,8</td>
<td>100</td>
<td>200</td>
<td>100</td>
<td>200</td>
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<tr>
<td>Intervalo QTc (%)</td>
<td>32,8</td>
<td>13</td>
<td>32,8</td>
<td>13,12</td>
<td>100</td>
<td>20</td>
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Tabla 3: Propiedades diagnósticas de las variables en estudio para diagnóstico de QTc prolongado.*

<table>
<thead>
<tr>
<th>Propiedades</th>
<th>Varón</th>
<th>Mujer</th>
<th>Varón</th>
<th>Mujer</th>
<th>Varón</th>
<th>Mujer</th>
<th>Varón</th>
<th>Mujer</th>
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<tbody>
<tr>
<td>Sensibilidad</td>
<td>62</td>
<td>75</td>
<td>88</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>65</td>
</tr>
<tr>
<td>Valor predictivo (s)</td>
<td>84</td>
<td>93</td>
<td>77</td>
<td>84</td>
<td>73</td>
<td>83</td>
<td>100</td>
<td>97</td>
</tr>
<tr>
<td>Valor predictivo (-)</td>
<td>73</td>
<td>75</td>
<td>88</td>
<td>87</td>
<td>100</td>
<td>100</td>
<td>70</td>
<td>69</td>
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<tr>
<td>Concordancia</td>
<td>54</td>
<td>47</td>
<td>65,7</td>
<td>69,6</td>
<td>70</td>
<td>78,1</td>
<td>59</td>
<td>64,5</td>
</tr>
<tr>
<td>KAPPA</td>
<td>54,5</td>
<td>66</td>
<td>65,7</td>
<td>69,9</td>
<td>70</td>
<td>75,7</td>
<td>59</td>
<td>60,5</td>
</tr>
</tbody>
</table>

*QTc prolongado >450 ms varones y >470 ms mujeres
**QT >430 ms varones y >470 ms mujeres
***Razon QTRR >97,5% varones y >97,5% mujeres

Tablas 1, 2 y 3
Late Cardiac Tamponade As A Complication Of Catheter Ablation For Atrial Fibrillation

Clinical Electrophysiology and Catheter Ablation

Alberto Pereira Ferraz, Sissy Lara Melo, Cristiano Faria Pisani, Carina Hardy, Muhieddine Omar Chokr, Mauricio Ibrahim Scanavacca

InCor, São Paulo, Brazil

Background - Introduction
AF ablation is a complex procedure with risks of early and late complications. One of these complications is cardiac tamponade (CT), which in some situations can occur late (CTT), with catastrophic consequences if not identified and drained immediately.

Objectives
The objective of this work is to evaluate the incidence of late cardiac tamponade in the electrophysiology service of the Instituto do Coração of FMUSP

Methods
Data were collected retrospectively from review of the medical records of the procedures performed between January 1998 to December 2019, where cardiac tamponade was identified after the end of the AF ablation procedure.

Results
In a total of 3,520 AF ablation procedures at InCor-FMUSP, we had 37 (1.05%) cases of tamponade; of these, 5 (13.5%) TCT. The mean age of patients with TCT was 58 ± 11.1 years, the median time of diagnosis was 24h (Q1: 3.5; Q3: 504) and the median volume drained was 300ml (Q1: 200; Q3: 800). In two cases, the diagnosed TCT was performed in the context of chest pain and in one due to symptoms of right heart failure. In the other cases, the clinical finding that led to the diagnosis was arterial hypotension. A patient who had an early CT, also had a TCT (40 days), associated with extended INR, needing a new pericardiocentesis. In all cases, pericardial drainage was successfully performed. One of the patients (ablation in 2003) died after 12 days due to atrio-esophageal fistula.

Conclusions
The diagnosis of CT after AF ablation procedure, although rare, demands high clinical suspicion due to its potential for morbidity and mortality.
#14

Lv Summit Premature Ventricular Complexes Ablation From The Great Cardiac Vein

Case reports

Angel Cueva-Parra, Gabriela Bustillos-García, Jorge Gómez-Flores, Manlio F. Márquez, Moisés Levinstein, José Luis Morales, Pedro Iturralde-Torres, Santiago Nava

Instituto Nacional de Cardiología, Mexico, Mexico

Background - Introduction
We present a case of a 15-years-old-male with frequent and symptomatic premature ventricular complexes (PVC) with a 31% of burden, with structurally normal heart that was taken to an Electrophysiological study (EPS) and ablation.

Objectives
To describe the technique used during EPS and ablation.

Methods
We first analyzed the surface ECG where the PVC presented a pattern break in the precordial leads and a pseudodelta wave suggesting a origin from the LV summit. We used electroanatomical mapping with Carto sound, the technique used was activation mapping.

Results
We placed a decapolar catheter (DC) in the coronary sinus (CS) and a quadripolar catheter in the bundle of his, we noticed that ventricular activation during PVC was earlier in the DC, so we placed it deeper in the CS reaching the great cardiac vein (GCV), in this position the ventricular activation was even earlier. We also mapped the right ventricular outflow tract and coronary cusps, but in these regions the electrograms were far-away. We interchanged the DC by an irrigated ablation catheter and we mapped into GCV, we found sharp potentials in de proximal and distal dipole. At the LV summit level, we found that the electrogram in the distal dipole was at least 29 ms earlier than the PVC of the surface ECG, the distal dipole electrogram was earlier than the proximal dipole and in the unipolar recording we found a QS potential being this the most interesting area. Before applying radiofrequency (RF) we made sure to be far enough away from the coronary arteries, we applied RF controlled by temperature (50 °C and 30 W), after 8.3 seconds the PVC’s disappeared.

Conclusions
The electrocardiography features of the LV summint PVC are very characteristic. For their ablation approach electroanatomically mapping is needed, and ablation can be performed through the venous system from the CS or the GCV or using an epicardial access through a subxiphoid puncture. In this case, we applied RF from the GCV with success and without any complications.
A. Electrocardiographic features of the LV summit PVC, pattern break in precordials leads, pseudodelta wave and Maximum deflection index (MDI) > 0.55 B. Left anterior oblique view showing the ablation catheter in the GCV, we performed a venography C. Anatomical 3D reconstruction employing Carto Sound view from above. NCC non-coronary cusp, RCC right coronary cusp, LCC left coronary cusp, LAA left atrial appendage, GCV great cardiac vein, LM left main, ADA anterior descending artery, RVOT right ventricle outflow tract.
Qtc Interval Correlates With Grace Risk Scale In Non-St-Segment Elevation Myocardial Infarction.

Electrocardiography/Holter monitoring/Syncope

Guillermo Cruz Aragón, Juan Alberto Vargas Mejía, Jhonatan Josué Hernández Marroquín, Manlio Fabio Marquez Murillo, Santiago Nava Towsend, Héctor González Pacheco

Instituto Nacional de Cardiología Ignacio Chavez, Ciudad De México, Mexico

Background - Introduction
Risk stratification in patients with non-ST-segment elevation myocardial infarction (NSTEMI) is nowadays performed with the Global Registry of Acute Coronary Events (GRACE) prediction model. QT/QTc interval is not considered in this model but could help to increase is efficiency to further discriminate patients at risk of unfavorable outcomes.

Objectives
The present investigation aims to correlate the QTc interval with the GRACE risk scale in order to elucidate a possible prognostic role of this ECG parameter.

Methods
An observational, retrospective study was carried between January 2016 and August 2019. A total of 940 patients with a confirmed diagnosis of NSTEMI were admitted to our institution, 634 patients met the inclusion criteria for this analysis and were classified into 2 groups, those with a normal QTc interval (< 440 ms; n=390) and those with a prolonged QTc interval (≥ 440 ms; n=244). Automatic measures of QT and QTc intervals taken by the electrocardiograph were registered. QTc intervals were calculated with Bazett's formula.

Subjects were classified according to the GRACE score in 2 preset ranges of low-intermediate (0-140 points) and high risk (> 140 points).

Results
In the comparative analysis of the GRACE risk scale, subjects with a normal QTc had a greater proportion of low and intermediate risk than those with a prolonged QTc. This difference was statistically significant (P = 0.001).

Conclusions
A normal QTc interval (<440 ms) correlates with a GRACE risk scale of low- or intermediate risk in patients with NSTEMI. Prospective studies are needed to include QTc interval in risk stratification scales.
<table>
<thead>
<tr>
<th>GRACE SCORE</th>
<th>QTc &lt; 440 ms (n= 390)</th>
<th>QTc ≥ 440 ms (n= 244)</th>
<th>Total (n=634)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-Intermediate Risk (0 - 140 points)</td>
<td>333 (85.4%)</td>
<td>153 (62.7%)</td>
<td>486</td>
<td>0.001</td>
</tr>
<tr>
<td>High Risk (&gt;140 points)</td>
<td>57 (14.6%)</td>
<td>91 (37.3%)</td>
<td>148</td>
<td></td>
</tr>
</tbody>
</table>

GRACE-QTc correlation between the groups.
Usefulness Of The Isochronous Activation Mapping On Top Of Traditional Techniques In The Vt Ablation In Ischemic Heart Disease

Case reports

Angel Cueva-Parra, Gabriela Bustillos-García, Jorge Gómez-Flores, Manlio F. Márquez, Moisés Levinstein, José Luis Morales, Pedro Iturralde-Torres, Santiago Nava

Instituto Nacional de Cardiología, Mexico, Mexico

Background - Introduction
We present the case of a 49-year-old man with a history of ischemic heart disease, admitted with VT with hemodynamic repercussion, which was cardioverted. He was taken an electrophysiological study (EPS) and ablation.

Objectives
To describe the techniques used during EPS and the ablation. And highlight the use of isochronous activation mapping as a complement to traditional methods.

Methods
We first analyzed the surface electrocardiogram, the clinical VT possible origin was from the basal inferoseptal segment of the left ventricle (LV). EPS was performed without general anesthesia, we used electroanatomical mapping with Carto the techniques used was voltage mapping (VM), ripple mapping and isochronous activation mapping (IAM). In the VM areas with bipolar recording less than 0.5 mV were considered as scar. In the IAM a deceleration zone (DZ) was defined as the presence of 3 or more areas with different conduction velocities within 1 cm.

Results
We performed an electroanatomical reconstruction of the with a pentaray catheter, the VM revealed a large area of necrosis in the inferoseptal, inferolateral and inferior segments, in this area there were a lot of fragmented and double potentials that were probably involved in the TV circuit. The IAM revealed a DZ in the posteroinferior wall, this allowed to better define the critical area of the TV circuit. The IAM considerably reduced the target area to apply radio frequency (RF). The ripple mapping also had a good correlation with the IAM, showing late and slow activation in the DZ. We apply RF at various points within and around the DZ and in other interesting areas with fragmented potential. After that, we performed ventricular pacing and we were unable to induce VT.

Conclusions
The different mapping techniques complement each other. In patients with an extensive scar the IAM allows better definition of the critical zone involved in the TV circuit. In the case presented, the IAM considerably reduced the area of interest to apply RF.
A. Isochronous activation mapping of the posteroinferior LV wall, showing a zone of deceleration, observe the presence of fragmented potentials in this area. B. Correlation between the voltage map (showing a large scar on the posteroinferior wall of the LV) with the isochronous activation map. C. Ripple mapping showing late and slow conduction in the deceleration zone, and normal conduction velocity in other areas.
Value Of The Apple Watch In Detecting An Accessory Pathway During Covid-19 Pandemic.

Case reports

Alvaro E. Reyes-Quintero\textsuperscript{1}, Gabriela Paola Garcia-Ordoñez\textsuperscript{2}, Alan Garcia\textsuperscript{1}, Giulio Conte\textsuperscript{3}, Moises Levinstein\textsuperscript{1}

\textsuperscript{1}. National Institute of Cardiology Ignacio Chavez, Mexico City, Mexico
\textsuperscript{2}. National Institute of Genomic Medicine, Mexico City, Mexico
\textsuperscript{3}. Fondazione Cardiocentro Ticino, Lugano, Switzerland

Background - Introduction

The current SARS-CoV-2 pandemic poses challenges to both electrophysiologists and cardiologist for the evaluation and follow up of patients. Digital tools such as direct-to-consumer mobile ECG, can be used to obtain a proper diagnosis in patients with palpitations without in-person contact and need of conventional ECG monitoring.

Objectives

Expand on the utility of a device currently available to cardiologists and electrophysiologists for remote patient assessment and monitoring during the pandemic.

Methods

Our patient acquired an Apple Watch series 5 for remote assessment. Standard lead I and bipolar precordial CR1 (bipolar equivalent of V1) ECGs were obtained by placing the watch on the chest.

Results

A 26-year-old woman was referred by her general practitioner to our Department for recurrent episodes of palpitations of abrupt onset and termination, as well as dizziness at rest. She had no cardiovascular history or risk factors. Due to the current pandemic, medical consultation and 12-lead ECG at a medical facility was initially not possible; thus, a telehealth approach by means of an Apple Watch series 5 was performed. Standard lead I (Figure 1A) and bipolar precordial CR1 (Figure 1B) ECGs, showed a delta-wave in both recordings (Blue arrow). The 12-lead ECG, obtained few weeks after, revealed identical limb and precordial leads ECG findings (Figure 1C-D), confirming the presence of a left lateral accessory pathway. EP study and ablation was postponed until hospital facilities return to regular activities.

Conclusions

Although, to the best of our knowledge, this is the first report on the value of Apple Watch in the diagnosis of Wolff-Parkinson-White syndrome, in the past, the watch has proven useful for detection of high grade AV block, as well as myocardial
infarction. When compared with baseline ECG, the Apple Watch ECG showed identical readouts in the limb and precordial leads; therefore, it can reliably substitute for 12-lead ECG in the detection, and even localization, of accessory pathways.
Impact Of The Covid-19 Pandemic On Electrophysiological Procedures At A National Referral Center

Clinical Electrophysiology and Catheter Ablation

Angel Cueva-Parra, José Antonio Fernández-Domenech, William Ortiz-Solis, Guillermo Muñoz-Benavides, Sandra Chi-Pool, Manlio F. Márquez, Jorge Gómez-Flores, Santiago Nava

Instituto Nacional de Cardiología, Mexico, Mexico

Background - Introduction
The COVID-19 pandemic has generated serious repercussions on the health system, reducing the number of all cardiology procedures worldwide.

Objectives
Describe the impact of the COVID-19 pandemic on the procedures performed by the electrophysiology department in a national referral center.

Methods
We made a retrospective review of our data base and we compared the among of procedures made in the last 3 years since 2017 to 2019 with the procedures made in the 2020. We divide the procedures into two large groups: device-related procedures (which included implants, changes, upgrades and extractions) and electrophysiological studies and ablations (which included conventional studies, and complex procedures which electroanatomic mapping and cryoablation).

Results
Until September the average of procedures in the last 3 years was 368, and the procedures made in 2019 were 391, while in 2020 we have performed only 225 procedures; the reduction in the total number of procedures was 38.8% comparing to the average of the last 3 years. Regarding the device-related procedures,until September the average of procedures average of the last 3 years was 133 and the procedures made in 2019 were 141, while in 2020 we have performed 137 procedures, value close to the previous year. Regarding the electrophysiological studies and ablations, until September the average of procedures of the last 3 years was 235 and the procedures made in 2019 were 250, while in 2020 we have performed only 88 procedures, considerably decreasing compared to the previous year, the reduction in the electrophysiological studies and ablations was 62.5% comparing to the average of the last 3 years. The most affected months were April, May and June.

Conclusions
The COVID-19 pandemic considerably affected the number of total electrophysiological procedures in our center, reducing it by 38.8%. The reduction of procedures fundamentally affected the electrophysiological studies and ablations, reducing
them by 62.5%.

A. Comparison of the total number of procedures between average of the last 3 years, the year 2019 and the year 2020. B. Comparison of the number of procedures related to devices between the average of the last 3 years, the year 2019 and the year 2020. C. Comparison of the number of electrophysiological studies and ablations between the average of the last 3 years, the year 2019 and the year 2020. D. Comparison of the procedures performed in the years 2017, 2018, 2019 and 2020 until september.
Algorithms For Ecg Location Of Accessory Pathways And Validation Of Iturralde’S Algorithm

Clinical Electrophysiology and Catheter Ablation

**Jorge Gómez-Flores**, Angel Cueva-Parra, Antonio Gallegos-Cortez, Manlio F. Márquez, Pedro Iturralde-Torres, Santiago Nava

Instituto Nacional de Cardiología, Mexico, Mexico

**Background - Introduction**

Multiple algorithms have been created to predict the location of the accessory pathways (AP), some of them have more steps than others and are therefore more complex. In 1996 Iturralde et al. published an algorithm based on the polarity of the QRS, this algorithm is the easiest to apply, unfortunately, it has not been validated yet.

**Objectives**

Validate the Iturralde’s algorithm and the determinate the global accuracy and the accuracy for parahisian AP.

**Methods**

We conducted a retrospective analysis of 364 patients with Wolff-Parkinson-White syndrome who underwent an electrophysiological study and catheter ablation. We employed the Iturralde algorithm to predict the AP anatomical location and then we compared this result to the real anatomic location determined by electrophysiological testing during the successful ablation procedure. We use the kappa coefficient and the Pearson coefficient to determine the precision and perform a comparison with other algorithms.

**Results**

A total of 364 patients were included, the mean age was 30 ± 14 years, and 57% were male. We obtained a global kappa coefficient score of 0.78 and Pearson’s coefficient of 0.90. We see that for the left lateral AP the correlation was very good with the kappa coefficient of 0.97. For the left lateral and left anterior AP the sensitivity was 90%, the specificity was 98%, the positive predictive value was 98% and the negative predictive value was 93%. There were 26 patients with a parahisian AP, which shows a great variability in the ECG features. Employing the Iturralde’s algorithm, 34.6% patients has a correct anatomical location, 42.3% has an adjacent location and only 23% an incorrect location. Compared with other algorithms, the Iturralde´s algorithm showed better accuracy for the parahisian accessory pathways

**Conclusions**

We demonstrate that the Iturralde’s algorithm has a good global accuracy especially for the left side AP. Iturralde’s algorithm is also useful for the parahisian AP.
A. Correlation between the anatomical location determinate by the electrocardiogram (ECG) employing the Iturralde’s algorithm and true location determinate by the electrophysiological study (EP). In the green boxes there are the number of patients with correct location, in the yellow boxes there are the number of patients with adjacent locations, and in the white boxes there are the number of patients with erroneous location. B. Diagnostic performance for each of the anatomical locations. C. Accuracy of the different algorithms for parahisian AP.
Risk Factors Associated With A Chronic Presentation Of Atrial Fibrillation In Mexican Subjects. Results From The CARMEN - AF Registry

Basic/Translational Science

Jose Antonio Fernandez Domenech, Manlio Marquez, Santiago Nava, William Ortiz, Diego Neach

INSTITUTO NACIONAL DE CARDIOLOGIA, Ciudad De Mexico, Mexico

Background - Introduction
Atrial fibrillation (AF) is the most frequent arrhythmia in adulthood. Currently, risk factors for chronic AF have not been described in the Mexican population. The CARMEN-AF Registry offers the opportunity to do so because it is a national, multicenter study, representative of current cardiology practice in Mexico.

