

**Heart Rhythm Podcast**

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Hello, this is Dr Peng-Sheng Chen, the editor-in-chief of Heart Rhythm. Thank you for listening to this podcast, which covers the October 2018 issue of Heart Rhythm.

大家好，我是《心律学》杂志的主编陈鹏生。本期节目将主要介绍《心律学》杂志 2018 年 10 月刊登的文章，感谢大家收听。也感谢哈尔滨医科大学附属第一医院心内科郭帅博士对这一期翻译工作的帮助。

The featured article this month is titled “Coronary artery compression from epicardial leads: More common than we think” by Mah et al., from Boston Children's Hospital. An accompanying video author interview conducted by our online editor, Dr. Daniel Morin, can be found at the [www.heartrhythmjournal.com](http://www.heartrhythmjournal.com) website. In this study, all patients with epicardial leads who underwent catheter angiography and computed tomography were retrospectively reviewed. Coronary compression was noted in 8 of 145 patients (5.5%) with epicardial leads. The median age at diagnosis was 11 years. Among those with coronary compression, 6 of 8 (75%) had symptoms, including 1 sudden death, 3 patients with chest pain including 2 with associated troponinemia, and 2 had unexplained fatigue. Seven patients underwent surgical repositioning of their lead. The authors conclude that they found a higher incidence of coronary artery compression by epicardial leads than previously reported in the literature. Epicardial leads are being used both in pediatric and in adult EP practice. This paper shows that one in 20 patients may suffer from coronary artery compression and its complications. Coronary artery compression needs to be included in the differential diagnosis for patients who are symptomatic after epicardial lead implantation – even long after.

本月的推荐文章来自波士顿儿童医院的 Mah 等人，题目为“心外膜导线引起的冠状动脉压迫：比我们想象的更常见”。我们的在线编辑 Daniel Morin 博士在 [www.heartrhythmjournal.com](http://www.heartrhythmjournal.com) 网站上发布了作者的访谈视频。本研究回顾性分析了 145 例接受导管血管造影和 CT 扫描的存在心外膜导线的患者，其中有 8 例，也就是大约 5.5% 的患者出现了冠状动脉压迫。诊断时的中位年龄为 11.4 岁。在冠状动脉受压患者中，8 例中有 6 例（75%）出现症状，包括 1 例猝死，3 例胸痛，其中 2 例伴有肌钙蛋白血症，还有 2 例出现不明原因的疲劳。7 名患者接受了导线重新定位手术。作者发现心外膜导线引起的冠状动脉压迫的发生率高于之前的文献报道。目前心外膜导线植入被应用于儿科和成人电生理临床实践中。本文表明，20 例患者中就有可能有 1 例会出现冠状动脉压迫及其并发症。冠状动脉压迫应该被包括在心外膜导线置入术后有临床症状患者的鉴别诊断之中，即使在术后很久，也应考虑。

The October issue is a focus issue on sudden death. The first article is written by Junttila et al., titled “Type 2 diabetes and coronary artery disease: preserved ejection fraction and sudden cardiac death”. The data came from a prospective observational study called ARTEMIS including 834 subjects with type 2 diabetes and 1112 subjects without diabetes. During a mean follow-up of 6.3 years, sudden cardiac death or sudden cardiac arrest occurred in 50 patients. The prevalence was higher in diabetic patients than in nondiabetic patients, with a hazard ratio of 2.6. However, the non-sudden death component of cardiac mortality was not significantly different between these two groups. The authors conclude that type 2 diabetes is an independent risk factor for sudden cardiac death or sudden cardiac arrest in CAD patients with preserved ejection fraction. An important lesson is that diabetes patients with CAD are at high risk of sudden death even if they have a preserved ejection fraction.

十月的焦点问题是猝死。第一篇文章由 Junttila 等人撰写，标题为“2 型糖尿病与冠状动脉疾病：射血分数保留和心源性猝死”。该数据来自 ARTEMIS 前瞻性研究，包括 834 名 2 型糖尿病患者和 1112 名非糖尿病患者。在平均 6.3 年的随访期间，50 名患者发生心源性猝死或心脏骤停。糖尿病患者的发病率高于非糖尿病患者，风险比为 2.6。然而，这两组心源性死亡中的非猝死比例没有显著差异。作者得出结论，2 型糖尿病是射血分数保留的冠心病患者心源性猝死或心脏骤停的独立危险因素。这提示我们，伴有冠心病的糖尿病患者即使他们的射血分数保留，猝死的风险也很高。

