

Early diagnosis of an uncommon presentation of reel syndrome following permanent pacemaker implantation. A case report

Diagnóstico precoz de una presentación poco común del síndrome de *reel* tras el implante de un marcapasos permanente. A propósito de un caso

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ARTICLE INFORMATION

Received: 03/09/2026
Accepted: 08/09/2026

Competing interests:

The author declare no competing interests.

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Category of the article:

Interventional cardiology

ISSN: 2078-7170
RNPS: 2235-145

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ABSTRACT

Macro-dislodgement syndromes comprise a group of complications that may occur following the implantation of cardiac pacing devices and can be associated with various clinical consequences. Reel syndrome, results from rotation of the generator around its transversal axis and typically occurs within the first month following implantation of cardiac pacing devices. We present the case of a 75-year-old female patient who developed Reel syndrome, which was diagnosed early due to loss of sensing of atrial lead, an uncommon manifestation of this syndrome. The clinical and therapeutic aspects of this syndrome, as well as its infrequent forms of presentation, should be recognized by cardiologists involved in the implantation of cardiac pacing devices.

Keywords: Macro-dislodgements; Reel Syndrome, Pacemakers Programming

RESUMEN

Los síndromes de macrodesplazamientos constituyen un grupo de complicaciones tras el implante de dispositivos de estimulación cardíaca, los cuales pueden asociarse a diversas consecuencias clínicas. El síndrome de *reel*, traducido al español como síndrome del carrete, se produce por una rotación del generador sobre su eje transversal y ocurre típicamente dentro del primer mes posterior al implante de dispositivos de estimulación cardíaca. Se presenta el caso de un paciente femenino de 75 años de edad que presentó un síndrome de *reel* y se diagnosticó precozmente por la pérdida del sensado del electrodo atrial, lo cual representa una manifestación poco común dentro del síndrome. Los aspectos clínicos y terapéuticos de este síndrome, así como las formas infrecuentes de su presentación, deben ser aspectos conocidos por los cardiólogos que se dedican al implante de dispositivos de estimulación cardíaca.

Palabras clave: Macrodesplazamientos; Síndrome de *reel*, Programación de marcapasos

INTRODUCTION

Pacing lead dislodgement constitutes an important group of complications associated with cardiac pacing. According to the time of onset, lead dislodgements are classified as early or late. Early dislodgements are the most frequent and occur within the first six weeks after implantation, those occurring thereafter are considered late dislodgements.¹

Within this group of complications, a subset of entities known as macro-displacements or macro-dislodgements have been described, traditionally reported under the term Twiddler syndrome. More recently, Reel syndrome has been described as a subtype of macro-dislodgement with a distinct mechanism and clinical presentation. Some authors also include iatrogenic displacement or those resulting from trauma to the pacemaker's system among these complications.^{2,3}

Increases in pacing thresholds, failure of capture and sensing,⁴ extracardiac pacing (skeletal muscle, phrenic nerve, or brachial plexus) caused by dislodgement of the pacing leads to variable locations, inappropriate therapies in patients with implantable cardioverter-defibrillators, heart failure due to loss of cardiac resynchronization in patients receiving biventricular pacing, and even death from asystole in patients who are completely pacing-dependent^{5,6} are some of the consequences associated with these macro-dislodgement syndromes.

CASO REPORT

A 75-year-old, normal-weight female patient with a history of systemic arterial hypertension, adequately controlled with pharmacological treatment. She was admitted to the Department of Cardiac Pacing because of third-degree atrioventricular block without associated reversible factors. Cardiovascular physical examination revealed regular bradycardic heart sounds without an associated murmur.

A 12-lead electrocardiogram showed complete atrioventricular block with wide QRS ventricular escape beats at 38 beats/min and a P-wave rate of 120 beats/min. Twenty-four hours after admission, a permanent pacemaker was implanted. A passively fixed Safio VDD pacing lead (Biotronik) was implanted via the cephalic vein. Radiographic assessment confirmed appropriate positioning of the atrial sensing dipole within the right atrium and of the distal tip of the lead at the right ventricular apex. In-

traoperative measurements were within normal limits (ventricular pacing threshold: 0.7 V, R-wave amplitude: 12.5 mV, ventricular pacing impedance: 570 Ω , P-wave amplitude: >3 mV). Following creation of the pacemaker pocket, a Biotronik Edora dual-chamber pacemaker was implanted, with the atrial and ventricular channels correctly connected to the generator. The procedure was completed without complications and the patient was discharged.

At the 7-day follow-up visit, programmable parameters remained within normal limits (ventricular pacing threshold: 0.9 V, R-wave amplitude: 10.5 mV, ventricular pacing impedance: 558 Ω , P-wave amplitude: >2.5 mV). A follow-up chest X-ray was obtained and showed no signs of complications related to implantation of the system pacing or lead malposition. During the 15-day follow-up visit after pacemaker implantation, ventricular pacing, sensing, and impedance parameters showed no significant changes compared with the previous visit. However, the sensing in the atrial channel showed no intracavitary electrograms. After confirming this finding and documenting loss of atrioventricular synchrony on the electrocardiogram, an anteroposterior chest X-ray was obtained (Figure 1).

