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**ABSTRACTS**

*Integrative Approach*

*Heart Failure - Old Troubles, New Tools*

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# IN TYPE II DIABETIC PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION LEFT ATRIAL FUNCTION INDEX AND POOR GLYCAEMIC CONTROL CAN BE PREDICTORS OF ARRHYTHMIA RECURRENCE

Horatiu Rus [1], Madalina Ivascu [1], Adrian Gheorghe [1], Elena Bobescu [1]

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**Introduction** Left atrial (LA) systolic dysfunction is present in early stages of atrial fibrillation prior to left anatomical changes and is influenced by left ventricular systolic function. We evaluate weather left atrial function index (LAFI), and glycaemic control can be a predictor of atrial fibrillation recurrence after medical or electrical conversion in type II diabetic patients with paroxysmal atrial fibrillation.

**Material and method:** We evaluate 180 patients with type II diabetes, who underwent medical or electrical conversion for paroxysmal atrial fibrillation, for a period of 2 years. LA systolic function was appreciated with the echocardiography determined LA emptying volume=Maximum LA volume (LAV max)-minimum LA volume (LAV min), LA emptying fraction= {[LAV max-LAV min]/LAV max]x100}, and LAFI=LA emptying fraction x LVOT-VTILA max index. Flow mediated vasodilation was recorded at the level of brachial artery. Recurrent atrial fibrillation was recorded in 90 patients (50%), time,11,5±10 month.

**Results:** Univariate analysis revealed as markers for arrhythmia recurrence low LAFI, reduced LA ejection force, high BMI, poor glycaemic control (cut-off value for glycosylated haemoglobin Hb A1C 7%), high BMI index, decreased index of flow mediated vasodilatation (FMD). On multivariate analysis poor glycaemic control, reduced LAFI, and larger LA diameter had a higher risk of atrial fibrillation than patients with higher LAFI and good glycaemic control log rank p<0,004).

**Conclusion:** In type II diabetic patients with paroxysmal atrial fibrillation, poor glycaemic control, reduced left atrial function index, larger left atrium, and altered endothelial dysfunction appreciated by flow mediated vasodilatation, can be predictors of atrial fibrillation recurrence.

# ARRHYTHMIA-INDUCED CARDIOMYOPATHY: A FORGOTTEN CAUSE OF HEART FAILURE

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Heart failure is associated with tachyarrhythmias, which may worsen cardiac dysfunction and, in the case of malignant ventricular arrhythmias, cause death. On the other hand, there are cases in which arrhythmias come first and cause cardiac dysfunction and heart failure. These cases are referred to as arrhythmias-induced cardiomyopathies (AICs). This causal relationship should be borne in mind by the physician treating a patient with systolic heart failure in association with cardiac arrhythmia. AIC refers to an impairment of left ventricular function caused by atrial or ventricular tachyarrhythmias which is partially or completely reversible after normalization of the heart rate. AIC is underdiagnosed in many patients with heart failure. The challenge is to determine whether arrhythmias are fully, partially, or at all responsible for an observed left ventricular dysfunction. AIC can affect patients of any age and has a wide range of clinical manifestations, from asymptomatic to severe heart failure symptoms. Early recognition of AIC is critical, and prompt treatment of the underlying arrhythmia using pharmacological or ablative techniques results in symptom resolution and recovery of ventricular function; also this will improve quality of life and long-term prognosis. Atrial fibrillation is the most common persistent arrhythmia in adults and the most common cause of arrhythmia-induced cardiomyopathy. Atrial fibrillation (AF) and heart failure (HF) often coexist and precipitate one another. Recent studies have shown that the causal significance of atrial fibrillation in otherwise unexplained left ventricular systolic dysfunction is underappreciated. This review focuses on current understanding and evidence for treatment and management in AIC, with a particular focus on AF-mediated cardiomyopathy. It also suggests the importance of timely recognition of this condition and the appropriate treatment of the underlying arrhythmia, which can substantially improve quality of life, clinical outcomes, and reduce hospital admission.

# THE MANAGEMENT OF THE ELDERLY PATIENT WITH ATRIAL FIBRILLATION, REPETITIVE STROKES AND NEOPLASTIC PATHOLOGY

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**Introduction** Atrial fibrillation (AF) is one of the most common cardiac arrhythmias, the risk of stroke increasing with age. Oral anticoagulation is therefore a mandatory goal for patients with permanent AF. Those who associate a neoplasm are a real therapeutic challenge, as they have additional risk factors for bleeding.

**Material and method:** We are presenting the case of an 82-year-old male patient with multiple cardiovascular risk factors and significant family history, known for 17 years with AF, which was initially paroxysmal, later becoming permanent. In evolution, five episodes of ischemic and embolic strokes were observed, therefore, based on the $CHA_2DS_2$-VASc score, the patient had an indication for oral anticoagulation. Treatment with vitamin K antagonists (VKAs) followed, maintaining an INR within the therapeutic limits.

**Results:** During the VKAs treatment, there were repeated episodes of macroscopic hematuria, which forced the cessation of anticoagulant medication, leading to the recurrence of acute cerebrovascular events. Following etiological investigations of hematuria, the patient was discovered with a right kidney malignant tumor, undergoing surgery, consisting of nephrectomy, resection of the ureteral stump and of a portion of the bladder wall. The repeated episodes of hematuria required the replacement of VKAs with an appropriate safety profile medication, like low molecular weight heparin and, subsequently, with a new oral anticoagulant (NOACs). The patient's evolution was favorable under the new therapeutic scheme, without the recurrence of stroke, hemorrhagic episodes or the aggravation of the remaining renal function. Regarding the antiarrhythmic treatment, it was decided to perpetuate the AF and control the heart rate with a beta-blocker.

