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Hello, this is Dr. Peng-Sheng Chen, the Editor-in-Chief of Heart Rhythm. The September 2022 issue of the journal is our annual focus issue on atrial fibrillation. The first article is "**Impact of Atrial Fibrillation Ablation on Activity Minutes in Patients With Cardiac Implantable Electronic Devices**". The authors used the Medtronic CareLink® database to identify patients who had a CIED with AF detection and accelerometer capabilities. Of 4297 eligible patients who underwent AF ablation, 409 (9.5%) were included in the analysis. After ablation, the relative AF burden decreased by 75.1%. There was no change in activity minutes per day after ablation in the entire cohort. The authors conclude that there were no clinically significant changes in activity minutes per day in patients with CIEDs after ablation for AF.

The next article is "**Incidence of new onset atrial fibrillation after transcatheter PFO closure using 15 years of Ontario administrative health data**". Of 1533 patients, 96 (6.26%) developed new-onset AF following PFO closure, over an average follow-up time of 8.2 years. Age >60 years and diabetes were statistically significant, independent predictors of AF according to the Cox model. The authors conclude that the incidence of new-onset AF after PFO closure was relatively low. Having diabetes and age >60 years were the most important factors associated with new-onset AF in this population.

Up next is "**Atrial Fibrillation Mechanisms Before and After Pulmonary Vein Isolation Characterized by Non-Contact Charge Density Mapping**". The purpose of this study was to use noncontact mapping to detail the global conduction patterns in paroxysmal and persistent AF and how they are modified during PV ablation. Forty patients during AF ablation underwent mapping using a noncontact catheter before and after PV isolation (PVI). Propagation history maps were analyzed postprocedure for each patient to categorize conduction patterns into focal, organized reentrant, and disorganized patterns. The authors found that Persistent AF was different from paroxysmal AF in demonstrating a higher region number and higher prevalence of disorganized-Patterns but a lower region number and lower prevalence of organized-Patterns and focal-Patterns.

Coming up is "**Effect of continuous positive airway pressure therapy on recurrence of atrial fibrillation after pulmonary vein isolation in patients with obstructive sleep apnea: A randomized controlled trial**". The authors randomized patients with paroxysmal AF and an apnea-hypopnea index (AHI) $\geqslant$15 events/hour to treatment with CPAP or standard care. PVI was performed in 83 patients. Thirty-seven patients were randomized to CPAP treatment and 46 patients to standard care. The AHI was reduced from 26.7 events/hour to 1.7 events/hour in the CPAP group, but AF burden after ablation was not different between group. The authors conclude that in patients with paroxysmal AF and OSA, treatment with CPAP did not further reduce the risk of AF recurrence after ablation. PVI considerably reduced the burden of AF in OSA patients, without any difference between groups.

Up next is "**Permanent pacemaker implantation after valve and arrhythmia surgery in patients with pre-operative atrial fibrillation**." The purpose of this study was to evaluate the prevalence and long-term survival of postoperative PPM implantation in patients with preoperative AF who underwent valve surgery. Results show that PPM implantation after surgery was necessary in only 2.5% of patients. Tricuspid intervention, cardiopulmonary bypass time, and endocarditis were shown to be risk factors for PPM. Over long-term follow-up, PPM was not associated with increased mortality. Surgical ablation was not associated with PPM implantation. In addition, surgical ablation improved survival regardless of PPM status.

The next article is "**Serum exosomal long noncoding RNAs as a diagnostic biomarker for atrial fibrillation**". The authors first screened and identified 26 differentially expressed

Exosomal long noncoding RNAs in serum exosomes from patients with persistent AF compared with controls. They then performed validation studies to find exosomal long noncoding RNAs were consistently upregulated in the serum of patients with persistent AF compared with controls. The authors conclude that serum-derived exosomal long noncoding RNAs LOC107986997 could serve as a potential diagnostic biomarker for AF.