The next paper is titled “Gender differences in patients with Brugada syndrome and arrhythmic events: Data from a survey on arrhythmic events in 678 patients” by Milman et al. from Tel Aviv University, Israel. The authors performed a multicenter survey on arrhythmic events in Brugada Syndrome. In Asians, the male to female ratio for arrhythmic events was about 9-fold higher than that in Whites. A spontaneous type 1 Brugada ECG was associated with an earlier onset of arrhythmic events in pediatric females. Females less frequently showed spontaneous type 1 Brugada ECG or arrhythmia inducibility at electrophysiology study. 48% of females with arrhythmic events were carriers of an SCN5A mutation, as compared with only 23% of males. This study confirms that female patients with Brugada Syndrome are much rarer, less frequently display a type 1 Brugada ECG, and exhibit lower inducibility rates than do males. It is interesting to note that the male predominance in arrhythmic events is much larger in Asians than in Whites. The latter findings pose significant challenges to geneticists and basic scientists in their search for the molecular mechanisms of Brugada syndrome.

下一篇文章来自以色列特拉维夫大学 Milman 等人，“Brugada 综合征患者和心律失常事件的性别差异：来自 678 名患者的心律失常事件调查的数据”，作者对 Brugada 综合征的心律失常事件进行了多中心调查。在亚洲人中，心律失常事件的男女比例比白人高约 9 倍。自发性 1 型 Brugada ECG 与女童早期发生心律失常事件相关。在电生理学研究中，女性较少出现自发性 1 型 Brugada ECG 或诱发心律失常。发生心律失常事件的女性中有 48% 是 SCN5A 突变的携带者，而男性只有 23%。该研究证实，患有 Brugada 综合征的女性患者更为罕见，较少出现 1 型 Brugada ECG，并且表现出比男性更低的诱发率。值得注意的是，在亚洲男性的心律失常事件比白人要多得多。此发现对遗传学家和基础科学家寻找 Brugada 综合征的分子机制提出了重大挑战。

The next article is written by Morita et al., from Okayama University, Japan. The title of the paper is “Progression of electrocardiographic abnormalities associated with initial ventricular fibrillation in asymptomatic patients with Brugada syndrome”.

The subjects of this study included 14 patients with VF and 48 consecutive asymptomatic patients, all with Brugada Syndrome. They defined “early phase” ECGs as ECGs taken >6 months before VF. Late phase ECGs are ECGs taken during the initial VF event. ECG parameters of the early and late phases were not different except for decreased ST voltage and low incidence of type 1 ECG in asymptomatic patients. In patients with VF, ECGs at the late phase had longer QRS intervals and intervals between the peak and the end of the T wave and more frequent type 1 ECG and fragmented QRS than did ECGs at the early phase. The authors conclude that QRS and ST-T wave abnormalities developed in association with the initial VF events. Aggravation of the conduction disturbance in addition to BrS-ECG promotes VF. These

findings suggest that there may be progression of diseases from one time point to the other. However, without a prospective study, it is difficult to confirm that these changes were due to progression of disease rather than due to transient and preventable clinical factors.

下一篇文章来自日本冈山大学的 **Morita** 等人。题目是“无症状 **Brugada** 综合征患者中，与心室颤动发生相关的心电图异常表现研究进展”。该研究包括 14 例发生室颤和 48 例持续无症状的 **Brugada** 综合征。在室颤患者中，他们将“早期”ECG 定义为在 VF 发生前，至少 6 个月的 ECG。晚期 ECG 是指 VF 事件发生期间的 ECG。在无症状患者中，他们选取了时间间隔大于 6 个月的两份心电图，发现除了 ST 电压降低和 1 型心电图发生率较低以外，早期和晚期的心电图参数没有差异。而在 VF 的患者中，晚期 ECG 则表现出更长的 QRS 间期和更长的 T 波峰值与 T 波终点的间期，并且比早期 ECG 更频繁的出现 1 型 ECG 和碎裂 QRS 波。作者认为，QRS 和 ST-T 波异常与 VF 事件发生相关。除 BrS-ECG 外，传导紊乱的恶化也会促进 VF。这些研究结果表明，这可能是疾病从一个时间点到另一个时间点的进展。然而，如果没有前瞻性研究，很难确定这些变化是由于疾病的进展而不是由于暂时的，可预防的临床因素引起。

Next up is a paper titled “A 10-year review of sudden death during sporting activities” by Dennis et al., from University of Sydney, Australia. The authors reviewed all autopsies conducted at their forensic medicine facility between 2006 and 2015. A total of 19,740 autopsies were completed in the study period. There were 201 sports-related adult deaths, at an incidence rate of 0.76-1.49 per 100,000 participant-years. Of the adult cases, 68% were due to cardiac causes, with coronary artery disease the most frequent cause. Of the 15 child deaths, 33% were arrhythmic or presumed arrhythmic, and 33% were related to inherited cardiomyopathies. The authors conclude that sudden cardiac death during sport is rare. Deaths are mostly due to coronary artery disease in adults, and cardiomyopathy or arrhythmia in children. A limitation is that this study was retrospective. Some of the premorbid conditions may not be included in the report. Therefore, it is unclear if these deaths could have been prevented.