**Conclusion:** In the context of an elderly patient with permanent AF, multiple cardiovascular comorbidities and associated neoplastic pathology, NOACs are proving to be the most appropriate choice to reduce the risk of both embolic stokes and bleeding.

# SLOW VENTRICULAR RESPONSE ATRIAL FIBRILLATION IN COVID-19 THE CALM BEFORE THE (CYTOKINE) STORM

Radu-Ștefan Miftode [1,2], Adrian Pintilie [1], Dan Tesloianu [1], Ovidiu Mitu [1], Ionela-Larisa Miftode [3], Cristian Haba [1], Irina-Iuliana Costache [1], Antoniu-Octavian Petriș [1]

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**Introduction** Severe cardiovascular events, including arrhythmias, are common amongst patients with coronavirus disease 19 (COVID-19). However, based on literature data, association of COVID-19 with bradycardia has been rarely reported. This case report describes bradyarrhythmia as a potential manifestation of COVID-19.

**Case report** We report the case of a 71-year-old male, with several cardiovascular comorbidities (dilated cardiomyopathy, atrial fibrillation, implantable cardioverter defibrillator, tricoronary lesions with multiple drug eluting stents) who was referred to emergency room after accusing progressive dyspnea and shivers. At admission, the blood tests showed significant inflammatory syndrome and leukocytosis with lymphopenia. Patient was hemodinamically stable, but anxious and dyspneic (SaO2=95%). ECG revealed atrial fibrillation, but with a controlled ventricular response of 95 bpm. Emergency computed tomography highlighted multiple, disseminated, pulmonary ground-glass opacities. The polymerase chain reaction test for SARS-CoV-2 was also positive. Shortly after admission, symptoms aggravated, with the subsequent initiation of noninvasive ventilation; on a second ECG we observed a paced ventricular rhytm (60 bpm) alternating with normally conducted QRS complexes, in a „slow" atrial fibrillation. Prompt treatment with Tocilizumab, Remdesivir and Meropenem have improved the clinical and biological status and also „normalized" the ECG to the previous aspect, showing an atrial fibrillation with narrow QRS complexes at a rate of ~100 bpm.

**Conclusions** Transient bradycardia or atrio-ventricular (AV) conduction disorders are rarely reported in COVID-19. Etiology can be multifactorial, but severe hypoxia and inflammatory damage of AV node cells are possible triggers. High levels of cytokines may act directly on AV node contributing to the development of transient block at this level, and could be considered a warning sign of cytokine storm onset.

# BREATHLESS - IN HEART DISEASES: PATIENTS COVID 19 AND THEIR PROBLEMS

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**Introduction** The current outbreak of SARS-CoV-2 (severe acute respiratory syndrome coronavirus – 2), also known as COVID – 19 ( coronavirus diseases 2019) has quickly spread and became a global pandemic. On the 1st of February 2021, 102.817.575 people worldwide were infected with the virus.

**Methods** We retrospectively evaluated the observational files of the patients admitted to our hospital for a period of 11 months following the impact of atrial fibrillation in the evolution of SARS COV 2 infection.

**Results** Currently in Romania almost 730.056 cases have been diagnosed and more than 18.402 infected people have died, however the true prevalence is much higher, as many individuals are asymptomatic and therefore never tested. Cardiovascular diseases, diabetes mellitus and obesity are contributing factors to the morbidity and mortality of COVID – 19 patients. Arrhythmias are frequently reported in SARS COV – 2 positive patients, atrial fibrillation (AF) being the most common form. In our clinic for the last 11 months, almost 5874 patients have been admitted, from which 207 had atrial fibrillation with ages between 42 and 88 years old. The treatment was according to the national and international protocols with good evolution. Approximately 7% of the patients who died for COVID – 19 had AF, which was hence the fifth most common condition in these patients after obesity, diabetes mellitus, hypertension, lung diseases. This suggests that cardiac arrhythmia is associated with an increased risk of mortality and morbidity in SARS COV 2 infected patients.

**Conclusion** In our patient series atrial fibrillation was a risk factor for mortality for patients infected with the new coronavirus. For a proper assessment and management of these patients, multidisciplinary collaboration between the cardiologist and the infectious diseases specialist is the key of success.

# CONDUCTION ABNORMALITIES IN LATE PRESENTATION STEMI - HOW LATE IS TOO LATE?

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**Introduction** Electrical conduction abnormalities are well-recognized complications of acute myocardial infarction (MI). They are caused by either autonomic imbalance (vagally mediated bradyarrhythmia and atrioventricular block) or ischemia-driven conduction delay. Complete heart block with a slow escape rhythm is a potentially life-threatening event in this setting if not detected and treated promptly.

**Methods** A 55-year-old male presented with generalized weakness and presyncope that began three days earlier. His prior medical history includes poorly controlled type 2 diabetes, peripheral artery disease stage IV as well a 30-pack-year smoking history. ECG and emergent laboratory tests revealed ST-segment elevation in inferior leads with elevated cardiac enzymes. Transradial coronary angiography revealed diffusely diseased mid-proximal right coronary artery (RCA) and complete thrombotic occlusion of distal RCA. Consequently, we proceeded to PCI to the proximal RCA. Due to diffusely diseased segments, there were deployed three Resolute Integrity drug-eluting stents (DES) into the I-III segments of RCA. Final angiography showed a good result, with TIMI 3 flow.