Up next is "**The Secretome of Atrial Epicardial Adipose Tissue Facilitates Reentrant Arrhythmias by Myocardial Remodeling**". The authors collected atrial epicardial adipose tissue and subcutaneous adipose tissue from patients with and without AF. The secretome was collected after a 24-hour incubation of the adipose tissue explants. They then cultured neonatal rat ventricular myocytes with epicardial adipose tissue, subcutaneous adipose tissue secretome, and cardiomyocytes conditioned medium for 72 hours. They found a change of potassium current that depolarized resting membrane of cardiomyocytes, along with decreased expression of connexin43. Cardiomyocytes incubated with epicardial adipose tissue showed reduced conduction velocity and increased conduction heterogeneity. The authors conclude that epicardial adipose tissue slows conduction, depolarizes the resting potential, alters electrical cell-cell coupling, and facilitates reentrant arrhythmias.

These original papers are followed by two AF-focused Research Letters. The first one is titled "**Troponin Release after Pulmonary Vein Isolation using Pulsed Field Ablation compared to Radiofrequency and Cryoballoon Ablation**". The second one is "**Feasibility of wide-band dielectric imaging to guide temperature-controlled atrial fibrillation ablation**".

In addition to the atrial fibrillation-focused articles, we also published the following regular articles. The first one is titled "**Intramyocardial mapping of ventricular premature depolarizations via septal venous perforators: Differentiating the superior intraseptal region from left ventricular summit origins**". The purpose of this study was to differentiate between ventricular premature depolarizations (VPDs) with a basal superior intraseptal site of origin and those originating from the epicardial superior intraseptal using septal intramyocardial mapping. The superior intraseptal site mapping was successful in 44 of 47 cases (93.6%). The authors found that a significant proportion (45.5%) of VPDs that appear to arise from the left ventricular summit actually have a superior intraseptal site origin. A significant minority (11.3%) of these can be ablated from the endocardium by targeting from an anatomic vantage point closest to the earliest intraseptal activation site.

The next article is "**Left Bundle Branch Area Pacing in Patients with Atrioventricular Conduction Disease: A Prospective Multicenter Study**". Patients with AV conduction disease referred for pacemaker implantation were included. LBBAP was successful in 340 of 364 patients (93%). Procedural success rates did not differ between indications or between patients with narrow vs wide QRS. Mean LBBAP threshold was 0.77 $\pm$ 0.34 V at 0.4 ms at implant and remained stable during follow-up. There were 4 (1.2%) acute LBBAP lead dislodgments. The authors conclude that LBBAP is safe and feasible with high success rates for patients with AV conduction disease. In contrast to His bundle pacing, LBBAP success rates remain high over the entire spectrum of AV conduction disease, and lead parameters remain stable during follow-up.

Up next is "**Effects of β-blockers on ventricular repolarization documented by 24-hour electrocardiography in long QT syndrome type 2**". The authors studied 25 patients with type 2 long QT syndrome. β-Blocker therapy decreased the maximal T2/T1-wave amplitude ratio. Under medication, abrupt maximal TPE intervals were shorter at heart rates of $\geqslant$75 beats/min

and maximal QT intervals were shorter at a heart rate of 100 beats/min. The authors conclude that β-Blockers stabilize ventricular repolarization in LQT2 by reducing electrocardiographic early afterdepolarizations and by reducing abrupt prolongation of electrocardiographic dispersion of repolarization and ventricular repolarization duration at elevated heart rates. The effect of β-blockers on pause-induced electrocardiographic early afterdepolarizations is weak. The findings provide an electrocardiographic explanation for the protective effects of β-blockers against exercise-induced cardiac events in LQT2.

Up next is "**Factors Associated with Remote Monitoring Adherence for Cardiovascular Implantable Electronic Devices**". The authors linked remote monitoring data from the Veterans Affairs National Cardiac Device Surveillance Program to clinical data. In 52,574 patients, the average remote monitoring adherence was 71.9%. Black or African American patients had a lower odds of complete remote monitoring adherence while Hispanic or Latino patients had a lower odds of complete remote monitoring adherence than non-Hispanic or Latino patients. Dementia, depression, and posttraumatic stress disorder were associated with lower odds of remote monitoring adherence. The authors conclude that there are significant disparities in RM adherence by race, ethnicity, and neuropsychiatric comorbidities.

