Implantable Loop Recorder for a Patient with Unexplained Syncope

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Recent studies have shown that the incidence of syncope in emergency departments is 0.9–1.7% of all attendances. One-third of these patients are diagnosed with unexplained syncope despite complete medical check-up, and several non-invasive and invasive examinations.1–5) An implantable loop recorder (ILR) has a loop memory, which continuously records the electrical activity of the heart (Figure 1). When the ILR is activated by a patient with symptoms of syncope, the electrical activity of the heart several minutes before activation is stored and can be retrieved for analysis. ILR is a promising technology for elucidating the cause of syncope in patients with unexplained syncope.

Case report

A 70-year-old man with syncope was referred to our hospital. He had total loss of consciousness 3 times in the past 3 years and had suffered from a head injury the last time he was unconsciousness. The results of a physical examination and other tests including 12-lead ECG, Holter ECG, echocardiography, exercise stress test, carotid sinus massage and head-up tilt testing, were not indicative of the cause of syncope. With the patient’s consent, we decided to implant an ILR. Three months after ILR implantation, the patient had total loss of consciousness while he was playing golf. ILR recordings showed a transient complete atrioventricular block and 17 seconds of ventricular arrest (Figure 2). The patient underwent electrophysiological study with sodium channel blocker test to induce blockade of the specialized conduction system, and coronary angiography with acetylcholine stress test to induce vasoconstriction. No significant findings were obtained. Finally, a permanent pacemaker was implanted, and thereafter he did not have syncope.

An ILR is a small device that continuously monitors heart rhythms and records them automatically when the patient uses a hand-held activator. The device is implanted beneath the skin in the upper chest under local anesthesia (Figure 3) and has a battery life of up to 36 months. ILRs continuously record the electrical activity of the heart. If the recording suggests a heart-related cause of syncope, an appropriate therapy may be selected on the basis of the cause. When the possibility of arrhythmia can be ruled out, the treatment strategy may be based on other potential causes. The disadvantages associated with the use of ILRs include the need for a minor surgical procedure, the fact that sometimes it can be difficult to differentiate between supraventricular and ventricular arrhythmias, and the presence of under- or oversensing that may fill the memory.

The gold standard for the diagnosis of syncope associated with arrhythmia is when a correlation between the symptom and a documented arrhythmia is recorded. Although the absence of a recording of arrhythmia during syncope cannot be considered a specific diagnosis, it allows the exclusion of arrhythmia as the cause of the syncope. The prognosis of cardiogenic syncope is worse than that of syncope due to other cause.6) In addition, cardiogenic syncope may be an indicator of sudden cardiac death. ILRs may assist in the
identification of patients with cardio-
genic syncope.

Insurance reimbursement for ILR implantation has been granted in Japan since October, 2009. The number of implantations of ILR is increasing gradually every year. The ESC guidelines for the diagnosis and management of syncope, indicate that ILRs should be implanted during the early phase of evaluation in patients with recurrent syncope of uncertain origin and absence of high risk criteria (Class I, evidence level B), the guidelines also indicate implantation in high-risk patients in whom comprehensive evaluation did not indicate the cause of syncope or a specific treatment strategy (Class I, evidence level B). Initially, ILRs were used for diagnosis in patients with unexplained syncope at the end of a completely negative work-up. Recently, however, it is believed the early use of ILRs may be more cost-effective than conventional investigation strategies.

References


Figure 2 Transient complete atrioventricular block when the patient had total loss of consciousness.

Figure 3 Chest radiograph. Reveal implanted near the heart. Reveal is implanted under the skin at the site where more than 1 mV R wave of ECG may be recorded.