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Case Report

Migration of long-sensing vector implantable loop recorder unmasked by remote monitoring in patient with unexplained syncope

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ABSTRACT

A 75-year-old man with hypertrophic obstructive cardiomyopathy underwent placement of a long-sensing vector implantable loop recorder (ILR) for unexplained syncope. One month later, ILR remote monitoring revealed unstable R-wave amplitudes ranging from very high (>1.9 mV) to very low (<0.2 mV) values. During an in-hospital clinic visit, the only site to establish communication with the ILR was the left posterior axillary area. Chest computed tomography confirmed ILR migration into the anterior costophrenic recess. The device was retrieved with forceps during video thoracoscopy without further complications.

Learning objective: This is the first case report of migration of an implantable loop recorder diagnosed by remote monitoring.

Introduction

Implantable loop recorders (ILRs) are indicated in patients with unexplained syncope in whom the comprehensive non-invasive evaluation has failed to identify the cause of transient loss of consciousness (T-LOC) [1]. Remote monitoring is recommended as part of the standard follow-up management strategy of ILRs [2] and may be useful for the early detection of device malfunction or clinically relevant arrhythmias [3]. We report a case of asymptomatic ILR migration into the pleural cavity, unmasked by remote monitoring, and its multidisciplinary management.

Case report

A 75-year-old man with systemic arterial hypertension, dyslipidaemia, chronic kidney disease, chronic obstructive pulmonary disease, and paroxysmal atrial fibrillation was referred to our syncope unit for the evaluation of recurrent episodes of orthostatic T-LOC without prodromes resulting in facial trauma. The result of the comprehensive cardiological evaluation, including electrocardiogram, echocardiogram, carotid sinus massage, and head up tilt test was negative. An ILR with a long-sensing vector (Biomonitor IIIM, Biotronik, Berlin, Germany) was implanted in the left anterior chest wall, under local anaesthesia, according to the standard technique. The procedure was completed with no complications. At implantation, the measured R-wave amplitude was 0.4 mV. The patient was remotely monitored with the Biotronik Home Monitoring® system. Approximately 1 month later, an unstable R-wave amplitude varying from very high (>1.9 mV) to very low (<0.2 mV) values was recorded at remote monitoring (Fig. 1). The patient's device was interrogated in the pacemaker clinic. It was not possible to achieve telemetric connection to the ILR at the implantation site. The only area where the ILR could be interrogated was the left posterior axillary site. Chest X-ray and computed tomography (CT) scan confirmed migration of the ILR into the anterior costophrenic recess (Fig. 2). The ILR was removed by uniportal video-assisted thoracic surgery (Fig. 3), with no post-operative complications. After two days a new ILR implantation was successfully performed and the patient was discharged from the hospital.

Discussion

ILR migration into the pleural cavity is a rare, but not unprecedented complication of the device implantation. It may be caused by an intraoperative technical mistake. If an excessive angle of penetration (>40°) is applied, the pocket tool might be inadvertently inserted through the intercostal space into the pleural cavity. Moreover, if the tip of the device was initially implanted deeply with angulation toward the intercostal

