Wearable Technology and Artificial Intelligence: Revolutionizing Cardiovascular Disease Monitoring

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ABSTRACT
The convergence of wearable technology and artificial intelligence (AI) has brought about a revolutionary phase in the field of healthcare, especially in the monitoring of cardiovascular diseases. This paper delves into the transformative influence of integrating wearable devices and AI techniques within the context of cardiovascular disease monitoring. Traditional methods of tracking cardiovascular health have often been inconvenient and infrequent, potentially leading to delays in identifying crucial changes in patients' conditions. However, the synergy between wearable technology and AI has enabled continuous, real-time monitoring of vital cardiovascular parameters. Wearable devices equipped with biosensors can amass a wealth of physiological data, including heart rate, blood pressure, ECG patterns, and levels of physical activity. AI algorithms can then analyze this data, providing accurate insights into patients' cardiovascular health status and early detection of anomalies. This paper examines various facets of this revolution, encompassing technical advancements in wearable sensor technologies, the role of AI in processing and interpreting data, and the clinical implications of timely intervention prompted by early warning systems. Furthermore, challenges related to data security, algorithm dependability, and user acceptance are also addressed. Ultimately, the fusion of wearable tech and AI holds the potential to revolutionize cardiovascular disease monitoring by enhancing preventive strategies, minimizing hospitalizations, and ameliorating overall patient outcomes.

Keywords: wearable technology-artificial intelligence-cardiovascular disease monitoring-biosensors-real-time monitoring-early detection-health data analysis.

Evaluation and Management of Bradyarrhythmias: What Do the Guideline Say?

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ABSTRACT
The primary physiological consequence of bradyarrhythmias is a reduction in cardiac output. Bradyarrhythmia patients may not have any symptoms if changes in stroke volume offset the heart rate decline. Syncope, weariness, decreased exercise tolerance, dizziness, and dyspnea are among of the more general symptoms of bradyarrhythmias. Subtle signs include impatience, lassitude, a difficulty to focus, and amnesia. Assessing the structural etiology requires a preliminary evaluation that includes a history-taking, physical examination, and electrocardiography (ECG). The underlying cause of the conduction tissue problem will have the biggest impact on the clinical symptoms of conduction tissue illness. To overcome the intermittent nature of the majority of symptomatic bradycardia caused by conduction system illness, ambulatory ECG monitoring was necessary.

The prevalence of pacemakers is continuously increasing due to an aging population and rising life expectancy. The goal of the guideline is to give clinicians advice on how to treat patients who have bradycardia, symptoms that are suspected to be related to bradycardia, or problems with the cardiac conduction system. Patients with severe atrioventricular block (AVB) with symptomatic sinus node dysfunction (SND), often known as sick sinus syndrome, should consider pacemaker implantation. In contrast to pacing for AVB, it has never been demonstrated that patients with asymptomatic SND have a worse prognosis after pacemaker implantation. As a result, determining a link between symptoms and bradyarrhythmia is an essential stage in making decisions in SND. There is no proof that pacemaker therapy leads to a better prognosis for SND, which has an erratic course. Quality of life is a crucial metric for assessing a patient's clinical condition and outcome since it gives a comprehensive picture of how well clinical treatment is working rather than simply lengthening life expectancy. Pacing is recommended in patients with sinus rhythm or atrial arrhythmia who have high-degree AVB or permanent or paroxysmal third- or second-degree type 2 infranodal 2:1, regardless of symptoms, as opposed to SND. When compared to individuals receiving conservative treatment, pacemaker-treated patients with severe AVB have a higher rate of survival.

KEYWORDS: cardiac pacing-sinus node dysfunction-atrioventricular block

Unravel Multimodal Tools For Diagnosing Pulmonary Hypertension

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ABSTRACT
Making a diagnosis of pulmonary hypertension as early as possible will affect the patient's outcome. Definitive diagnosis of pulmonary hypertension is right heart catheterization, but this examination is invasive and limited. The use of non-invasive diagnostic tools such as echocardiography, computed tomography, ventilation perfusion scans, and cardiac magnetic resonance imaging can be the next choice in diagnosing pulmonary hypertension. The selection of diagnostic tools will be influenced by institutional expertise, patient safety and convenience, and repeatability

KEYWORDS: diagnosis-pulmonary hypertension-multimodal

Tackling Emergency State in Pulmonary Hypertension

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ABSTRACT
Common emergency manifestations in Pulmonary Hypertension (PH) patients include cardiac arrest/sudden death, right ventricular failure, syncope, hypoxic respiratory failure, arrhythmia, hemoptysis, pulmonary embolism, chest pain/compression syndrome left brain stem and infection.

Understanding the limited cardiac reserve of PAH patients, emergency service providers must quickly recognize the signs and symptoms of right heart failure (RHF), identify the cause of the clinical deterioration, and provide early interventions to improve RV function, and assess for end organ involvement (renal dysfunction, liver dysfunction).

The patient should be transferred to the intensive care setting. Appropriate investigations and surveillance are aimed at identifying and reversing the triggers, especially those associated with high mortality characteristics. It is important to ensure that patients are compliant with current medications and to address specific management considerations.

Keywords: Emergency-Pulmonary Hypertension (PH)-Right Ventricular Failure

Connective Tissue Disease Assosiated With Pulmonary Arterial Hypertension

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ABSTRACT
Pulmonary Arterial Hypertension (PAH) is one of the complications of Connective Tissue Disease (CTD) and have a worse clinical outcome and survival. The most common of CTD were Systemic Sclerosis, Systemic Lupus Erithematosus and Mixed Connective Tissue Disease. The pathophysiology mechanism leading to PAH is still unknown. The signs and symptoms are similar to Idiopathic Pulmonary Arterial Hypertension (IPAH) but the mortality is higher. Echocardiography is the first screening to investigate CTD-PAH but must be confirmed with Right Heart Catheterization (RHC). In PAH associated CTD treatment of the underlying condition is recommended. For PAH itself, Endothelin Receptor Antagonist and PDE 5 Inhibitor such as Sildenafil have shown favorable results

KEYWORDS: pulmonary arterial hypertension-connective tissue disease-pathophysiology and treatment

A New Horizon of Ventricular Arrhythmia & Sudden Cardiac Death: Etiology and Risk Stratification

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ABSTRACT
Ventricular arrhythmias (VA) and sudden cardiac death (SCD) are two of the most devastating incidents that affect people with cardiovascular disease, their families, and even people in general. Its etiology and risk stratification are important topics in this field. SCD is a particularly concerning issue for most physicians, as it involves the stratification of patients in a field that is full of uncertainty, yet with potentially serious implications in terms of treatment and clinical results.

Risks of VA and SCD vary across populations with diverse underlying cardiac conditions, family history, and genetic variants. The clinical presentation of VA can range from completely symptom-free to cardiac arrest. The age distribution of SCD-related cardiac diseases varies. In the young, there is a high prevalence of primary electric diseases, cardiomyopathy, myocarditis and coronary anomalies. Half of SCD cases in the fourth decade are associated with coronary artery disease (CAD). In the older population, CAD (either through acute coronary events (ACS), chronic coronary stenosis (CCS), valvular heart disease (VHD) and heart failure) predominate. Possible inherited electrical diseases or structural non-ischemic diseases may cause over 50% of SCDs in individuals under 50 years of age. Figure 1 shows the age distribution at presentation of VA and SCD, dominant VA subtype, triggers, genetics, and gender, all of which are associated with an increased risk for VA.

In recent years, there has been a significant development in prediction modelling in the field of SCD, which has led to the development, validation, and reporting of risk calculators. These risk calculators are designed to discriminate between patients with higher risks and those with lower risks, as well as to provide a more accurate quantification of the individual risk. A variety of risk calculators have been proposed for use in adults and paediatric populations, each with its own cut-off value based on the competing risk, outcome measured, and robustness of each risk calculator.

A large number of studies have been conducted to evaluate the efficacy of various risk parameters derived from ECGs in both general population and patients with various cardiac disorders. However, their clinical relevance is sometimes unclear due to a limited sample size or duration of follow-up, and studies to determine which parameter combinations offer robust risk predictors have not been conducted. Establishing the most appropriate ECG risk marker combination remains a challenge due to the fact that some ECG risk indicators provide information on an arrhythmias substrate, while others may provide information on arrhythmic triggers, neural pathways, and genetic predisposition.