Objectives
To identify risk factors associated with a permanent presentation of AF in Mexico.

Methods
We analyzed the patients registered in the CARMEN-AF study, an observational, longitudinal, multicenter and national study in adult patients with non-valvular AF. Recruitment was carried out between 2014 and 2016. In total, 1,423 patients were included who were classified into 2 groups according to the type of AF: non-permanent and permanent.
The following risk factors for AF were analyzed: age, smoking, alcoholism, diabetes mellitus, systemic arterial hypertension, and obesity.

Results
A comparison of risk factors was made between non-permanent AF and permanent AF, a statistically significant association was found between patients with permanent AF and grade II obesity (OR = 1.53, 95% CI 1.005-2.352, p <0.05), the rest of the risk factors does not appeared to have any relationship.

Conclusions
The risk factors traditionally described for presenting non-valvular AF in its chronic form in the world literature are not the same in the Mexican population, obesity being the factor that can condition permanent AF. The next stage will consist of a prospective analysis of the CARMEN-AF Registry of the risk factors that determine the progression of paroxysmal to permanent AF.
<table>
<thead>
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<th></th>
<th>Non permanent AF (n=845)</th>
<th>Permanent AF (n=578)</th>
<th>( p^* )</th>
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<tr>
<td>Age</td>
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<td>70 ± 13</td>
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</tr>
<tr>
<td>Diabetes mellitus</td>
<td>28.4</td>
<td>28.4</td>
<td>0.991</td>
</tr>
<tr>
<td>Systemic arterial hypertension</td>
<td>72.7</td>
<td>72.3</td>
<td>0.886</td>
</tr>
<tr>
<td>Smoking</td>
<td>17.3</td>
<td>15.2</td>
<td>0.305</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>9.3</td>
<td>9.0</td>
<td>0.821</td>
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</table>

<table>
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<th>Non permanent AF (n=845)</th>
<th>Permanent AF (n=578)</th>
<th>( p^* )</th>
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<tr>
<td>overweight</td>
<td>47.0</td>
<td>43.1</td>
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<td>Obesity I</td>
<td>23.2</td>
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</tr>
<tr>
<td>Obesity II</td>
<td>5.3</td>
<td>8.0</td>
<td>0.046</td>
</tr>
<tr>
<td>Obesity III</td>
<td>2.1</td>
<td>3.5</td>
<td>0.088</td>
</tr>
</tbody>
</table>
Alternating Narrow QRS Tachycardia, A Non-Common Arrhythmia Mechanism.

Case reports

**Diego Neach**, Angel Cueva, Antonio Fernandez, Selene Lara, Willian Ortiz, Sandra Chi, Moises Levinstein, Santiago Nava

Instituto Nacional de Cardiología, Mexico City, Mexico

**Background - Introduction**
A 72-year-old woman with a medical record of systemic arterial hypertension and dyslipidemia was referred to our institution for an electrophysiological study. She had a history of recurrent sudden-onset palpitations refractory to multiple antiarrhythmic drugs. Physical examination, chest X-ray, and echocardiography were normal. She had an electrocardiogram (ECG) with a SVT that showed regular variations on QRS axis and RR intervals.

**Objectives**
N/A

**Methods**
N/A

**Results**
An electrophysiological study was performed and clinical tachycardia was induced with ventricular stimulation. A fix VA conduction at 150 ms with two different AH intervals with a difference of 50 ms (180 ms and 230 ms respectively). An orthodromic AVRT involving a left posteroseptal accessory pathway with anterograde conduction through an AV node with dual physiology was confirmed. Successful accessory pathway radiofrequency ablation was performed with documented VA dissociation during ventricular programmed stimulation.

**Conclusions**
QRS voltage and cycle length alternation tachycardias may be due to interesting mechanisms in which differential diagnosis include atrial tachycardia with different antegrade conduction limbs, AVNRT with multiple pathways or AVRT with two accessory pathways.

However, an AVRT secondary to a left AP with the involvement of dual AVN pathways as antegrade limbs in a single patient tachycardia is quite uncommon. Although we demonstrated a dual AVN physiology as a part of the arrhythmia circuit, it wasn’t pathological itself because no AVNRT was induced, so no slow pathway ablation was made. Our case demonstrated an unusual double loop reentry circuit that involved a dual AVN pathway and a concealed posteroseptal AP, which after successful ablation, no tachycardia was again induced.
Two morphology narrow QRS tachycardia, 160 bpm, with periodic change in the PR and RR interval with the same RP interval.
Monophorific Ventricular Tachycardia In Brugada Syndrome

Case reports

María Alexandra López¹, Angelo Columna-Capellán¹, Angel Cueva-Parrা², Santiago García¹, Luciano López¹

  1. Hospital Regional Universitario José María Cabral y Báez, Santiago, Dominican Republic
  2. Instituto Nacional de Cardiología, Mexico, Mexico

Background - Introduction
Brugada syndrome (BrS) is a channelopathy commonly associated with polymorphic ventricular tachycardia (VT), in adults it is very rarely associated with monomorphic ventricular tachycardia.

Objectives
Report a case of BrS that debuted with monomorphic TV and do a short literature review.

Methods
We describe the case of a 22-year-old female, with a family history of sudden cardiac death, who presented palpitations, chest pain and dizziness without syncope, after 2 hours she received medical attention, a BP of 70/40 mmHg was found, the electrocardiogram was compatible with VT with lower axis, left bundle branch block pattern and precordial transition in V3 (figure A). After 200 joules, she went into sinus rhythm that alternated with non-sustained VT, in the sinus beats there was a type I Brugada pattern (figure B), then she received magnesium sulfate which managed to keep her in sinus rhythm where the type I pattern was better appreciated (figure C), 24 hours later the type I pattern disappeared (figure D). Echocardiogram showed absence of structural heart disease

Results
The diagnosis of BrS is defined by a documented type I pattern with at least one of the following: ventricular fibrillation, documented polymorphic VT, inducibility of ventricular arrhythmias during electrophysiological study, syncope or nocturnal agonal respiration, on the other hand, the presence of monomorphic VT in BrS makes one suspect the presence of other pathologies. It is not uncommon that the BrS could be associated with other channelopathies or rhythm disturbances. In this case, TV impresses coming from the RVOT but it is monomorphic, therefore some differential diagnoses could be arrhythmogenic RV dysplasia or idiopathic VT sensitive to adenosine.

Conclusions
There are very few cases reported in the literature about BrS and monomorphic VT. The presence of monomorphic VT in these patients should make us suspect another pathology. The electrophysiological study is key for the diagnostic and therapeutic approach in these patients.

A. Ventricular tachycardia with lower axis and left bundle branch block pattern
B. Sinus rhythm with type I Brugada pattern alternating non-sustained ventricular tachycardia
C. Sinus rhythm with type I brugada pattern
D. Sinus rhythm without type I pattern.
Brugada Syndrome: Is The Addition Of Electrocardiographic Risk Markers The Key For Risk Stratification?

Clinical Electrophysiology and Catheter Ablation

Alejo Tronconi, Guillermo Carnero, Mauricio Mysuta, Brenda Labin, Debora Ramirez Ghezzi, Mariel Alvarez Correa, Nestor Galizio, Jose Luis Gonzalez

University Hospital Favaloro Foundation, Caba, Argentina

Background - Introduction
Risk stratification in Brugada Syndrome (BS) remains a clinical challenge. Several electrocardiographic risk markers (ECG-RM) had been described, as a spontaneous type 1 Brugada pattern (ST1B), maximal time interval between the peak and the end of the t wave in precordial leads (Tpe Max), the presence of an S Wave on DI, a PR interval and (PRi) ≥ 200ms.

Objectives
Evaluate the association of ECG-RM with sudden cardiac death (SCD) or appropriate shocks (ASH) from implantable cardioverter defibrillator (ICD) in patients (p) with BS.

Methods
From a registry of 109 p with BS with a median follow up of 1.8 years (Q1 0.4-Q3 7.2), 12 lead ECG were recorded in every p. Tpe Max was measure on V1 to V6. If an S-DI was present, duration and amplitude was measured. PRi was measured on DII. Baseline characteristics: Age 44 ± 13 years, male 77 (71%), secondary prevention 4 (4%), malignant syncope 11 (10%), inducible electrophysiology study 22/45 (48%), SCD on first grade family < 35 years 12 (11%) and ICD 35 (32%). A-Sh and SCD were compared among p with ST1B vs no ST1B, TpeMax≥100 vs <100ms, S-DI ≥0.4 vs <0.4ms, S-D ≥0.1 vs <0.1mV, PRi≥200 vs <200ms and presence of f-QRS ≥ 2 spike ≥ 2 leads. Variables that were associated with A-Sh or SCD were combined. For variables with significant difference sensibility (Sen) and specificity (Spe) was calculated.

Results
During follow up 6 p presented A-Sh and no p SCD. Results are described in the Table.

Conclusions
In our study population, there was a significant higher incidence of A-Sh in p with ST1B, Tpe Max ≥ 100ms and S-DI ≥ 0.1mV. We found that the presence of one ECG-RM had a high sensibility to predict ASh. The presence of the 3 ECG-RM highly increased specificity to predict A-Sh. Further trials should be carried out to assess if ECG-RM would allow us to differentiate which asymptomatic pts could
benefit from electrophysiological study for risk stratification (high sensibility - One ECG-RM) or would benefit from ICD implantation (high specificity - 3 ECG-RM).

<table>
<thead>
<tr>
<th></th>
<th>p</th>
<th>Sen</th>
<th>Spe</th>
</tr>
</thead>
<tbody>
<tr>
<td>STB1</td>
<td>5/38 (13.1%)</td>
<td>No STB1</td>
<td>1/71 (1.4%)</td>
</tr>
<tr>
<td>Tpe Max &gt; 100 ms</td>
<td>6/41 (14.6%)</td>
<td>Tpe Max &lt; 100 ms</td>
<td>0/68 (0%)</td>
</tr>
<tr>
<td>S-DI &gt; 0.4 ms</td>
<td>4/38 (10.5%)</td>
<td>S-DI &lt; 0.4 ms</td>
<td>2/71 (2.8%)</td>
</tr>
<tr>
<td>S-DI ≥ 0.1 mV</td>
<td>5/45 (11.1%)</td>
<td>S-DI &lt; 0.1 mV</td>
<td>1/64 (1.6%)</td>
</tr>
<tr>
<td>F-QRS</td>
<td>2/7 (14.3%)</td>
<td>No F-QRS</td>
<td>5/102 (4.9%)</td>
</tr>
<tr>
<td>PRI &gt; 200 ms</td>
<td>3/23 (13.0%)</td>
<td>PRI &lt; 200 ms</td>
<td>3/76 (3.9%)</td>
</tr>
<tr>
<td>Tpe Max ≥ 100 ms and S-DI ≥ 0.1 mV</td>
<td>5/22 (22.7%)</td>
<td>Tpe Max &lt; 100 ms or S-DI &lt; 0.1 mV</td>
<td>1/87 (1.1%)</td>
</tr>
<tr>
<td>Tpe Max ≥ 100 ms and STB1</td>
<td>5/22 (22.7%)</td>
<td>Tpe Max &lt; 100 ms or no STB1</td>
<td>1/87 (1.1%)</td>
</tr>
<tr>
<td>S-DI ≥ 0.1 mV and STB1</td>
<td>4/19 (21.1%)</td>
<td>S-DI &lt; 0.1 mV or no STB1</td>
<td>2/90 (2.2%)</td>
</tr>
<tr>
<td>Tpe Max ≥ 100 ms, S-DI ≥ 0.1 mV and STB1</td>
<td>4/9 (44.4%)</td>
<td>Tpe Max &lt; 100 ms, S-DI &lt; 0.1 mV or no STB1</td>
<td>2/101 (2%)</td>
</tr>
</tbody>
</table>
Prevalence, Risk Factors And Outcome Related To Arrhythmias In Hospitalized Patients With COVID-19

Juan Esteban Gómez-Mesa¹, Maria Claudia Montes¹, Natalia Granados-Duque¹, Stephania Galindo-Coral¹, Noel Flórez-Alarcón¹, Ricardo Ramírez Ramírez², Victor Rossel³, Grupo De Investigación Registro Cardio Covid 19-20⁴

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Background - Introduction
A wide range of dysrhythmias are described in patients with COVID-19, describing a prevalence as higher as 17% in some reports and the second most severe complication after acute respiratory syndrome, but data about its prevalence and/or incidence is still limited.

Objectives
To describe the prevalence, risk factors and outcome related to the occurrence of atrial/ventricular arrhythmias in hospitalized patients with COVID-19.

Methods
The CARDIO COVID 19-20 Registry is a multicentric registry of cardiovascular diseases in hospitalized patients with confirmed COVID-19. Recruitment started in May 1th 2020; until October 16th, 1563 patients were included from 37 institutions in 12 Latin-American countries. Of those, 973 patients had all in hospital data registered and completed at the time of the analysis. Patients with and without arrhythmias were compared by their clinical, paraclinical, treatment, and vital status at discharge. Data analysis included comparisons with chi squared test for categorical values and the nonparametric Mann-Whitney U test for continuous variables. A significance level of 0.05 was used.

Results
Patients who developed in-hospital arrhythmias (5,9%) were classified in supraventricular (5,2%) and ventricular (0,71%), and they were older, had more hypertension and heart failure, had higher levels of inflammatory biomarkers (D-dimer, C-Reactive Protein and Troponin), required more hemodynamic support (inotropics and vasoactives) and mechanical ventilation. Those patients had higher in-hospital mortality (table 1).

Conclusions
In Latin America, based in this registry, the prevalence of worsening or new onset atrial/ventricular arrhythmias in hospitalized patients with COVID-19 is relatively low
compared with previous reports. This population have a higher prevalence of cardiovascular comorbidities (hypertension and heart failure), more systemic inflammation, require more hemodynamic and ventilatory support, which is related with a higher mortality, compared with no cardiac arrhythmias.

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>No arrhythmias (n=394)</th>
<th>Arrhythmias (n=98)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years (median [IQR])</td>
<td>58.00 [45.00, 69.00]</td>
<td>57.00 [45.00, 69.00]</td>
<td>68.00 [62.25, 76.00]</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Hypertension (%)</td>
<td>418 (34.0)</td>
<td>381 (31.7)</td>
<td>37 (38.4)</td>
<td>0.602</td>
</tr>
<tr>
<td>Heart failure (%)</td>
<td>38 (3.9)</td>
<td>32 (3.5)</td>
<td>6 (6.2)</td>
<td>0.622</td>
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<tr>
<td>Prior atrial fibrillation (%)</td>
<td>12 (1.3)</td>
<td>12 (1.3)</td>
<td>7 (7.2)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>D-dimer, ng/ml (median [IQR])</td>
<td>0.74 [0.40, 1.24]</td>
<td>0.71 [0.40, 1.51]</td>
<td>1.17 [0.64, 2.08]</td>
<td>0.011</td>
</tr>
<tr>
<td>High sensitivity troponin I, ng/L (median [IQR])</td>
<td>9.65 [4.38, 25.18]</td>
<td>9.00 [4.00, 23.03]</td>
<td>21.00 [9.50, 40.00]</td>
<td>0.004</td>
</tr>
<tr>
<td>Vasopressors (%)</td>
<td>257 (26.5)</td>
<td>216 (23.7)</td>
<td>41 (41.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Inotropes (%)</td>
<td>98 (10.1)</td>
<td>79 (8.7)</td>
<td>19 (19.4)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Mechanical ventilation (%)</td>
<td>343 (35.3)</td>
<td>299 (32.7)</td>
<td>44 (44.8)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Alive at discharge (%)</td>
<td>717 (75.8)</td>
<td>711 (77.8)</td>
<td>6 (6.2)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 1
A Possible Novel Marked Of Multiple Accessory Pathways In Ebstein’s Anomaly. Report Of Two Cases

Gabriela Andrea Bustillos García, Angel David Cueva Parra, Moises Levinstein Jacinto, Jorge Rafael Gomez Flores, Manlio Fabio Marquez Murillo, Jose Luis Morales Vazquez, Pedro Iturralde, Santiago Nava

Instituto Nacional de Cardiología Ignacio Chávez, Ciudad De México, Mexico

Background - Introduction
It is well known that 38% of the patients with Ebstein’s anomaly (EA) have accessory pathways (AP), most of them have multiples AP. A common electrocardiographic feature is right bundle branch block (RBBB). In sinus rhythm this pattern can be masked by the anterograde conduction over an accessory pathway. Our group described absence of RBBB pattern in these patients as a strong predictor of an AP, with a sensitivity 98% and specificity 92%.

Objectives
Report two cases of patients with EA with atrioventricular reentrant tachycardia (AVRT) without RBBB as the first presentation of multiple accessory pathways.

Methods
We analized 12 lead ECG of two patients with WPW syndrome. Case 1: A 15-years-old boy with EA with 33% of right ventricular atrialization.(figure 1, A). Case 2: A 10-year-old boy with a history of heart failure medically treated because of neonatal Ebstein’s anomaly. Rest ECG (figure 1, C), and tachycardia documented.(figure 1, D)

Results
Case 1 underwent electrophysiological study and three AP were found (in the right posteroseptal, one posterior, and the last one in the right lateral wall). Radiofrequency catheter ablation was made in all of them. The post ablation electrocardiogram did not show preexcitation pattern, neither a classic RBBB. He came back for palpitations, and tachycardia (figure 1, panel B). He received 12 mg adenosine and the QRS becomes wider for a few seconds, and then returned to its original morphology. An Electrical cardiovertion was required. The ECG showed a sinus rhythm without RBBB and a preexcitation pattern.
Case 2
An Electrophysiological study was made with electro anatomic mapping and ICE reconstruction. A mid septal AP ablation despite absence of clear pre excitation pattern in the surface ECG. We found an anomalous potential with AV fusion in the postero lateral wall c

Conclusions
Absent of RBBB during tachycardia and the similar QRS morphology in the sinus rhythm and in the tachycardia can predict the presence of multiple accessory pathways.