**Results** The patient presented with intermittent complete atrioventricular block, alternating with high degree AV block. Atrioventricular block associated with acute MI, especially in the setting of inferior MI, usually resolves after reperfusion, with the recovery of AV nodal function within 2–7 days. The return of 1:1 conduction immediately after revascularization supports ischemia theory in this case. The particularity of the case consists of late presentation. Still, in this case, given the presence of ongoing ischemia, primary PCI ⩾12 hours after symptom onset translated into a substantial clinical benefit.

**Conclusion** STEMI patients presenting ⩾12 hours after symptom onset are at higher risk of periprocedural events, such as distal embolization, no-reflow phenomenon, and they have a reduced rate of myocardial salvage. Still, in the context of ongoing ischemia manifested as intermittent conduction abnormalities, primary PCI translated into a substantial clinical benefit.

# TO PLAY OR NOT TO PLAY? CHANNELOPATHIES AND EXERCISE

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**Introduction** Even though congenital cardiovascular diseases are relatively rare in the general population, they are associated with an increased risk for ventricular tachyarrhythmias and sudden cardiac death (SCD), frequently exacerbated during exercise. These diseases include two main categories: structural abnormalities (e.g. hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy) and primary electrical diseases (Brugada syndrome, long QT syndrome - LQTS, short QT syndrome - SQTS, catecholaminergic polymorphic ventricular tachyarrhythmia – CPVT, early repolarisation syndrome - ERS, idiopathic ventricular fibrillation - IVF).

**Methods** We searched the electronic database of PubMed from its earliest date for studies that evaluated the relationship between cardiac channelopathies and sports activity, as well as current guidelines and consensus documents focusing on monitored medical therapy, decision-making, and precautions for recreational and competitive sports.

**Results** The initial evaluation in patients with suspected channelopathies includes a complete personal and family history, physical examination (with emphasis on the clinical symptoms and signs associated with the cardiovascular diseases responsible for exercise-related sudden death), and 12-lead ECG. Echocardiography and cardiac magnetic resonance imaging are valuable to rule out structural heart disease. Awareness of the patient is also important in managing the risk of arrhythmic and SCD events. Taking into account the risk of recurrent lethal arrhythmias, an ICD is often the first-line therapy in symptomatic patients with suspected channelopathies and a history of VT/VF or syncope. Recreational exercise requires the personalization of recommendations based on individual arrhythmogenic diseases, patient preferences, and priorities.

**Conclusion** Although current guidelines and consensus documents remain fairly rigid on exercise in patients diagnosed or with a strong suspicion of a cardiac channelopathy, data are emerging showing that the risk of cardiovascular events is low after a comprehensive treatment program has been established.

# DOES THE IMPLANTATION OF LOOP RECORDERS REALLY HELP?

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**Introduction** According to the current guidelines for syncope management, implantable loop recorders (ILRs) are required for the evaluation of patients who presented with recurrent syncope/presyncope after negative initial investigations. The aim of this study is to evaluate the diagnostic benefits for the device therapy especially in young patients who received ILRs.

**Methods** In this study, we included patients who undergone ILR evaluation, in our cardiology center of "Sf.Spiridon" County Hospital, Iasi, Romania, between April 2019 to December 2020. The patients underwent periodic 3-month in clinic follow-up together with remote monitoring through the dedicated app provided by the manufacturing company.

**Results** In an interval of 18 months, 25 patients (52.9% male), with an average age of 56.7 years, received an ILR for the investigation of syncope/presyncope (77.5% of cases) and recurrent symptomatic palpitations (22.5% of cases). 16 (64%) of patients required implantation of a cardiac pacemaker or cardioverter defibrillator. Out of these patients, 10 presented with sinus node disease, 5 with intermittent total atrio-ventricular block and one patient with sustained ventricular tachycardia. Another 2 patients underwent radiofrequency ablation for symptomatic paroxysmal atrial fibrillation. Furthermore, 3 patients presented episodes of diurnal sinusal bradycardia, without indication of pacemaker implantation. The average time between ILR implantation and the detection of a rhythm disorder requiring device or interventional therapy was 5.3 months.

**Conclusion** Our study reveals that ILRs are a useful tool for the investigation of arrhythmias necessitating pacemaker/ICD therapies. Furthermore, in our study the time required for diagnosis was rather short (approximately 5 months), probably facilitated by continuous in office and remote monitoring. In conclusion, ILRs are a useful addition for long term rhythm monitoring and should become a standard in clinical practice.

# VASOVAGAL SYNCOPE – A PERMANENT CHALLENGE

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**Introduction** The vasovagal syncope leads to reduced brain blood flow causing sudden drop of heart rate and blood pressure and determining the briefly loss of consciousness. Vasovagal syncope most often affects children and young adults, but it can happen at any age. The syncopal episode usually occurs in orthostatism and can be precipitated by fear, emotion, stress or pain.

**Case Study** We present the case of a 32-year-old female known to have multiple syncopal episodes with a regular occurrence every 2-3 years. She performed a positive tilt test in July 2019 which prove predominant cardioinhibitory mechanism. So she received the diagnosed of vasovagal syncope. In August 2019, the patient presents to our clinic for a new syncopal episode. Due to the increase of the frequency and the severity of the syncopal episodes, it is decided to implant a loop-recorder. In December 2019, the patient presents a new syncopal episode. The interrogation of the loop recorder highlights the appearance of an asystole lasting 21 s, concordant the associated bradycardia we decided to implant a bicameral pacemaker.