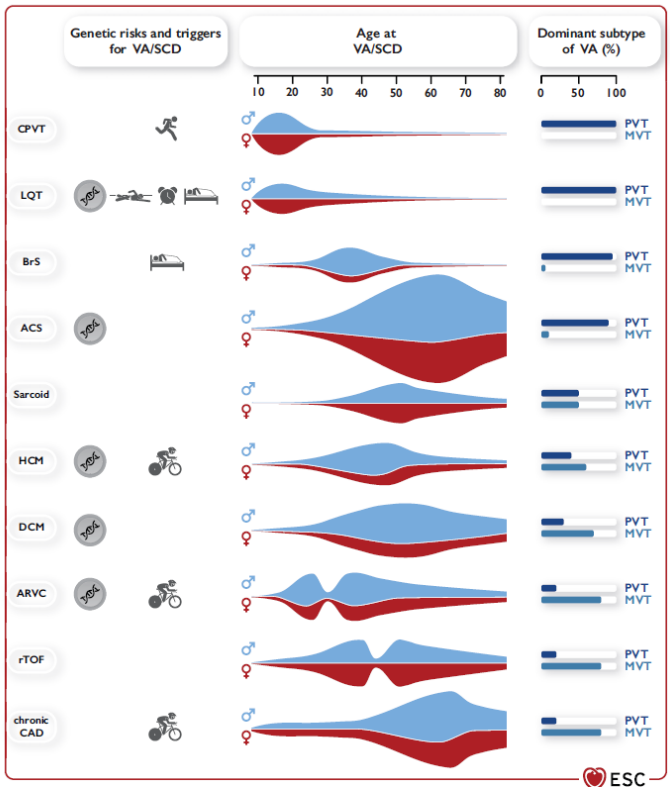

Figure 1. An overview of the genetic risk factors associated with the development of VA/SCD, the typical triggers associated with these conditions, the age at presentation of the disease, the gender makeup of the population, and the typical manifestations of VA/SCD in various diseases.

ACS, acute coronary syndrome; ARVC, arrhythmogenic right ventricular cardiomyopathy; BrS, Brugada syndrome; CAD, coronary artery disease; CPVT, catecholaminergic polymorphic ventricular tachycardia; DCM, dilated cardiomyopathy; HCM, hypertrophic cardiomyopathy; LQT, long QT syndrome; MVT, monomorphic ventricular tachycardia; PVT, polymorphic ventricular tachycardia; rTOF, repaired tetralogy of Fallot; SCD, sudden cardiac death; VA, ventricular arrhythmia; VF, ventricular fibrillation.

The relationship between autonomic nervus system (ANS) abnormalities, poor outcome and cause-specific mortalities, particularly SCD, in cardiac patients is likely to be dependent on the underlying cardiac disease and the occurrence of diabetes or renal impairment. Although genetic predisposition is of paramount importance, the exact mechanism of ANS abnormalities is yet to be elucidated. Specifically, sympathetic dominance in combination with other pro-arrhythmic processes, including myocardial ischemia, increases the likelihood of VF and thus the risk of SCD.

KEYWORDS: arrhythmia-sudden cardiac death

An Updated Strategy for The Management of Ventricular Arrhythmias: From Guideline to Clinical Practice

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ABSTRACT
The term "sudden cardiac death" (SCD) refers to sudden, nontraumatic deaths that happen within an hour of the development of new or worsening symptoms (witnessed arrest) or, in the case of an unwitnessed death, within 24 hours of the last time the person was seen alive. Successful prevention-focused developments in some Western societies may be offset when heart disease prevalence rises elsewhere in the world. The cornerstone of SCD preventive therapy continues to be initiatives aimed at coronary artery disease and congestive heart failure prevention, diagnosis, and treatment. The majority of doctors who deal with risk stratification of patients are concerned about SCD since it has very serious implications for the course of action to be taken and the clinical results. The European Society of Cardiology (ESC) updated its 2015 recommendation with a new guideline in 2022 for the care of patients with ventricular arrhythmias and the avoidance of sudden cardiac death. This guideline addresses risk classification, SCD prevention, VA therapy, and family member management in a methodical manner. To make it easier for clinicians to use the guidelines in routine clinical decision-making, the diagnostic and management sections have been modified. The current guidelines offer fresh suggestions for risk classification and therapy, despite the fact that there are still large gaps in the available evidence. Cardiac magnetic resonance imaging and genetic testing have been greatly improved in the diagnostic assessment and risk stratification of sudden cardiac death. The best care of the underlying condition is crucial for long-term management, and recommendations for heart failure therapy are adjusted to meet current international standards. The management of symptomatic idiopathic ventricular arrhythmias as well as patients with ischemic cardiomyopathy and recurrent ventricular tachycardia are improved by catheter ablation. Criteria for the use of primary prophylactic defibrillators are still up for debate. Imaging, genetic testing, and clinical considerations are given additional weight in the setting of dilated cardiomyopathy in addition to left ventricular function. Furthermore, updated diagnostic standards are offered for a wide range of main electrical illnesses. There have been a number of improvements, particularly in hereditary, inflammatory, and infiltrative illnesses. However, for more conventional clinical circumstances, new and encouraging solutions are offered, which ought to lead to improved patient care.

KEYWORDS: sudden cardiac death-ventricular arrhythmias

3D Catheter Ablation of Ventricular Arrhythmia: Where Are We Now?

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ABSTRACT
Three Dimensional (3D) high density mapping of ventricular arrhythmias has revolutionised the mapping workflow of ventricular arrhythmias. The historical way of point-by-point mapping used a lot of time and energy to construct a map. High density mapping in 3D shortens time needed to construct a map and consistently produced a more detailed and accurate maps in shorter time. Specialised high density mapping catheter such as the Grid mapping catheter, when used together with the Ensite mapping system, produced reproducible and dependable maps in 3D, and smoothens the workflow for the electrophysiologist. Nevertheless, high density mapping in 3D has all shortcomings as well. Some are the issues includes far field signal pickups in unipolar mapping as well as directionality dependence in bipolar mapping, also known as bipolar blindness. The Ensite Precision system attempted to overcome the bipolar mapping issue by way of orthogonal bipolar mapping, where 2 simultaneous bipoles are used to interrogate an electrogram and demonstrate the best electrogram voltage to the operator. Other methods where bipolar blindness may be overcome is by changing the activating wavefronts or by extra stimulus mapping. The advent of Omnipolar signals, where virtual bipolars are constructed from the electric field (E-field) of a passing electrogram through a 3 set unipolar electrodes called a clique, overcome bipolar blindness issues and produced consistently larger electrogram voltages independent of wavefront or electrode orientation.

KEYWORDS: Three Dimensional-3D Catheter- ventricular arrhythmia

A Review Concepts and Mechanism of Antiplatelet Resistance in CVD

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ABSTRACT
Antiplatelet drug therapy has become one of the cornerstones of treatment for patients with cardiovascular disease. Large clinical trials have shown that antiplatelet medications have important clinical benefits and prevent adverse outcomes in patients with coronary artery disease. Recurrent adverse cardiovascular events still occur in a substantial proportion of patients on standard dual antiplatelet therapy, however, which has been attributed to nonresponsiveness to this treatment. Both pharmacological and pharmacokinetic mechanisms are involved in variability in responsiveness to antiplatelet agents, and include drug bioavailability, medication noncompliance, drug–drug interactions, cytochrome P450 activity, and genetic polymorphisms.

Evidence has emerged that patients with intact platelet responsiveness while on antiplatelet therapy are at risk for future cardiovascular events. A challenge for the future will be the prompt identification of patients with reduced platelet responsiveness, so that therapy can be initiated to overcome this effect and improve clinical outcomes.

KEYWORDS: antiplatelet-resistance-CVD

Antiplatelet Resistance: Suspicion and Measurement

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ABSTRACT
Antiplatelet resistance is still a controversial issue because of its multifactorial entity. Mechanisms underlying antiplatelet resistance such as reduced bioavailability, genetic variation, enhanced platelet turnover, alternate pathways of platelet activation, and individual variation. Either inborn or acquired, and multifactor cause, antiplatelet resistance led to recurrent thrombotic and ischemic events must be considered as targets for optimizing patient management.