Figure 1: A. Sinus rhythm without evident preexcitation pattern in V1, the PR interval is normal, but there is not a RBBB pattern. B. Tachycardia with a QRS similar to the preexcitation pattern, arrows indicate P waves. C. Sinus rhythm with preexcitation pattern. D. Tachycardia with a QRS similar to the preexcitation pattern, arrows indicate P waves.
Ablation Of Post-Operative Atrial Flutter In Left Bronchial Isomerism, Cortriatriatum Dexter, Atrial Septal Defect Closure

Case reports

Gabriela Andrea Bustillos Garcia, Angel David Cueva Parra, Jorge Rafael Gomez Flores, Moises Levinstein Jacinto, Manlio Fabio Marquez Murillo, Jose Luis Morales Vazquez, Pedro Iturralde, Santiago Nava

Instituto Nacional de Cardiología Ignacio Chávez, Ciudad De México, Mexico

Background - Introduction
Patients diagnosed with atrial isomerism are prone to develop arrhythmias because of the underlying anatomy, anomalies of conduction tissue, and scarring resulting from surgery. Catheter ablation of these arrhythmias can be difficult because of the complex morphology and difficulties in vascular access.

Objectives
We present the aproach of this rare case of a patient with a complex congenital cardiac disease and atrial flutter.

Methods
A 13-year-old boy referred with a history of Cor triatriatum dexter, atrial septal defect surgery repaired at 11 months. He had palpitations at 8 years old and a typical atrial flutter was diagnosed by a 12-lead ECG. In another institution Electrophysiological (EP) study with electroanatomic mapping (EAM) was made finding dual-loop reentry (right atrial wall (RA) and superior cava vein (SCV) as an upper loop reentry). Radiofrequency ablation was made at RA and SVC, atrial flutter stopped followed by hemodynamically unstable bradycardia. An endocardial dual-chamber pacemaker was implanted. Flutter auricular was observed in a pacemaker interrogation. (Figure 1, A)

Results
He underwent to an EP study with EAM and CARTOMERGE module. An angiotomography reported azygous continuation of an interrupted inferior vena cava (IVC), left persistent SCV ends in a sinus coronary that ends in left atrium, and the supra-hepatic venous drainage is directly to the right-sided atrium. A duodecapolar catheter placed at right atrium showed a clockwise atrial flutter, with a perfect entrainment in the supra-hepatic isthmus. (Figure 1, B, C) A coherent mapping was performed.(Figure 1, D) Radiofrequency catheter ablation was performed in a huge anatomical zone of the isthmus. (Figure 1, E) Pacemaker final rhythm was documented.

Conclusions
Accurate knowledge of the anatomy and surgical procedures prior to ablation
procedure is crucial for the development of adequate strategies in planning the approach in these patients with complex congenital heart disease.

Figure 1. A. 12 lead ECG atrial flutter B. Intracavitary signals showed perfect entrainment at CMI of a clockwise atrial flutter. C. Fluoroscopy sight of catheters position. D. Coherent mapping atrial flutter. E. Ablation sites provided by tags from EAM.
"Initial Experience At The Ignacio Chavez National Institute Of Cardiology For Stimulation In His Evaluated By Ecocardiography"

Cardiovascular Implantable Electronic Devices

Sandra Angélica Chi Pool, Moisés Levinstein Jacinto, Nilda Gladys Espinola Zavaleta, Santiago Raymundo Nava Townsend, Jorge Rafael Gómez Flores

Instituto Nacional de Cardiología Ignacio chávez, Ciudad De México, Mexico

Background - Introduction
There are multiple reports on His bundle pacing, which have shown that it is feasible and has been associated with an improvement in exercise capacity, ventricular synchrony and ejection fraction. In order to avoid harmful effects After pacing in the apex of the right ventricle (RV).

Objectives
To describe the first cases of Hisian pacing evaluated by echocardiography.

Methods
This is an observational, descriptive, retrolective and longitudinal study. Performed at the INC Ignacio Chávez, in patients of both genders, over 18 years of age with an indication for permanent cardiac stimulation. In the period from June 10, 2019 to October 21, 2020, 10 patients were studied. All these patients underwent a complete medical history, resting ECG, baseline electrophysiological study and implantation of a pacemaker / ICD and two-dimensional, 3D and GLS transthoracic echocardiography.

Results
The implant was performed in 8 men and 2 women. The mean age was 68.3 years (range 47 to 85 years).
Selective capture of the bundle of His was achieved in 2 patients, 7 patients had subselective capture and 1 patient had parahisian stimulation. Even when a shortening of > 30% of the QRS was not achieved, a QRS similar to the baseline was achieved, without the widening of the QRS caused by apical stimulation. A percentage of QRS change ≥ 30% was obtained in 2 patients. The% change in LVEF was achieved in 3 patients, obtaining a significant improvement in patient # 3, in whom the LVEF of 10% preimplantation increased to 33%.AV synchrony measured by% of mitral flow in relation to RR, intraventricular synchrony measured with M-mode, and interventricular synchrony measured with pulsed Doppler were found in all patients.

Conclusions
His stimulation did not cause atrioventricular, intraventricular or interventricular asynchrony in the patients studied at the Ignacio Chávez National Institute of Cardiology. Hisian stimulation is similar to physiological.
<table>
<thead>
<tr>
<th>Patient</th>
<th>Type of stimulation</th>
<th>Baseline QRS</th>
<th>% change QRS (≥ 30%)</th>
<th>Baseline FEVI %</th>
<th>% change FEVI</th>
<th>SGI (%)</th>
<th>Wave R (mV)</th>
<th>T. Fluor (min)</th>
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<tr>
<td>1</td>
<td>Selective</td>
<td>101</td>
<td>Not (0%)</td>
<td>57.30</td>
<td>Yes (16.7)</td>
<td>-18</td>
<td>16</td>
<td>54</td>
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<tr>
<td>2</td>
<td>Subselective</td>
<td>187</td>
<td>Yes (30)</td>
<td>59</td>
<td>Not</td>
<td>-21.7</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
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<td>179</td>
<td>Not (27.37)</td>
<td>10</td>
<td>Yes (338.30)</td>
<td>-15.60</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Parahisian</td>
<td>141</td>
<td>Not (-6.38)</td>
<td>36.40</td>
<td>Not</td>
<td>-15.60</td>
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<td>5</td>
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<td>95</td>
<td>Not (-10.52)</td>
<td>44</td>
<td>Not</td>
<td>-15.60</td>
<td>1.20</td>
<td>21</td>
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<tr>
<td>6</td>
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<td>120</td>
<td>Not (25)</td>
<td>60</td>
<td>Not</td>
<td>-18.8</td>
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<td>64</td>
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<tr>
<td>7</td>
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<td>127</td>
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<td>8</td>
<td>Selective</td>
<td>148</td>
<td>Yes (40.50)</td>
<td>67</td>
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<td>Yes (3.78)</td>
<td>-17.14</td>
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</tr>
</tbody>
</table>
First Experience In Lead Extraction Of Cardiac Rhythm Devices: A Report Of A Single-Center.

Cardiovascular Implantable Electronic Devices

Manuel Felipe Patete Ayala1,2,3, Leonel Lembert4, Dulce Maria García Frías1,2,3,4, Mikel Gorka Liñero Fariñas1,2,3, Keren Millán Asencio2, Nioralí Quintero2, Frank Abel Aquino Brea2

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4. Hospital Salvador B. Gautier, Santo Domingo, Dominican Republic

Background - Introduction
Lead removal is a specialized procedure, with well-defined indications. Several studies from high-volume centers have demonstrated that it can be performed with high success and low complication rates, by employing various methods. As this procedure is becoming increasingly frequent in daily practice, reporting objective data is the cornerstone to accurate risk assessment, ultimately improving patients’ outcomes.

Objectives
To present our experience in lead removal, through the evaluation of indications for lead removal, short-term safety, and major procedure-related complications.

Methods
The study included consecutive patients referred to lead removal at our institution over a 21 month period (from January 2019 to September 2020). Continuous variables are presented as mean and SD, and categorical variables are presented as frequency and percentage.

Results
Nine consecutive patients (mean age 62.2 ± 19.8 years, 55.5% woman) underwent removal procedures of a total of 18 leads. Seventeen (89.4%) patients underwent removal of permanent pacemaker leads, 1 patient was a ICD. Right ventricle pacing leads accounted for the majority of the leads removed, followed by atrial leads. Lead tip fixation was active in 15 leads (83.3%) and passive in 4 leads (22.2%). Mean time since implantation was 64 months (range 12-156 months).

Indications for the procedure were pocket infection (2 leads, 22.2%), infective endocarditis (3 leads, 33.3%), and lead dislocation (4 leads, 44.4%). There was a median of two leads removed per patient (range 1–3). Three patients underwent lead explant and 6 patients underwent extraction.

Clinical success was achieved in 17 (94.4%) of the leads and partial in 1 leads (5.5%). All patients were discharged without complications, and there were no deaths at 30
Conclusions
Our first experience in removing leads from cardiac implantable electronic devices has proven to be effective and safe.
Radiofrequency Catheter Ablation Of Ventricular Tachycardia From The Left Ventricular Summit In Congenital Heart Disease

Case reports

Gabriela Andrea Bustillos Garcia, Alan Garcia, Angel David Cueva Parra, Jorge Rafael Gomez Flores, Moises Levinstein Jacinto, Manlio Fabio Marquez, Pedro Iturralde, Santiago Nava

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Background - Introduction
Tetralogy of Fallot (ToF) is one of the most prevalent cyanotic congenital heart diseases (CHD). Pulmonary atresia with ventricular septal defect (PA-VSD) may be considered as an extreme form of classic ToF. Surgical repair creates scars as source for ventricular arrhythmias.

Objectives
Present an unusual finding in a complex congenital heart disease.

Methods
Seven years old boy with PA-VSD was referred to the emergency department because of two episodes of apparent ventricular tachycardia in the last two months treated with amiodarone. Pulmonary atresia with a ventricular septal defect was diagnosed where pulmonary blood flow depended by a tortuous and small patent duct arteriosus (PDA). Not suitable for interventional treatment, he underwent a systemic pulmonary shunt placement (modified Blalock-Taussig), a Rastelli procedure was carried out, and left anterior descending artery was repaired (iatrogenic injury). LAD had anomalous origin from the right cuspid. The 12 lead electrocardiogram (figure 1, a).

Results
An electrophysiologic study under deep sedation was performed. Clinical VT was induced creating activation maps of the LVOT. The earliest ventricular activity was found near the ostium of the left coronary trunk by -44ms; pace-mapping utilizing PASO software of the Carto 3 system had 95% of similitude to clinical VT at this site. Coronary angiography was performed before ablation to assess the distance from the major epicardial coronary arteries. (Fig. 1, b) The earliest activation with a fragmented mid diastolic potential was near to the left coronary cuspid (LCC) close to first diagonal branch that originated from the LCC. Catheter ablation was attempted with interruption of the tachycardia being noted after the first three seconds. (Fig. 1, c)
Conclusions
Catheter ablation represents a challenge after surgical repair of complex congenital heart disease. The best approach for mapping and ablation of LVS ventricular tachycardia comes from initial carefull analysis of the ECG.

Figure 1. A: 12 lead electrocardiogram showed wide QRS tachycardia, 180 beats per minute, with an inferior axis, rSR in V1 with slurring of the initial portion of the QRS complex: pseudo-delta wave > 34ms, intrinsic deflection time > 85ms. Precordial “pattern break” in V2 was present. B: Fluoroscopic image (RAO) coronary angiography. C: Radiofrequency catheter ablation accelerates ventricular tachycardia then slows it down until it stops.
Cardioneuroablation For Atrioventricular Block: A Single Center Experience

Clinical Electrophysiology and Catheter Ablation

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². Istanbul-Cerrahpasa University Hospital, Istanbul, Turkey
³. Kansas City Heart Rhythm Institute and Research Foundation, Kansas City, United States

Background - Introduction
According to current guidelines, pacing therapy is the suggested approach in patients with symptomatic atrioventricular block (AVB) regardless of nature of AVB. Cardioneuroablation (CNA) has been used to treat vagally mediated AVB.

Objectives
The aim of this study is to assess acute and medium-term outcomes of CNA for treating patients with AVB.

Methods
Thirty-one patients (61.3% men; age 39.9 ± 14 years) undergoing CNA for AVB were included in the study. All patients had documented functional second- or third-degree AVB episodes. Patients were divided into two groups: (1) bi-atrial or left-sided CNA and (2) right-sided CNA. Atropine response test was attempted in all cases and only patients demonstrating positive response were included in the analysis. Demonstration of 1:1 atrioventricular conduction or a decrease higher than 25% in PR interval was accepted as positive response. Post-atro

Results
The mean follow-up time was 20.6 ± 19 months. Clinical endpoint was achieved in 30 (96.8%) of cases. In group 1, clinical endpoints were met in all of 26 cases. Bi-atrial ablation was used for acute success in all patients except four patients who underwent the left atrium only ablation because targeted PR responses were already achieved. In all patients except one patient who underwent pacemaker implantation 6 months after CNA due to transient high-degree AVB at night, there was no new AVB episode during follow-up Holter recordings. In group 2, clinical endpoints were met in 4 of 5 cases. In failed case, although the rhythm intermittently changed to first-degree AVB during radiofrequency application, 1:1 atrioventricular conduction could not be achieved. The patient underwent pacemaker implantation at the end of procedure. In 2 of remaining 4 cases, pacemaker was implanted for symptomatic AVB and pacemaker syndrome–like complaints due to accelerated junctional rhythm, respectively.
Conclusions
CNA appears to be an effective strategy with favorable medium-term results in well-selected patients with functional AVB.
Successful Ablation Of Ventricular Tachycardia Supported By Ecmo. First Case In Our Institution

Case reports

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Background - Introduction
Ventricular tachycardia (VT) with hemodynamic compromise represent a challenge in radiofrequency catheter ablation (RFCA) for the Electrophysiologist. Extracorporeal life support (ECLS) is a very effective bridging therapy in patients with left ventricle dysfunction and electrical storm.

Objectives
We present the first case of ablation with ECLS in our institution.

Methods
A 65-year-old male patient with history of diabetes and hypertension was referred for ST segment elevation myocardial infarction (STEMI) of anterior wall. Left ventricle ejection fraction 23%. Hemodynamically non-tolerated VT started twenty days after infarction. (Figure 1, A) External electrical cardioversion was performed 7 times. He underwent to an Electrophysiological study (EP) however presented pulseless electrical activity (VT) requiring cardiopulmonary resuscitation. Although he was maintained with sedation, assisted ventilator support and intravenous amiodarone, he persisted with VT storm.

Results
The surgery service performed a veno-arterial extracorporeal membrane oxygenation (ECMO) by left femoral route. Meanwhile an EP study with electroanatomical mapping was carried out, voltage map was created with late abnormal potentials, double potentials and fragmented signals in the scar zone. Purkinje potentials were found in the anterosuperior fascicle region where good pacemapping (96%) was made. Power controlled radiofrequency was applied triggering and stopped a sustained episode of VT. And a substrate guided ablation was performed with the elimination of late potentials and non inducibility of VT as end points. The ECMO took off after procedure and the patient stayed at critical care unit to monitoring. At 10 months of follow-up no VT episodes were reported.

Conclusions
ECMO procedure works as adjunctive therapy in catheter ablation of VT in critically ill patients. Its safety and reproducibility are highly demonstrated by literature. This
approach may be considered in high risk patients of acute hemodynamic decompensation.

Figures: 1 Tachycardia Electrocardiographic characteristics, 2 Electroanatomical mapping (voltage map) with double and late potentials. 3, 4: EAM showed purkinje potentials at the anterior-superior fascicle zone, where pacemap was the same morphology to the clinical VT.
Second Generation Cryoballoon Ablation In Atrial Fibrillation: Long Follow Up Outcomes

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Catéter ablation of symptomatic atrial fibrillation (AF) with no response to pharmacologic treatment showed to be safe and effective strategy to control rhythm. Although there is not enough evidence about the result of second generation cryoballoon ablation beyond 24 months.

Objectives
To determine the safety and efficacy of second generation cryoballoon ablation in patients (P) at long term follow up

Methods
Between 2014 and 2019, 329 P with AF underwent pulmonary vein isolation (PVI) with second generation cryoballoon catheter. Basal characteristics: Age 60 ± 11 years, men 247 (75%), paroxysmal AF 250 P (75%), persistent AF 79 P (24%) and long standing AF 26 P (4.8%), greater than 2 points CHADS-VASc score 82 P (24%), left ventricular ejection fraction 59 ± 6 %, left atrium diameter 40 ± 6.9mm and left atrium area 23.5 ± 4.9cm2. Procedure time 101 ± 31 minutes and radioscopy time 23 ± 16 minutes.

Follow up was performed with 48 hours Holter at 1, 3, 6 and 12. After 12 month follow up was performed every 6 month. Recurrence was define as the presence of AF, atrial tachycardia or atrial flutter lasting more than 30 second after a 3 month blanking period.

Results
PVI was achieved on 1265/1290 pulmonary veins (98%). Additional cavo-tricuspid istums block was performed on 40 P (12%). Median follow up 22 ± 12 month, 231 P (70%) were free of recurrence. Recurrence of arrhythmia was observed on 15 P (4.5%) at 12 month, 32 P (9.7%) between 1 and 2 years, 30 P (9.4%) between 2 and 3 years, and 17 P (5.1%) between 3 and 4 years, and 3 P (0.9%) beyond 5 years. Mayor complications 4 (1.51%): 2 P pericardium tapenade, 1 P pharynx perforation and 1 transient amourosis.

Conclusions
In our population study population second generation cryoballoon catheter show to be
a safe and effective technique to achieve PVI and rhythm control at long time follow up. The incidence of complications were low.

Figure 1
Deep Stimulation Of The Left Bundle Branch Of The HisPurkinje System: Reestablishing Physiological Ventricular Activation

Cardiovascular Implantable Electronic Devices


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Background - Introduction
Conventional right ventricular pacing increases the risk of atrial fibrillation and heart failure in patients with pacemaker. Direct left bundle branch pacing is a form of direct stimulation of the cardiac conduction system and prevention of such outcomes.

Objectives
Retrospectively analyze the perioperative outcomes of patients after direct stimulation of the left bundle branch at a single medical center.

Methods
Pacemaker electronic data and early complications of 51 consecutives patients that underwent left bundle branch pacing were analyzed. Data analysis was conducted through R programming version 3.6.2.

Results
51 patients underwent left bundle branch stimulation, and 49 were successful. Two cases were not possible to capture the conduction system. 4 different inclusion criteria were considered for this study: Primary pacemaker implant to achieve LBBP (n = 30), patients that underwent His-Bundle Pacing and presented threshold > 2V x 1 ms or R wave < 2mV during the procedure (n = 10), patients that were submitted to His-Bundle Pacing and presented threshold elevation > 4V x 1 ms during the follow-up (n = 4) and patients that had a poor response to cardiac resynchronization therapy (n = 7). The average age was 70.5 ± 12.3 years-old and 67% of patients were male. QRS duration before the procedure was 142 ± 38.8 ms and 121 ± 15.8 ms after pacing. Left ventricular activation time was 77.6 ± 14.1 ms. The average R wave amplitude was 10 ± 4.75 mV, pacing threshold was 0.4 V x 0.4 ms and impedance was 651 ± 160 ohms. Procedure duration was 115 ± 33 min and the fluoroscopy time was 18.6 ± 18.3 min. No complications were observed.

