

CARDIAC ARRHYTHMIA SPOT LIGHT

Delayed identification of high-degree atrioventricular block with prolonged asystole revealed after the removal of an implantable loop recorder owing to battery depletion

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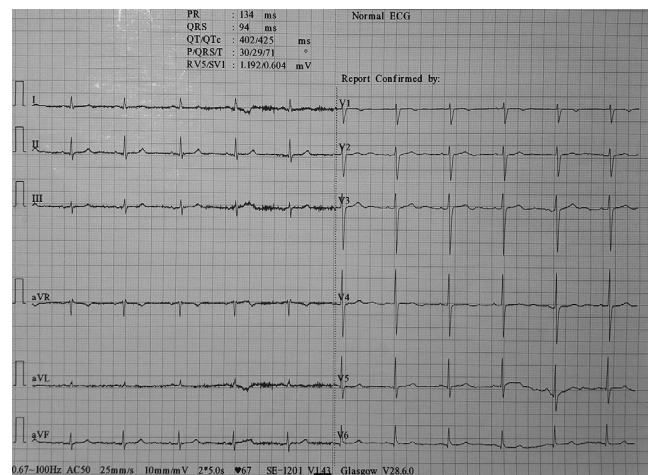
KEYWORDS

high-grade atrioventricular block, implantable loop recorder, prolonged follow-up, syncope

Implantable loop recorders (ILRs) represent useful tools for the diagnosis of a wide variety of heart rhythm disorders in the setting of unexplained syncope investigation or in patients with other cardiovascular conditions (ie, palpitations and cryptogenic stroke) that may have an arrhythmic origin.

A 55-year-old woman referred to our tertiary center for further evaluation of recurrent syncopal episodes with a plan for ILR implantation. The patient had a 3 year history of syncope reporting at least four episodes of sudden loss of consciousness, two of them associated with head injury. The last syncopal episode happened 1 month before the referral. She did not mention any precipitating factor or other associated symptoms while the episodes occurred both in the erect and in the sitting position. Her past medical history was significant only for hypertension treated with irbesartan, and hyperlipidemia treated with atorvastatin.

The 12-lead electrocardiogram of the patient did not show any specific abnormality (Figure 1). Several investigations had been made in order to elucidate the cause of these blackouts without any abnormal finding. These included electrocardiograms, 48-hour Holter recordings, echocardiogram, exercise stress test, tilt test, orthostatic challenge tests, and carotid sinus massage. All laboratory examinations, including thyroid function and autoimmunity tests, were within normal limits. Also, she had undergone full clinical and laboratory neurological assessment which was unremarkable.

**FIGURE 1** Baseline 12-lead ECG of the patient

An ILR (Medtronic Reveal[®] XT) was implanted under local anesthesia. The patient did not suffer any syncopal episode for the following 34 months, while no rhythm disturbance or heart rate incompetence was detected at regular device interrogations performed at regular 6 month intervals. Eventually, the device explanted owing to battery depletion. Our patient was not subjected to a successive ILR implantation immediately after the removal of the

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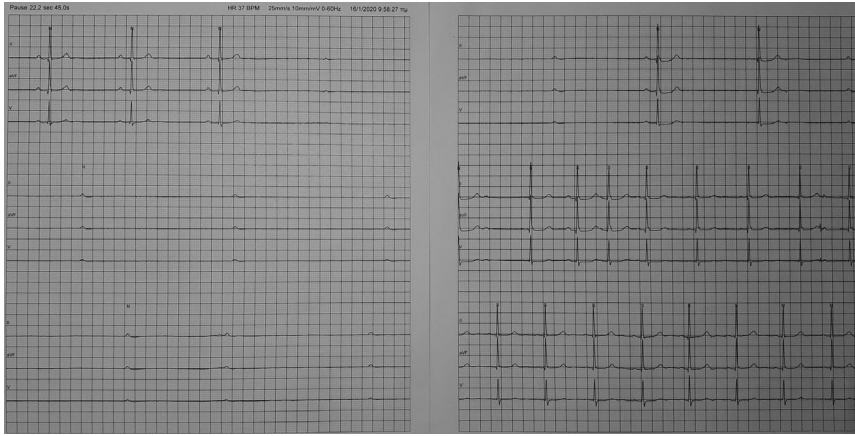


FIGURE 2 Holter recording strip showing sudden onset of high-degree atrioventricular block with 22 seconds of ventricular asystole

first device. Firstly, the patient was not very keen on to proceed to a second ILR implantation since she did not suffer any syncopal event during the follow-up. However, an implantation of a second ILR had been planned 2 months after the explanation because the availability and provision of these devices in our hospital are not instant after the official request.

Of note, 28 days after ILR removal, the patient suffered a syncopal attack in the sitting position and suffered an injury in the right arm. A subsequent 24-hour Holter recording, performed 3 days after this event by a private cardiologist, showed a marked ventricular asystole (22 sec) in the context of advanced atrioventricular block in the afternoon while the patient had a blackout (Figure 2). A diagnosis of idiopathic high-grade atrioventricular block was made. The following day, she underwent a dual chamber pacemaker implantation.

This case highlights the potential need for very prolonged monitoring and close follow-up in selected cases of recurrent unexplained syncope. Despite the increased longevity of the new generation ILRs, the underlying bradycardic disorder in our patient was not revealed during the lifetime of the device since she had a very prolonged event-free time period before the last syncope. In fact, ILRs have an excellent diagnostic ability to unravel a potential correlation between syncopal symptoms and disorders of heart rhythm. Current evidence supports the early implantation of ILRs in cases of unexplained recurrent syncope. Indeed, early ILR implantation even in low-risk patients with unexplained syncope provides a superior diagnostic yield and reduced health-care costs compared to other conventional strategies.

Our patient was proved to suffer from paroxysmal high-degree atrioventricular block. Idiopathic advanced atrioventricular conduction abnormalities are uncommon in the young and middle-aged individuals. The diagnostic ability of conventional tests is limited in this setting and therefore prolonged electrocardiographic monitoring is often required.

According to current data derived from real-life registries, an etiologic diagnosis can be obtained in up to one third of ILR patients for a mean follow-up of 1 year. Modern devices have the ability of extended monitoring even for more than a 3 year time period supporting a greater diagnostic efficacy. In a series of 161 patients with unexplained syncope, it was indicated that a prolonged observation up to 4 years increases the diagnostic yield of ILRs to


the level of 80%, while 26% of the diagnoses were made after the initial 18 month period. Notably, 14 of these patients received two successive ILRs, and two patients received three successive ILRs during the observation period. Also, the probability to reach an ILR-based diagnosis tended to be higher in patients with ≥ 3 syncopal episodes. In this context, it has also been demonstrated that patients with explanted ILRs (older models; median duration of recording 16 months) and no diagnosis at the time of removal suffer a relatively high rate of syncope recurrence (approximately 40%) within 4 years after removal. In this series, most of the recurrences had a neurally mediated profile, while the long-term prognosis was excellent without increased cardiac or sudden deaths. Of note, a second ILR was implanted in one patient owing to recurrences of syncope leading to a diagnosis of reflex syncope with prominent cardioinhibitory component.

In conclusion, patients with no diagnosis of syncope at the time of ILR removal (owing to battery depletion) should be further followed-up, even though they have a low mortality risk. In certain circumstances, the implantation of a second ILR may be necessary in order to prolong the electrocardiographic monitoring period and reach a definite diagnosis. In specific, successive implantation of an additional device in patients with a history of probable cardiac syncope is strongly recommended.

CONFLICT OF INTEREST

The authors declare no conflict of interest for this article.

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