接下来是澳大利亚悉尼大学 **Dennis** 等人的一篇题为“体育活动期间猝死的 10 年回顾”的文章。作者研究了 2006 年至 2015 年期间所有在其法医学机构进行的尸体解剖。在此期间共完成了 19,740 次尸体解剖。其中，成人与运动相关的死亡有 201 例，也就是每 10 万参赛者，年死亡率为 0.76-1.49。在成人病例中，68% 是由心脏疾病引起的，冠心病是最常见的原因。在 15 名儿童死亡中，33% 是由心律失常或疑似心律失常引起，还有 33% 与遗传性心肌病有关。作者认为，运动期间心脏性猝死比较少见。成人死亡主要是由于冠状动脉疾病，儿童则由于心肌病或心律失常。这项研究的局限性在于，它是回顾性的，可能并未包含某些病前病症。因此，尚不清楚这些死亡是否可以被预防。

Up next is a paper by Minami et al from Tokyo Women's Medical University, in Japan. The paper is titled “B-type natriuretic peptide and risk of sudden death in patients with hypertrophic cardiomyopathy”. The authors measured plasma BNP levels at the initial evaluation in 346 patients with hypertrophic cardiomyopathy. The median BNP level in the study patients was 197.2 pg/mL. During a median follow-up period of 8.4 years, 37 patients experienced the combined end point of sudden death or potentially lethal arrhythmic events. Patients with BNP levels >312 pg/mL were at a significantly higher risk of sudden death and the combined end point than were patients with low BNP levels. Multivariable analysis showed that high BNP levels were an independent determinant of the combined end point. The authors conclude that elevated BNP levels may be associated with sudden death and the combination of

sudden death or potentially lethal arrhythmic events in patients with hypertrophic cardiomyopathy. The journal has previously published two papers on BNP and sudden death. In 2014, Levine et al. reported BNP is independently associated with ventricular arrhythmias in patients with ICDs, and Medina et al. reported in 2016 that BNP was an independent risk factor for ventricular arrhythmias in the MADIT-CRT population. All three studies suggest that BNP is important in arrhythmia risk stratification.

下面是来自日本东京女子医科大学 Minami 等人的文章。题目是“B 型钠尿肽与肥厚型心肌病患者的猝死风险”。作者对 346 例肥厚型心肌病患者进行了血浆 BNP 水平测量。中位 BNP 水平为 197.2 pg / mL。在中位 8.4 年的随访期间，37 例患者发生了猝死或潜在致命性心律失常的联合终点事件。BNP 水平 > 312 pg / mL 的患者发生猝死及联合终点事件的风险显著高于 BNP 水平低的患者。多变量分析显示，高 BNP 水平是联合终点事件的独立决定因素。作者得出结论，BNP 水平升高可能与肥厚型心肌病患者的猝死和猝死或潜在致命性心律失常联合终点事件相关。本杂志此前曾发表过两篇关于 BNP 和猝死的文章。2014 年 Levine 等人报道，BNP 与 ICD 患者的室性心律失常独立相关，2016 年 Medina 等报道，BNP 是 MADIT-CRT 人群室性心律失常的独立危险因素。所有三项研究均表明 BNP 在心律失常危险分层中非常重要。

Up next is a paper titled “A QRS axis-based algorithm to identify the origin of scar-related ventricular tachycardia in the 17-segment American Heart Association model” by Andreu et al., from Barcelona, Spain. The authors used a frontal plane axis-based ECG algorithm, together with the polarity in leads V3 and V4, to predict the segment of origin of VT. The results were compared with the site of origin determined during invasive EP mapping procedures. The ECG correctly predicted the segment of origin 82% of the time. There were no differences in the accuracy of the algorithm based on the segment of origin or the type of structural heart disease. The authors conclude that this novel QRS axis-based algorithm accurately identifies the segment of origin of VT in the 17-segment American Heart Association model. Non-invasive determination of the origin of VT based on surface ECG is an important but difficult task. I can refer the readers to an accompanying editorial written by Bazan and Marchlinski, who review multiple other ECG algorithms and suggest possible further improvements of the ECG criteria.