Conclusions
Direct left bundle branch pacing is a feasible and safe technique. LBBP in this study presented a high success rate, low procedure and fluoroscopy time, and appropriate electronic pacemaker parameters.
QRS duration before and after deep stimulation of the left bundle branch.
Ablation In Patients With Ebstein's Anomaly And Wolff Parkinson White Syndrome

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Ablation in patients with Ebstein's Anomaly (EA) and Wolff Parkinson White (WPW) syndrome is challenging due to the complex anatomy and the presence of multiple accessory pathways (AP).

Objectives
To report the results of our experience on ablation in patients with EA and WPW syndrome.

Methods
We conducted a retrospective review of the cases of EA and WPW syndrome, which were taken to ablation in our center between 2002 and 2019. For the analysis we only include the first procedure performed on each patient.

Results
We found that in the indicated period, at least one electrophysiological study and ablation had been performed in 57 patients, 50.8% were males and the average age at the time of the study was 19 years, 87.79% had no right bundle branch block in sinus rhythm. Some of them had other associated arrhythmias, atrial flutter was the most frequent (10.7%). Regarding the procedures, most of them were conventional studies 46 (86%) and only 8 (14%) were performed with electroanatomical mapping. We used intracardiac ultrasound in 8 cases (14%). The acute success rate was 75.4% and in the follow-up 24 patients (42.1%) presented recurrence, of these 16 were taken to a second procedure. Only 3 (5.3%) presented a major complication, two of them presented AV block and the other an ischemic stroke. A significant number presented multiple accessory pathways (19.3%). The most important finding was in relation to the location of the accessory pathways, the most frequent location was the right posterolateral with 57.9%, followed by the right posteroseptal with 43.8% and the right lateral with 10.5 %.

Conclusions
The most frequent location of the accessory pathways in patients with EA and WPW syndrome was the right posterolateral pathway, the ablation in these patients constitutes a challenge, the recurrence rate is high, this could be explained because the most of procedures were conventional studies. New studies are needed to demonstrate the usefulness of new techniques to reduce the recurrence rate.
A. Table of the main characteristics of the population studied. B. Representative scheme that explains the absence of right bundle branch block in patients with EA and WPW syndrome. C. Diagram showing the distribution of the accessory pathways of the population studied.
Pacing System Malfunction Due To COVID-19: Syncope Due To Unexplained Loss Of Pacing Capture.

Case reports

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Background - Introduction
A 34-year-old male was referred in to our Institution due to a clinical history of heart failure. A reduced LV ejection fraction of 36% was documented and initially diagnosis of hypertrophic cardiomyopathy was made. MRI confirmed biventricular hypertrophy with extensive fibrosis and systolic biventricular dysfunction. He was admitted to the emergency department due to a high degree AV block so a double chamber cardioverter-defibrillator (ICD) was successfully implanted for primary prevention. Implant parameters were: atrial and ventricular capture thresholds of 0.4 V and 0.7 V respectively, cable impedance of 1,026 Ohm (atrial) and 572 Ohm (ventricular). During his in-hospital assessment and recovery, pyrophosphate scintigraphy was done and cardiac amyloidosis was finally diagnosed. In a routine follow-up the ICD was interrogated with normal thresholds (0.25V and 0.5V for atrial and ventricular) with no other findings.

Objectives
N/A

Methods
N/A

Results
Six months later he attended the Emergency Department with a 48-hour history progressive dyspnea and syncope. A third degree AVB without pacemaker stimulation was observed, so temporal pacemaker was implanted. Viral test confirmed COVID-19. Adequate lead position was documented in a chest X-ray. The ICD was interrogated and several days before admission a progressive elevation of stimulation thresholds was observed until finally ventricular capture was completely lost. Progressive clinical deterioration occurred and finally our patient present cardiorespiratory arrest and death.

Conclusions
Many cardiovascular complications have been described in patients with COVID-19. These include cardiac arrhythmias in its many forms. To our knowledge this is the first reported case of pacemaker system dysfunction due to COVID-19. The patient had a completely normal device before infection and he developed syncope due to
AVB because of the system malfunction. The only explanation that could be argued for this event is direct myocardial injury.

12 lead ECG with complete heart block in the emergency department
New Approach For Successful Ablation In Patients With Ebstein Anomaly And Wolff Parkinson White Syndrome

Case reports

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Background - Introduction
Absence of right bundle branch block (RBBB) pattern in patients with Ebstein anomaly (EA) is a predictor of an ipsilateral accessory pathway (AP). Look for a RBBB pattern after ablation can be useful for determining ablation success. However, ablation procedure in these patients had no good success, the use of electroanatomical mapping (EAM) techniques may improve results.

Objectives
Present a new approach for catheter ablation of accessory atrioventricular (AV) pathways in EA.

Methods
We investigated a series of 8 patients with wolff parkinson white and EA who underwent to electrophysiological study (EP) with EAM with CARTO system using an additional image tool (intracardiac echocardiography ICE) to improve anatomical landmarks accuracy. This approach consisted of: reconstruct a heart shell guided by ICE drawing tricuspid valves carefully, conventional mapping was made through delimitation of AV potentials fused looking for the earliest ventricular potential (EVP)

Results
We identified most common AP localization was right posterolateral. Three of them showed multiple AP. In 7 patients the EVP site was at the anatomical tricuspid anulus. As an interesting finding was that when radiofrequency ablation was applied at the EVP site and loss of preexcitation occurred, the AV connections are still registered at this huge zone delimited by these fused potentials. These potentials are frequently found at the right ventricular atrialized portion. We decided to make a larger ablation at this zone until all local potentials completely disappeared. After this we realized that the ablation was linear. We reproduce the same approach to all of this patients and we observed the same behavior of all these AP. A RBBB was also one of the end points of ablation. During 24 months of follow-up the treated arrhythmia recurred in only one patient.

Conclusions
It is been described branched connections in right AV groove as a factor of recurrence. That's why we propose a “linear ablation” as a novel approach for AP.

Figure 1. A, B 3D reconstruction by CARTOSOUND system in a patient with EA. Shows the AV fusioned potentials with normal PR interval. C, D: Schematic design and intracardiac ecocardiography images of Ebstein anomaly linear ablation points. E: EAM by CARTO system with ablation points.
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**Diagnosis Of Brugada Syndrome With SCN5A P. Mutation In A Symptomatic Child At Night: Case Report**

Case reports

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**Background - Introduction**

Brugada syndrome (BS) is an autosomal dominant inherited disease with incomplete penetrance that affects sodium channels mainly at the myocardial level. The prevalence is 1 in 5000-10,000, higher in men, and constitutes 4-12% of the causes of sudden death (SD), which may be its first manifestation. Symptoms occur at rest, generally at night, and more frequently in the third to fourth decade of life. Only 30% of patients have a Brugada type 1 (Bt1) pattern on resting electrocardiogram (rECG), which makes diagnosis difficult, sometimes requiring provocation tests and genetic studies, the latter with low performance (15 to 30%).

**Objectives**

A case of a symptomatic 3-year-old Bt1 patient with a positive genetic study in whom a defibrillator was implanted is presented.

**Methods**

Case:
Male, 3-years-old, was taken to the emergency room because during sleep with his mother in the night, he presented agonal breathing. She describes him as rigid and with perioral cyanosis, but with a posterior reaction to stimulation. rECG showed a Bt1 pattern. An endocavitary implantable cardioverter-defibrillator (ICD) was implanted without any complications to prevent the risk of SD.

**Results**

Discussion:
BS requires high index of suspicion due to the risk of SD, three times higher in symptomatic patients, with the diagnosis made with rECG, as it was in this case. Interestingly, the mother and sister had Brugada pattern type 2 phenotype on rECG. The patient's genetic study was positive for a mutation of the sodium channels SCN5A p. Which has been found to be the cause of BS. Although it is not the typical age, patients with symptoms compatible with convulsive syncope, especially at night, should have a rECG, since this can make the diagnosis and offer treatment. Installation of an endocavitary ICD is feasible, despite the small age of the patient, being the only effective treatment for the management of ventricular fibrillation.
**Conclusions**

BS requires high suspicion due to the risk of SD, despite small age ICD can be implanted.
Case Report: Ablated Idiopathic Mitro-Aortic Ventricular Tachycardia In A 4-Year-Old Child

Case reports

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Background - Introduction
Idiopathic ventricular tachycardia (IVT) is mostly seen in patients older than 12 years of age and 80% originate in the right ventricular outflow tract. Treatment is conservative given its evolution and benign prognosis. Radiofrequency ablation (RA) is curative and has low risk of complications, although it is reserved for special situations.

Objectives
A case of a 4-year-old patient with left IVT, who underwent successful RA is presented.

Methods
Case:
Male, 4 years old, evaluated for asymptomatic tachycardia. Holter monitoring demonstrated isolated monomorphic Ventricular Extrasystoles (VE) in frequent pairs with incessant VT bursts up to one minute. Echocardiogram and MRI were normal. Management started with propranolol up to 3 mg/kg/day with a diminished number of VT, however with sinus pauses (SP) of more than 2.5 seconds. Treatment was adjusted to atenolol and amiodarone, with shorter VT but intermittent first degree AV block, complete right bundle branch block, and SP. Therapy was then changed to sotalol (2 mg/kg/day), with diminished VT, but longer SP up to 4.4 seconds. Due to adverse effects, RA with carto at the superior mitral aortic level, close to the posterior aortic leaflet, using Navistar 4mm carto 7F ablation cathether under transesophageal echocardiography (TEE) vision was successfully made.

Results
Discussion:
Left IVT is rare and even more so the mitral aortic focus. Despite the young age, RA should be considered as a management option as well as for cases with severe symptoms, tachycardiomyopathy, and those who wish to perform competitive sports (since many are triggered with physical effort).
Conclusions
RA should be considered in patients with incessant IVT in selected cases, especially in those who do not respond to antiarrhythmic drugs. The support of transesophageal or intracardiac echocardiography and electroanatomic three-dimensional mapping is recommended.
Epicardial Ablation Of Incessant Left Atrial Appendage Tachycardia In A Case With Tachycardiomyopathy

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Background - Introduction
Atrial tachyarrhythmias (AT) with an origin in the left atrial appendage (LAA) are rare and often they are incessant and associated with tachycardiomyopathy, often originated at the ostium. Reports of AT originating from the epicardial aspect of the LAA are scarce.

Objectives
The objective of this case is to describe a rare presentation of a recurrent and AT associated with tachycardiomyopathy originating from the epicardial aspect at the tip of the LAA.

Methods
A case of a 21-yr-old woman with incessant atrial tachycardia is presented, refractory to medical therapy, echocardiography showed global dilation with LV ejection fraction of 20%. After two failed endocardial ablations an epicardial access was attempted. The earliest activation site was located at the tip of the epicardial aspect of the LAA. RFCA was successful at this site. The patient remains asymptomatic during a follow-up of 10 months; the ventricular function was completely recovered after 6 months (LVEF of 50 %).

Results
We show a case of successful epicardial ablation of incessant left atrial appendage tachycardia in a case with tachycardiomyopathy. The described approach was successful at 10 months a follow-up of; the ventricular function was completely recovered after 6 months (LVEF of 50 %).

Conclusions
LAA tachyarrhythmias are rare, often incessant and might produce tachycardiomyopathy. Catheter ablation is the treatment of choice, though technical considerations should be considered with regards to anatomy and potential site of origin in the epicardium or the distal aspects of the appendage. ROT mapping could serve as a reference for epicardial origin.
A-B. Left anterior oblique (A) and anteroposterior (B) views of endocardial activation map shows earliest atrial activation at tip of LAA. C. Epicardial activation map, left anterior oblique view (right panel) show earliest activation at -70 ms at the tip of the LAA and cessation of atrial tachycardia during radio frequency application (left panel). LAA: Left atrial appendage
Dual-Chamber Pacemaker Implantation In Pregnant Woman Without Fluoroscopy, Using Intracardiac Echocardiogram

Case reports

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Background - Introduction
Although electroanatomical mapping and intracardiac echocardiography (IEC) are already routinely incorporated into electrophysiology procedures, their use in artificial cardiac stimulation is still quite incipient. Exposure to ionizing radiation during pregnancy can cause malformations in the fetus and a greater likelihood of malignant neoplasms.

Objectives
To describe a case of permanent pacemaker implantation in a pregnant woman without fluoroscopy, using IEC.

Methods
Case report description

Results
Patient 24 years old, 23 weeks pregnant, G2P1A0, complaining for 2 months of lipothymias associated with malaise and dyspnea, in addition to 2 episodes of syncope.
ECG with sinus rhythm, heart rate (HR) 29bpm, first degree AV block and blocked atrial bigeminy; Holter with HR average 71bpm and minimal 29bpm, first degree AV block, Wenckebach periods and sinus pauses up to 5.5s (awake); echocardiogram with EF (Simpson) 53%, normal. Class IA indication for implantation of a dual chamber pacemaker. Due to pregnancy, we decided to indicate the transvenous access, without fluoroscopy, with the help of the IEC. The procedure was uneventful, with an atrial electrode implanted in the atrial appendage (image 1) and the right ventricular electrode in the septal position (image 2), lasting 1 hour and 40 minutes.

Conclusions
The use of IEC, as a strategy for pacemaker implantation without fluoroscopy, despite being incipient, proved to be effective.
Image 1: Red arrow showing location of atrial electrode in the right appendage

Image 2: Red arrow showing location of right ventricular electrode in the septal position
Long QTS With Bradycardia, And Left Ventricular Non-Compaction Cardiomyopathy

Case reports

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Background - Introduction

The electrocardiogram (EKG) of patients with Left ventricular non-compaction cardiomyopathy (LVNC) is usually abnormal in up to 87% of patients.

Objectives

Despite being an extremely rare entity, LVNC and long QT syndrome (LQTS) have already been reported previously, however, to our knowledge this is the first case associated with severe bradycardia reported.

Methods

A 5-year-old boy, referred to our center, without history of sudden death or arrhythmias in relatives. His mother was diagnosed with hypothyroidism during pregnancy, treated with levothyroxine. The child presented bradycardia fetal and was born at 37 weeks gestation due to acute fetal distress. At the age of 4, he attended a consultation and asymptomatic bradycardia of 40 bpm was documented. A transthoracic echocardiogram reported LVNC in the apical, lateral, and posterior regions, normal chambers diameters and LVEF of 66% (Panel A). The EKG showed sinus bradycardia of 35 bpm and a prolonged QTc interval (630 ms), High-amplitude, broad-based, inverted T waves in precordial leads (Panel B). The mother's EKG also showed prolonged QT (540 ms). A dual-chamber endocardial pacemaker was placed (Panel C) improving QTc interval (518 ms) programmed in DDDR mode at a rate of 80 bpm (Panel D), to begin treatment with beta-blocker (propranolol 4.5 mg/kg TID). Genetic analysis revealed the variant c.691C>T in exon 5 of the KCNQ1 gene in heterozygous form (LQTS1).

Results

As far as we know, this would be the first documented case of this rare entity in Latin America. Unlike the reported cases, our patient has not developed arrhythmias related to prolonged QT and its presentation was associated with asymptomatic bradycardia.

Conclusions

Inquiring about this unique combination of entities will provide a better
understanding of the mechanisms involved, and therefore, will provide a pathway to an optimal treatment and clarified prognosis.

LQTS, Bradycardia and LVNC
Post-Surgical Sinus Node Dysfunction. Experience At The Instituto Nacional De Cardiología "Ignacio Chávez".

Basic/Translational Science

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Background - Introduction
Studys regarding presentation of post-surgical sinus node dysfunction (SND) have very contrasting results over time, both in terms of the basic pathology and the type of surgery performed, in correspondence to the presentation time and the need for pacemakers (PPM) associated with this condition.

Objectives
Quantify the time after surgery in which SND and the resolution or decision-making of placing a PPM in post-surgical patients for correction/palliation of congenital heart disease (CHD) at the Instituto Nacional de Cardiología (INC).

Methods
Type of study: Descriptive, retrospective. Universe of study: Patients of the INC carrying CHD who underwent some surgical, corrective or palliative intervention, between january 1, 2003 to december 31, 2019. Sampling: Non-probabilistic consecutive cases. Sample size: The entire study universe.

Results
72 patients were admitted, 51% were female. Mean age (in months) was 63.1, median 36, standard deviation (SD) 62.2. Both CHD and surgical procedures were varied, SND being more common in intracardiac total anomalous venous return. Discarding patients whose SND presentation was over the month, SND was presented (in days) with a mean 0.8, median 0, SD 2.7. 25 (35%) returned to sinus rhythm. SND resolution data (in days): mean 4.6, median 3, SD 3.6. In those who remained with SND, 23 (49%) required PPM. Discarding patients who’s PPM were placed after the month of surgery we get: mean 17, median 18 and SD 6.9 days.

Conclusions
Given the heterogeneity of the pathologies and the results obtained, it’s difficult to conclude an ideal surveillance time after surgery for the placement of PPM. Considering our population, we suggest 21 days of surveillance in patients with low cardiac output attributable to SND.
Association Between The Presence Of Chronic Complications Of Type II Diabetes Mellitus And Prolongation Of The QTc And QTd Intervals.

Basic/Translational Science

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Background - Introduction
Type 2 diabetes mellitus (DM2) affects 346 million people around the world and leads to the progressive development of microangiopathic complications such as retinopathy and nephropathy. Similarly, it represents a risk factor for cardiovascular diseases, mainly ischemic heart disease. It is known that patients with DM2 present QTc and QTd electrocardiographic intervals above 440ms. These intervals have been shown to be markers of cardiovascular risk especially for the development of malignant arrhythmias (torsade de pointes type) and sudden death.

Objectives
To determine the association between chronic ophthalmological (retinopathy) and renal (proteinuria) complications due to DM 2 and the presence of prolonged QTc and QTd intervals and the relationship between the progression to advanced complications and the QT interval lengthening.

Methods
A clinical record of 50 patients with DM2 was reviewed with an ophthalmology assessment and protein determination in 24 hrs and EKG of the last 6 months of Regional Hospital “Mérida ISSSTE”. The QT intervals were corrected by the Bazett formula, and the QTd was calculated by the formula QTd=QTmax-QTmin. A QTc > 430 ms in men, > 450 ms in women and QTd > 80 ms was considered prolonged. For all results, a p <0.05 will be considered significant. SPSS Ver.17.0 statistical package was used.