Platelet aggregometry as a measurement for antiplatelet resistance has been considered as the gold standard but it is very operator dependent, time consuming, and has shown little correlation with other available tests of antiplatelet resistance. There are another available tests of platelet function, with limitations and evidence for their use, including simple, rapid, near-patient test, which is affordable and useful in the clinical setting, could allow risk stratification of patients and individualization of antiplatelet medication to improve outcome, although routine antiplatelet resistance laboratory measurement still not recommended because of lack evidence in benefit of adjusting antiplatelet therapy based on antiplatelet function test during clopidogrel therapy.

Some indication and clinical setting for suspicion of antiplatelet resistance must be recognized, measurement and management for antiplatelet resistance from studies are available for improve the responsiveness to antiplatelet therapy and later benefit in improving patient outcome.

KEYWORDS: aspirin-clopidogrel-antiplatelet-resistance-thrombosis

Tailoring Antiplatelet Therapy for Patient With Antiplatelet Resistance

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ABSTRACT
Antiplatelet resistance, a noteworthy concern affecting agents like clopidogrel, has prompted the adoption of personalized antiplatelet therapy to optimize therapeutic efficacy and patient safety. The TRITON-TIMI 38 study established prasugrel as a superior alternative due to its potent antiplatelet effects, exhibiting enhanced efficacy and a lower incidence of Major Adverse Cardiovascular Events (MACE). Another common antiplatelet agent, clopidogrel, also plays a pivotal role in treatment. Personalized therapy involves the strategic "Escalation-De-escalation" approach, initially employing potent agents like prasugrel or clopidogrel based on patient responses. This tailored approach aims to fine-tune antiplatelet therapy and enhance clinical outcomes. The PRASFIT-ACS study further underscores prasugrel's efficacy in Acute Coronary Syndrome (ACS) cases. This paper delves into the combined insights from TRITON-TIMI 38 and PRASFIT-ACS studies to shed light on the merits of personalized antiplatelet therapy. The discussion encompasses rationale, benefits, and potential challenges, highlighting the strategy's potential to revolutionize cardiovascular care by optimizing therapeutic choices based on individual profiles.

KEYWORDS: Antiplatelet Resistance, Personalized Antiplatelet Therapy, Prasugrel, Clopidogrel, TRITON-TIMI 38 Study, PRASFIT-ACS Study, Major Adverse Cardiovascular Events (MACE), Escalation-De-escalation Strategy, Cardiovascular Outcomes, Treatment Tailoring, Risk Profiling, Acute Coronary Syndrome.

Cardiac Channelopathies Disease: Uncovered the Iceberg Phenomenon

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ABSTRACT

Cardiac channelopathies are a class of genetic disorders that are associated with the development of fatal cardiac arrhythmias. These diseases are distinguished by malignant arrhythmias in a structurally normal heart that are brought on by genetic changes in ion channels or related proteins. Due to the lack of gross structural alterations in the heart, cardiac channelopathies are often classified as causes of death in forensic autopsies that are otherwise unexplained.

It is estimated that sudden arrhythmic death due to channelopathies is responsible for 10-15% of sudden cardiac death (SCD) in individuals who do not have structural heart disease at the time of death. Sudden cardiac arrest (SCA) and its most prevalent consequence, SCD, are major public health concerns. SCD accounts for over half of all cardiovascular deaths, with at least 25% of them being first-time cardiac events. Unfortunately, there fails to be an abundance of data on which people die from SCD, partially because various epidemiologists calculate the risk in different ways.

Sudden cardiac death (SCD) in the young is common among individuals who seem to be in good health, may occur with or without warning signs, and may be a marker of the early onset of a genetic heart disease. Estimates of the number of young people who die from SCD vary, but it's estimated to be between 5% and 20%. Unfortunately, there is not much information on SCD around the world based on ethnicity, and the cause of death changes with age (see Figure 2).

Sudden cardiac death episodes may be preceded by warning symptoms, the most common of which is syncope. A rapid self-terminating polymorphic ventricular tachycardia (PVT) that is a result of cardiogenic syncope is commonly accompanied by epileptiform activity (myoclonic seizures). These episodes are common and are sometimes misdiagnosed as seizure disorders, resulting in a 20% chance of misdiagnosis as an epileptic illness. As a result, patients at risk for SCD receive a delayed diagnosis and are frequently subjected to anti-epileptic drugs with possibly pro-arrhythmogenic effects.

The most common types of channelopathies are long QT syndrome (LQTS), Brugada syndrome (BrS), catecholaminergic polymorphic ventricular tachycardia (CPVT), short QT syndrome (SQTS), and early repolarization syndrome (ERS). These conditions are typically identified by ECG abnormalities at baseline or in specific circumstances such as during exercise, fever, or pharmacological challenge.

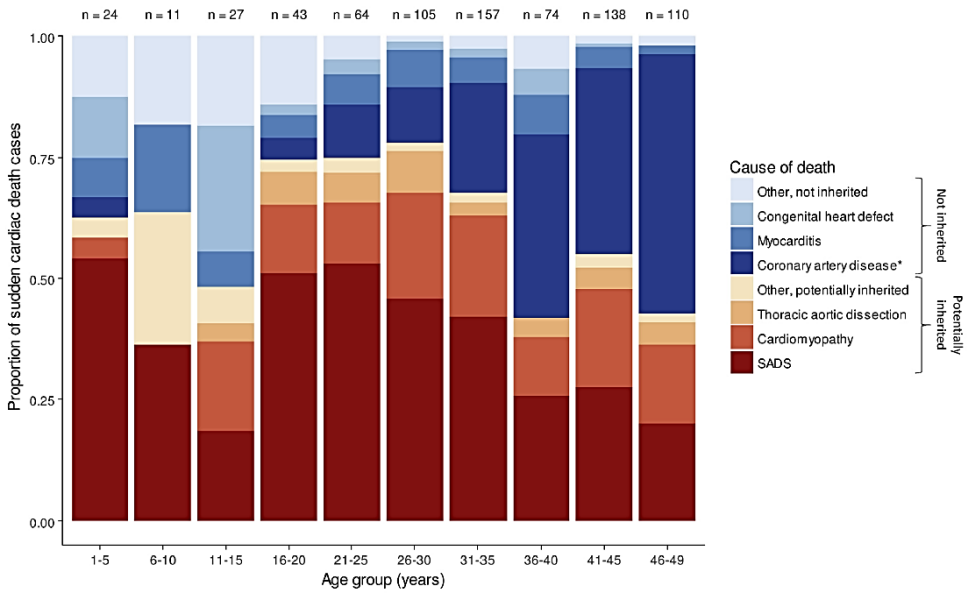

Figure 2. Causes of death in autopsied cases of sudden cardiac death in people aged 1-49 years in Denmark, according to age. SADS: sudden arrhythmic death syndrome. *Coronary artery disease, particularly in young people, may be caused by an inherited condition (for example, familial hypercholesterolemia).

Meanwhile, Brugada syndrome has an estimated global frequency of 5 to 20 per 10,000 people. The gender disparity is 3 to 1 (male to female), which is likely due to hormone problems. However, due to concealed forms of the disease, as well as ethnic and geographical variances, this percentage may be understated. Exertion-related polymorphic or bidirectional ventricular tachycardia that is linked to syncope and abrupt cardiac arrest is what CPVT is known for. Between 3% and 13% of patients have experienced a SCA. One in 10.000 people are considered to be affected by the disease.

The incidence of SQTS is estimated to be less than 1 per 10.000 years. At present, the occurrence of SQTS has only been reported in a few families around the world, and all patients with SQTS demonstrate QTc less than 320 ms without evidence of structural heart disease. The prevalence of short QTc ≤340 ms is estimated to be 5 in 10.000 in persons <21 years of age and is more common in males. An incidental finding of a short QTc ≤320 ms in an asymptomatic patient warrant monitoring and follow-up without prophylactic medication treatment.
When a patient is resuscitated from PVT or ventricular fibrillation (VF) without having any structural heart diseases, ERS is identified by the early repolarization pattern (ERP), which is J-point elevation of 1 mm or more in 2 contiguous inferior and/or lateral ECG leads. Its prevalence in adults has been found to be 5.8% and it is more prevalent in young males and athletes. However, relatives of cardiac arrest survivors and SADS cases are more common in those with ERP.

The main obstacles to SCD prevention are early identification of those susceptible and clinical measures in asymptomatic individuals carrying a mutation, because the initial sign

of the disease can be SCD itself. Comprehensive genotype-phenotype investigations in large cohorts of families should be done in the future to clarify the genetic basis of SCD-related disorders, as well as the adoption of individualized preventive medicines for the prevention of SCD.

