EDITORIAL

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Unexplained syncope: what time-to-diagnosis and risk profiles tell us

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Syncope is a sudden, transient loss of consciousness resulting from cerebral hypoperfusion, typically followed by rapid and complete recovery. Population-based data from individuals aged > 45 years estimate a lifetime prevalence of approximately 19%, with higher incidence observed in women [1].

Implantable loop recorders (ILRs) have significantly improved the diagnostic approach for patients with unexplained syncope, especially when conventional tests, including electrocardiogram (ECG), Holter monitoring, echocardiography, and the head-up tilt test, are inconclusive. According to the 2017 guidelines from American College of Cardiology/American Heart Association/Heart Rhythm Society, ILRs are indicated in patients with suspected arrhythmic syncope that remains unexplained after initial evaluation, including those with or without underlying structural heart disease [2]. The 2018 European Society of Cardiology (ESC) guidelines recommend ILR implantation during the early evaluation of patients with recurrent syncope of unknown origin, particularly when there are no high-risk features but a high likelihood of recurrence. ILRs are also indicated in high-risk patients when a thorough workup fails to identify the cause, and there is no clear indication for implantable cardioverter difibrillator or pacemaker therapy [3].

ILRs have been shown to significantly improve the likelihood of identifying arrhythmic causes compared with conventional methods. The PICTURE registry, an observational study evaluating 570 patients with unexplained recurrent syncope, demonstrated that ILRs enabled a definitive diagnosis in 78% of patients who experienced events during follow-up [4].

The present study by Kim et al. [5] is a large-scale, multicenter registry analysis evaluating the utility of ILRs in Korean patients with unexplained syncope. Among 394 patients who underwent ILR implantation, serious arrhythmias were identified in 52% of cases, which was remarkably high compared to previous studies that reported diagnostic yields of 16–48%. Sick sinus syndrome (SSS) was the most common diagnosis (43.7%), followed by atrioventricular block (6.1%) and ventricular arrhythmias (2.3%).

Notably, over one-third of arrhythmic events were detected within the first month post-implantation, highlighting the early diagnostic value of ILRs. The FRESH study, a randomized trial comparing ILR implantation with conventional evaluation, demonstrated that ILR had a higher diagnostic yield, emphasizing the importance of early use [6]. Similarly, Kim et al. [5] emphasized the importance of early ILR implantation in patients with unexplained syncope. A unique and significant contribution of this study is the identification of two predictors of SSS: enlarged left atrial volume index (LAVI ≥ 34 mL/m²) and baseline sinus bradycardia (< 60 bpm). While previous studies focused on age or conduction abnormalities, few explored the predictive role of echocardiographic markers. The observed association of an enlarged LAVI, a marker of atrial remodeling, with SSS supports the concept of atrial cardiomyopathy as a shared pathophysiological substrate for both bradyarrhythmias and atrial tachyarrhythmias. Furthermore, the combination of structural and electrical indicators may enable better stratification of patients at risk of underlying sinus node dysfunction.

A limitation of the present study is the lack of evaluation

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of additional echocardiographic parameters beyond the LAVI. A previous study has shown that in patients with unexplained syncope who were later diagnosed with ventricular tachycardia (VT) using ILR, echocardiographic findings, such as increased left ventricular (LV) mass index, reduced global longitudinal strain, and greater mean LV wall thickness, were significantly associated with VT risk [7]. These findings support the value of a more comprehensive echocardiographic evaluation before ILR implantation as a tool for stratifying patients according to their arrhythmic risk. Incorporation of both atrial and ventricular structural markers may further refine patient selection and improve the overall diagnostic yield of ILRs in clinical practice.

Despite this limitation, this study provides important insights into the clinical application of ILRs for unexplained syncope, and proposes practical predictors for improved patient selection. The integration of echocardiographic parameters with simple ECG findings offers a feasible, noninvasive approach to guide ILR use in real-world practice. Such tools may help prioritize high-risk patients, optimize resource utilization, and facilitate the earlier diagnosis of life-threatening arrhythmias. Future prospective studies are needed to validate these findings and to determine the role of LAVI into diagnostic algorithms for syncope evaluation.

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