**Conclusions** Noncardiac syncope has a good prognosis and has no effect on the mortality rate, but despite benign evolution, reflex syncope can be recurrent and unpredictable and can cause disability. The essential element of the management of these patients is non-pharmacological therapy, including education, lifestyle changes and reassuring the patient of the benign nature of his suffering, however permanent electrical cardiostimulation therapy should be considered in patients with asystole dominant feature of reflex syncope.

# RESISTANT VENTRICULAR TACHYCARDIA 8 DAYS AFTER ACUTE MYOCARDIAL INFARCTION – A CASE REPORT

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**Introduction** Ventricular arrhythmias commonly occur following myocardial infarction, with important negative prognostic value. The mechanisms involved are various and time-dependent, with implications upon therapeutic management. We report the case of a patient with myocardial infarction who couldn't benefit from early invasive approach and developed recurrent ventricular tachycardia during the 8th day after admission.

**Case report** A 65 years-old male patient with multiple cardio-vascular risk factors (hypertension, obesity, dyslipidemia, diabetes) was referred to the emergency room with acute severe chest pain and dyspnea 12 hours prior to admission. He was diagnosed with inferior STEMI , therefore was transferred to a PCI-capable center. Coronary angiography couldn't be performed because of intense dyspnea due to acute pulmonary edema , the patient not being able to maintain the dorsal decubitus position. After stabilization, he was transferred to another cardiology department for medical treatment because the chest pain disappeared and not being within the therapeutic window. After another 6 days, he was referred to our interventional cardiology department due to electric instability, with persistent monomorphic ventricular tachycardia resistant to medication. Coronary angiography revealed massive thrombotic occlusion in the RCA with a TIMI0 flow. Three DES were implanted with a positive outcome of TIMI3 flow. However, the patient maintained electrical instability, with persistant monomorphic VT and required several electrical shocks. Shortly after, a cardiac arrest occurred (asystole) that didn't respond to resuscitation.

**Conclusions** Although the flow was restored in the culprit lesion, electric instability in the form of ventricular tachycardia was still persistent. Monomorphic VT is characteristic to the chronic phase of myocardial infarction secondary to structural changes and scars, which could explain the persistence of the arrhythmia after reperfusion in our patient. Even after the acute phase of myocardial infarction, risk for arrhythmias is still significant, with persistant TV having an increased mortality rate.

## WHAT DO WE HAVE HERE: A CLEAR ACS CASE?

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**Introduction** Myocardial infarction with non-obstructive coronary arteries also known as MINOCA is a wide umbrella term which accounts for approximatively 6% of acute coronary syndrome presentations.

**Methods** We would like to present a case of a 46 year old male, with an acute inferior myocardial infarction treated medically and documented during a periodic cardiological consult 6 months, which is admitted in emergency setting in our hospital for severe chest pain and rest dyspnea for 6 hours. At admission, the patient was stable, with high hs-troponin (1600ng/dL). ECG revealed diffuse ST depression with negative T waves in anterior leads, and q waves in inferior leads. Echocardiographically the left ventricle was dilated with a severely depressed systolic function (30%), with akinesia of the inferior wall, akinesia of the apex with apical anuerysm, and akinesia of the antero-lateral wall. We decided to activate the cathlab and coronarography revealed normal coronary arteries and the methylergotamine test for epicardial vasospasm was negative.

**Results** The patient presented all the criteria for MINOCA diagnosis according to the current European society of cardiology guidelines, and we continued with optimal medical treatment. The patient was then referred to cardiac MRI which revealed chronic inferior myocardial infarction and recent anterior myocardial infarction. According to current guidelines of heart failure we decided to implant a cardiac defibrillator for primary cardiac prevention. At 3 and 6 months check-up the patient presented a significant decrease of angina symptoms and dyspnea.

**Conclusion** MINOCA remains a diagnostic and therapeutic challenge in everyday practice, and although there are well defined criteria, cardiac MRI has an important role to enforce the diagnostic and to differentiate between coronary and non-coronary etiologies which lead to a more individualized optimal therapy.

# MULTISTENTING IN A PATIENT WITH KAWASAKI CORONAROPATHY AND HIGH SURGICAL RISK

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**Introduction** Kawasaki disease is a generalized systemic vasculitis involving the medium and small vessels. The coronary involvement can be found in 15%-20% of patients, and it is usually manifested as ectasia, aneurysms, with alternating stenosis.

**Methods** We would like to present the case of a 54 year old male patient, known with Kawasaki disease for 20 years, with severe chronic kidney disease under hemodialysis for 2 years, which is admitted in emergency setting in our hospital for dyspnea and orthopnea for 6 hours. At admission he was in acute pulmonary edema, with high Hs-troponin (500ng/dL), and ST elevation in inferior leads. Echocardiography revealed moderate depressed left ventricular systolic function (35%) with severe hypokinesia of the infero-lateral wall. After stabilization and oro-tracheal intubation, coronarography was performed revealing: severe multivascular disease with left main bifurcation, culprit right coronary with severe diffuse multiple suboclussions, but with TIMI 3 distal flow, with a total anatomical SYNTAX score of 63, EUROscore II of 6%. Although the surgical indication was well explained, the patient refused systematically the procedure, and after a Heart Team approach we decided to revascularize percutaneously.