KEYWORDS: arrhythmia-channelopathy-sudden cardiac death

When To Put Implantable Cardioverter Defibrillator in Channelopathy and Infiltrative Cardiomyopathy

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ABSTRACT
It is known that many previously unexplained sudden cardiac deaths (SCDs) and life-threatening ventricular arrhythmias in young people are genetic in origin and are linked to an increasing number of unique inherited arrhythmogenic diseases. Most genetic arrhythmias are associated with either infiltrative cardiomyopathy or cardiac ion channel diseases, also known as channelopathies. The best treatment for preventing SCD is an implantable cardioverter defibrillator (ICD). The indications for ICD in channelopathies are patients who experience arrhythmogenic syncope (particularly in patients on highest tolerated therapeutic medications dose), have documented spontaneous sustained ventricular tachycardia (VT), or are survivors of an aborted cardiac arrest. To prevent SCD in infiltrative disease, ICD is indicated mainly in patients with hemodynamically intolerable VT or aborted cardiac arrest. It is crucial to implant ICD in these patients to prevent arrhythmic death.

KEYWORDS: arrhythmia-sudden cardiac death-implantable cardioverter defibrillator

SGLT-2 Inhibitor Era in HFrEF: From Context to Clinical Pearls

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ABSTRACT
Canagliflozin, dapagliflozin, empagliflozin, and ertugliflozin are FDA-approved for managing adult patients with type 2 diabetes mellitus (DM) to improve blood sugar control adjunct to diet and exercise. All four agents are sodium-glucose transport protein 2 (SGLT2) inhibitors acting on the SGLT-2 proteins expressed in the renal proximal convoluted tubules to reduce the reabsorption of filtered glucose, decrease the renal threshold for glucose (RTG), and promote urinary glucose excretion.

Sodium-glucose co-transporter-2 (SGLT-2) inhibitors are antihyperglycemic agents acting on the SGLT-2 proteins expressed in the proximal convoluted tubules. These drugs exert their effect by preventing the reabsorption of filtered glucose from the tubular lumen. To date, the indications of SGLT-2 Inhibitor are not only for Type 2 DM but also for cardiovascular disease. Other indications: Reduction of major adverse cardiovascular events (nonfatal myocardial infarction and nonfatal stroke, cardiovascular death) in patients with type 2 DM and established cardiovascular disease. To decrease the risk of cardiovascular hospitalization and death for heart failure in patients with HFrEF (heart failure with reduced ejection fraction-NYHA class II-IV). Improvement of cardiovascular outcomes in patients with HFpEF (Heart failure with preserved ejection fraction). Dapagliflozin is now FDA-approved for the treatment of heart failure across the full spectrum of left-ventricular ejection fraction (LVEF), including HFrEF, HFpEF, and HFmrEF (Heart failure with mildly reduced ejection fraction- LVEF of 40–49%).

KEYWORDS: SGLT-2 Inhibitor-HFrEF-Heart Failure

The Use of Rosuvastatin in CVD Patients: Beyond Its Cholesteriol-Lowering Impact

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ABSTRACT
Cardiovascular diseases (CVDs) are still the number one killer globally, taking an estimated 17.9 million lives each year. Meanwhile, high-intensity statins are pivotal in primary and secondary prevention for cardiovascular disease patients. There are only 2 statins included in high-intensity statin, namely rosuvastatin and atorvastatin. They are essential for reducing cholesterol level and their pleiotropic effects. Enhanced endothelial function, notable reduction in oxidative stress, stabilization and regression of atherosclerotic plaques, immunomodulation, inhibition of vascular smooth muscle proliferation, anti-inflammatory actions, antithrombotic properties, and diminished susceptibility to dementia constitute some of these diverse pleiotropic impacts. The selection between rosuvastatin and atorvastatin, the two mainstays of high-intensity therapy, hinges on patient-specific characteristics.

Keywords: CVD-rosuvastatin-pleiotropic effects-high-intensity statins

The Role of Angiotensin Receptor-Neprilysin Inhibitor (ARNI) in The Treatment of Heart Failure

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ABSTRACT

Heart failure has become a major health problem due to the high rate of adult patients experience recurrent hospitalization, decreased survival and weakened quality of life. Among many biosystems, renin angiotensin aldosterone system is activated early in the course of heart failure due to adaptation to myocardial injury or increased cardiac load. This activation amplifies with the progression of heart failure. Increased level of vasodilatation-induced peptides also occurring during the heart failure initiation and progression, which deems protective and beneficial for patients with heart failure. To maintain the level of these peptides, the activity of a neutral endopeptidase such as neprilysin must be inhibited. Angiotensin receptor-neprilysin inhibitor (ARNI) is drug that combine a neprilysin inhibitor with an angiotensin receptor blocker, to augment levels of vasodilatation-induced peptides while blocking the effects of angiotensin II. The result of pivotal clinical trials of ARNI in heart failure patients, namely PARADIGM-HF and PIONEER-HF showed significant beneficial impacts on morbidity and mortality in patients with heart failure. Currently, ARNI has become the first line pillar therapy for heart failure patients, especially those with reduced ejection fraction.

KEYWORDS: heart failure-arni-parafigm-pioneer

Device option for treating HF
What to know and when to refer

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ABSTRACT

Although, pharmacotherapy for heart failure (HF) was going rapidly and reduced mortality in heart failure, but in the last 2 decades, there was plateau progression except angiotensin receptor/neprilysin (ARNI). The mortality of patients with HF with reduced ejection fraction (EF) was still high ie. 20-30% per year. Half of mortality due to sudden cardiac death (SCD)

In the last decades, there are significant progression of cardiovascular implantable electronic device (CIEDs) for management of patients with brady- and tachycardia or heart failure with reduced EF beside concomitant pharmacotherapy. This is associated with emergence of complex stimulation system {pacemaker, implantable cardioverter-defibrillators (ICDs), cardiac resynchronization therapy (CRT)} and the growing number of patients with different indication treated with CIEDs. Indeed, rhythm management device may improve the life expectancy and quality of life of these patients. For prevention SCD, either for primary or secondary prevention, ICD will reduce mortality 30 to 50% especially for ischemic cardiomyopathy. The more important thing for ICD implantation is detecting fatal arrhythmia and delivering appropriate shock without need cardiac pacing. Subcutaneous ICD, now available in the market.

Fifteen to 30% of HF patients with reduce EF, have dyssinchrony and they will get a benefit from CRT. Patients with left bundle branch block and wide QRS complex will improve either physiologic cardiac function and improve quality of live or survival of the patients from CRT implantation. Basically, there are 3 leads implanted in cardiac chamber. One

lead for RV pacing, 1 lead for LV pacing (biventricular pacing) and 1 lead for right atrial pacing. The drawback of CRT is few area of LV lead pacing site, phrenic nerve stimulation and sometimes high threshold. Moreover, 20% of CRT patients are non-responder.

His bundle pacing (HBP), left bundle pacing (LBP) ware also considered for correcting dyssinchrony in HF patients and reduced EF. But, more data was needed. LBP may have some advantages compare with HBP, i.e., lower threshold and longer battery longevity, larger area for pacing site, higher R wave sensitivity and no atrial far-field sensing.

Although CRT, HBP and LBP have advantage in selected HF patients, but some HF patients without any evidence with dyssynchrony such as having narrow QRS complex and unresponsive to optimal medical therapy need something new in modality CIED. Leadless CRT may be such alternative consideration. Cardiac contractility modulation (CCM) device however, may play a role in this subset of patient. CCM enhances ventricular contractile strength of the failing myocardium, with delivering a high voltage non-excitatory electrical impulse during absolute refractory period state of cardiac muscle cells independently of synchrony of myocardial contraction. These signals do not initiate a new contraction of affect

activation sequence. The CCM signals are relatively high-voltage electrical impulse delivered to the myocardium 30-40 ms after detection of local myocardial activation during the absolute refractory period. A more data is needed.

CIED is now fast growing in cardiovascular technology. Most of CIED implantation in HF patients with low EF is for reduce SCD or improving cardiac function and quality of live and finally to prolong survival.