接下来是来自西班牙巴塞罗那的 Andreu 等人的一篇文章，“在 17 节段分区的美国心脏协会心脏模型中，基于 QRS 轴的算法识别瘢痕相关室性心动过速的起源”。作者使用基于前平面轴的 ECG 算法，以及 V3 和 V4 导联的极性来预测 VT 的起源部分。将其结果与侵入性电生理标测中确定的起源位置进行比较。心电图在 82% 的时间内准确预测了起源部位。基于起源部位或结构性心脏病类型的算法，准确性没有差异。作者得出结论，这种新的基于 QRS 轴的算法可在 17 节段美国心脏协会模型中准确地识别 VT 的起源部分。应用体表 ECG 非侵入性地确定 VT 的起源是重要但困难的任务。我可以推荐 Bazan 和 Marchlinski 的社论评论，他们检讨多种其他 ECG 算法，给出能进一步完善 ECG 标准的建议。

Muser et al. from University of Pennsylvania wrote the following article, titled “Outcomes with prophylactic use of percutaneous left ventricular assist devices in high-risk patients undergoing catheter ablation of scar-related ventricular tachycardia: A propensity-matched analysis”. The authors studied 75 high-risk patients who received percutaneous left ventricular assist devices, or “pLVADs,” while undergoing catheter ablation of scar-related VT. They also included a control population with similarly high risk but without prophylactic pLVAD placement. Periprocedural acute hemodynamic decompensation occurred in 7% in the prophylactic pLVAD group and in 23% in the control group. The

subsequent 12-month cumulative incidence of VT was not different, but the 12-month incidence of death or transplant was 33% vs. 66%, respectively. In multivariable analysis, prophylactic pLVAD was independently associated with death or transplant. The authors conclude that prophylactic pLVAD placement in high-risk patients undergoing catheter ablation of scar-related VT is associated with a reduced risk of acute hemodynamic decompensation and death or transplant during follow-up without affecting VT-free survival. Future prospective randomized trials are needed to confirm the results of their study.

来自宾夕法尼亚大学的 Muser 等发表了一篇文章，题目为“对接受导管消融的瘢痕相关性室性心动过速患者，预防性使用经皮左心室辅助装置治疗的效果：倾向匹配分析”。作者研究了 75 名接受经皮左心室辅助装置的高风险患者，也就是“pLVADs”，同时接受瘢痕相关性室速的导管消融。同时研究也入选了具有相似的高风险性，但没有预防性 pLVAD 植入的对照组。围手术期急性血流动力学失代偿在预防性 pLVAD 组中发生率为 7%，在对照组中为 23%。随后 12 个月的 VT 累积发病率没有差异，但 12 个月的死亡或移植率分别为 33% 和 66%。在多变量分析中，预防性 pLVAD 与死亡或移植独立相关。作者认为，在接受导管消融瘢痕相关性 VT 的高风险患者中预防性 pLVAD 与随访期间降低急性血流动力学失代偿和死亡或移植的风险相关，而且不影响无 VT 的生存。需要进一步的前瞻性随机试验来确认他们的研究结果。

Next up is a paper titled “Ventricular fibromas in children, arrhythmia risk, and outcomes: A multicenter study” by Jones et al. from University Hospital Bristol, in Bristol, United Kingdom. Ventricular fibromas are the second most common type of cardiac tumor in children. The authors report on a total of 19 patients with fibromas. Arrhythmias were common, with 5 patients presenting with cardiac arrest and 5 others having documented ventricular tachycardia. Nine of these patients have undergone surgical resection at various hospitals, and all these patients have survived with good long-term outcomes. There were no recurrences of arrhythmia after surgery, and the need for a defibrillator was alleviated in all cases. The authors conclude that ventricular fibromas have a high propensity to cause malignant arrhythmias, and if they are not managed appropriately, mortality is high. The outcomes of surgical resection are good, regardless of tumor size, and this represents the best therapeutic option, with most patients being symptom-free on the long term. An important lesson from this case series is that preventative surgical resection is associated with good clinical outcomes. This is particularly true in small children, among whom the complication rate of ICDs remains high.