**Results** After complete stabilization of the patient, we performed angioplasty on the right coronary artery, with good result. We then continued with miniTAP technique for circumflex-marginal bifurcation, followed by a T stenting of the distal left main, and a provisional stenting of the proximal descending artery, with good final result and complete revascularization. At consecutive monthly follow-ups, the patient was asymptomatic, stable, with negative stress-test at 6 month and 1 year, and 45-50% left ventricular ejection fraction at one year, with mild inferior hypokinesia at 1 year.

**Conclusion** Kawasaki arteriopathy is a rare entity and can severely affect the coronary arteries with recurrent acute coronary syndromes.

# THE SEPTAL WHICH BECAME THE ANTERIOR DESCENDING IN A LEFT MAIN INTERVENTION

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**Introduction** The importance of septal arteries can significantly vary amongst individuals, and during percutaneous interventions, septal occlusions can lead to a wide range of arrythmic complications and can affect the ventricular synchrony.

**Methods** We would like to present a case of a 60 year old male patient, known with triple aorto-coronary bypass for 6 years, which is admitted in emergency setting in our hospital for sudden onset of chest pain for 2 hours. At admission, the patient was stable with high HS-troponin (8000ng/dL), and infero-lateral ST elevations. Echocardiographic evaluation he developed a transient complete heart block 20/min, spontaneously resolving after 5 min. The left ventricular ejection fraction was 40%, with severe hypokinesia of the infero-lateral wall. Coronarography revealed a thrombotic LM distal suboclussion, a permeable left mammary graft and a chronic occluded right coronary graft.

**Results** Because the first septal was well developed, and due to the arryhthmic complications at admission, mild depression of left ventricular ejection fraction, we decided to treat the left main lesion as a bifurcation, and performed a provisional approach with a left main to circumflex drug eluting stent implantation. During inflation, the patient developed a short episode of ventricular tachycardia, immediately resolving after deflation. We continued with ostial septal balloon dilatation, and during inflation we observed the same episode of ventricular tachycardia, resolving in the same manner. The final proximal optimization of the left main stent was performed with a 3.5/8mm balloon, with good final result, TIMI 3 flow in all vessels, and good run-off from the circumflex to right coronary artery.

**Conclusion** We presented a case of an atypical STEMI, with high arrythmic importance of a septal branch (giving transient complete heart block and 2 episodes of ventricular tachycardia during PCI) requiring a protected distal LM intervention with a bifurcation technique.

# ANTIARRHYTHMIC DRUGS: BETWEEN RISKS AND BENEFITS

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Antiarrhythmics are drugs used to treat arrhythmias, but in 5-10% of patients, they present a proarrhythmic effect, which is characterized by the appearance of a new arrhythmia or the aggravation of the pre-existing one. The risk of proarrhythmia is increased in patients with structural heart disease, electrolyte imbalance, or during drug initiation.

Proarrhythmia can manifest as atrial and ventricular arrhythmias, or abnormalities of conduction or impulse formation. We present a series of cases that underline possible proarrhythmic effects of commonly used antiarrhythmic drugs in clinical practice. In the first case, a patient who received loading doses of amiodarone for prophylaxis of atrial fibrillation recurrence, presented significant prolongation of the QT interval, with nonsustained torsades de pointes (TdP) on Holter ECG evaluation. After discontinuation of amiodarone, the QT interval normalized, without other arrhythmic events. The case of another patient who was a chronic alcohol consumer with alcoholic cardiomyopathy and congestive heart failure, reveals the fact that amiodarone administration in such patients may have an increased proarrhythmic risk. This patient developed important QT prolongation during loading doses of amiodarone, with frequent nonsustained TdP episodes on Holter ECG monitoring, with persistence of QT prolongation after discontinuation of amiodarone. The patient eventually developed sustained ventricular tachycardia, without response to defibrillation and deceased. Another case demonstrates a less expected proarrhythmic effect of amiodarone, namely the conversion from atrial flutter with 2/1 nodo-ventricular conduction to atrial flutter with 1/1 nodo-ventricular conduction and broad QRS complexes. The case of another patient reflects the proarrhythmic effect of sotalol, which caused extreme QT interval prolongation and consequent TdP.

Antiarrhythmic drugs have the potential to generate arrhythmias, and one should consider both the benefits and the risks when initiating antiarrhythmic therapy. Monitoring ECG abnormalities, treating electrolyte imbalance, and preventing bradycardia have major importance in the management of proarhythmias.

# TECHNICAL DIFFERENCES IN LEAD EXTRACTION FOR EARLY AND LATE LEAD-RELATED ENDOCARDITIS

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**Introduction** The purpose of this presentation is to emphasize differences between early and late percutaneous lead extraction in patients with lead-related endocarditis (LRE).

**Material and Methods** We present 2 cases with lead related endocarditis, one 12 years since implant, and the other one in the first year (entry site - multiple percutaneous coronary interventions without antibiotic prophylaxis). While early LRE is rather common, very late LRE is a rare entity, with sporadic mentions (four cases reported after more than 10 years since implantation) and only one case with percutaneous lead extraction. Scar tissue encountered along the lead, present in multiple locations with the venous entry site, subclavian area, and right ventricle as the most frequent sites, is usually the primary reason for partial or failed percutaneous removal of a lead. The duration of the device implantation is an important factor in the formation of adhesions and, with it, problems with the extraction of leads. A passive fixation mechanism, as in one of the presented cases, is usually associated with multiple adherences in the heart, because of the tines at the tip of the passive lead.

