

ArrhythmiaNEWS

From the Al-Sabah Arrhythmia Institute at St. Luke's-Roosevelt Hospital Center

Arrhythmia News is a physician bulletin providing arrhythmia updates and information on services at **St. Luke's-Roosevelt Hospital Center** which may benefit your practice and your patients.

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Implantable Loop Recorders: When, Why, and Which One?

The technologies available for remote patient monitoring of patients with suspected cardiac arrhythmias have evolved over time. Specifically, from the original 24-hour Holter monitor have emerged event monitors, loop recorders, auto-triggered loop recorders, and most recently, mobile cardiovascular telemetry systems.

A central theme has emerged from this evolution: the diagnostic yield of any monitoring strategy increases as the monitoring period is increased. Towards that end, implantable loop recorders (ILRs) offer the best opportunity for long-term continuous ECG monitoring. The current challenge is to identify patients most suited to receive this novel technology.

Implantable loop recorders (ILR) have been best studied in patients with unexplained syncope. Given the intermittent nature of recurrent syncopal episodes, it is not surprising that **ILRs (capable of**

providing continuous single lead ECG data) have been shown to be superior at establishing a diagnosis as compared to conventional strategies such as event monitors, tilt table tests, and electrophysiologic testing.

Each of these conventional tools is associated with poor sensitivity for establishing a diagnosis of bradycardia.⁽¹⁾ How do we select patients with unexplained syncope who are appropriate candidates for an ILR?

Who is the Ideal ILR Patient?

Young patients without structural heart disease generally have a form of neurally-mediated syncope and can typically be treated with basic lifestyle modifications and reassurance. On the other hand, older patients with underlying structural heart disease (especially left ventricular dysfunction) should receive an implantable cardioverter-defibrillator (ICD) based on the results of multiple, randomized, clinical trials. Similarly, patients with genetic conditions known to be associated with high risk for sudden death (e.g. hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, short and long QT syndrome, Brugada syndrome, etc.) should also receive an ICD when presenting with unexplained syncope.




A cohort of patients who may be particular well suited for an ILR are middle-aged to older patients with an abnormal ECG such that one suspects underlying sinus node, AV node and/or His-Purkinje system disease as the cause for syncope. An example of this type of patient is one with underlying bifascicular block (e.g. left bundle branch block or right bundle branch block with anterior or posterior fascicular block) and

unexplained syncope. Historically, these patients have been treated with an electrophysiology study guided management strategy. However, data from ILR studies shows that **1/3 of patients with a normal electrophysiology study will still proceed onwards to complete heart block** and benefit from dual chamber pacemaker implantation.⁽²⁾ Conversely, empiric pacemaker implantation in all such patients would result in "over-treatment" in the vast majority.

Other Potential ILR Uses

In our practice, we advocate ILR in patients with unexplained syncope, especially those in whom the episodes are recurrent, associated with trauma, or occurring in the presence of an abnormal ECG. However, there are many other potential uses for this technology. These include patients with recurrent unexplained palpitations and for risk stratification of patients post-myocardial infarction as well as asymptomatic patients with an underlying high-risk genetic condition such as hypertrophic cardiomyopathy and Brugada syndrome.

One of the most exciting areas for potential use is for atrial fibrillation monitoring. This includes post atrial fibrillation ablation monitoring (to assess procedural efficacy and define the need for continued antiarrhythmic drug therapy and anticoagulation) and searching for atrial fibrillation in patients with cryptogenic stroke. Towards this end, a number of ILRs have recently been approved by the FDA capable of providing answers in these various disease states (Figure). Further studies are need to determine the clinical utility of ILRs in these settings.

Implantable Loop Recorder (ILR) Product Profiles			
ILR Device	Reveal XT	Confirm ICM	Sleuth AT
			
Manufacturer	Medtronic	St. Jude	Transoma Medical
FDA Approved Indication	<ul style="list-style-type: none"> Patients with clinical syndromes or situations at increased risk of cardiac arrhythmias Patients who experience transient symptoms that may suggest a cardiac arrhythmia 		
Size and Comparable Item	8 cc Similar to: memory stick drive	6.5 cc Similar to: memory stick drive	8 cc Similar to: 50-cent piece or small pacemaker, with flexible antenna
Additional components	<ul style="list-style-type: none"> Hand held, personal diagnostic manager (PDM) Home transmitter/base station 	<ul style="list-style-type: none"> Hand held, activator box Home transmitter/base station Programming device/ portable computer (for doctor only) 	<ul style="list-style-type: none"> Hand held, personal diagnostic manager (PDM) Home transmitter/base station
Monitoring Service	Medtronic CareLink Network for data storage and physician notification of events	St. Jude Merlin Network for data storage and physician notification of events	Medicomp: 24/7 monitoring by certified cardiac technicians with alert to physicians of substantive events
Placement	Subcutaneous, chest area	Subcutaneous, chest area	Subcutaneous, chest toward shoulder
Data Collection Modes	<ul style="list-style-type: none"> Patient triggered storage Automatic programmed storage at predetermined heart rates 49.5 min of stored electrograms Transtelephonic monitoring 	<ul style="list-style-type: none"> Patient triggered storage Automatic programmed storage at predetermined heart rates 48 min of stored electrograms Transtelephonic monitoring 	<ul style="list-style-type: none"> Patient triggered storage Automatic programmed storage at predetermined heart rates Automatic capture every 20 sec, 7.5 min, 15 min, or 4 hr 43 min of stored electrograms Wireless transmission of data to PDM and transtelephonic delivery to Medicomp Service
Longevity (battery life)	3 years	3 years	2.3 years

References

- Krahn AD, Klein GJ, Yee R, Skanes AC. *Randomized assessment of syncope trial: Conventional diagnostic testing versus a prolonged monitoring strategy.* Circulation 2001; 104: 46-51.
- Brignole M, Menozzi C, Moya A, Garcia-Civera R, Mont L, Alvarez M, Errazquin F, Berras J, Bottoni N, Donato P. *Mechanism of syncope in patients with bundle branch block and negative electrophysiological test.* Circulation 2001; 104: 2045-2050.

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