KEYWORDS: heart failure-cardiovascular-implantable-electronic-device

AKI In ICCU: Pathomechanism and Consequences for Critically Ill Patient

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ABSTRACT
Acute kidney injury (AKI) is characterized by a rapid loss of kidney function, leading to a number of complications including fluid imbalance, metabolic acidosis and uremia. The prevalence of AKI in the ICCU is 15% and can increase very closely related to the underlying disease or invasive procedures performed in the ICCU. The causes of AKI occur along with the hemodynamic changes that occur in cardiovascular disease. Cardiorenal syndrome (CRS) is a condition characterized by kidney failure and heart failure, originating from the inability of the heart to generate an adequate flow, resulting in prerenal hypoperfusion. Insufficient renal afferent flow activates the RAAS axis, sympathetic nervous system, and arginine vasopressin secretion, causing fluid retention, increased preload, and this exacerbated his heart failure. Several non-hemodynamic pathways that play a role in CRS and exacerbate cardiac or renal injury, are activation of the sympathetic nervous system, chronic inflammation, activation of the RAAS, including the effects of nephrotoxic contrast media. The incidence of acute kidney injury (AKI) after heart surgery (CABG) is from 1% - 30% and increases the risk of short and long term morbidity and mortality.

KEYWORDS: acute kidney injury-ICCU-critically ill patient

Renal Support In ICCU: Focusing on Continuous Renal Replacement Therapy Management

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ABSTRACT
Acute kidney injury (AKI) are common in the Intensive Cardiovascular Care Unit (ICCU). AKI may be accompanied by metabolic, acid-base, electrolyte disturbances and fluid overload. AKI may affect other organ systems and may require immediate treatment. Management of AKI plays an important role in morbidity & mortality. Renal support is important in management patient with cardiac problems. One of the treatment options for AKI is using Renal Replacement Therapy (RRT). There are intermittent and continuous RRT (CRRT).

CRRT provides slow, continuous and gentle replacement of renal function. CRRT closely mimics the native kidney in treating AKI and fluid overload. Its removes large amounts of fluid and waste products (urea, creatinine) over time, re-establishes electrolyte and pH balance and tolerated well by hemodynamically unstable patients. Systemic Inflammatory Response Syndrome (SIRS) often occurs in patients with cardiogenic shock. CRRT has the advantage of overcoming SIRS conditions. There are several modes of CRRT therapy, i.e., SCUF (Slow Continuous Ultrafiltration), CVVH (Continuous Veno-Venous Hemofiltration), CVVHD (Continuous Veno-Venous HemoDialysis) and CVVHDF (Continuous Veno-Venous HemoDiaFiltration). Each of these modes can be used according to the needs and clinical conditions of the patient.

KEYWORDS: acute kidney injury-continuous renal replacement therapy-systemic inflammatory response syndrome

Overview of New Cellular and Structural Alteration in Pathophysiology of Hypertension Mediated Organ Damage

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ABSTRACT
Hypertension is a global health problem that contributes to organ damage, such as damage to the heart, kidneys, brain, and blood vessels. The mechanism that underlies hypertension-mediated organ damage is still elusive today. We hope our overview can increase understanding of the cellular and structural changes caused by hypertension.

Studies have shown the importance of vascular remodeling in complications caused by hypertension. Endothelial dysfunction could cause impairment of nitric oxide, increase oxidative stress, and cause vascular inflammation. This will further cause stiffening of the arteries, remodeling, and atherosclerosis. In hypertensive heart disease, the remodeling is caused by cellular hypertrophy, fibrosis, and inflammation. This is caused by the interaction of myocytes, fibroblasts, and immune cells, which also involve TGF-β and aldosterone in cardiac remodeling.

Meanwhile, in the kidney, the alteration of the glomerulus and tubulointerstitial would contribute to glomerular damage. Furthermore, the damage to proximal tubular cells impacts sodium handling and worsens renal injury. Neurological complications include small vessel disease, a decline in cognitive ability, disruption in the blood-brain barrier, white matter lesions, and neuronal dysfunction. In conclusion, our increased understanding of cellular and structural changes caused by hypertension and the occurrence of organ damage will advance the process of developing novel therapeutic strategies. It is very important to target endothelial dysfunction, inflammation, neurohormonal, and fibrotic signaling pathways.

KEYWORDS: hypertension-pathophysiology-cellular alteration

Current Challenge in Management of Hypertension

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ABSTRACT
Hypertension is the most prevalent cardiovascular disorder in the world and a major cardiovascular risk factor, contributing significantly to cardiovascular disease burden and disability worldwide. Hypertension control still remains a largely unmet challenge for public health systems. Despite the progress in blood pressure (BP) measurement techniques, and the availability of effective and safe antihypertensive drugs, a large number of hypertensive patients are not properly identified, and a significant proportion of those who receive antihypertensive treatment fail to achieve satisfactory control of their BP levels. Addressing relevant current challenges in hypertension management and potential strategies for an improvement in how to improve hypertension diagnosis by a proper identification of elevated BP values and specific BP phenotypes (through the combined use of office and out-of-office BP monitoring), and how to improve achievement of hypertension control and adherence of antihypertensive drugs are needed to achieve better BP control. Particular attention is given to the role of ambulatory (ABPM) and home BP monitoring (HBPM), BP telemonitoring and mobile health technologies, which may allow not only to quantify different BP patterns known to have prognostic relevance and also to improve patients' adherence/compliance to antihypertensive treatment and patient–physician interaction.

KEYWORDS: hypertension-current-management

The Importance of Blood Pressure Profile in The Early Management of Hypertension

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ABSTRACT
Major international hypertension guidelines still emphasize the importance of out-of-office blood pressure measurement in the diagnosis and management of hypertension. The two main options available are home blood pressure monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM). The use of out-of-office BP measurement is used to diagnose hypertension and determine the patient's blood pressure profile, including detection of white coat hypertension (WCH) and masked hypertension (MH), morning surge, nocturnal hypertension, dipping status. There are three main important BP measures, i.e., ambulatory BP profiles (24-hours BP, daytime BP, nighttime BP and morning BP), nocturnal BP fall (dipper, non-dipper, riser and extreme dipper), and morning BP surge and BP variability. Some diseases have specific BP profile. For example, patients with OSA had non-dipping profile, morning BP surge, and increased BPV, non-dipping is common in diabetes, masked hypertension is also more common in patients with diabetes and appears to increase the risk of target organ damage. Patients with chronic kidney disease (CKD) have a high prevalence of MH, which is a significant predictor of progression to end-stage renal disease and total mortality. Abnormal ABPM findings in CKD include nocturnal non-dipping and increased BPV. Knowing the patient's BP profile can help the physician determine the right drugs for the right patient.

KEYWORDS: Hypertension-home blood pressure monitoring-ambulatory blood pressure monitoring

Chronic Heart Failure: Cardiovascular Disease Continuum Revisited

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ABSTRACT
Congestive heart failure is a clinical syndrome that precipitates generalized organ dysfunction. Cardiovascular system is governed by physical law, are regulated by autonomic, hormonal, and local controls; and are subject to complex reflex feedback mechanisms. Myocardial failure is the term that used to describe myocardial muscle dysfunction, it may result from damage of myocardial caused by ischemia, infarction, myopathy, and myocarditis as well as associated with mechanical restriction as seen in valvular disorders, increased aortic impedance, and pericardial restriction.

Sympathoadrenergic stimulation, cardiac dilation, myocardial hypertrophy, renal response and increased tissue oxygen extraction is mechanism of compensation, while all variation of dyspnea and edema are signs and symptoms of left and right congestive heart failure. The balance of supply and demand in oxygen consumption, daily activities, and drugs are the best ways to do in the comprehensive strategy in management of congestive heart failure.

KEYWORDS: heart failure-preload afterload-compensated decompensated

The Four Pillars of HFrEF Therapy: Is It Time to Treat Heart Failure Regardless of Ejection Fraction

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ABSTRACT
Heart failure is a clinical syndrome due to a structural and/or functional abnormality of the heart that results in elevated intra cardiac pressures and/or inadequate cardiac output at rest and/or during exercise. Heart Failure has been divided into HFrEF, HFmrEF and HFPEF. For management of HFrEF there are four pillars based on the pathomechanisms such as ARNI, MRA, Beta blocker and SGLT2Inhibitor. Based on 2023 ESC Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, SGLT2I has a class 1 recommendation for the treatment of HFPEF and HFmrEF. So, currently SGLT2I have class 1 recommendation for treatment of HF regardless of ejection fraction.