**Results** While the extraction in the early LRE case was marked by the risk of embolism, in the other case, difficulties encountered were somehow typical to very LRE, with the presence of extensive fibrosis at the venous entry site and in the right ventricle with neointimal fibrotic encapsulations of the distal end of the lead. Large dimension vegetation with the risk of embolism posed a supplementary difficulty in both cases.

**Conclusion** Both early and late extraction in LRE pose risks, with the difference that there is very limited experience worldwide regarding extraction of leads with vegetations more than 5 years after the initial implant.

# LEFT VENTRICULAR INVOLVEMENT IN ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA – A CMR IMAGING CASE

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A few studies reported left ventricular (LV) involvement in arrhythmogenic right ventricular dysplasia (ARVD), which is a rare disease. The aim of the present case was to report the CMR patern of LV involvement. A 46-year-old patient was presented to the CMR examination with a history of two ventricular tachycardia events at 5-year intervals and moderate dilation of the right heart chambers at transthoracic echocardiography. At CMR examination, dilation of the right heart chambers was not confirmed. However, the right ventricle (RV) showed moderate global systolic dysfunction, akinesia and dyskinesia of the basal lateral wall, systolic aneurysm of the basal inferior lateral wall. The basal lateral wall of the RV showed an intense transmural late gadolinium enhancement (LGE). At the same time, the LV, showed normal volumes, preserved global systolic function, hypokinesia of the mid lateral myocardium, subepicardial LGE on the mid lateral myocardium and nodular LGE of the mid-basal interventricular septum. The CMR patern is highly suspected for ARVD with LV involvement and presents a major criteria for establishing the diagnosis according to the revised task force criteria.

# ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA

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**Introduction** The subject is an update on the clinical diagnosis and differential diagnoses of arrhythmogenic right ventricular dysplasia (ARVD), as well as the understanding of the underlying pathogenesis, and it sheds light on risk stratification, electrocardiographic abnormalities, current therapeutic and preventive measures.

**Material and Methods** Based on the systematic review of the dedicated literature and actual consensus, the topic highlights the complexity of the disease and tremendous opportunities to advance the care deliver to these patients.

**Results** Arrhythmogenic right ventricular dysplasia is an inherited cardiomyopathy characterized by ventricular arrhythmias, right ventricular dysfunction, and significant risk of sudden cardiac death. Progressive loss of right ventricular myocardium and its replacement by fibrofatty tissue is the pathological hallmark of the disease. The genetic desmosomal abnormalities, the importance of proband status and ventricular ectopy for risk stratification of patients at risk for sudden cardiac death and the critical role that exercise plays in the development and progression of ARVD/C are a few major advances in the diagnosis and management of the disease. From a treatment perspective, the placement of implantable cardioverter defibrillators in those at risk for sudden cardiac death and ablation techniques have also evolved over time.

**Conclusion** ARVD has seen important improvements in both its clinical and pathogenetic characterization over the past few decades. Appropriate pharmacological therapy and the prevention of sudden death are important in the management of these patients.

Keywords: Arrhythmogenic right ventricular cardiomyopathy; sudden cardiac death; ventricular tachycardia; implantable cardioverter defibrillator;

# LATE EXTRACTION OF A PERFORATED RV LEAD WITH INTRATHORACIC MIGRATION – SHOULD WE BE SCARED ABOUT IT? – CLINICAL CASE PRESENTATION

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**Introduction** The use of intracardiac leads has become common in clinical practice due to the increased indications for implantation of cardiac pacemakers, cardioverter-defibrillators and cardiac resynchronization therapy devices. Cardiac perforation is a rare complication of pacemaker lead implantation with an incidence of less than 1%. Although it usually is asymptomatic, lead perforation can be potentially life-threatening, due to the risk of cardiac tamponade. Treatment of this complication can be quite complex and requires expertise and experience regarding transvenous lead extraction.

**Methods** We report the case of an 80-year-old patient presenting for syncopal episodes and exhaustion at moderate efforts. 24-hour ECG Holter monitoring revealed intermittent 1st degree and 2nd degree AV block. We decided on implanting a single chamber VVI pacemaker. After subclavian venous access, an active fixation lead was placed at the apex of the right ventricle, with adequate pacing parameters. The patient was discharged 2 days after the procedure.

**Results** 2 weeks after the procedure the patient presented for fatigue, dyspnea, fever and chills. ECG revealed pacemaker malfunction. Subsequent thoracic X-Rays and CT showed the perforation of the pacemaker lead into the costodiaphragmatic recess, together with severe bronchopneumonia. After antibiotic treatment, the patient refused lead repositioning. 1 year after implantation, the patient presented for repeated syncopes due to intermittent 2nd degree AV block. We performed a transvenous lead extraction followed by placement of a passive fixation lead into the right ventricle. There were no complications at subsequent follow-ups.

**Conclusion** Pacemaker lead perforation is an uncommon complication of pacemaker implantation, which can be asymptomatic or in extreme circumstances can cause cardiac tamponade. The lead perforation can be managed safely using transvenous lead extraction, with similar success to open surgery extraction.

# TECHNICAL CHALLENGES IN IMPLANTING A CARDIOVERTER-DEFIBRILLATOR IN A PATIENT WITH DEXTROCARDIA AND SITUS INVERSUS

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**Introduction** Dextrocardia is a rare congenital malformation, presenting in 0.83 out of 10000 pregnancies, in which the heart is situated at the level at the right hemithorax. Dextrocardia can be associated with other cardiac anomalies, such as septal defects, transposition of the great vessels, persistence of left superior vena cava or associated with genetic disorders especially primary ciliary dyskinesia. Due to the anatomical changes of dextrocardia, interventional procedures such as device implantation can become more difficult.