Results
22% and 33% present, respectively, prolonged QTc and QTd intervals. ANOVA test to determine if there is a relationship between the prolongation of the QTc and QTd intervals between the categories of complications, obtaining values of p = 0.16 and p = 0.4 respectively.

Conclusions
There is no association between the presence of chronic complications from DM 2 and the prolongation of the QTc and QTd intervals. No association was found between the progression to advanced complications and the QT interval lengthening.
Alcoholization Of Vein Of Marshall As Definite Treatment In A Peri-Mitral Flutter Refractory To Endo-Epicardial Radiofrequency Ablation

Case reports

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Background - Introduction
The Radiofrequency catheter ablation (RFCA) of perimitral atrial flutter (PMAFL) is challenging because of the important participation of the epicardium in the arrhythmic circuit which generate the necessity to produce deeper myocardial lesion of the involved area

Objectives
To describe our experience in one case of PMAFL after of PVI and resolved using ethanol infusion into the vein of Marshall (VOM)

Methods
N/A

Results
A 68-year-old man with PMAF 6 months after of PVI for persistent AF, normal LVEF, recurrent to RFCA with endocardial and CS-epicardial approach. Underwent to the VOM alcoholization. We put an intracardiac echocardiography probe in the right atrium, a decapolar catheter in the CS. Transeptal atrial puncture was made with Brockenbrough-1 XS 71 cm and 98 cm needles through a Swartz SL1 and Agilis Nxt Steerable Sheath respectively. An atrial flutter (AFL) with eccentric CS activation was documented with fusion, entrainment and PPI IN since mitral annulus. Anatomical, voltage and LAT maps were made with Pentaray catheter. Additional RFCA applied in the endocardium an inside the CS did not resolve the arrhythmia. We considered ethanol infusion into the VOM (Figure. 1). We placed the Agilis Sheath into the ostium of the CS canulating the VOM with a right coronary Judkins catheter 3.5/6F supported over a balance middle weight (BMW) 0.014 mm guidewire. A 4Fr balloon catheter 2.5 x 40 x 150 cm AmphirionTM Deep was introduced into the VOM through the Judkins catheter and over the BMW guidewire allowing occlusion of the VOM with posterior infusion of 7.5 ml of absolute alcohol for 10 seconds finishing the AFL and obtaining sinus rhythm without complication and no recurrency in 2 years of following
Conclusions
VOM alcoholization is a useful technique for the treatment of PMAFL refractory to RCA
Protocol For A Prospective Multi-Site Non-Random Registry Of Real-World Experience Of Catheter Ablations For The Treatment Of Symptomatic Paroxysmal Atrial Fibrillation: Real Af Registry

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Catheter ablation has become the mainstay therapy for atrial fibrillation (AF) with rapid innovation over the past decade. This has brought heterogeneity to our field and the ideal strategy is unknown. Variability in factors such as ablation, mapping and validation techniques, fluoroscopy use and post procedure care may affect efficiency, safety, and efficacy. Real world evidence assessing the impact of these variations across a broad spectrum of operators may provide insight into these questions.

Objectives
REAL-AF is an international prospective registry that aims to enroll 4000 patients at high volume centers with an emphasis on procedural technique and long-term patient outcomes.

Methods
Consecutive patients presenting to contributing centers are screened for enrollment. Data is collected about center and provider practices, patient and procedural characteristics (including mapping system’s data) and outcomes. A rigorous standard of care for participating institutions is required including use of patch monitors at 6 and 12 months, event monitors as needed, EKG at every visit, and interrogation of implanted devices. Outcomes analyzed will include markers of safety, efficiency and effectiveness (freedom from AF longer than 30 seconds at 9 weeks and 12 months), procedure time and complications and a patient-reported outcome at one year. Data is shared amongst contributing centers to allow for optimization of delivered care.

Results
Enrollment began January 2018 at a single site. Additional sites began enrollment in October 2019 and through October 2020, 713 patients underwent 738 procedures at 13 institutions.
Conclusions
REAL-AF’s multiple data sources and detailed procedural information, its emphasis on high volume operators, and use of rigorous standardized follow-up methodology represents a novel registry paradigm. It will allow evaluation of the impact of a multitude of data points on procedural outcomes. Data sharing amongst participating institutions may allow for improvements in quality of care.
Ventricular Arrhythmias In A Structurally Normal Heart

Electrocardiography/Holter monitoring/Syncope

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2. Hospital Nacional Dos de Mayo, Lima, Peru
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4. Hospital Central de la Fuerza Aerea del Peru, Lima, Peru

Background - Introduction
Ventricular tachycardia (VT) in the structurally normal heart usually occurs in young people, it causes palpitations, syncope, cardiomyopathy and rarely sudden cardiac death; in this way, we present a 65-year-old man without comorbidities who presented recurrent palpitations.

Objectives
To analyze electrocardiograms (ECG) of a patient without structural heart disease who presents two different morphology of ventricular arrhythmias.

Methods
We assess ECGs and 24-h Holter, and we employed the treadmill test, echocardiogram, cardiac computed tomography (CCT) and cardiovascular magnetic resonance (CMR) in order to rule out any structural or functional heart disease.

Results
The ECG showed a sinus rhythm alternating with a wide QRS complex tachycardia with a right bundle branch block (RBBB) and an upper axis pattern, suggesting that its origin from the posterolateral papillary muscle. The 24-holter reported a high burden of premature ventricular complexes (PVCs) 28%, and some episodes of sustained and non-sustained VT (fig A), also we identified other morphology of PVCs with left bundle branch block (LBBB) pattern, inferior axis and late precordial transition in relation to a possible origin of the right ventricular outflow tract (RVOT).

The treadmill test was negative to ischemia and in exercise the papillary muscle VT disappeared but the PVCs from the RVOT were kept at any given stage (Fig B). Normal findings were observed on echocardiography, no significant coronary lesions were found in CCT and CMR did not reveal fibrosis (Fig C). Finally, he was prescribed metoprolol 50mg od meanwhile he is awaiting for an electrophysiological study.

Conclusions
Usually, ventricular arrhythmias in structurally normal heart occur in young people, for this reason it is important to highlight this case in which an older adult with
structurally normal heart presented two types of ventricular arrhythmia: a TV from the posterolateral papillary muscle and PVCs from the RVOT.

**A. 12-lead Holter monitor with two ventricular arrhythmia morphologies**

**B. Behavior of arrhythmias during the treadmill test**

**C. Complementary studies showing absence of structural heart disease**

Figure: A. Twelve-lead Holter monitor shows a wide QRS complex tachycardia with a RBBB and upper axis pattern, probably originated from posterolateral papillary muscle (left) and PVCs with LBBB pattern, inferior axis and late precordial transition possible in accordance to origin of RVOT (right). B. Papillary muscle VT disappeared and PVCs from RVOT kept in exercise on treadmill test. C. Absence of structural heart disease on echocardiography, CCT did not show any significant obstructive coronary stenosis and LGE was absent neither RVOT nor posterolateral papillary muscle on CMR. RBBB: Right bundle branch block, PVCs: Premature ventricular complexes, LBBB: Left bundle branch block, RVOT: Right ventricular output tract, CCT: Cardiac computed tomography, CMR: Cardiovascular magnetic resonance.
Prognostic Value Of Non-Invasive Programmed Stimulation In Primary Prevention Implantable Cardioverter-Defibrillator Recipients. Long-Term Results Of The NIPS-ICD Study.

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Implantable cardioverter-defibrillator (ICD) offers an opportunity to examine vulnerability to ventricular tachycardia (VT) or ventricular fibrillation (VF) by performing non-invasive programmed ventricular stimulation (NIPS). Whether NIPS can predict VT/VF recurrences in patients with primary prevention ICD, has not yet been examined.

Objectives
To examine a long-term predictive value of NIPS for identification of patients with future VT/VF and with ICD implanted for primary prevention.

Methods
The study group consisted of consecutive 41 patients with ICD implanted for primary prevention of sudden cardiac death, included in the prospective NIPS-ICD study (ClinicalTrials ID: NCT02373306) (34 males, age 64±11 years). The patients underwent NIPS using the protocol up to three premature extrastimuli at 600, 500 and 400ms drive cycle lengths. The end-point of NIPS was induction of sustained VT or VF or completion of the protocol.

Results
At baseline NIPS, VT/VF was induced in 8 (19,5%) patients. During 5 year follow up the primary end-point occurred in 9 (22%) patients – all had ischemic cardiomyopathy (ICM). There was no significant difference between NIPS-inducible vs NIPS-noninducible patients regarding VT/VF occurrence (37,5% vs 18%, log rank test p=0,34) in the whole study group. Occurrence of future VT/VF was significantly more frequent in those patients with ICM who had VT/VF induced at NIPS (log rank test p=0,01). The NIPS-induced VT/VF had a sensitivity of 33%, specificity of 84%, positive predictive value of 38% and negative predictive value of 82% for identification of ICM patients with future ICD interventions.
Conclusions
During a long term observation spontaneous VT/VF occurred exclusively in patients with ICM and most frequently in those who had VT/VF induced at NIPS. Non-inducibility at NIPS identifies with high accuracy those who will have uneventful long term follow-up.
Tachycardia-Induced Cardiomyopathy A Reversible Cause Of Ventricular Dysfunction Rarely Suspected.

Case reports

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Background - Introduction
Tachycardia-induced cardiomyopathy is a ventricular dysfunction resulting from the presence of supraventricular or ventricular tachyarrhythmias (frequent ventricular premature beats are included) which is reversible after tachyarrhythmia management or control of the heart rate. Data from multiple studies and case reports have shown that management with cardioversion, negative chronotropic agents or catheter ablation improve ventricular function.

Objectives
Present a case of tachycardia-induced cardiomyopathy

Methods
A 30-year-old woman with no previous medical history admitted to our Institute due to rapid and irregular palpitations, sudden onset and end, with up to six episodes per month. Holter with multiple episodes of sustained atrial tachycardia, with normal transthoracic echocardiogram, management was started with Propafenone and Metoprolol with improvement of palpitations events. In the follow up the patient discontinued treatment, subsequently presenting new episodes of palpitations and heart failure; at the emergency department electrocardiogram with atrial tachycardia at 160 beats per minute, laboratories with NT-ProBNP 9540 pg / ml. New transthoracic echocardiogram with LVEF 30%. Electrophysiological study was performed with CARTO system and ablation of the ectopic focus with posterior exit to sinus rhythm.

Results
In control transthoracic echocardiogram at six months without valvular insufficiencies and with normal biventricular function. 2 years follow up asymptomatic, functional Class I NYHA, Holter of 24 hours without the presence of atrial or ventricular arrhythmias. Myocardiopathy induced by incessant atrial tachycardia was concluded.
Conclusions
The relevance is found in that it is a diagnosis rarely suspected by the clinical cardiologist. The diagnosis should be suspected in those patients with atypical presentation with significant decrease in ventricular function in the context of an arrhythmia.
Post Ablation Of Atrial Fibrillation Follow-Up Using A Wearable Biosensor (Apple Watch 4)

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Atrial fibrillation is the most common arrhythmia with an ever-increasing population due to the rise in risk factors prevalence. Ablation of the pulmonary veins is a safe approach for definitive treatment; however, due to its high recurrence rates, long-term follow-up of post ablated patients is essential to ensure a safe outcome. The Apple Watch is a relatively affordable device that can detect AF in the user. Herein we present the first series of patients that underwent pulmonary vein ablation for AF and were monitored with an Apple Watch.

Objectives
To evaluate the potential benefit of the apple watch for long term follow up of patients after pulmonary vein ablation for AF.

Methods
Each patient acquired an apple watch for their follow-up after AF ablation was performed. They were instructed to record an ECG during three situations: 1) Apple Watch notifies the user of irregular rhythm, 2) Patient had symptoms related to AF (palpitation, dyspnea, fatigue), 3) Acute intervention follow-up. After recording each event they were instructed to contact their corresponding EP to report results and confirm the diagnosis.

Results
Five male patients (median age 59 years) were followed up for 8 ± 6 months. Cryoablation of the 4 pulmonary veins was successfully performed in 60% of the subjects; whereas 40% of them were treated with radiofrequency ablation. A total of 14 episodes were recorded between 4 patients; only one patient has yet to report an event. Only 8 notifications were related; 6 were for low and high rate events. 63% of the notifications for AF were confirmed by the EP; 2 for sinus bradycardia and 1 for sinus tachycardia. Four notifications correspond to atrial tachycardia and two to premature atrial beats.
Conclusions
The apple watch can be a relatively affordable long term follow-up device. Its automatic AF detection algorithm far surpasses the diagnostic capabilities of commercial Holter monitors; however, the limited availability of the ECG app hinders its potential benefit in many countries.
Ventricular Tachycardia Ablation In Ischemic Heart Disease

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
Ventricular tachycardia (VT) ablation in ischemic heart disease (IHD) is a very useful strategy to reduce implantable cardioverter defibrillator (ICD) shocks, improve quality of life and reduce mortality, however this procedure is not free of adverse events.

Objectives
To report the experience of our center in VT ablation in patients with IHD.

Methods
We performed a retrospective review of our database from 2015 to the present. We analyze the characteristics of the patients and those of the procedures separately. Acute success was defined as the inability to induce clinical VT at the end of the study.

Results
From 2015 to the present, we have performed 31 procedures in 25 patients, most of them were male (84%) and the mean age at the time of ablation was 59 years. The average ejection fraction was 37% and 5 cases were presented as an electrical storm (20%), more than half of them had a ICD (60%).

All procedures were performed with electroanatomic mapping, the most frequently used system was CARTO in 87.1% of patients, we used intracardiac ultrasound in 3 cases (9.7%) and one study was conducted with ventricular assist with ECMO. The acute success rate was 71%, and at follow-up 3 patients had recurrences (9.7%). At the time of the procedure, clinical VT occurred in 20 cases (64%), either spontaneously or induced. The most used techniques were substrate modulation (67.7%), activation mapping (54.8%) and pace mapping (38.7%). In 5 procedures (16.12%) we had to perform electrical cardioversion due to VT with hemodynamic instability also, 5 patients presented a major complications (16.12%), and in two cases the study was interrupted due to incessant VT with hemodynamic compromise, in one of them the outcome was fatal.

Conclusions
In recent years, VT ablation in our center has a good effectiveness and a low recurrence rate, however, due to the underlying conditions of the patients, some of
them had a major complication. The technique most used by us is substrate modulation.

A. Summary table of the characteristics of the patients and procedures

<table>
<thead>
<tr>
<th>A. Patients N = 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>LVEF</td>
</tr>
<tr>
<td>Electrical storm</td>
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<tr>
<td>ICD / ICD-CRT</td>
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</tbody>
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<table>
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<tr>
<th>B. Procedures N = 31</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of electroanatomic mapping</td>
</tr>
<tr>
<td>CARTO</td>
</tr>
<tr>
<td>ENSITE</td>
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<tr>
<td>Acute success</td>
</tr>
<tr>
<td>Recurrence</td>
</tr>
<tr>
<td>Major complications</td>
</tr>
<tr>
<td>Clinical VT in the procedure</td>
</tr>
<tr>
<td>Technique used</td>
</tr>
<tr>
<td>Substrate modulation</td>
</tr>
<tr>
<td>Activation mapping</td>
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<tr>
<td>Pace mapping</td>
</tr>
<tr>
<td>Entrainment</td>
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</tbody>
</table>

B. An example of VT from the lower septal region

C. Presence of fragmented potentials from a scar in the postero-inferior region of the LV and an electroanatomic voltage map with ablation points in the scar.

A. Summary table of the characteristics of the patients and procedures B. An example of VT from the lower septal region C. Presence of fragmented potentials from a scar in the postero-inferior region of the LV and an electroanatomic voltage map with ablation points in the scar.
Clinical Experience In Catheter Ablation Of Premature Ventricular Complex Using Half-Normal Saline Open-Irrigation

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
The Radiofrequency catheter ablation (RCA) effectiveness to treat ventricular arrhythmias (VAs) depends to create optimal damage of the culprit myocardium. Decreasing the ionic concentration of the irrigated solution during RCA has been advocated to produce larger and deeper myocardial lesions.

Objectives
To describe our experience using half normal saline (HNS) for open-irrigated RCA of premature ventricular complexes (PVCs)

Methods
A prospective analysis of PVCs ablations performed with HNS at one center between 2016-2020 is reported. Procedural details were collected for 60 patients.

Results
A total of 60 patients (53 +/- 15 years, with 55% women). As a first choice in 55 cases, 33/60 without cardiomyopathy, 23/60 with non-ischemic cardiomyopathy and 4/60 with Ischemic cardiomyopathy. The mean LVEF in men 48% (IR 38-51) and 60% IR (51-61) in women, 16/60 (26 %) cases had coexistence of non-sustained VT and 3/60 (5 %) of monomorphic VT. MRI showed no LGE in 24/60, LGE in 8/60, 5/8 with adequate correlation of the LGE zone and the ablation success site. 17 patients had been receiving some antiarrhythmic before the procedure. We used conscious sedation in all the cases. The mapped chambers were endocardial LV (33/60), endocardial RV (33/60) aortic root (16/60) and GCV/AIV (8/60).
The ablation success sites were LV Summit 17/60 (28%), RVOT 16/60 (26%), anterolateral papillary muscle 5/6 (8%) and posteromedial papillary muscle 3/6 (5%). Acute success (PVC suppression or non-inducibility) was achieved in 60/60 cases (100 %). One patient (1.7%) had no fatal pericardial effusion and a recurrence of 4/60 (7 %) was documented at follow-up in 238.9 days.
Conclusions
RCA of PVCs using HNS is feasible and safe. The acute and long-term success rate reported in our series suggests that this technique could have an interesting role to ablate PVCs that should be tested in larger studies.
Pulmonary Vein Atypical Flutter Mimicking An Atrial Focal Tachycardia

Case reports

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Background - Introduction
60-yr patient with a history of hypertension, diabetes and hypertrophic cardiomyopathy. Previous ICD implantation in primary prevention of sudden cardiac death. Diagnosis of paroxysmal AF, for which a PVI was performed 8 months earlier. The patient is scheduled for a second ablation due to palpitations and EKG suggesting atypical atrial flutter or atrial tachycardia.

Objectives
To present a curious case of atypical atrial flutter.

Methods
The procedure was performed under general anesthesia and the support of a 3D anatomical mapping system (St Jude Velocity).
A decapolar catheter positioned in the coronary sinus showed an organized tachycardia (380 ms cycle length) with a concentrical activation. Several attempts failed to entrain the atrial tachycardia, so we decided to create an activation map.
Left atrium’s activation map (CL 380 ms) showed a focal activity arising from the inferior aspect of the RPSV, so an Optima catheter was placed into the vein. The RSPV tracings showed a twice as fast cycle length regular tachycardia (190 ms). An activation map within the RSPV was performed suggesting a reentrant tachycardia. The reentrant tachycardia hypothesis was sustained by having electrograms throughout the full cycle length.