KEYWORDS: Heart Failure, management, four pillars, regardless of ejection fraction

The HFpEF Diagnostic Algorithm's Usefulness In Clinical Practice

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ABSTRACT

Heart failure is a clinical syndrome characterized by symptoms of shortness of breath, fatigue, decreased tolerance for activities, and can be accompanied by signs of congestion, namely increased jugular venous pressure, also pulmonary and leg edema. About half of patients is with heart failure with preserved ejection fraction (HFpEF). In the heart failure registry at RSUP Dr. Sardjito (2016-2018) around 60% of HF patients included were HFpEF. Patients with HF generally have a very high predicted 5 year mortality rate of 50% - 75%, which is comparable to HFrEF, so the right treatment should be given early to prevent mortality and morbidity.

Patients with HFpEF are associated with multimorbidities, approximately 50% of them have several comorbidities. The specificity of HFpEF is that there is an increase in left ventricular stiffness which results in impaired relaxation, so it can be predicted that this case will increase in the elderly. The prevalence of HFpEF is greater in patients with hypertension, diabetes mellitus (DM), chronic renal failure (CRF), atrial fibrillation (AF) and non-cardio vascular disease such as obesity and chronic obstructive pulmonary disease (COPD).

The pathophysiology of HFpEF is complex due to systemic changes associated with its co-morbidities, which cause myocardial dysfunction in a number of different ways. Types of HF based on differences in left ventricular ejection fraction (LVEF) according to current international guidelines (European Society of Cardiologist (ESC) and American Heart Association (AHA) divide HF into heart failure with reduced ejection fraction (HFrEF) with an LVEF <40%, heart failure with a mildly reduced ejection fraction (HFmrEF) with an LVEF between 41 % and 49%, and HFpEF with LVEF >50%. Based on the definition of HFpEF that has been set out in the guidelines, it can be used as a simple step in diagnosing HFpEF, as Three Simple Steps in diagnosing HFpEF, including; 1) Signs and symptoms of heart failure, 2) LVEF ≥50%, 3) Objective evidence of cardiac structure and/or functional abnormalities consistent with left ventricular diastolic dysfunction/increased left ventricular filling pressures, including increased natriuretic peptide (NP).

Although the diagnosis of HF is generally used by clinicians, the diagnosis of HFpEF is often more difficult, considering that an echocardiogram may not show obvious structural or functional cardiac abnormalities and natriuretic peptide levels may be normal, especially in

obese individuals with HF. Considering the lack of testing to definitively diagnose HFpEF, a clinical scoring system is used that can help in diagnosing suspected HFpEF, namely the H2FPEF or HFA-PEFF algorithm. Both algorithms use a scoring system to help determine the likelihood that HFpEF is the underlying etiology of dyspnea sufferers.

The goal of therapy for HFpEF patients is to reduce symptoms, improve functional status and reduce rehospitalization and reduce mortality. The essence of therapy in HFpEF is focused therapy of the underlying comorbidity and treatment of modifiable HF risk factors. Hypertension, AF, CAD, hyperlipidemia, obesity, anemia, DM, CKD and sleep apnea are conditions frequently associated with comorbid HFpEF.

In accordance with the latest ESC and ACC/AHA - 2022 guidelines regarding HFpEF therapy, diuretics, to reduce congestion symptoms as initial therapy with class recommendation I, followed by group SGL2-i with class recommendation-2a, with evidence of RCT studies on the use of SGL2-I between other; trial of EMPagliflozin in Patients with HFpEF (EMPEROR-Preserved) and trial of Dapagliflozin in HFpEF.

The EMPEROR-Preserved trial demonstrated a 21% reduction in HF hospitalization or cardiovascular death in the empagliflozin group. The benefit of empagliflozin was significant at 18 days after randomization and remained significant thereafter. Empagliflozin resulted in significantly reduced total hospitalizations for heart failure, and improved quality of life at 52 weeks.

KEYWORDS: HFpEF-diagnostic-Algorithm

Biomarker Profiles and Pathophysiological Pathways in Patients with Chronic Heart Failure and Metabolic Syndrome

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ABSTRACT
Metabolic syndrome is clinical conditions that has multiple pathophysiological mechanisms and responsible for cardiac dysfunction leading to heart failure. The pathophysiological pathways leading to heart failure in patients with metabolic syndrome are related to insulin resistance, obesity and chronic inflammation. The role of biomarkers in supporting the pathophysiological mechanisms are currently under investigations. A study in this field, a cohort from BIOSTAT-CHF, reports the most significantly increasing biomarkers in metabolic syndrome and heart failure are leptin, fatty acid-binding protein 4, interleukin-1 receptor antagonist, tumour necrosis factor receptor superfamily member 11a, and RET proto-oncogene. Most biomarkers are linked to lipid metabolism, obesity and chronic inflammation. These biomarkers may become the target for drugs which will be develop in the population of metabolic syndrome and heart failure in the future.

KEYWORDS: biomarker-heart failure-metabolic syndrome

Clinical Evidence on Positioning of SGLT2-Inhibitors in Type 2 DM Management

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ABSTRACT
The prevalence and number of patients with prediabetes and diabetes is very high with an increasing trend. Without proper intervention, prediabetes will progress to diabetes, increasing both macrovascular and microvascular complications, and placing type 2 DM as the biggest cause of chronic kidney disease (CKD) and cardiovascular disease (CVD).
The 2023 American Association of Clinical Endocrinology Consensus Statement uses a complication-based algorithm for glycemic control, using SGLT2-inhibitors or GLP-1 RA based on the complication.

Clinical research evidence shows a cardiorenal protective effect with the use of SGLT2-inhibitors in patients with DM, and the use of these drugs has even shifted to be used in patients with heart failure despite not having DM without causing hypoglycemia.
SGLT2-inhibitors, a new class of anti-diabetic drugs with pleiotrophic effects, have become the standard of care for patients with type 2 DM, especially with risk factors for CKD and CVD worsening. The protective effect has been shown by various randomized control trial studies in DM and non-DM patients, with an independent effect on the glycemic effect.

KEYWORDS: SGLT2-inhibitor-DM tipe 2-CKD-CVD

The Atrium and Embolic Stroke: Myopathy Not Atrial Fibrillation as A Clinical Entity

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ABSTRACT
Atrial myopathy (AM) is often neglected as a clinically relevant entity in causal relationships on ischemic stroke. It refers to structural and electrical remodeling of the atria, which can lead to impaired mechanical function. While historical studies have implicated atrial fibrillation (AF) as the leading cause of cardioembolic stroke, AM may be an important, even though it is an underestimated contributor. Recent advances in cardiac imaging of the left atrium, such as mechanical strain from echocardiography, have improved our understanding of the complex AM and function. Identifying robust markers of an underlying AM may allow for early identification of patients at risk for cardioembolic stroke. Our recent ongoing study in a subgroup of patients with and without embolic stroke demonstrated the severity of atrial failure drives the risk of thromboembolic stroke even prior to AF development. Then it may confirm that AF is the endmost marker of AM.

KEYWORDS: atrial myopathy-embolic stroke-atrial fibrillation

Clinical Spectrum of Cryptogenic Stroke

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ABSTRACT
A unified diagnostic strategy for cryptogenic stroke that is both evidence-based and cost-effective has not yet been defined. Targeted selection and judicious use of appropriate tests in the work-up of cryptogenic strokes are still crucial and may be even more relevant in the future. However, the prognostic utility of these markers is still unclear and should be prospectively assessed with atrial fibrillation detection and recurrent stroke as outcomes. A cryptogenic stroke, or stroke of undetermined etiology, as defined by the Trial of Org 10172 in Acute Stroke Treatment criteria, is a brain infarct not attributed to a definite source of large-vessel atherosclerosis, cardioembolism, or small-vessel disease, in the presence of extensive cardiac, vascular, hematologic, and serologic evaluation; incomplete evaluation; or evidence of more than one competing cause. Furthermore, additional work is needed to standardize measurement of ECG markers, confirm their reliability and predictive value, and define the risk-benefit ratio of specific interventions in high-risk individuals. In addition, further studies should also include the efficacy of a multimodal approach combining clinical factors, electrocardiography, and biological markers to select cryptogenic stroke patients for prolonged cardiac rhythm monitoring.

KEYWORDS: cryptogenic stroke-etiology-diagnosis-standardize measurement

Cryptogenic Stroke with Patent Foramen Ovale: To Close or Not To Close?