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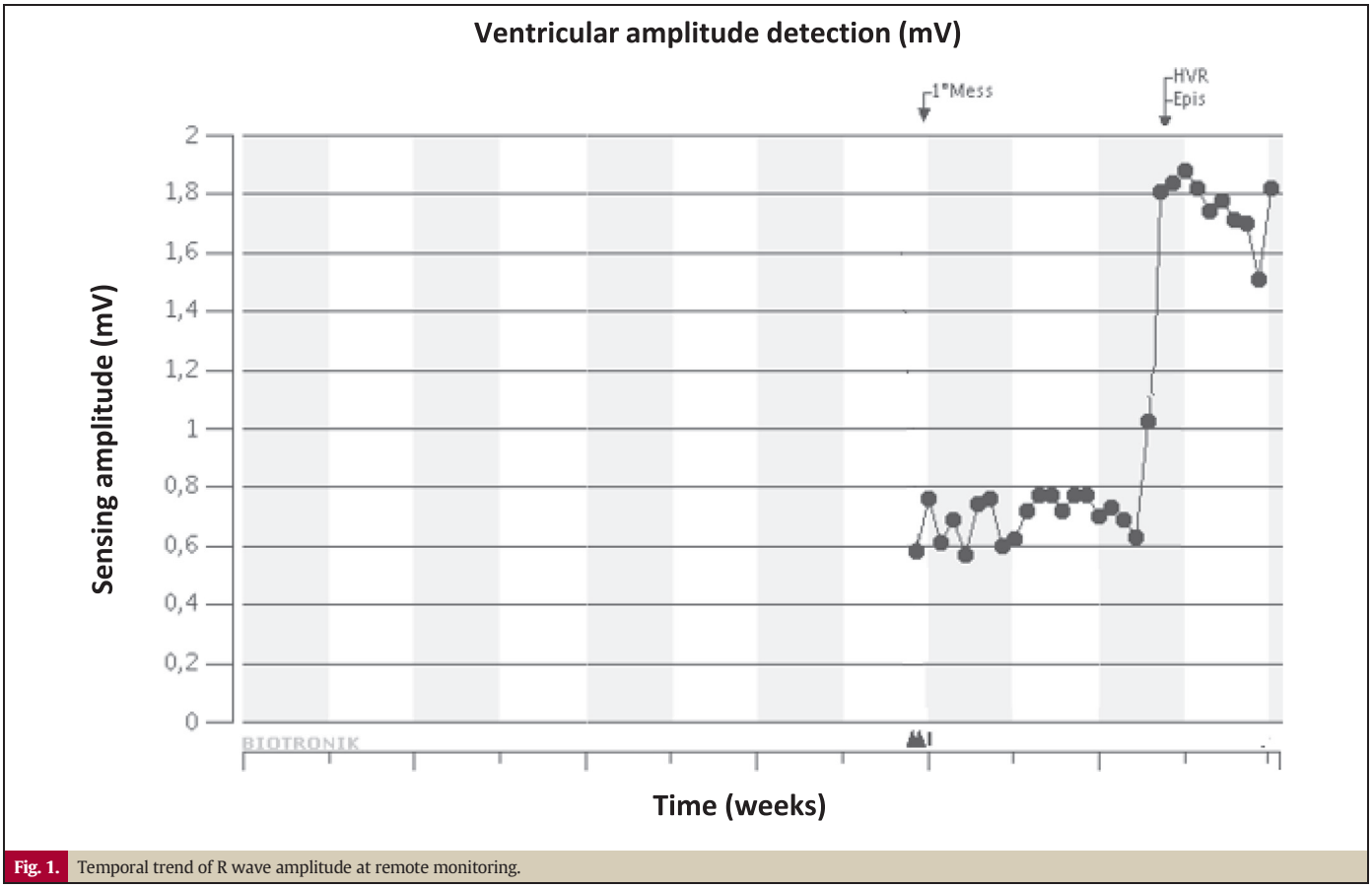

Fig. 1. Temporal trend of R wave amplitude at remote monitoring.