Coming up is "**Pacing Burden and Clinical Outcomes Following Transcatheter Aortic Valve Replacement, A Real-World Registry Report**". A total of 1239 patients underwent TAVR with a median follow-up period of 2.3 years. Patients who underwent new pacemaker implantation had a higher combined outcome of death and heart failure hospitalizations and was associated with almost twice the risk of 1-year mortality. Pacing burden, however, was not associated with the primary outcome. Furthermore, no significant difference was observed at 3-year follow-up. The authors conclude that pacemaker implantation after TAVR is associated with a higher 1-year adverse outcome, but this attenuates over time, suggesting that competing factors may play a role. Interestingly, the pacing burden is not associated with adverse clinical course.

Next up is "**Contemporary Maternal and Fetal Outcomes in Treatment of LQTS during Pregnancy: Is Nadolol Bad for the Fetus?**". Among 68 live-birth pregnancies in 31 women with LQTS, there were 5 arrhythmic events in 4 mothers. All arrhythmic events occurred in the postpartum period, and there were no arrhythmic events in patients taking β-blockers. Nadolol was the most commonly prescribed agent throughout pregnancy and the postpartum period. The rate of intrauterine growth restriction was not significantly different in fetuses exposed to β-blockers vs unexposed. In the postnatal period, hypoglycemia was not seen and 1 patient in the exposure group had bradycardia. The authors conclude that β-Blocker therapy, specifically nadolol, was not associated with a higher incidence of intrauterine growth restriction. Moreover, neonatal bradycardia was rare and hypoglycemia was not observed.

The next one is "**Post-Traumatic Stress Disorder in pediatric Implantable Cardioverter Defibrillator patients and their parents**". Fifty youth and 43 parents completed the measures. Among them, 6 youth (12%) met the screening criteria for a likely PTSD diagnosis, while 20 parents (47%) met the cutoff for PTSD on the screening measure. The authors found that parents were more likely to meet the criteria for PTSD than youth. In youth, PTSD was associated with medical and psychosocial factors, whereas PTSD in parents was associated with being female and child depression. Clinic-based screenings and management planning of emotional functioning are warranted to address psychological distress in patients and parents.

Up next is "**Sex Hormones and Repolarization Dynamics during the Menstrual Cycle in Women with Congenital Long QT Syndrome**". The authors prospectively studied 65 women with congenital LQTS and unaffected female relatives. Patients underwent three 7-day ECG

recordings during their menstrual cycles. In women with LQT type 2, there are significant inverse correlations of the corrected QT interval with progesterone levels and with the progesterone to estradiol ratio. Inverse relationships of the R-R interval with estradiol levels and of the T-wave duration with testosterone levels were also observed in women with LQT2. In contrast, no significant associations were observed between ECG parameters and sex hormone levels in women with LQT type 1 or unaffected relatives. These findings show genotype-specific unique corrected QT dynamics during the menstrual cycle that may affect the propensity for ventricular tachyarrhythmia in women with LQTS, particularly women with LQT type 2.

Up next is a contemporary review titled "**Aldehyde dehydrogenase 2 and arrhythmogenesis**". The authors summarized recent research on the potential role of ALDH2 activation and antiarrhythmic protection, as well as the role played by the ALDH2∗2 polymorphism (rs671) in promoting arrhythmic risk.

The next article is a Creative Concept titled "**Near-Infrared Sensitive Nanoparticle Mediated Photothermal Ablation of Ventricular Myocardium**". The journal also published 3 research letters. The first one is titled "**Correlation between radiation dose and myocardial remodeling after stereotactic radiation therapy for ventricular tachycardia: First assessment of dose-effect relationship in human"**. A second one is titled "**A second chance to make a first impression: Parylene C residuals staining the surface of cardiac implantable electronic devices**". The last one is "**Heart Rhythm Society's Survey Assessing the Impact of Reductions in Medicare Reimbursement for Cardiac Ablation in the United States**". The final article is a HRS document titled "**Racial and ethnic disparities in arrhythmia care: A call for action**".

I hope you enjoyed this podcast. For Heart Rhythm, I'm the Editor-In-Chief, Dr. Peng-Sheng Chen.