接下来是由 Jones 等人撰写的题为“儿童心室纤维瘤，心律失常风险和预后：多中心研究”的文章。来自英国布里斯托尔的布里斯托尔大学医院。心室纤维瘤是儿童中第二常见的心脏肿瘤。作者共报告了 19 名纤维瘤的患者，心律失常的发生很常见，5 例患者出现心脏骤停，另外 5 例有室性心动过速。其中 9 名患者在不同医院接受了手术切除，所有患者均存活，并取得了良好的长期疗效。手术后没有复发心律失常，并且在所有病例中都减少了对除颤器的需求。作者得出结论，心室纤维瘤高危引起恶性心律失常，如果管理不当，死亡率很高。无论肿瘤大小如何，手术切除的结果都很好，这可能是最好的治疗选择，并且大多数患者长期无症状。源于这些病例的一个重要启示是预防性手术切除与良好的临床预后相关。在小孩中尤其如此，因为他们 ICD 并发症的发生率仍然很高。

The next paper is “Prospective blinded evaluation of a novel sensing methodology designed to reduce inappropriate shocks by the subcutaneous implantable cardioverter-defibrillator” by Theuns et al., of Erasmus University Medical Center, in Rotterdam, The Netherlands. The purpose of this study was to

evaluate the effects of a new high pass filter, called “SMART Pass,” on shock frequency in ambulatory patients with the subcutaneous ICD. The study cohort consisted of 1984 patients, and a total of 880 shocks were adjudicated. At implantation, SMART Pass was enabled in one third of the patients. The results showed that SMART Pass reduced the risk for all inappropriate shocks by 68%. The incidence of inappropriate shocks was 4.3% in the SMART Pass enabled arm vs. 9.7% in the SMART Pass disabled arm. The incidence of appropriate shocks was similar, as was the time to treat the first appropriate shock, between groups. The authors conclude that the SMART Pass filter reduces inappropriate shocks from the subcutaneous ICD without a negative effect on delivery of appropriate shocks. An accompanying editorial by Swerdlow points out that in transvenous ICDs, some high-pass filters have been associated with failure to treat VF. Thus, there is reason for caution. The present study is an encouraging first step to eliminate a major problem of subcutaneous ICD, that is, inappropriate shocks. However, more data will be needed to further confirm the clinical benefit of the new high pass algorithm.

下一篇文章是荷兰鹿特丹伊拉斯姆斯大学医学中心 Theuns 等人发表的“对一种旨在减少皮下植入式心律转复除颤器不适当放电的新感知方法的前瞻性盲法评估”。本研究的目的是评估在非卧床患者中新型高通滤波器（称为“SMART Pass”）对皮下 ICD 放电频率的影响。该研究由 1984 例患者组成，共发生 880 次放电。植入时，三分之一的患者启用了 SMART Pass。结果显示，SMART Pass 减少了 68% 的不适当放电风险。SMART Pass 启用组的不适当放电发生率为 4.3%，非启用组为 9.7%。而两组间的合理放电发生率相似。由此作者得出结论，SMART Pass 可以减少皮下 ICD 的不适当放电，同时又不影响合理放电。Swerdlow 指出经静脉 ICDs 中，一些高通滤波器与除颤治疗失败相关。因此仍应谨慎。这项研究为解决皮下 ICD 面临的主要问题，即不适当放电，迈出了令人鼓舞的一步。然而高通滤波的临床获益性仍然需要更多的数据进一步证实。

Houston et al. from the Medical University of South Carolina wrote the following article titled “Acute biventricular hemodynamic effects of cardiac resynchronization therapy in right bundle branch block”. Forty patients (9 with RBBB and 31 with LBBB) undergoing CRT implantation underwent temporary pacing with varying pacing configurations and AV delay. The results show that patients with LBBB had a greater LV dP/dt maximum response to CRT than did patients with RBBB. In patients with RBBB, single- or dual-site RV pacing configurations resulted in greater increases in RV dP/dt(max) than did biventricular pacing. Optimal AV delays that maximized RV dP/dt(max) were shorter than optimal AV delays for LV dP/dt(max). Furthermore, AV delays chosen to maximize improvement in RV dP/dt(max) frequently resulted in negative effects on LV dP/dt(max). The authors conclude that the biventricular hemodynamic response in heart failure patients with RBBB might be improved by optimizing pacing modalities and AV delays. This may be particularly important in patients in whom RV failure predominates, such as patients with pulmonary hypertension and LV assist devices. Because RV failure is a clinical problem without any good solution available, the findings reported in the present study may lead to the improvement of device management in those patients.