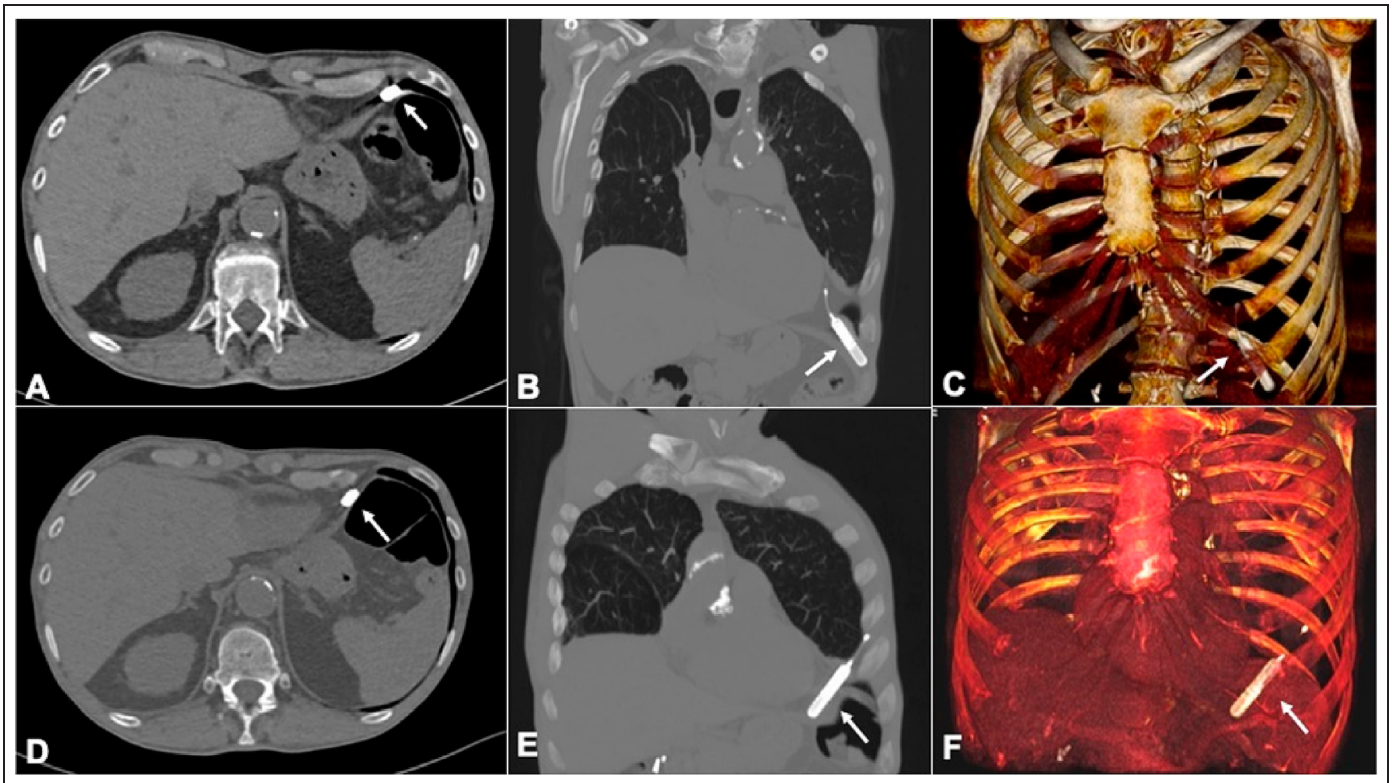

Fig. 2. Computed tomography (CT) examination confirmed migration of the implantable loop recorder (ILR) into the left pleural cavity. In particular, in (**A**) and (**D**) axial CT scans performed 10 days apart show the ILR in the left anterior pleural cavity (*arrows*); thick coronal oblique multiplanar reconstruction (**B**, **E**) and 3D-volume rendered (**C**, **F**) imaging better demonstrate the change in position of the device, free to move in the pleural space (*arrows*).