**Methods** We report the case of a 75-year-old patient, known with situs inversus and dextrocardia, which presented for the implantation of a cardioverter-defibrillator for secondary prevention of sudden cardiac death, after an episode of sustained ventricular tachycardia.

**Results** We decided on implanting the cardioverter-defibrillator on the right side of the patient in order to preserve the defibrillation shock electrical vector on the same side as the heart. Technical difficulties in placing the leads arose due to the modified anatomy, especially while placing the atrial lead. Sensing, threshold and impedance parameters were adequate after the procedure.

**Conclusion** Implanting a pacemaker or a cardioverter-defibrillator lead in patients with dextrocardia can be technically difficult, but the challenges can be overcome with good knowledge of radiological anatomy and careful pre- and intraprocedural planning.

# DILATED CARDIOMYOPATHY IN A YOUNG PATIENT WITH COVID 19 INFECTION– PREVENTION OF SUDDEN CARDIAC DEATH AND MANAGEMENT ISSUES

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**Introduction** The management of young patients with dilated cardiomyopathy is often difficult, due to their rare aetiology (the majority with idiopathic cardiomyopathy) and association of multiple comorbidities and complications.

**Materials and Methods** We are presenting the case of a 53-year-old patient, known with idiopathic dilated cardiomyopathy since the age of 48 with multiples comorbidities: hepatitis C virus infection since the age of 43 and recent COVID 19 pneumonia that needed hospitalisation in the Infectious Diseases department.

**Results** One week after discharge, patient was admitted in the cardiology department for heart failure decompensation symptoms (lower limb oedema, respiratory distress, low blood pressure). Initial workup revealed blood pressure values of 90/70mmHg, 02 saturation 92% in ambient air, the ECG showed Sinus rhythm, 90/minute, left bundle branch block, QRS axis -30, ORS interval 120 milliseconds, PR interval 210 milliseconds, ventricular extrasystoles. Laboratory exams revealed mild renal and hepatic disfunction, and high NT proBNP level. Transthoracic echocardiography revealed low ejection fraction (15%), dilated cardiac chambers, moderate mitral regurgitation, probable pulmonary hypertension. The 24-hour ECG Holter monitoring showed frequent ventricular extrasystoles, polymorphic (over 30 per hour), with bigeminy and trigeminy episodes, 1 episode of non-sustained ventricular tachycardia (4 complexes). The patient underwent ICD implantation, and had his heart failure medication schedule readjusted, with favourable evolution. After one month, the defibrillator interrogation revealed one episode of ventricular tachycardia with a ventricular rate of 280/min, with one internal electric shock administration and a return to normal sinus rhythm. We initiated antiarrhythmic treatment with amiodarone and dapagliflozin for heart failure symptoms. The evolution was favourable without reoccurrence of ventricular tachycardia or heart failure decompensation episodes.

**Conclusion** Young patients with dilated cardiomyopathy often need complex management with a multi-disciplinary team (cardiologist, electrophysiologist, infectious disease, gastroenterologist, psychologist, cardiac surgeon), prepared to deal with heart failure complications and other comorbidities.

## THYROTOXIC CRISIS AND ARRHYTHMIAS

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**Introduction:** Thyroid storm, also known as thyrotoxic crisis is at the forefront of severity from thyrotoxicosis, maintaining a high mortality rate of 8-25%, if not promptly considered – the diagnosis is clinical.

**Background**: A 35 year old man presents to the Emergency Department with a generalized rash, myalgia, fever, chills and low extremity oedema after consuming fast food 24-48 hours prior to presentation. Patient works as a truck driver, is a smoker, states high daily intake of energy drinks and denies use of recreational drugs.

**Methods:** On presentation GCS 15, BP 170/80 mmHg, HR 95/min – previously undiagnosed Atrial Fibrillation (AF), Temperature 38.9 °C. VBG showed: Ph 7.35, $HCO_3$ 24.5 mmol/L, BE 1.6 mmol/L, K 3.6 mEq/L. Patient received symptomatic treatment and a cardiology consult for the undiagnosed AF. Prior to leaving, he suddenly became anxious, stating loss of visual acuity, muscle weakness and loss of sensation in lower extremities. Shortly after muscle weakness evolved to upper extremities, he became agitated, followed by a syncopal episode with a HR 27bpm. ECG showed a third-degree heart block, followed by AF with bigeminal ventricular complexes and shortly after Pulseless Ventricular Tachycardia with Torsade des Points that responded to fast defibrillation with 200 J achieving ROSC. ABG shows Ph 7.43, Lactate 1.3 mmol/L, $HCO_3$ 22.9, BE 2.6 mmol/L, K = 1.2 mEq/L.

**Results:** Adequate post resuscitation care included intubation, central venous line, diagnosis and treatment of underlying causes. CT exam revealed a 51/30/65mm mass on the right lobe of the thyroid, which explains severe hypokalemia and, implicitly, rhythm disorders. Patient was safely discharged after two weeks of hospitalization.

**Conclusion:** Although not as common in modern times, thyrotoxic crisis still presents with high mortality. This case presentation highlights the importance of clinical diagnosis and acute management of patients with early recognition and treatment being

## IN EMERGENCY DEPARTMENT CARDIAC ARREST DURING COVID 19 PANDEMIA

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**Purpose of the study:** The study aims to analyze in hospital deaths during the pandemic compared to the same period of 2019.