下面是南卡罗来纳医科大学的 Houston 等人的文章，“右束支传导阻滞的心脏再同步治疗的急性双心室血流动力学效应”。40 例 CRT 植入的患者（其中 9 例 RBBB，31 例 LBBB），接受了不同起搏模式和 AV 延迟的临时起搏。结果显示，与 RBBB 患者相比，LBBB 患者对 CRT 的左室 dP / dtmax 反应更强。在 RBBB 患者中，单位点或双位点 RV 起搏模式导致右室的 dP / dt (max) 比双心室起搏更大。最大化 RV dP / dt (max) 的最佳 AV 延迟短于 LV dP / dt (max) 的最佳 AV 延迟。此外，选择最大化 RV dP / dt (max) 改善的 AV 延迟经常对 LV dP / dt (max) 产生负面影响

响。作者认为，**RBBB** 的心力衰竭患者的双心室血流动力学效应可能可以通过优化起搏模式和 **AV** 延迟得到改善。这对于 **RV** 衰竭为主的患者尤其重要，例如肺动脉高压和 **LV** 辅助装置的患者。由于 **RV** 衰竭是一个没有较好解决方案的临床问题，本研究的结果可能会对改善这些患者的设备管理模式提供参考。

The next article is “Prognostic value of global longitudinal strain in heart failure patients treated with cardiac resynchronization therapy” by Khidir et al., from Leiden University Medical Center, The Netherlands. The study included 829 heart failure patients treated with CRT. The primary endpoint was the combination of all-cause mortality, heart transplantation, and LV assist device implantation. The secondary endpoint was the occurrence of ventricular arrhythmias or appropriate implantable defibrillator device therapies. During follow-up, 332 patients reached the primary endpoint, and 233 presented with the secondary endpoint. Patients in the quartile with the most impaired LV global longitudinal strain had a 2-fold higher risk of reaching the combined endpoint compared with patients in the best quartile of LV global longitudinal strain. LV global longitudinal strain was significantly associated with the combined endpoint. The authors conclude that in this large cohort of CRT patients, baseline LV global longitudinal strain was independently associated with death, transplant, or LVAD implantation. Global longitudinal strain is measured by speckle-tracking strain imaging as the average LV longitudinal chamber deformation in a cardiac cycle. It is an important index of left ventricular systolic function and is useful in patients with both reduced and preserved ejection fraction. More studies are needed to further document the importance of strain in managing patients with arrhythmias.

下一篇文章是来自荷兰莱顿大学医学中心的 **Khidir** 等人的“心脏再同步治疗的心力衰竭患者的全局纵向应变的预测价值”。该研究包括 **829** 名接受 **CRT** 治疗的心力衰竭患者。主要终点是全因死亡，心脏移植和 **LV** 辅助装置植入的联合终点。次要终点是发生室性心律失常或合理的植入式除颤器装置治疗。在随访期间，**332** 名患者达到主要终点，**233** 名患者出现次要终点。与 **LV** 全球纵向应变的最佳四分位数患者相比，**LV** 全球纵向应变最差的四分位数患者达到联合终点的风险高 **2** 倍。**LV** 全局纵向应变与联合终点显著相关。作者认为，在大量 **CRT** 患者中，基线水平 **LV** 全局纵向应变与死亡，移植或 **LVAD** 植入独立相关。通过斑点追踪技术测量全局纵向应变作为心动周期中的平均 **LV** 纵向腔室变形，是左心室收缩功能的重要指标，可用于射血分数减少和保留的患者。需要更多的研究来进一步证明应变在心律失常患者管理中的重要性。

Up next is “Left ventricular regional remodeling and lead position during cardiac resynchronization therapy” by Kronborg et al., from Aarhus University Hospital, Denmark. A total of 107 consecutive patients were included. The change in systolic wall thickening from baseline to follow-up was -19% in concordant segments, -0.1% in adjacent segments, and 20% in remote segments. In nonresponders with nonischemic cardiomyopathy, the authors observed a significant reduction in wall thickening in concordant and adjacent segments, with no increase in wall thickening in remote segments. The authors conclude that during CRT, systolic wall thickening increases in segments remote to LV lead position. An accompanying editorial by Wilson and Deschenes relates these remodeling changes to intracellular calcium concentration. The accumulation of myocardial calcium in high-stress, late-activated segments is expected to initiate hypertrophic signaling pathways, leading to hypertrophy and heart failure. CRT restores the normal activation sequence and restores the intracellular Ca concentration, leading to reverse remodeling in late-activated segments.

接下来是来自丹麦奥胡斯大学医院的 Kronborg 等人的“心脏再同步治疗期间的左心室局部重构和导联位置”。共纳入 107 名患者。从基线到随访期，收缩期室壁增厚的变化在与左室导联一致的节段为-19%，在相邻节段为-0.1%，在远离的节段为 20%。在非缺血性心肌病无应答者中，作者观察到与左室导联一致的节段和相邻节段的室壁增厚显著减少，而远离的节段的室壁增厚没有增加。作者得出结论，在 CRT 治疗期间，远离 LV 导联位置的节段，收缩期室壁增厚增加。