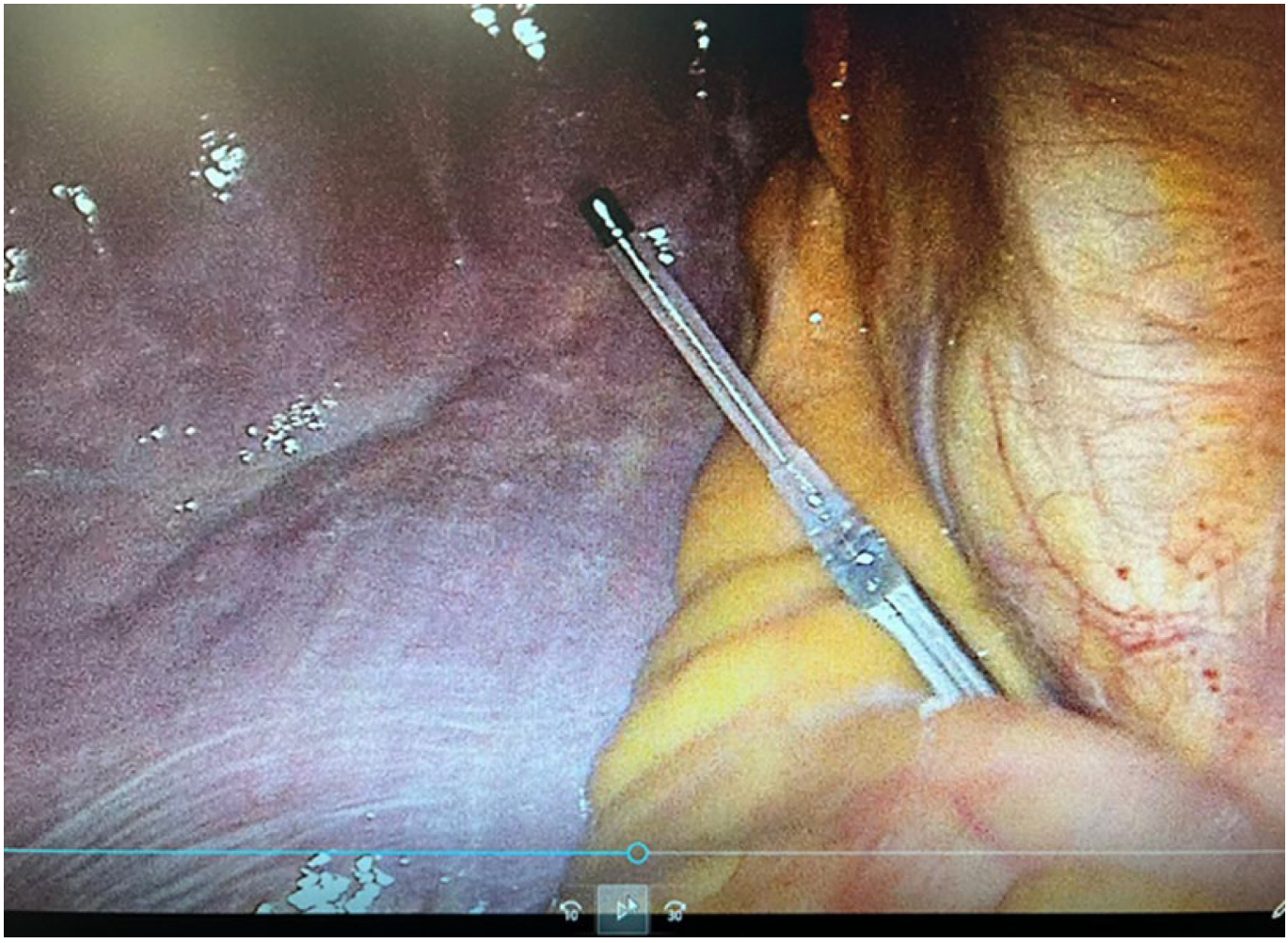

Fig. 3. Video-assisted thoracoscopy showing the implantable loop recorder in the left anterior pleural cavity.

muscle, the thin chest wall structure and the negative pressure of the pleural cavity could result in intrathoracic migration [4].

From the analyses of the previous published cases with Biomonitor II or III [5,6] and Medtronic LINQ [7–9] the event occurred from the 5th to the 35th day after the procedure. The left posterior inferior pleural cavity was the more prevalent site of migration. In half of patients, the migration was asymptomatic. The diagnosis was usually achieved by chest CT scan. Uniportal video-assisted thoracic surgery was the first-choice surgical approach to achieve successful, safe device retrieval and a favorable patient outcome [6]. In all the reported cases, the suspicion of ILR dislocation was suggested by patients' symptomatology (i.e. chest pain) [7,8] or by the impossibility to telemetrically interrogate the ILR at routine clinical visit [5,6,9]. In our case, the sudden and unexpected unstable R-wave amplitude flotation with very high values detected at device remote monitoring led us to evaluate the patient before the scheduled in-hospital clinical visit and to detect the ILR migration. A measured R-wave amplitude >1.5 mV [4] should raise suspicion of improper device placement. The device and alert programming should consider the sudden increased in R wave amplitude.

Conclusions

ILR migration into pleural cavity is a rare, but not negligible complication, of ILR implantation. ILR remote monitoring may be useful to early detect the sudden and unexpected R-wave amplitude flotation which may lead to ILR migration diagnosis, even if the patient is asymptomatic.

Ethics approval statement

N/A

Patient consent statement

N/A

Clinical trial registration

N/A

Declaration of competing interest

N/A

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N/A

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