Results
A focal ablation was done in the earliest point of the LA activation map (inferior aspect of the RPSV) achieving RPSV isolation. Sinus rhythm was restored in the LA and the tachycardia remained unaffected within the RPSV.

Conclusions
This response demonstrated the fact that the RSPV tachycardia was driving the LA in 2.1 response through a focal conduction gap.
Transmural Posterior Wall Isolation: A New Endpoint Of Af Ablation

Clinical Electrophysiology and Catheter Ablation

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4. University of Pennsylvania, Philadelphia, United States

Background - Introduction
The additive value of PW isolation (PWI) to PVI to prevent arrhythmia recurrence after catheter ablation (CA) of AF have showed contradictory results. Recently, we reported the role of the epicardial septopulmonary band impeding transmural PWI (Transm-PWI) to explain failed procedures.

Objectives
We aimed this study to test feasibility and outcomes of a new endpoint of Transm-PWI on top of PVI for CA of AF.

Methods
Data of AF pts. undergoing WACA-PVI and PWI by box performed in 3 international centers were prospectively collected. Endocardial PWI (Endo-PWI) was first demonstrated by standard definition (absence of non-dissociated sharp EGM and LA capture at 10mA/2ms from the boxed area). Then, residual LA capture by high output at 20mA/2ms from inside the PW box was tested and assumed, when present, as evidence of epicardial breakthrough bypassing the linear ablation set. Additional ablation over PW segments showing residual high output LA capture was attempted until its total elimination (final endpoint of Transm-PWI). Information related to outcomes was filled out on a predefined spreadsheet.

Results
79 AF pts. (age 63.2 ± 8.4 years) were included (Figure). PVI was successful in 98.7% and Endo-PWI was achieved in 78/79 pts. (98.7%) after initial box lesion set, however, Transm-PWI was documented only in 26/78 (33%). Additional PW ablation in the remaining 52 pts. achieved Transm-PWI in 32 for a total of 73.4% (58/79). Additional procedure and RF times to the endpoint were 12.4 ± 13.7 and 2.6 ± 1.5 minutes. No major complications occurred. At 12 months after ablation, 91% remained arrhythmia-free.
Conclusions
Standard definition of PWI did not predict transmural effect. A new end point of total elimination of LA capture at high output from the PW, as surrogate of transmural isolation, was feasible and safe and associated with high success at follow-up.
Channelopathies: A Rare Genetic Entity With High Mortality. Report Of A National Reference Center In Chile.

Clinical Electrophysiology and Catheter Ablation

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**Background - Introduction**
Channelopathies are ion channel mutations whose dysfunction generates changes in the action potential predisposing to malignant arrhythmias and sudden death (SD).

**Objectives**
To describe the clinical characteristics of a cohort of patients with channelopathies and their follow up in our center.

**Methods**
We reviewed the database of the Electrophysiology Unit of Instituto Nacional del Torax from 2002 up to September 2020, representing one of the most important cohorts in Chile.

**Results**
We describe 31 patients with channelopathies: 17 women and 14 men; 15 diagnosed with long QT syndrome (LQTS), 12 Brugada syndrome (BrS), 1 catecholaminergic polymorphic ventricular tachycardia (CPVT) and 3 idiopathic SD. Of the patients with LQTS, 11 are women, mean age at diagnosis 21 years, with recurrent syncope in 7 and SD in 3; 7 with affected first-degree relatives, 5 with a genetic study with the KCNH2 gene in 3 of them. All patients are in beta blockers. Fourteen with Implantable Cardioverter Defibrillator (ICD) and 5 with appropriate shocks, on average 7.5 years post implantation. Of the 12 patients with SBr; 9 are men, with average age at diagnosis 34 years, 5 with SD during sleep or rest and 6 with recurrent syncope; 3 with affected first-degree relatives and 3 with a genetic study, none with SCN5A. ICDs were implanted in all of them, 6 had appropriate shocks in average at 4.4 years post-implantation, 2 had electrical storm and 3 are on quinidine. The case of CPVT is a man with recurrent syncope since childhood and SD at 15 years of age during physical activity. He received an ICD, in treatment with beta-blockers, with multiple shocks, controlled with flecainide. Idiopathic SD in 3 cases; all women, average age at diagnosis 30 years, and SD under emotional stress. In two cases genetic test; 1 with pathogenic gene. They received ICD, with appropriate shocks in 1, 9 years after implantation.

**Conclusions**
Channelopathies are a rare entity in young people, which determines sudden death and the need for ICD implantation.
Ablation Of Posterior Septal Accessory Pathway Associated With Coronary Sinus Diverticulum

Case reports

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Background - Introduction
The posterior septal accessory pathways can be difficult to eliminate, especially when they have an epicardial location related to coronary sinus (CS) diverticulum. The ablation inside the diverticulum is associated with unsuccessful outcomes due to proximity to coronary arteries, risk of third-degree atrophicventricular block, high impedance during applications and inability to achieve adequate energy.

Objectives
To describe an ablation of posterior septal accessory pathway located inside the coronary sinus diverticulum.

Methods
Case report of a patient from Clinical Hospital, analysis of medical records and literature review.

Results
A 51-year-old male with palpitations, structurally normal heart, ECG with ventricular pre-excitation, was referred for electrophysiological study and ablation. The catheters were positioned through the right femoral vein. During the study an antegrade refractory period of less than 250 ms (high risk) was found and the catheters manipulation induced self-limited atrial fibrillation with pre-excitation. Radiofrequency (RF) pulses were applied to the right posterior septal (PS) region, left PS (transeptal approach) and inside the CS. After unsuccessful applications, venography of the CS was performed, which revealed two proximal diverticula with a single ostium (figure 1). Mapping inside the diverticula showed early activation and the RF applications eliminated the accessory pathway (AP) after three seconds. The patient was discharged from hospital without complications and, after one year of follow-up, was discharged from outpatient clinic because he did not have recurrence of conduction through the AP.

Conclusions
The presence of CS diverticulum, a rare congenital malformation, is associated with Wolff-Parkinson-White syndrome in 7.5% of adults with posterior septal AP. It is related to higher recurrence rates and, despite the low risk, complications such as thrombosis, CS stenosis and lesion of the circumflex artery and atrophicventricular node artery should be considered.
Fig. 1: CS venography showing two diverticula with a single ostium.
Ventricular Tachycardia As A Cardiovascular Manifestation In A Patient With Mucolipidosis Type III: Case Report

Case reports

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Background - Introduction
The mucopolipidosis (ML) are autosomal recessively inherited lysosomal storage disorders, due defects in a lysosomal acid hydrolase, causing progressive lysosomal accumulation of substrates specific for each disorder involving multiple organs, with a prevalence of 1/20,000 live births. The cardiac involvement may include valve dysfunction, conduction disorder and cardiomyopathies.

Objectives
Describe the occurrence of ventricular tachycardia (VT) as a cardiac manifestation in a patient with ML type III.

Methods
Case report.

Results
A 36-years-old man, with musculoskeletal changes since childhood and diagnosis of ML type III at 22 years old, was admitted to inpatient evaluation after presenting syncope classified as high-risk in the initial evaluation. He has a previous diagnosis of dilated cardiomyopathy with LVEF of 33% on echocardiogram. The ECG demonstrated sinus bradycardia, low QRS voltage in frontal lead and abnormal anterolateral ventricular repolarization; frequent polymorphic ventricular extrasystoles (433/h), with episodes of non-sustained VT were observed in Holter; the cardiac MR showed circumferential, global, subepicardial LV and RV late gadolinium enhancement, biventricular dysfunction (LVEF= 38%, RVEF =26%) and LV dilation (62mm), and an increase in myocardial extracellular volume (43%). An electrophysiological study was performed with induction of sustained VT with a cycle of 240ms, associated with hemodynamic instability. The patient was discharged after implantation of implantable cardioverter-defibrillator plus amiodarone.

Conclusions
ML type III can cause myocardial fibrosis, predisposing to cardiac arrhythmias. Thus, although infrequent, this case emphasizes the importance of screening and early diagnosis of life-threatening arrhythmia to prevent sudden cardiac death.
Cardiac Sympathetic Denervation As First Line Therapy In High Risk Patients For Ventricular Tachycardia Ablation.

Clinical Electrophysiology and Catheter Ablation

Diego Andrés Rodríguez, Juliana Villa, Carlos Andrés Tapias, Luis Carlos Sáenz, Miguel Tejeda, Alonso Rafael Arroyo, Karen Julieth Moreno

Fundación Cardioinfantil, Bogotá, Colombia

Background - Introduction
The autonomic nervous system plays a role in the genesis and maintenance of ventricular arrhythmias. Bilateral sympathectomy (BS) has shown benefits on the short and long term with reduction of ventricular tachycardia episodes and ICD shocks. No information to our knowledge has been presented as a first line therapy in patients with high risk for ventricular tachycardia ablation.

Objectives
To evaluate the characteristics and short and long terms outcomes of bilateral sympathectomy as first line therapeutic strategy in a series of patients with high risk ventricular tachycardia ablation procedure.

Methods
Prospective analysis of patients who underwent bilateral thoracoscopic sympathectomy as a first line strategy of management between Mar 2015 and Feb 2020 at FCI.

Results
Fifteen patients undergoing BS, median age of 67 years (IQR=57-71), 71.4% male, median LVEF 16% (RIQ=15-28). Cardiomyopathy etiologies were Ischemic (50%), Chagasic (28.6%), idiopathic (14.3%) and other 7.1%. Presenting NYHA class between III - IV were 57.1% and 85.7% of patients had ICD therapies. Follow-up was completed in all cases, with a median of 14.5 months (IQR=2-39) after BS. Mortality rate was 28.6%, in most cases occurred after 7 days of surgery (Fig) and was related to cardiovascular causes. Sustained VT recurrence was presented in half of the patients (Fig).

Conclusions
First line BS may play a role in the management of high risk patients for ventricular tachycardia ablation. Further studies are needed to prove this hypothesis.
Survival & VT recurrence probability after bilateral sympathectomy.
Incidence And Evolution Of Esophageal Lesions Post-Pulmonary Vein Isolation

Clinical Electrophysiology and Catheter Ablation

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Hospital Universitario QuironSalud Madrid, Pozuelo De Alarcon, Spain

Background - Introduction
The incidence of esophageal lesions after atrial fribillation ablation has not declined with time and is independent of the operator experience. There remains a small proportion of patients that will experience a fatal atrioesophageal fistula after pulmonary vein isolation (PVI). All efforts should be made to decrease the rate of this deadly complication and try to prevent its appearance

Objectives
Main: To describe the incidence, evolution and treatment of patients with post-PVI esophageal lesions. Secondary: Assess clinical and anatomical factors that could impact the incidence of such lesions

Methods
Fifty-nine consecutive procedures of pulmonary vein isolation were included at a single institution (53 patients). Patients were assessed with a pre-procedural CT scan / MRI and underwent wide antral PVI under general anesthesia. Ablation was done at 25W in the posterior wall and 30W in the anterior wall with an irrigated-tip catheter with 30 sec lesions. All patients underwent an upper endoscopy <48h after the procedure.

Results
Patients were 59 yo (±12), 38% females with a CHADS2VASC score of ≤ 2 in 64.4%, 45.2% persistent AF and 21 (36%) were pre-treated with PPI pre-ablation. Nine patients (4%) were treated with contact force sensing catheters and 10 (28%) patients with dragging approach. Asymptomatic esophageal lesions were found in 15 patients (25.4%), of those only 4 were ulcerous lesions (8%). All patients with esophageal lesions were kept NPO with high dose PPI and esophageal protection with sucralfate and underwent a repeated upper endoscopy. All lesions resolved, eight lesions resolved in less than 48h and, if the duration was higher, the median time was 5 days. Only right-sided esophageal location was associated with esophageal injury (p=0.014)

Conclusions
The incidence of asymptomatic esophageal lesions post-PVI is high. Esophageal
location with respect to the LA could play an important role. Conservative medical management shows complete resolution of lesions without relevant complication.

Figure 1: Post-PVI esophageal ulcer evolution
Evaluation Of The Average Contact Force To Predict An Effective Injury By Measuring The Lesion Size Index (LSI) During Atrial Fibrillation Ablation - A Pilot Study.

Clinical Electrophysiology and Catheter Ablation

Acácio Fernandes Cardoso, Cynthia Silva Rocha, Luiz Claudio Behrmann Martins
Santa Casa de Misericórdia de Santos, Santos, Brazil

Background - Introduction
The recurrence rate after atrial fibrillation (AF) ablation is still high and mainly related to pulmonary veins reconnection. New tools, as lesion size index (LSI) and force time integral (FTI), have been incorporated into the procedure to qualify the radiofrequency lesions. In the preliminary studies, a LSI above to 5 was associated to less recurrence after AF ablation. Although the LSI can be monitored during the ablation, the most utilized parameter is the contact force (CF). The average CF that best predicts a LSI above to 5 is still unknown.

Objectives
Evaluate the mean of the CF capable of predicting an LSI greater than or equal to 5.

Methods
Between February and August 2019, we prospectively enrolled 12 patients, both gender, underwent to AF ablation using a CF TactiCath-TM Quartz Catheter. The pulmonary veins were divided into four segments (anterior, posterior, roof and inferior). The acquisition of the lesions was determined by the AutoMark system. The operator was blinded to the LSI. A four lesions for each segment were selected randomly after the procedures. The power varied between 20 and 40 Watts. A LSI value < 2, an application time < 5 seconds or extra-pulmonary lesions were excluded to the protocol. The analyses were performed using the IBM-SPSS software with a 5% significance level.

Results
Among 1506 lesions acquired, 605 (40%) were analyzed. The mean time of application was 22.50 seconds. The CF, power and FTI average were higher in LSI lesions > 5 (p<0.001). In the multiple regression model, the duration of application, the CF, the impedance drop and the power were associated to a LSI > 5 (p<0.001). The CF cutoff value to predict a LSI > 5 ranged to 10.5g and 13.5g for different segments with an accuracy between 71.2% and 92%. The LSI and FTI presented a good correlation (r=0.71; p<0.001).

Conclusions
During pulmonary vein isolation, the maintenance of CF average between 10g and 13g presented a good accuracy to predict an effective lesion defined by LSI.
**Background - Introduction**

Atrial Fibrillation (AF) catheter ablation can cause Symptomatic Cerebral Embolism (SCE) in 0.1% to 0.8% and Asymptomatic Cerebral Emboli (ACE) in 1.7% to 41% of patients post procedure. Several changes in the procedure have been implemented to this. Modifications in anticoagulation protocols, catheter handling, and even in how the energy is administered revealed reduction in the ACE rate even with the same catheter.

ACE rate varies according to the ablation system used in the Pulmonary Veins Isolation (PVI). PVAC initially presented higher rates of ACE of up to 41.7%, however modifications were done to reduce these rates. A recent study using PVAC GOLD associated with procedures to decrease the thrombi formation resulted in a lower rate of ACE of 1.7%.

**Objectives**

Cerebral evaluation by means of magnetic resonance imaging after cardiac ablation of atrial fibrillation by PVAC Gold catheter

**Methods**

This is a secondary analysis of the trial “Isolation of Pulmonary Veins With PVAC Gold in Elderly Patients” registered on clinicaltrials.gov (NCT0402346), not published yet.

The patients recruited were ≥65 years old, with symptomatic paroxysmal AF. They were randomized in two groups, one to undergo ablation with PVAC Gold, and the control group was treated only with antiarrhythmic drugs. They were followed for 12 months 48 hours after the procedure patients undergone MRI 1.5 T.

In this study the ACE rate was analysed in the PVAC Gold arm and the Mini-Mental score before the procedure and during the reevaluations of six and twelve months after the procedure.

**Results**

Of the 30 patients that were submitted to ablation, seven presented ACE, and one presented SCE with resolution of symptoms in 5 days, although they did not alter the
cognitive state.

**Conclusions**
In this study 23.3% of the patients presented with ACE and 3.3% with SCE. Yet, the impact of these findings on the MRI is still unknown, especially considering that the cure of AF might protect the cognition on long-term.

Asymptomatic Cerebral Emboli post Ablation
Computed Tomography Angiography (CTA) For Substrate Evaluation In Patients With Ventricular Tachycardia And Chagas Cardiomyopathy.

Clinical Electrophysiology and Catheter Ablation

Cristiano Faria Pisani, Felipe Kalil, Muhieddine Chokr, Sissy Melo, Carina Hardy, Francisco Darrieux, Cesar Nomura, Mauricio Scanavacca

InCor - Instituto do Coração da FMUSP, São Paulo, Brazil

Background - Introduction
Preprocedural imaging is important for VT ablation planning, although many patients that have an ICD have limitation to perform CMR, but CT angiogram (CTA) with wall thickness (WT) analysis and hypoenhacement (HE) can be an alternative, especially in Chagas disease in which apical and infero-latero-basal aneurysms are common.

Objectives
To correlate the CTA using ADAS software with the epicardial and endocardial voltage map in patients with Chagas Disease.

Methods
We retrospectively selected 12 pts with Chagas disease who VT catheter ablation that had pre-procedural CTA. We selected images acquired at 70% of the cycle and processed using WT and LV-HE modules of ADAS3D software (Galgo Medical, Barcelona, Spain) and correlate with the finding of the scar on bipolar voltage map.

Results
Most of the patients were male (66.7%), with a mean age of 61.1+10 years-old, with ICD (83.3) and EF of 29.1+5.6%. CTA was acquired in a median time of 15 (Q1: 7; Q3: 14) days before ablation. The median maximum WT was 10.3mm (Q1: 9.4; Q3: 11.0) and the minimum was 1.4mm (Q1: 0.6; Q3: 2.3). All patients presented minimal WT of less than 5mm and 8 (66.7%) less than 2mm. Segments 17, 16, 14 and 13 of the LV bull-eye were more frequently abnormal (<5mm) on cardiac CT (91.7%, 75%, 58.3% and 83%, respectively), and segments 5, 6, 11 and 17 (83.3%, 83.3%, 58.3% and 58.3%, respectively) were more frequently abnormal on Voltage Map (<1.5mV). In segments that in some abnormality was found there was only a trend for correlation on segment 5 (LR: 0.075; Risk Estimate: 0.667). No correlation was found for segment 6 and 17 (LR: 0.39 and 0.17). Using manual WT analysis compared to Carto, there was some visual correlation in 7 (58.3%) patients, with a mean thickness threshold of 6.1+1.2mm. There was a possible HE in 4 (33.3%) cases and confirmed in 1 (8.3%).

Conclusions
CT angiogram WT and HE analysis are feasible using specific software, although in Chagas disease patients, there was no good correlation with voltage maps.