Wilson 和 Deschenes 的一篇随刊评论将这些重构变化与细胞内钙浓度联系起来。在高压压力，激动晚的节段中，心肌钙的积累可能启动肥大的信号传导途径，导致肥大和心力衰竭。CRT 治疗可恢复正常激动顺序并恢复细胞内 Ca 浓度，导致晚期激动节段的逆向重构。

The next article is “Determinants of heart rate variability in the general population: The Lifelines Cohort Study” by Tegegne et al., from University of Groningen, the Netherlands. The authors analyzed baseline data of 10-second electrocardiograms from the Lifelines Cohort Study, with 149 thousand participants. They found that HRV strongly declined with age and was consistently higher in women. These demographic factors together explained 17.4% of the variance in Root Mean Square of the Successive Differences. Adding lifestyle and psychosocial factors to the model as well explained less than 0.5% of the variance. The authors conclude that age and sex were the most important determinants in this very large general population cohort, explaining almost one-fifth of the individual differences in HRV. The additional contribution of lifestyle and psychosocial factors was negligible. The strength of the study is the large number of participants included in the study. However, a single 10-second standard supine ECG segment may insufficiently reflect the potential impact of environmental factors and psychosocial status.

下一篇文章来自荷兰格罗宁根大学的 Tegegne 等人，题目是“一般人群心率变异性的决定因素：生命线队列研究”。作者分析了来自 Lifelines 队列研究的 10 秒心电图的基线数据，有 149,000 名参与者。他们发现 HRV 随着年龄的增长而明显下降，并且在女性中一直较高。这些人口统计因素共同解释了 RMSSD 这一指标 17.4% 的偏差，RMSSD 就是相邻 RR 间期差值的均方根。生活方式和心理社会因素解释了不到 0.5% 的方差。作者得出结论，年龄和性别是一般人群中最重要决定因素，解释了大约五分之一的 HRV 个体差异。生活方式和心理社会因素可以忽略不计。该研究的优势在于研究中包含大量参与者。然而，单个 10 秒标准仰卧位心电图片段可能不足以反映环境因素和社会心理状态的潜在影响。

William et al. from the Cleveland Clinic wrote the next article titled “Assessing the Accuracy of an Automated Atrial Fibrillation Detection Algorithm Using Smartphone Technology - the iREAD Study”. This is a single-center, adjudicator-blinded case series of 52 consecutive patients with AF. The authors studied automated AF detection using the Kardia Mobile Cardiac Monitor (KMCM), which is a popular smart phone linked handheld device that can record cardiac rhythm tracings. The results were compared with 12-lead electrocardiograms (ECGs). There were 225 nearly simultaneously acquired KMCM and ECG recordings. The KMCM automated algorithm interpretation had 96.6% sensitivity and 94.1% specificity for AF detection as compared with physician-interpreted ECGs. Sixty-two recordings (27.6%) were unclassified by the KMCM algorithm. In these instances, physician interpretation of KMCM recordings had 100% sensitivity and 79.5% specificity for AF detection as compared with 12-lead ECG interpretation. The authors conclude that the KMCM system provides sensitive and specific AF detection relative to 12-lead ECGs when an automated interpretation is provided. Patients with chronic diseases such as hypertension and diabetes rely on inexpensive equipment to frequently measure blood pressure

and serum glucose levels for optimal disease control. It is also possible that similarly accurate and inexpensive automated AF detection methods can improve patient care.

来自克利夫兰诊所的威廉等人发表了一篇题为“一种基于智能手机技术的心房颤动自动检测算法的准确性评估 - iREAD 研究”的文章。是一个单中心，由 52 名连续 AF 患者组成的病例系列。作者研究了采用 Kardia 移动心脏检测仪 (KMCM) 进行的房颤自动检测，KMCM 是一种连接智能手机的用于心律记录的手持设备。将结果与 12 导联心电图 (ECG) 进行比较。KMCM 和 ECG 获得了几乎同步的 225 个记录。相较于医生解读的 ECG，KMCM 自动算法对 AF 检测具有 96.6% 的灵敏度和 94.1% 的特异性。62 个记录 (27.6%) 未被 KMCM 算法分类，对于这些记录，比较医生解读的 KMCM 记录的心电图和 12 导联心电图，KMCM 的记录对 AF 检测具有 100% 的灵敏度和 79.5% 的特异性。作者认为，自动解读时，KMCM 系统提供了类似于 12 导联心电图的、灵敏且特异的 AF 检测能力。患有高血压和糖尿病等慢性疾病的患者可以利用比较便宜的设备经常测量血压和血糖水平，以实现最佳疾病控制。类似的准确且便宜的自动 AF 检测方法也可以改善患者管理。