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ABSTRACT
Cryptogenic stroke is a type of stroke that is not related to atheroscletosis or embolism. It accounts for one-third of all type of ischemic stroke. The causal relationship between patent foramen ovale (PFO) and cryptogenic stroke has been controversial. PFO occur in 25% of adult population and is significantly higher in patients with cryptogenic stroke; up to 40% of ischemic strokes without an identifiable cause have a PFO. Anatomic features of PFO (size, degree of shunt, morphology, atrial septal aneurysm, and other atrial or venous abnormalities) may be associated with cryptogenic stroke. Evidence supporting PFO-mediated paradoxical embolic stroke include cortical location of infarcts, strokes in multiple vascular distributions, and infarcts of different ages in the same vascular territory.

Study shows a beneficial effect of PFO closure in the secondary prevention of cryptogenic stroke. The benefits appear to be greater where a high-risk PFO is present. Before considering PFO closure, a careful evaluation should be done to rule out other causes of stroke, including hypercoagulable states, atherosclerotic lesions, other cardioembolic sources, and arterial dissection. One of the most important conditions to exclude is AF. Occult AF has been identified in up to 16% of cryptogenic stroke within 90 days of randomization. However, due to the high prevalence of PFOs in the general population, a comprehensive, clinical history for the exclusion of other possible. This intervention is one of the safest and easiest in cardiology. Procedure complications are rare.

KEYWORDS: Cryptogenic stroke-Patent foramen ovale (PFO)-PFO closure

Platelet Activation Pathway: A Guide for Antiplatelet Therapy In Cardiovascular Disease (CVD): Is One Superior To The Others?

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ABSTRACT
Cardiovascular disease (CVD) is a leading cause of death worldwide, with an estimated global death rate of 31%, mostly resulting from stroke and myocardial infarction (up to 85%). Thrombosis plays a pivotal role in this condition by initiating "a blood clot" that disrupts circulation and induces an ischemic event. Platelet activation and aggregation are important components of this mechanism. Initially, platelets sense and respond to vascular injury, preventing blood loss following vascular damage and tissue trauma.

Under normal conditions, a balance exists between pro-thrombotic hemostatic and anti-thrombotic and anti-coagulation mechanisms, which restrict clot formation. However, in pathological conditions such as atherosclerotic lesions, this balance is disrupted due to the highly thrombogenic contents and stenosis of the lesion, causing an increase in local shear rates.
Soluble agonists like ADP and thromboxane A2 (TxA2) play a central role in driving thrombus development, making them targets for antiplatelet therapy. ADP released from damaged endothelial cells and activated platelets acts on P2Y1 and P2Y12 receptors, further inducing platelet activation and ADP release. TxA2 produced and released by stimulated platelets also activates additional platelets, promoting plug formation.

Aspirin, the first antiplatelet drug, works by irreversibly blocking the platelet-induced cyclooxygenase (Cox)-1 enzyme to inhibit the formation of TxA2, acting as an effective agonist of platelet aggregation and vasoconstrictor. Other antiplatelet agents include P2Y12 receptor antagonists, including thiophene pyridines (clopidogrel and prasugrel) and non-thiophene pyridines (ticagrelor). Thienopyridines are oral pro-drugs that require hepatic activation via cytochrome P450, and their metabolites irreversibly bind to P2Y12 receptors for 7 – 10 days. On the other hand, non-thienopyridines are potent, reversible, and direct-acting drugs.

In addition to their antiplatelet actions, ticagrelor has additional effects that some studies deem "superior" to others. These effects include an increase in adenosine plasma concentration, leading to heightened adenosine-related coronary blood flow, cardio-protection, and promotion of the release of anticoagulant factors. The decision to choose the appropriate antiplatelet must be made by a clinician based on each patient's tailored condition, including the underlying pathological disease, bleeding risk associated with the patient's profile, and comorbidities.

KEYWORDS: antiplatelet activation pathway-CVD-ADP-P2Y12 inhibitors

The Role of Antithrombotic in Acute Coronary Syndrome When To Use High Potent Anti Platelet

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ABSTRACT
Antiplatelet therapy reduces the risk of thrombosis and its consequences, including death and myocardial infarction. Antiplatelet drugs play a crucial role in the management of ACS and have been shown to minimize the incidence of significant adverse cardiovascular events and recurrent myocardial infarction;

Aspirin, clopidogrel, prasugrel, ticagrelor, abciximab, tirofiban, dipyridamole, cilostazol, and novel antiplatelets are included in the review. Aspirin's effectiveness as a first-line antiplatelet medication in ACS is well established. It has significantly lowered the risk of serious adverse cardiovascular events.

Its classify antiplatelet agents into six main classes: Irreversible cyclooxygenase inhibitors (aspirin, triflusal), ADP receptor inhibitors (clopidogrel, ticagrelor, ticlopidine, prasugrel, cangrelor), adenosine reuptake inhibitors (dipyridamole), glycoprotein IIb/IIIa platelet inhibitors (abciximab, eptifibatide, tirofiban), protease-activated receptor-1 antagonists (vorapaxar), and phosphodiesterase inhibitors (cilostazol)

Aspirin is generally well-tolerated with a low risk of adverse effects, although the risk of bleeding events, particularly gastrointestinal bleeding, cannot be eliminated. Clopidogrel, prasugrel, and ticagrelor are P2Y12 receptor inhibitors found to lower the incidence of recurrent ischemia episodes in ACS patients and its have been associated with a small increase in the risk of bleeding events, particularly in patients with a high risk of bleeding. The interaction of ADP with its platelet receptors (P2Y1 and P2Y12) plays a crucial role in thrombogenesis. ADP receptor inhibitors are a type of antiplatelet drug used to treat ACS or prevent thromboembolism, MI, or stroke

The current state of the art in treating ACS involves using antiplatelet drugs, specifically P2Y12 receptor inhibitors, which prevent the aggregation of platelets and reduce the risk of thrombosis. The latest guidelines for managing ACS recommend using ADP receptor inhibitors, such as clopidogrel, ticagrelor, and prasugrel, combined with aspirin as early as
Advances in ADP receptor inhibitor therapy have led to the development of more potent and faster-acting drugs, such as ticagrelor and prasugrel, showing varying benefits and limitations in reducing the risk of MACE. Overall, the use of ADP receptor inhibitors in combination with therapies other than aspirin continues to be an important aspect of managing ACS. possible after the onset of symptoms.

The PLATO study showed superior efficacy of the nonthienopyridine platelet $P2Y_{12}$–receptor inhibitor, ticagrelor, as compared to clopidogrel in preventing death from vascular causes,

myocardial infarction (MI), or stroke in patients with ACS, without an increase in overall major bleeding events.

KEYWORDS: antithrombotic-acute coronary syndrome-P2Y12-receptor inhibitor-high potent anti platelet.

Pathophysiology and Diagnostic Workup of Myocarditis and Chronic Inflammatory Cardiomyopathy

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ABSTRACT
Myocarditis is an inflammatory disease of the heart that may occur because of infections, immune system activation, or exposure to drugs. Regarding terminology, myocarditis can be characterized according to etiology, phase, and severity of the disease, predominant symptoms, and pathological findings. Clinically, acute myocarditis (AM) implies a short time elapsed from the onset of symptoms and diagnosis (generally <1 month). While chronic inflammatory cardiomyopathy indicates myocardial inflammation with established dilated cardiomyopathy or hypokinetic nondilated phenotype, which in the advanced stages evolves into fibrosis without detectable inflammation. Typical manifestation of this disease is heart failure, chest pain, or arrhythmias. The most important non-invasive diagnostic method is magnetic resonance imaging, but the gold standard of diagnostics is invasive examination, endomyocardial biopsy.

KEYWORDS: myocarditis-cardiomyopathy-diagnostic

Updates On Peripartum Cardiomyopathy

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ABSTRACT
Peripartum cardiomyopathy (PPCM) is a rare but serious condition that affects pregnant women or those who have recently given birth. It is characterized by reduced heart function and symptoms of heart failure, such as shortness of breath, swelling, and fatigue. The causes and mechanisms of PPCM are not fully understood, but genetic, hormonal, inflammatory, and viral factors may play a role. PPCM can have severe consequences for both the mother and the baby, such as death, chronic heart disease, or recurrence in subsequent pregnancies. Therefore, early diagnosis and treatment are essential to improve the outcome and quality of life of affected women. This abstract summarizes the current knowledge and recent advances on PPCM. It covers various aspects of PPCM, such as epidemiology, pathophysiology, diagnosis, management, prognosis, and research trends. It also highlights the gaps and challenges in the understanding and treatment of PPCM, as well as the future directions for research and clinical practice.