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**Intracardiac Echocardiography As An Adjunctive Tool For Accessory Pathway Ablation In Ebstein Anomaly**

Clinical Electrophysiology and Catheter Ablation

Carlos Tapias¹, Andres Enriquez², Pasquale Santangeli³, Diego Rodriguez¹, Luis Saenz¹

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2. Queen’s University, Ontario, Canada
3. University Of Pennsylvania, Philadelphia, United States

**Background - Introduction**

Ebstein anomaly is a rare congenital cardiac malformation. Accessory pathway-related arrhythmias are frequent in this population, and catheter ablation is challenging due to difficulties locating the AV ring and maintaining catheter stability. Despite current technologies, arrhythmia recurrence following an ablation procedure remains high.

**Objectives**

To report the use ICE in accessory pathway ablation in Ebstein’s patients.

**Methods**

In this case series we report the use of intracardiac echocardiography (ICE) to overcome some of these problems, allowing identification of the true AV ring and monitoring catheter-tissue contact.

**Results**

The EP study was conducted under conscious sedation in 3 patients and general anesthesia in 1 patient (Table 1). Electroanatomic mapping system was utilized (CARTO in 2 patients and Ensite Precision in the other 2). In all cases, a decapolar catheter was placed into the coronary sinus and a phased array intracardiac echocardiography catheter was advanced via left femoral access into the right atrium to identify the true AV ring. A high-definition multipolar catheter was used for mapping in 3 of 4 patients (HD grid in 2, Pentaray in 1) and ablation was performed with an open irrigated tip ablation catheter with contact force measurement capabilities (SmartTouch DF in 2 patients and Tacticath in 2). At the end of the procedure, the patients had no accessory pathway conduction and no tachycardia was inducible with programmed atrial and ventricular stimulation.

**Conclusions**

Even with the use of new technologies, ablation in individuals with Ebstein anomaly is challenging. We propose the systematic use of ICE to guide ablation of accessory pathways based on anatomical and histopathological principles. We hypothesize that
the use of ICE in this population improves efficacy and reduces complications, but this must be verified in prospective studies

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total, n: 4</th>
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<tbody>
<tr>
<td>Age at ablation (median, IQR)</td>
<td>23.5, (21.25-26.25)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>Palpitations, n (%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>N° Previous ablation procedure, n (%)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2 (50%)</td>
</tr>
<tr>
<td>1</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>2</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Tricuspid valve surgery, n (%)</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>Technology, n (%)</td>
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</tr>
<tr>
<td>Abbott</td>
<td>2 (50%)</td>
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<tr>
<td>Biosense</td>
<td>2 (50%)</td>
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<tr>
<td>HD cath mapping, n (%)</td>
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</tr>
<tr>
<td>Pentarray</td>
<td>1 (25%)</td>
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<tr>
<td>HD grid</td>
<td>2 (50%)</td>
</tr>
<tr>
<td>no</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>Anesthesia, n (%)</td>
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<tr>
<td>Sedation</td>
<td>3 (75%)</td>
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<tr>
<td>general</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>AVRT, n (%)</td>
<td>4 (100%)</td>
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<tr>
<td>N° of accessory pathways, n (%)</td>
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<tr>
<td>1</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>Location AP</td>
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<tr>
<td>Superanterior</td>
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<tr>
<td>anteroinferior</td>
<td>1 (25%)</td>
</tr>
<tr>
<td>inferior</td>
<td>1 (25%)</td>
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<tr>
<td>Duration of procedure mins (median, IQR)</td>
<td>265.5 (170-296.5)</td>
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<tr>
<td>Fluoroscopic time mins (median, IQR)</td>
<td>13.62 (11.21-20-21)</td>
</tr>
<tr>
<td>Contact force, n(%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>Irrigated ablation catheter, n(%)</td>
<td>4 (100%)</td>
</tr>
<tr>
<td>Long sheath, n(%)</td>
<td>4 (100%)</td>
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<tr>
<td>Intracardiac Echo, n(%)</td>
<td>4 (100%)</td>
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<td>Power W, (median, IQR)</td>
<td>32.5 (28.75-36.25)</td>
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<td>Ablation time, mins (median, IQR)</td>
<td>6.75 (3.75-10.67)</td>
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<tr>
<td>Acute success, n(%)</td>
<td>4 (100%)</td>
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<tr>
<td>Complication, n(%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Arrhythmia recurrence, n(%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Follow up months (median, IQR)</td>
<td>11 (8.75-12.75)</td>
</tr>
</tbody>
</table>

Table 1
High-Power Short-Duration Ablation Of Atrial Fibrillation Using Standard Contact Force Irrigated Catheter: Clinical Results And Incidence Of Esophageal Heating.

Clinical Electrophysiology and Catheter Ablation

Ricardo Ryoshim Kuniyoshi1,2, Marcio Augusto Silva1, Erick Sessa Merçon1, Jorge Elias Neto1, Guilherme Futuro1, Deborah Vasconcelos1

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2. Centrocor Vitória, Vitória, Brazil

Background - Introduction
The ablation technique of high-power short-duration (HPSD) using standard contact force irrigated catheter (sCFiC) is not well defined, and operators have been using point-by-point, dragging or panting technique. In addition, some studies have suggested that the rate of esophageal heating (EH) in HPSD ablation is significantly lower than standard atrial fibrillation ablation (AFabl).

Objectives
This study sought to evaluate the safety, efficacy, and the rate of EH of HPSD AFabl using catheter dragging technique with sCFiC.

Methods
We included 57 consecutive patients who underwent the first AFabl. The first 24 patients (pts) and 33 subsequent pts were underwent standard ablation (20-30W, 17 mL/min, 10-30g of contact force [CF] during 20-30 seconds) (G1) and HPSD ablation (40-50W, 30mL/min, 5-30g of CF during 5-10 seconds) (G2), respectively. Dragging catheter technique was used in both groups. Lower power was used during radiofrequency delivery at the left atrium posterior wall and was stopped when EH occurred (≥ 37.5ºC [G1] or ≥ 0.5ºC from basal temperature [G2]).

Results
There was no significant difference between G1 and G2 in the baseline clinical characteristics. Pulmonary vein isolation (PVI) was reached in 100% in G1 and 97% in G2. Procedure duration (216 ± 10.7 minutes vs 181.1 ± 8.6 minutes; P = 0.014), RF time (54.7 ± 0.35 minutes vs. 20.9 ± 1.5 minutes; P < 0.001), and PVI time (109 ± 17 minutes vs 68.1 ± 8.4 minutes; P = 0.037) were shorter in G2. The rate (73.7% vs 58.3%, P = 0.35) and severity (38.3 ± 0.6ºC vs 37.8ºC; P = 0.09) of EH were similar between groups. No major complications occurred in either group. One-year Kaplan-Meier event rate estimates for clinical failure (AT/AF ≥ 30 seconds) were 17.4% (G1) and 15.2% (G2); P = 0.95; HR = 0.96 (95% CI, 0.26 to 3.59).
Conclusions
HPSD AFabl using catheter dragging technique with sCFiC can shorten the procedure and ablation time without having a negative impact on safety and efficacy, but do not reduced the rate and severity of EH.
Contemporary Approach For Ablation Of Recurrent Accessory Pathways

Clinical Electrophysiology and Catheter Ablation

Lukas Salazar, Carlos Tapias, Diego Rodriguez, Juliana Villa, Oscar Perez, Luis Saenz

Fundación Cardioinfantil, Bogota, Colombia

Background - Introduction
Acute success rate of AP ablation has been reported between 90 and 99% with the first procedure, however, long-term relapse reaches 7 to 22%. AP Relapse has been related to right-sided AP, multiple AP’s, congenital heart defects and some locations of the AP.

Objectives
We describe a case series of patients with failed AP catheter ablation and requires re-intervention with contemporary technologies, in order to pose the hypothesis whether the before mentioned technologies improve the efficacy and safety results of AP catheter ablation.

Methods
We performed a multi-center, descriptive, retrospective study of all patients over the age of 18, who required re-intervention of AP catheter ablation, between February 2017, and April 2020. Patients were identified using the electrophysiology procedures database. The data were obtained from charts and procedure descriptions and images review

Results
A total of 39 patients were included. Patient’s mean age was 32,2 ± 8 years. Only one previous catheter ablation attempt was described in 59% of the patients, while the other 41% had 2 or more previous attempts. Technologies used for the re-interventions of AP catheter ablation included intracardiac echocardiography (90%), irrigated catheter (77%), contact force (95%), HD multielectrode (100%) and deflectable sheath (97%). Acute success was 100%, and 8% of recurrence was described during the follow up. The most frequent AP location were posteroseptal (23%), and anterolateral location (18%). Anatomical instability was the main obstacle identified (7%), followed by risk of adjacent structure injury (15%).

Conclusions
Our study shows that the use of some technologies during the approach of the re-intervention of AP catheter ablation could lead to a high acute success rate with low recurrence. Anatomic location of the AP was the main cause of recurrence, and probably the use of ICE and deflectable sheath that allow a more exact location of the ablation catheter could reduce the risk of re-interventions.
Are 90 Days Enough To Classify A Surgical Site Infection In Cardiac Implantable Electronic Devices?

Cardiovascular Implantable Electronic Devices

Jose Luis Morales¹, Alvaro E. Reyes-Quintero¹, Alan Garcia¹, Gabriela Paola Garcia-Ordoñez², Pedro Iturralde¹, Jorge Gomez-Flores¹, Manlio Fabio Marquez¹, Santiago Nava¹

¹. National Institute of Cardiology Ignacio Chavez, Mexico City, Mexico
². National Institute of Genomic Medicine, Mexico City, Mexico

Background - Introduction
In cardiac implantable electronic devices (CIED) the time of surgical site infection (SSI) onset can span during the entire device's longevity. Different definitions have been proposed to classify infections according to its time of occurrence and clinical presentation but they are not based on objective arguments. Inflammation at local site can be an early ill marker; erosion or extrusion of the CIED can occur late without clear local or systemic involvement.

Objectives
To find a point in time that could better define SSI's compared to the current definition of CDCs.

Methods
Out of 7122 CIED implants, 276 consecutive SSI patients were studied in the last 15 years. Cases were classified in two groups: 1. evident inflammatory response(SSIwIR),(local or systemic inflammation) and 2. without evident inflammatory response(SSIwoIR). The cases were compared using serum levels of high sensitive CRP(HS-CRP) to construct a ROC curve and based on this result, a dichotomous variable was constructed and analyzed to find the time of SSI, determined by the Youden index according to their presentation at 90 days

Results
In total 87.5% had pacemakers. 60% had SSIwIR with a median HS-CRP of 19.2 mg/L(IQR: 13.2-79.6) compared to 3.73 mg/L(IQR: 2.32-7.3) in group 2(p=0.001). The HS-CRP value that differed between both groups was 9.7 mg/L(sensitivity 0.80, specificity 0.67). With a cut off time at 310.5 days sensitivity was 0.89, specificity 0.60; detecting 40% of total cases. Using a 90 days cut off, the sensitivity was 0.96, specificity 0.40 with only 24% of all cases. Endocarditis and tunnel infections occurred more often within the first 90 days; after 310 days, we observed an abrupt 2.5-fold increase in the number of patients in group 2.

Conclusions
Using a cut off value of 310 days has better sensibility and specificity for defining
SSI, compared to the 90 days’ definition of the CDC. The CDC criterion for the SSI detection time may underestimate the number of patients with SSIwIR.

<table>
<thead>
<tr>
<th>Time at event (days) x ± SD</th>
<th>0 – 90 days n = 66 (24%)</th>
<th>0 – 180 days n = 90 (32.5%)</th>
<th>0 – 310 days n = 111 (40%)</th>
<th>0 – 365 days n = 124 (45%)</th>
<th>0 – 550 days n = 160 (58%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity/Specificity</td>
<td>96/40</td>
<td>92/54</td>
<td>88/60</td>
<td>82/65</td>
<td>60/73</td>
</tr>
<tr>
<td>Type of event (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Endocarditis</td>
<td>12 (18)</td>
<td>17 (19)</td>
<td>18 (16)</td>
<td>18 (14.5)</td>
<td>22 (14)</td>
</tr>
<tr>
<td>- Fever with hidden infection</td>
<td>2 (6.5)</td>
<td>4 (4.5)</td>
<td>4 (3.5)</td>
<td>4 (3)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td>- Pocket infection</td>
<td>45 (68)</td>
<td>62 (69)</td>
<td>77 (70)</td>
<td>84 (7.5)</td>
<td>92 (57.5)</td>
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<tr>
<td>- Extrusion</td>
<td>5 (7.5)</td>
<td>7 (8)</td>
<td>12 (11)</td>
<td>18 (14.5)</td>
<td>42 (26)</td>
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<td>Cultures (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Negative</td>
<td>15 (23)</td>
<td>24 (28)</td>
<td>35 (31.5)</td>
<td>44 (35.5)</td>
<td>64 (40)</td>
</tr>
<tr>
<td>- Staphylococcus</td>
<td>35 (53)</td>
<td>45 (50)</td>
<td>53 (47)</td>
<td>56 (45)</td>
<td>64 (40)</td>
</tr>
<tr>
<td>+ Aureus</td>
<td>23 (35)</td>
<td>27 (30)</td>
<td>31 (28)</td>
<td>31 (25)</td>
<td>31 (19)</td>
</tr>
<tr>
<td>+ Coagulase-Negative</td>
<td>12 (18)</td>
<td>18 (20)</td>
<td>22 (20)</td>
<td>25 (20)</td>
<td>33 (20)</td>
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<tr>
<td>- Other</td>
<td>16 (24)</td>
<td>21 (23)</td>
<td>23 (21)</td>
<td>24 (19)</td>
<td>32 (20)</td>
</tr>
<tr>
<td>HS-PCR mg/L</td>
<td>30 (14-118)</td>
<td>23 (13-79)</td>
<td>18.5 (12.5-63)</td>
<td>17.5 (12-63)</td>
<td>15 (6-52.5)</td>
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<tr>
<td>Median (25th – 75th)</td>
<td></td>
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</tbody>
</table>

Case reports

Conrado Pedroso Balbo, Luiz Cláudio Bermann Martins, Fabio Dorfmann, Tan Chen Wu, Daniel Hazaki Dos Santos, Francisco Darrieux, Leandro Cabral Zacharias, Mauricio Ibrahim Scanavacca

Heart Institute, Sao Paulo, Brazil

Background - Introduction
The risk of ophthalmic complications using PVAC Gold system

Objectives
Assess the risks and complications after AF ablation.

Methods
Seventy years old patient, with hypertension, atrial fibrillation (AF) for 2 years, refractory to antiarrhythmic drugs were referred to as AF ablation. CHAD2VASC2 equal 2, warfarin (INR=2,3). Transthoracic echocardiogram and treadmill test did not show any structural heart anomaly and without thrombi. He was selected and included in a randomizes clinical trial in elderly patients with symptomatic paroxysmal AF undergoing RF ablation using the PVAC.

Results
The day after the ablation, there was an acute visual loss of the left eye and magnetic resonance imaging (MRI) and complete ophthalmological evaluation was performed, looking for thromboembolic events of cardiac origin. However, he presented retinal venous occlusion in the left eye (photo), without signs of arterial embolism. MRI showed no damage. The patient recovered his visual acuity without complications and had no AF or embolic events. Arterial thromboembolic events can occur after cardiac ablation, leading to arterial occlusions in several places, including the retina. In our case, it is not explained by the direct migration of a cardiac thrombus through the systemic arterial circulation to the retina, as it would occlude smaller arteries and capillaries before reaching the venous circulation. A possible explanation for this occurrence would be the promotion of a systemic inflammatory state through the procedure, which combined with classic risk factors for the current retinal venous occlusions would lead to the formation of a local venous thrombus.

Conclusions
As the treatment of retinal venous and arterial occlusions is different and the symptoms are similar, and the occurrence of arterial thromboembolism requires different systemic management, it is of fundamental importance to perform an ophthalmological evaluation of patients who present visual symptoms after cardiac ablation.
Retinography and fluorescein angiography by venous
Left Ventricle Reverse Remodeling After Pacemaker Reprogramming In A Young Patient With Electronic Wenckebach During Exercise
Case reports

Alexandra Regia Dantas Brigido, Guilherme Dagostin De Carvalho, Gabriela Marsiaj Rassi, Maira Rodrigues Oliveira Pimenta, Cinthya Ibrahim Guirao, Savia Bueno, Silvana Angelina Dorio Nishioka, Martino Martinelli Filho

Heart Institute, InCor / HC-FMUSP, Sao Paulo, Brazil

Background - Introduction
The development of functions and algorithms for new generations of PM has facilitated the adaptation of programming according to patient's demands.

Objectives
Report a case illustrating that in patients with higher metabolic demand, the HR adjustment is essential for the proper functioning of the device.

Methods
A 33yo female patient, previously asymptomatic, with 3rd degree congenital AVB, attended the outpatient clinic seven months after PM implantation complaining of dyspnea on exertion, NYHA II functional class. Echocardiogram (ECHO) showed LVEF of 60% and LV end-diameters (LVED) of 53x36mm. Treadmill test revealed episodes of "electronic Wenckebach" close to the upper rate, junctional rhythm and 3rd degree AVB at the peak of the exercise, reaching a maximum HR of 123bpm (Figure A). On that occasion, PM was programmed in DDDR 60/130, with an automatic PVARP and AVI, leading to a 2:1 AVB with HR of 100bpm at rest and 130bpm on exercise. The PM was reprogrammed: PVARP was set to 220ms and AVI to a dynamic mode allowing a maximum HR of 170bpm (closer to age-appropriate).

Results
One month after adjustments, the patient returned asymptomatic. A new treadmill test showed normal functioning PM, physiological chronotropic response and preserved functional capacity, with improved double-product and exercise tolerance, reaching a peak HR of 164bpm (Figure B). Echo showed a reduction in LVED (47x33mm). Patient resumed physical activity, asymptomatic.

Conclusions
In the present case, we believe that the LV dilation was probably adaptive, aiming to maintain cardiac output, secondary to the limitation of the maximum HR caused by inadequate PM programming. In this scenario, the reprogramming of device parameters not only promoted an improvement in exercise tolerance and quality of life, but was also a possible determinant for reverse LV remodeling.
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**Ablation Of Cardiac Arrhythmias In Children, With Contact Force Sensor Catheters.**

Clinical Electrophysiology and Catheter Ablation

**Alvaro Arenas**

FUNDACION CARDIOINFANTIL, Bogota, Colombia

**Background - Introduction**

Pediatric arrhythmia is a common cardiovascular disease with diverse types and symptoms. Common types of pediatric arrhythmias include atrioventricular reentrant tachycardia (AVRT), atrioventricular nodal reentrant tachycardia (AVNRT), ventricular tachycardia (VT) and atrial tachycardia (AT). Some cases of arrhythmia can lead to serious clinical symptoms, without intervention, the recurrence of arrhythmia can cause persistent myocardial damage or even sudden death. In the past, the focus of treatment of pediatric arrhythmia has been the antiarrhythmic drugs. Nowadays, with the continuous development of interventional medicine, radiofrequency ablation has become an alternative to drug therapy in the treatment of a variety of types of pediatric arrhythmias and has even become the preferred method of treatment of many types of arrhythmias. New technologies are currently available, such as catheters with contact force sensors that allow ablation guided by the degree of contact of the catheter with myocardial tissue.