**Materials and methods**: All patients with cardiac arrest registered in the ED of St. Spiridon Hospital Iasi, from the 1st of March till April the 30th 2019 (group 1) and 1st of March till April the 30th2020 (group 2) were statistically processed.

**Results:** A number of 78 cardiac arrest were documented in the study. The incidence of CA in pandemic period was 5% lower (40/38). ROSC in 2019 was achieved in 13 cases, 9 after Asystole and 4 after Pulseless Electrical Activity (PEA) where as 2020 showed 19 ROSC with 12 with an initial rhythm of Asystole, 3 PEA and 4 VF/VT - all of the previous patients being admitted to the Intensive Care Unit. In terms of age 2019 had 25 patients over the age of 65 whilst 2020 had only 16. Cardiac arrest etiology for the deaths pupils during the designated months of the years 2019/2020 were assigned to the following groups of diseases: cardiac 17/11 (42.4%/28.94%), malignancy 2/5 (5%/13,15%), traumatic 2/3 (5%/7.89%), pulmonary 7/9 (17.5%/23.68%), others 12/10 (30%/26.31%). The mortality associated with respiratory disease was 22.5% in group 1, (9 patients) whilst in group 2 we noticed a decrease - 15.8% patients (6 patients).

**Conclusions:** There was no significant change noted in the numbers of CA and mortality within this Emergency Department, more so a slight decrease of mortality rates due to respiratory causes comparing the same period has been observed – however we must take into account that pandemic protocols have assigned specific hospitals within our county with the triage and processing of patients with respiratory complaints. A significant jump in male mortality
rates was noted.

# OUT OF HOSPITAL CARDIAC ARREST DURING COVID PANDEMIA

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**Purpose of the study:** The aim of this study is to compare the incidence of cardiac arrest (CA) during the pandemic period with the same period last year.

**Materials and methods**: All cardiac arrests with CPR registered by the Iasi county medical crews, between the March 1st -April 30th, 2019 (group 1), and the March1st-April 30th, 2020 (group 2) were statistically processed.

**Results**: A total of 642 CA cases were included, 299 from group 2 and 343 from group 1. ROSC was recorded 62 in 2019 and 87 in 2020. The initial rhythms for the patients with ROSC 2019/2020 are: VF/TV 5/14, PEA 10/23 and Asystole 47/50. Causes that lead to cardio-pulmonary arrest 2019/2020 are: cardiac 223/218, pulmonary 30/29, trauma 14/4, malignancy 25/20 and other 51/28. If in 2019 a fairly equal number of deaths was registered in rural areas U/R 172/171, in 2020, the urban area increased to U/R 161/138. Gender distribution for 2019 was M/F 203/140 and for 2020, M/F 179/120.

**Conclusions**: The incidence of OHCA and mortality in the region was not affected by the pandemic period. In 2019 rural to urban mortality areas was evenly distributed, 2020 mortality rate in urban overcrowded areas increased, but we cannot clearly link it to SARS – COV-2. The ROSC rate for OHCA improved in 2020 compared to the same period 2019.

# TAHIARRHYTHMIAS IN COVID PREGNANT PATIENTS

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The new pandemic represents a real challenge for all, patients, doctors and entire medical system. It became common knowledge that during SARS 2 COV infection, ones might experience cardiac arrhythmias and especially tahiarrhythmias. For pregnant patients this period of time was very difficult to cope with. Inpregnant women with Covid we diagnose more often atrial fibrillation, supraventricular arrhythmias and ventricular arrhythmias without myocardial involvement. The suspected patients with symptoms or contact with confirmed patient according to the definition of disease were admitted, isolated and tested for COVID 19 with RT-PCR test. In every patient we performed clinical exam, standard ECG evaluation, morphologic and functional ECHO evaluation and laboratory tests. 18 with mild symptoms were admitted. Others 4 were evaluated and send home. 16 out of 18 patients with moderate symptoms were admitted. Pregnant women with COVID describe more often cardiac complaints such as palpitations without objective signs, more conected with anxiety. None of the patients were previously hypertensive or diabetic. High blood pressure, heart rate and arrhythmias - Holter documented were found more frequently in patients with moderate symptoms including high fever for more than 3 days, cough, severe headache. We encountered pericardial effusion in 5 cases, mild alterations in left ventricular kinetics in 11, and more important in 2 patients and tricuspid regurgitation with mild to moderate pulmonary hypertension in 22. All needed careful surveillance for both mother and fetus and all were send to the gynecology clinic for evaluation and future assistance. Anticoagulant therapy according to the protocol, corticoids and blood pressure control together with rhythm control when necessary allow a normal and health development of the pregnancy.

# GHOSTLY UNUSUAL CARDIOVASCULAR MANIFESTATIONS DURING COVID-19

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Covid-19 has rapidly evolved as a worldwide healthcare emergency exerting tremendous pressure on the healthcare systems throughout all countries. Although pre-existing conditions such as arterial hypertension, diabetes mellitus type II or neoplasia are known predisposing factors to infection, severe disease and poor prognostic, we found several unusual clinical manifestations unrelated to Covid-19 treatment. We present a series of cases with acute lower limbs ischemia (without prior condition) and Takotsubo syndrome in patients without cardiovascular comorbidities and acute onset of thoracic pain and STEMI aspect on EKG but with "clean" coronarography.