KEYWORDS: peripartum cardiomyopathy-pregnancy-genetic-bromocriptine

A to Z For CLTI: All Part Involved In CLTI

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ABSTRACT
Chronic Limb Threatening Ischemia (CLTI) is a silent but a serious disease with very poor prognosis and outcome. Limited blood flow of the limb due to atherosclerosis plaque lead to pain, unhealed ulcer, or gangrene. Despite a reduction in amputation and mortality rate following revascularization procedure, these rates remain alarmingly high. Consequently, a multidisciplinary approach is mandatory to address the multifaceted complexities of CLTI, spanning from early diagnosis to comprehensive rehabilitation strategies. Furthermore, advocating for prevention to screening protocol for peripheral arterial disease should also be encouraged to prevent development of CLTI.

KEYWORDS: limb ischemia-diagnosis-treatment-multidisciplinary approach-screening

Current Approach to Accurate Treatment of CLTI Medical or Revascularization

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ABSTRACT

In 2010, according to Fowkes FG, 2013, estimates suggested that more than 200 million people worldwide were living with PAD. This represented a 23.5% increase since 2000, an increase that is believed to be largely attributable to aging populations and the growing prevalence of risk factors, in particular DM.

Chronic limb-threatening ischemia (CLTI) is associated with mortality, amputation, and impaired quality of life. CLTI is a clinical syndrome defined by the presence of peripheral artery disease (PAD) in combination with rest pain, gangrene, or a lower limb ulceration more than 2 weeks duration. Venous, traumatic, embolic, and nonatherosclerotic etiologies are excluded.

CLTI be defined to include a broader and more heterogeneous group of patients with varying degrees of ischemia that may delay wound healing and increase amputation risk. All patients with suspected CLTI should be referred urgently to a vascular specialist. Accurately staging the severity of limb threat is fundamental, and the Society for Vascular Surgery Threatened Limb Classification system, based on grading of Wounds, Ischemia, and foot Infection (WIfI) is endorsed.

Objective hemodynamic testing, including toe pressures as the preferred measure, is required to assess CLTI. Management decisions in the patient with CLTI are derived from the clinical presentation, physical examination, and review of noninvasive vascular studies, with consideration of risk factors that impact a decision for intervention or conservative care.

All patients with CLTI should be afforded best medical therapy including the use of antithrombotic, lipid-lowering, antihypertensive, and glycemic control agents, as well as counseling on smoking cessation, diet, exercise, and preventive foot care. Following Evidence based revascularization (EBR), long-term limb surveillance is advised. The effectiveness of non revascularization therapies (eg, spinal stimulation, pneumatic compression, prostanoids, and hyperbaric oxygen) has not been established. Regenerative medicine approaches (e.g., cell, gene therapies) for CLTI should be restricted to rigorously conducted randomized clinical trials.

The approach is tailored to each patient based upon numerous factors, including presence and degree of tissue loss, patient-specific vascular anatomy, availability of vascular conduit for revascularization, and comorbidities such as cardiac risk (may impact the magnitude of intervention) and renal insufficiency (may impact options for contrast agents and likelihood of procedural success). If intervention is pursued, the interaction of the limb status, patient

comorbidities, and the patient's vascular anatomy determine the best form of revascularization. As revascularization options have evolved and improved, more patients have become candidates. Unfortunately, for some patients, the most appropriate course of treatment may be primary amputation or palliation. The importance of multidisciplinary teams and centers of excellence for amputation prevention is stressed as a key health system initiative.

KEYWORDS: chronic limb-threatening ischemia, grading of wounds-ischemia- foot infection, medicamentous therapy, revascularization, amputation.

Lipid Management in High Bleeding Risk Patient - Less or Aggresive?

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ABSTRACT

Hyperlipidemia is a major risk factor for coronary artery disease (CAD), and it is well known that treatment of hyperlipidemia reduces the morbidity and mortality of CAD. current cholesterol management guidelines have been modified toward more aggressive goals for lowering low-density lipoprotein cholesterol (LDL- C). Consequently, the emerging concept of "the lower the better" has become the paradigm of ASCVD prevention. Current European Society of Cardi- ology/European Atherosclerosis Society joint guidelines emphasize that LDL-C remains the most important marker to attain treatment targets, a target of LDL-C < 70 mg/dL or ≥50% reduction (if the baseline is between 70 and 135 mg/dL) should be set to treat patients with ACS.

However, there is evidence from observational studies of a U-shaped association between baseline LDL-C levels and all-cause mortality in population-based cohorts. Among East Asian populations, low LDL-C was associated with an increased risk for hemorrhagic stroke in patients not on antithrombotic therapy. Accumulating evidence showed that low LDL-C was associated with an enhanced bleeding risk in patients on dual antiplatelet therapy following percutaneous coronary intervention. There is also evidence linking low LDL-C levels to an increased bleeding risk among patients on high-intensity antithrombotic therapy. Among ticagrelor-treated patients, the LDL-C threshold for increased bleeding risk was observed at < 88 mg/dl, whereas for clopidogrel-treated patients, the threshold was < 54 mg /dl whereas for clopidogrel-treated patients

The potential mechanisms underlying this phenomenon are unclear may be related low cholesterol exposure may consequently predispose individuals to weakening of endothelial cells and enhancement of blood-brain barrier permeability, which may underlie the pathogenesis of the low-cholesterol-level-related risk for hemorrhagic stroke. Cholesterol also serves as the key component of platelet lipid rafts, which are essential for the signaling pathway during thrombus formation, and platelet responsiveness to aggregation agonists is significantly reduced in the case of in vitro cholesterol depletion and LDL-apheresis. Another possible mechanism is that cholesterol is a positive regulator of thrombocytopoiesis in the bone marrow and there is a positive association between LDL-C and platelet counts.

The need to recognize patients with high bleeding risk as well as adjustment of lipid-lowering intensity and/or the choice of an optimal antiplatelet agent, is required to ensure the safety of patients on antithrombotic therapy.

KEYWORDS: lipid-management-high-bleeding-risk-antiplatelet

Antiplatelet Therapy in Patients at High Bleeding Risk: Less Is More-More or Less

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ABSTRACT
The Academic Research Consortium for High Bleeding Risk (ACR-HBR) identified key factors associated with bleeding risk post percutaneous coronary intervention (PCI). The ARC-HBR definition is dichotomous and defines HBR as a Bleeding Academic Research Consortium (BARC) 3 or 5 bleeding risk of > 4% and/or risk of intracranial hemorrhage > 1% within 1 year after PCI. These key factors are stratified into major criteria and minor criteria. Patients are at HBR if at least 1 major or 2 minor criteria are met. The bleeding risk was assessed at the time of PCI. If the patient did not meet the criteria to be classified as HBR, he fell into the Low Bleeding Risk (LBR) classification. The LBR group does not only correspond to patients at low risk of bleeding but also to patients at medium risk of bleeding.

Dual antiplatelet therapy (DAPT) with aspirin and a P2Y12 receptor blocker is the standard antithrombotic treatment after PCI but the optimal duration of treatment is still a matter of debate. DAPT has a narrow therapeutic window, as it is associated with a substantial increase in major bleeding as a function of its duration and composition. It has been known for a decade that bleeding is not merely an inconvenience of antithrombotic therapy but carries important subsequent risks of adverse cardiac outcomes. A bleeding complication has been associated with a three- to five-fold increase of subsequent mortality, and could easily offset the benefit of ischaemic protection from prolonged DAPT. Preserving the balance between ischaemic and bleeding risk during DAPT is even more challenging among patients at HBR. International guidelines recommend standardized bleeding and ischaemic risk evaluation to inform treatment decisions, favoring a more conservative approach in terms of therapy type or duration in HBR patients.

An abbreviated DAPT regimen of either 1 or 3 months, followed by single antiplatelet therapy, was associated with lower bleeding, with a favorable effect on CV mortality, without increasing ischaemic events or stent thrombosis. A one-month or 3-month DAPT course after PCI appears an appealing treatment option in HBR patients to optimize outcomes. For patients undergoing non-complex PCI who are at HBR but without an indication for chronic anticoagulation, it is fair to say that 1–3 months of DAPT reduces the risk of major or clinically relevant non-major bleeding, without apparently increasing the risk of thrombotic events.

KEYWORDS: antiplatelet-DAPT-bleeding-CV mortality

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