**Objectives**

To determine the usefulness of catheters with contact force sensors, for ablation of arrhythmias in the pediatric population.

**Methods**

All the medical records of pediatric patients who underwent ablation of cardiac arrhythmias, with catheters with contact force sensors, from January 2016 to September 2020, were analyzed.

**Results**

A total of 230 ablations with contact force sensor catheters were performed in children during the period analyzed. The most frequent arrhythmias were AVRT, VT and AT. The mean age of the patients is 12.4 years (4-18), all weighing more than 16 kg. Ablation effectiveness was achieved on the first attempt in 94% of arrhythmias, with the use of these catheters. There were no complications. In AVNRT, accessory pathways or foci with parahisian location, these catheters were not used.

**Conclusions**

This series shows that the use of catheters with contact force sensors is safe in children, with a high rate of effectiveness and a low risk of complications.


Is The Contact Force Useful Tool During Premature Ventricular Contraction Ablation Coming From LVOT?

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
The standard radiofrequency parameters of ablation includes impedance dropping, temperature and voltage decrease during RF application. The contact force information has not been validate in order to ablate PVC.

Objectives
Show two cases successful of LVOT-PVC ablation were CF were used as a handful tool.

Methods
First case. 52yomale was admitted for catheter ablation of symptomatic frequent PVCs without response to antiarrhythmic treatment. He had a normal echocardiogram. Ecg revealed PVC with a left bundle branch block morphology, right inferior axis and transition at lead V3. Holter demonstrated 30,000 beats of PVCs per day. Initially, activation mapping of the aortic sinus cusp was performed retrograded. The earliest ventricular activation was in the left aortic coronary cusp. Once a target site was located, radio frequency catheter ablation application was attempted with stable catheter position, contact force18gandguided by ICE. EarlyR application eliminated the PVCs. Second Case. 32 year-old, male with sudden syncope, coughing before pass out, with a workflow showed a normal echocardiogram 60% of LVEF, normal cardiac MRI, and a bigeminy PVC on the ECG with a PVC morphology RBBB in V1 with no precordial transition, DII, DIII, aVF positive DI and a dangerous short coupling interval (280ms), with a PVC burden of 20% the patient was brought to the EP-LAB; unidirectional irrigated with contact force information catheter was used Tacticath. During activation mapping we found the earliest ventricular activation of the -52ms at the Left coronary cuspid, the pace mapping showed a 12/12 correlation, then ablation was performed, showing ventricular automatism and elimination the PVC.

Results
The contact force information was used as an extra parameter during RF ablation; we found handy and useful information, contact was always confirmed by ICE. As we revealed there is no contact force values in order to ablate PVC.
Conclusions
Clinical studies with randomization are needed in order to establish the real utility of CF.

First and Second case pictures
A Rare Case Of Kearns-Sayres Syndrome.

Case reports

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Background - Introduction
Kearns-Sayre syndrome (KSS) is a rare mitochondrial disorder, with a prevalence rate of ~1–3 per 100 000 individuals, characterised by early onset (before 20 years old), progressive external ophthalmoplegia, and pigmentary retinopathy, accompanied by either cardiac conduction defects, elevated cerebrospinal fluid protein or cerebellar ataxia. Almost half of patients with the syndrome develop cardiac complications, as complete atrioventricular block.

Objectives
To describe a rare case of Kearns-Sayres syndrome, which had almost 20 years delay in his etiologic diagnosis.

Methods
A 52-year-old male patient was referred to our service for follow-up. He had undergone a pacemaker implant at the age of 32 due to complete atrioventricular block. In the initial evaluation, short stature, bilateral eyelid ptosis, visual hypoacuity, cognitive limitation, generalized muscle weakness were observed. The patient complained of frequent falls, with no arrhythmias or dysfunctions detected in the pacemaker. The family considered that the patient's changes were due to alcohol and drug abuse in his youth, with no similar family history.

Results
The patient underwent ophthalmic and neurological evaluations, diagnosing ophthalmoplegia and pigmentary retinopathy. The skeletal muscle biopsy showed irregular red fibers, confirming the diagnosis.

Conclusions
There should be a clinical suspicion when a patient presents with bipalpebral ptosis, pigmentary retinitis and alterations in cardiac conduction. Early diagnosis, palliative treatment and follow-up can prevent possible complications.
Cardioneuroablation: A Therapy Of Cardioinhibitory Reflex Syncope.

Case reports

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Background - Introduction
The potential therapeutic effects of cardioneuroablation (CNA) in patients with severe vasovagal syncope (VVS) has been used in the last years. Different techniques have been used, and various ganglionic plexuses (GP) locations have been the focus of this new therapy in VVS patients.

Objectives
To demonstrate the efficacy and safety of cardioneuroablation with radiofrequency catheter guided by CARTO system. Establish its reproducibility

Methods
Two patients with 2B cardioinhibitory VVS refractory to conventional treatment were underwent to CNA in our institution. We identified GPs sites by an anatomically guided method and high-output stimulation (HOS). The 3-D endocardial shell of both atria was reconstructed by CARTO system, and identification of GP sites as follows: border of left superior pulmonary vein and left appendage, left superior pulmonary vein, floor of left inferior pulmonary vein, carina of right pulmonary veins, right inferior pulmonary vein, superior vena cava and coronary sinus ostium. HOS (20 MA /2 ms) was used to confirm each GP site through a positive vagal response (VR). The sites showing a positive VR were assigned as ablation targets. Radiofrequency ablation is applied at this GP sites in power-controlled mode. Sinus node recovery time and Wenckebach cycle length were recorded before and after the cardioneuroablation procedure.

Results
After ablation of GP sites, sinus node recovery time and sinus node conduction time decreased in both patients. At the end of ablation inability to induce a vasovagal response was confirmed.

Conclusions
Radiofrequency ablation of the ganglionic plexuses of the pulmonary veins and superior vein cava, through a technique that combines the anatomical approach and high-frequency stimulation has proven to be a safe and effective therapy of patients with 2B cardioinhibitory vasovagal syncope refractive to medical treatment. Making changes of baroreflex sensitivity eliminating syncope periods and pre-syncope symptoms
3-D endocardial surface of both atria reconstructed by CARTO system and ganglionated plexuses ablation points.
Cryoballon Ablation For Atrial Fibrillation Guided By Intracardiac Echocardiography (ICE)

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
The isolation of the pulmonary veins (PVI) is the treatment of choice in atrial fibrillation (AF) refractory to medical treatment. This invasive procedure is a complex ablation, which can perform with cryoballon (CBA) or radiofrequency. CBA has a better safety profile with fewer thromboembolic complications and contiguous injuries such as atrial-esophageal fistulas. The intracardiac echocardiography (ICE) has proved to be a very useful tool for performing complex ablation procedures in the electrophysiology lab.

Objectives. Describe the usefulness of the ICE in CBA procedure.

Methods
We included consecutive patients from two different centers in Mexico (Mexico City and Monterrey NL), undergoing PV isolation with CBA from March 2014 to May 2020 in whom ICE was used during the procedure. In CAB, the ICE allows us to: detect thrombus in the left atrial appendage, choose the precise site for the transseptal puncture, avoid perforations, move the flexcath system by reducing fluoroscopy, and verified the appropriate seal of PV's during therapy. Moreover, the ICE could detect complications in real-time throughout the procedure and identify between pericardial effusion and vagal reaction.

Results
A total of 220 patients were included. A thrombus was identified in the left atrial appendage in 2 cases (1.1%), so the procedure was not performed; later, it was corroborated with transesophageal echocardiography. In another 4 cases (1.2%), a thrombus was identified in the puncture sheath located in the right atrium, with the transseptal puncture already performed. Transseptal puncture was performed guided by ICE in all cases, without complications. The total fluoroscopy time was 16 ± 7.7min (historical times of 26±8), with success in isolation, achieving 100% of PV’s isolation and patients in sinus rhythm upon leaving the EP Lab.

Conclusions
The ICE is a useful tool in CBA for AF, as an auxiliary tool for a transseptal puncture, become a more efficient occlusion and detect further complications such as thrombus.
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**Sudden Cardiac Death During Holter Monitoring**

Electrocardiography/Holter monitoring/Syncope

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**Background - Introduction**

Sudden cardiac death (SCD), a rare event during outpatient monitoring, represents 5.6 to 15% of total deaths, leading to significant economic and social impact.

**Objectives**

Report a case of SCD during holter monitoring, an useful tool for elucidating arrhythmogenic mechanisms involved.

**Methods**

A 64yo female patient, asymptomatic, previous smoker and no comorbidities, attended the outpatient clinic after a routine treadmill test with frequent polymorphic premature ventricular contractions (PVCs) and nonsustained ventricular tachycardia (NSVT). During outpatient investigation: non-reactive Chagas serology; normal ECHO; 24-h Holter with 19% polymorphic PVCs and episodes of NSVT, in addition to episodes of atrioventricular block (AVB), including periods of 2:1 conduction; coronary angiotomography without stenoses and zero CAC score; high resolution EKG with absence of late potential; cardiac MRI with preserved biventricular function, without fibrosis.

**Results**

We initiated sotalol due to the high density of PVCs, without significant reduction. EP study showed an automatic mechanism of the PVCs and origin in the cusp of the left coronary artery, with successful ablation. Programmed ventricular stimulation did not induce VT. She remained asymptomatic and without PVCs for two years after ablation and then she had recurrence of high density of PVCs (19%). New MRI was performed without evidence of structural heart disease. New 24-h Holter showed periods of 1st and 2nd degree type I AVB, with ventricular escape beats and some episodes of polymorphic NSVT throughout the day until the late afternoon, when she had an episode of polymorphic VT that lasted 9 minutes. It degenerated to ventricular fibrillation and then asystole, causing death at home.

**Conclusions**

The present case illustrates the complexity in the management of ventricular arrhythmias since some cases of SCD can occur in the absence of structural heart
disease. Atrioventricular conduction disorders were incipient in previous exams and then SCD was documented.

Polymorphic VT degenerating to Ventricular Fibrillation
Venoplasty During Pacemaker Upgrade To CRTP, CRTD

Cardiovascular Implantable Electronic Devices

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Background - Introduction
Patients with pacemaker devices are having more change to develop symptoms related with ventricular pacing, or decrease left ventricular function. In order to bring a right treatment upgrade are often performed.

Objectives
show the brachiocephalic vein venoplasty during upgrade from pacemaker to CRT-P or CRT-D can be performed as a step of the procedure

Methods
first case, 86 year-old lady, who is known as single chamber pacemaker user, with several months showing a decrease in the functional status, as well as heart failure symptoms. During follow up the upgrade to CRTP was proposed because 95% of ventricular pacing and 40% of LVEF. During the procedure a stenosis of brachiocephalic vein was found, and venoplasty with a 5 mm Mustang catheter was perform with excelente results.

second case, 45 year-old man with dual chamber pacemaker was found with decreasing a functional status by dyspnea, even edemas, with the history of dextrocardia and 27% of LVEF despite 1 year of optimal treatment, we decided to do an upgrade to CRTD, also during procedure we found a brachiocephalic stenosis and venoplastia with a 6 mm Mustang ballon was performed with excellent results.

Results
Venoplasty with a Mustang ballon is as easy technic to perform, even when there is a cardiac anatomical challenge

Conclusions
Venoplasty with ballon is a feasible technic in order to do an upgrade to resynchronisation or high voltage therapy.
braquitocephalic venoplasty in order to perform upgrade. first and second cases
Ventricular Tachycardia In The Setting Of COVID 19

Clinical Electrophysiology and Catheter Ablation

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Background - Introduction
we are living in a pandemic era sooner will be an endemic situation, the patients are no consulting because fear to get infective by the SARSCOV 2; nonetheless some patient device users are easily exposed to cardiac problems related with COVID 19.

Objectives
show a case of electrical storm in the setting of COVID 19 infection

Methods
a 52 year-old male patient was admitted to our clinic because syncope related to a electrical storm due to ventricular tachycardia, with the history of atrial fibrillation and single chamber defibrillator even AV node ablation performed in a different institution, with a reduce LVEF 20%, he was taken to the EP LAB for VT ablation, Voltage map revealed a big anteroseptal and lateral scar, during VT the activation map was performed as a result with entrainment mapping the istmus of the tachycardia was found in the septal area of the RVOT were ablation was performed and the tachycardia was eliminated, then a LV modulation was performed. the next day the patient was taken to upgrade from single chamber ICD to CRTD. During the follow up the patient has a new episode of VT, and a new shock was presented, as a refractory VT was referred to cardiac transplantation even though COVID 19 infection was diagnosed during hospitalization, the patient suddenly did not present more episodes of VT, so an ventricular stimulation was perform from the device without induction of VT, so we decide to recommend a bilateral sympatectomy with no recurrence of VT.

Results
ablation and upgrade to CRTD in combination with sympatectomy are a powerful combination and it can performed in a COVID 19 infection during VT

Conclusions
strong strategic approach should be used against ventricular tachycardia in the setting of COVID 19 infection
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**Focal Atrial Tachycardia From The Fossa Ovalis**

Clinical Electrophysiology and Catheter Ablation

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**Background - Introduction**

Focal atrial tachycardia (FAT) is a rare cause of supraventricular tachycardia. The most common site of origin of FAT is the right atrium, rarely may originate from the interatrial septum. There are few case reports of FAT arising from the patent foramen oval (PFO), specifically from the peri-PFO and limbus-PFO.

**Objectives**

To describe the catheter ablation approach of the first two cases of FAT in our hospital.

**Methods**

Two patients with atrial tachycardia, with evidence in an electrophysiological study with the CARTO electroanatomic system of origin in the interatrial septum at the level of the fossa ovalis. In one of them, right and left ablation was performed with a transseptal puncture, successfully ablation. In the other patient, an area of more precocity was identified in the posterior region of the interatrial septum. The ablation catheter was advanced towards said area without achieving cessation of electrical activity. During the application of radiofrequency, self-limited paroxysms of flutter and atrial fibrillation occurred. It was decided to perform a transseptal puncture to map the left atrium. The left atrium was mapped, identifying the area of more precocity at the septal level with a value of -46 ms. Radiofrequency was applied at this point, registering an increase in transient ectopic activity for the subsequent abrupt cessation. Programmed decremental stimulation was performed without achieving tachycardia after the infusion of isoproterenol and a new decremental stimulation train. Some atrial extrasystoles of different clinical morphologies were observed. The control electrocardiogram at 12 hours revealed ectopic atrial rhythm.

**Results**

In both cases the catheter ablation was a successful treatment strategy providing a longterm cure without recurrence so far

**Conclusions**

PFO is a rare focus of FAT. Nevertheless we describe the catheter ablation approach of the first two cases of FAT from the PFO and demonstrated the success of the long-term strategy.
fossa ovalis
Cardiodesfibrillator Implant (Icd) In Non-Compacted Myocardiopatia Of The Left Ventricle (Lvnc): First Case In An Adolescent Patient In Peru

Case reports

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Background - Introduction
BACKGROUND:
According to published data, the incidence of malignant ventricular arrhythmias is reported up to 47% and sudden death in 50% of adults affected by LVNC; a better prognosis is reported in the pediatric population. In particular, Kobza and Duru et al. demonstrated how fatal ventricular arrhythmias can occur in these patients and how ICD therapy can be effective
INTRODUCTION:
Left ventricular noncompaction cardiomyopathy (LVNC) is a rare form of primary genetic cardiomyopathy. Echocardiography is considered the gold standard for the diagnosis of LVNC. Ventricular tachyarrhythmias are reported in 38% to 47% and sudden cardiac death Treatment is based on drugs and the use of ICDs.

Objectives
- Publicize the first case of cardioverter defibrillator (ICD) implantation in an adolescent with LVNC in Perú.

Methods
Observational.

Results
19-year-old patient from Tarapoto, with a history of recurrent syncope episodes since the age of 12 associated with palpitations, with a history of non-compacted cardiomyopathy diagnosed in 2016 at INCOR, with a stress test study (08/19/2016) : Not conclusive for myocardial ischemia at 44% of FCM, functional class II, with pressor response and adequate chronotropic disease. Bigeminate ventricular extrasystoles from the start of exercise and disappears in the recovery phase; with negative Tilt Test tests (09/21/2016) for syncope of neuromedial origin; Therefore, a subcutaneous Holter monitor was implanted 07/27/2017, registering up to 3 syncope episodes (April, May and September 23, 2018). A cardioverter defibrillator was implanted (07/09/2019) Medtronic Evera MRI VR Sure Scan generator, the catheter was positioned in the mid-apical septal area of the RV, because good parameters were not achieved at the apical level. After the procedure, the patient is asymptomatic, has an EKG in sinus rhythm.
Conclusions
We consider that our patient has a high risk of sudden death and ICD was not only a treatment for the condition but also a bridge towards a potential heart transplant.

TITLE: CARDIOIDESFIBRILLATOR IMPLANT (ICD) IN NON-COMPACT MYOCARDIopathy (LVNC): FIRST CASE IN AN ADOLESCENT PATIENT IN PERÚ

INTRODUCTION:
- LVNC is a rare form of primary genetic cardiomyopathy.
- Ventricular tachyarrhythmias are reported in 38% of cases. Better prognosis in pediatric age.
- Sudden cardiac death occurs in 20% of cases.
- The macoreentrance is the responsible mechanism.
- Clinical manifestations vary from asymptomatic to heart failure, systemic thromboembolism, arrhythmias and sudden death.

OBJECTIVE:
- Publicize the first case of cardioverter defibrillator (ICD) implantation in an adolescent with LVNC in Perú.

CASE REPORT:
19 years old female from Tarapoto

History of syncope and palpitations since the age of 12.

Negative syncope study for vasovagal origin (Stress test and negative Tilt Test).

DISCUSSION:
ACC/AHA/ESC guidelines indicate ICD in NYHA class III or IV with syncope and EF <40%, who receive medical therapy and have a survival expectancy of more than one year.

There are several reports in the world of similar cases but none reported in adolescent patients.

CONCLUSIONS:
In LVNC and ventricular arrhythmias the use of ICD is indicated as secondary prevention.
In high risk syncope, think as differential of LVNC.
With this reported case, it is intended to expand knowledge about LVNC and publish the first case with this pathology at this age presented at INCOR Perú.