Next up is “Complex aberrant splicing in the induced pluripotent stem cell-derived cardiomyocytes from a patient with long QT syndrome carrying KCNQ1-A344Asp1 mutation” by Wuriyanghai, from Shiga University of Medical Science, Japan. Type 1 LQT syndrome is caused by mutations in the KCNQ1 gene. The authors generated human-induced pluripotent stem cell-derived cardiomyocytes from peripheral blood mononuclear cells obtained from a patient with LQT1 carrying the mutation KCNQ1-A344Asp1, which is a synonymous amino acid change of Alanine to Alanine at residue 344 but causes a splicing error. Using those cells, the authors identified 7 aberrant RNA variants, which were more complex compared with those in peripheral lymphocytes. After administering 500 nanomolar isoproterenol, action potential durations of human-induced pluripotent stem cell-derived cardiomyocytes with that variant were significantly longer than those of the controls. The authors conclude that they have identified complex aberrant messenger RNA variants in the pluripotent stem cell-derived cardiomyocytes model and successfully recapitulated the clinical phenotypes of the patient with concealed LQT1. A eukaryotic gene is transcribed to a precursor messenger RNA that is spliced into mRNA by removing their intronic sequences and retaining the exonic sequences. Splicing errors cause aberrant mRNA variants that in this case negatively affected potassium channel function, causing long QT syndrome. Therefore, this study provides new insights into the pathogenesis of a common LQT1 mutation.

接下来是来自日本滋贺医科大学的 Wuriyanghai 的，“携带 KCNQ1-A344Asp1 突变的长 QT 综合征患者的诱导性多能干细胞起源的心肌细胞的复杂异常剪接”。1 型 LQT 综合征是由 KCNQ1 基因突变引起的。作者从携带 KCNQ1-A344Asp1 突变的 LQT1 的患者中获得外周血单核细胞，产生人诱导的多能干细胞来源的心肌细胞，它是丙氨酸与丙氨酸 344 残基的同义氨基酸改变，但引起剪接错误。利用这些细胞，作者确定了 7 种异常 RNA 变体，与外周淋巴细胞相比更为复杂。在使用 500nM 异丙肾上腺素后，具有该变体的人诱导性多能干细胞所分化的心肌细胞的动作电位时间显著长于对照组。作者得出结论，他们能够在多能干细胞分化的心肌细胞模型中识别复杂的异常信使 RNA 变体，并成功地获得了隐匿型 LQT1 患者的临床表型。将真核基因转录为前体信使 RNA，通过去除其内含子序列并保留外显子序列将其剪接成 mRNA。剪接错误导致异常 mRNA 变体，在这种情况下负向影响钾通道功能，导致长 QT 综合征。因此，本研究为常见的 LQT1 突变的发病机制提供了新的视角。

The next article is a Hands-On article titled “How to perform left atrial appendage electrical isolation using radiofrequency ablation” written by Romero et al., from Albert Einstein College of Medicine. It is followed by an Unknown of the Month titled “A wobbling tachycardia: what is the mechanism?” by Moore et al., from Royal Prince Alfred Hospital, Australia. This is followed by a special Point-of-View article by Dr. Melvin Scheinman of UC San Francisco. In that article, Dr. Scheinman reflects on his long and illustrious career in cardiac electrophysiology. The Josephson and Wellens ECG this month is prepared by Dr. Hein Wellens. The title of the ECG is “A 73 year old woman with high degree AV block.” In addition, we have 4 EP News articles. Finally, the journal publishes a Guideline article entitled “2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death”. The writing Committee was chaired by Dr Sana M. Al-Khatib.

下一篇文章是由阿尔伯特爱因斯坦医学院的 **Romero** 等人分享的实际操作经验性文章，“如何使用射频消融进行左心耳电隔离”。接下来的是来自澳大利亚皇家阿尔弗雷德皇家医院的 **Moore** 等人的一篇名为“心动周期变化性（摆动性）心动过速：机制是什么？”的文章。接下来是加州大学旧金山分校 **Melvin Scheinman** 医生的文章。文章中，**Scheinman** 医生回顾了他在心脏电生理学领域长期的、杰出的职业生涯。本月 **Josephson** 和 **Wellens** 心电图课程由 **Hein Wellens** 医生准备，题目是“一例高度房室传导阻滞的 73 岁女性患者。”此外，我们有 4 篇电生理新闻文章。最后，刊登了“2017 年 AHA / ACC / HRS 室性心律失常患者管理和心脏猝死预防指南”。**Sana M. Al-Khatib** 医生担任撰写委员会主席。

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

最后，希望大家喜欢本期的内容。我是《心律学》杂志的主编，陈鹏生。再次感谢大家的收听。