The diagnosis of early-stage macro-dislodgement in the form of Reel syndrome was confirmed, and a new procedure was scheduled. The pacing lead was repositioned to an appropriate site (Figure 2), and intraoperative measurements were obtained (ventricular pacing threshold: 0.8 V, R-wave amplitude: 13.8 mV, ventricular pacing impedance: 680 Ω , P-wave amplitude: >3.5 mV). The pacemaker generator was then secured to the pectoral fascia using 2-0 polyester suture.

During the three-month follow-up period after reintervention, no signs of pacing system malfunction were observed.

COMMENT

This case highlights an unusual presentation of Reel syndrome, with only a few cases reported in the literature. The authors consider it relevant to define Reel syndrome as a distinct form of macro-displacement syndromes and to emphasize the clinical and therapeutic aspects of this condition, which should be part of the knowledge base of cardiologists involved in the implantation of cardiac pacing devices.⁷

Reel syndrome, is an uncommon cause of pacemaker and defibrillator malfunction³.

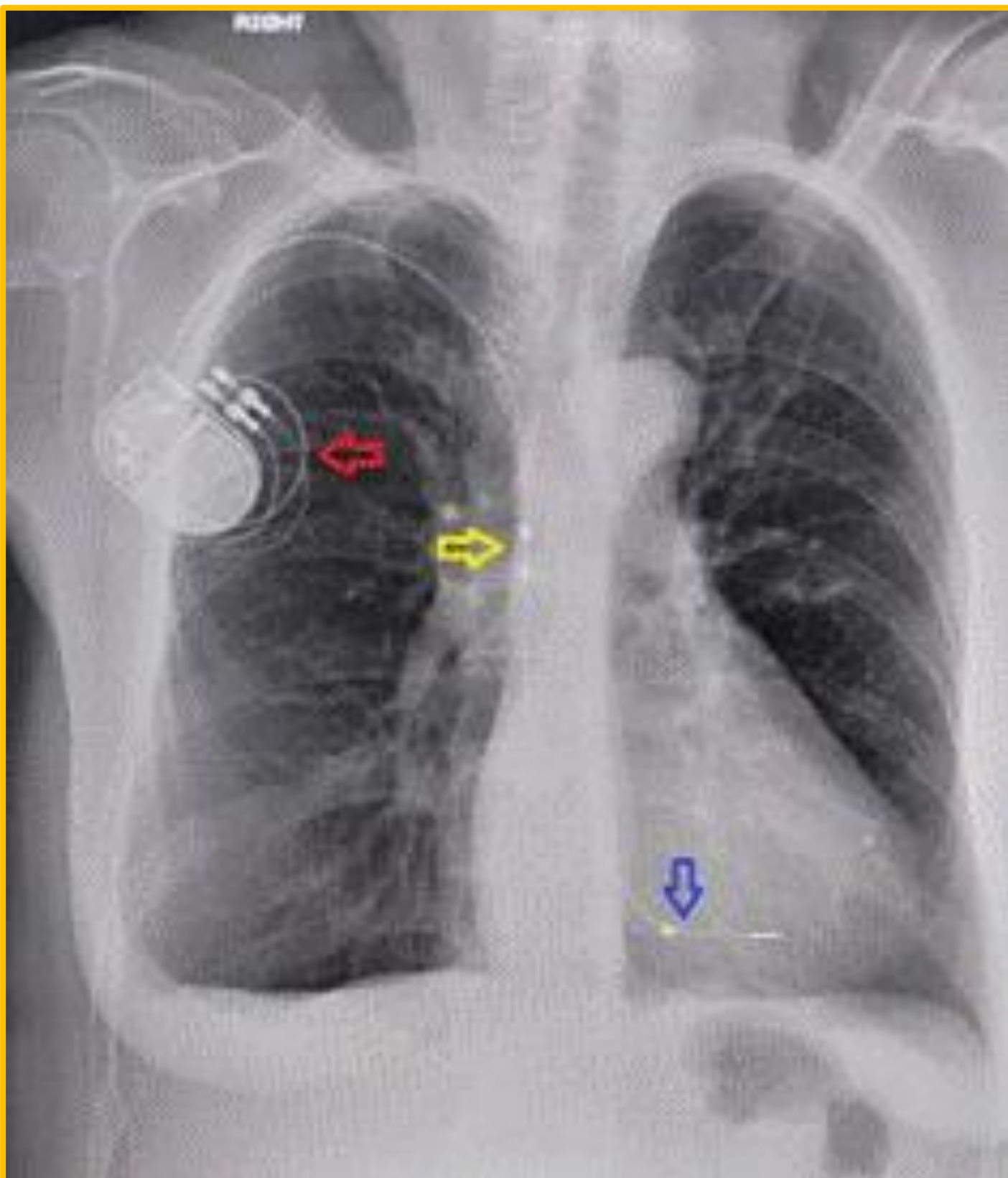


Figure 1. Anteroposterior chest X-ray.

Obtained 15 days after pacemaker system implantation. The image shows the system pacing, including the Biotronik dual-chamber (leadless) pacemaker generator and the passively fixed Safio VDD pacing lead. Red arrow: excessive coiling of the lead around the generator, resembling thread wound around a spool. Yellow arrow: atrial sensing dipole located outside the right atrium, in an unexpected position. Blue arrow: ventricular dipole located near the tricuspid valve plane, the distal electrode remains in contact with the ventricle.

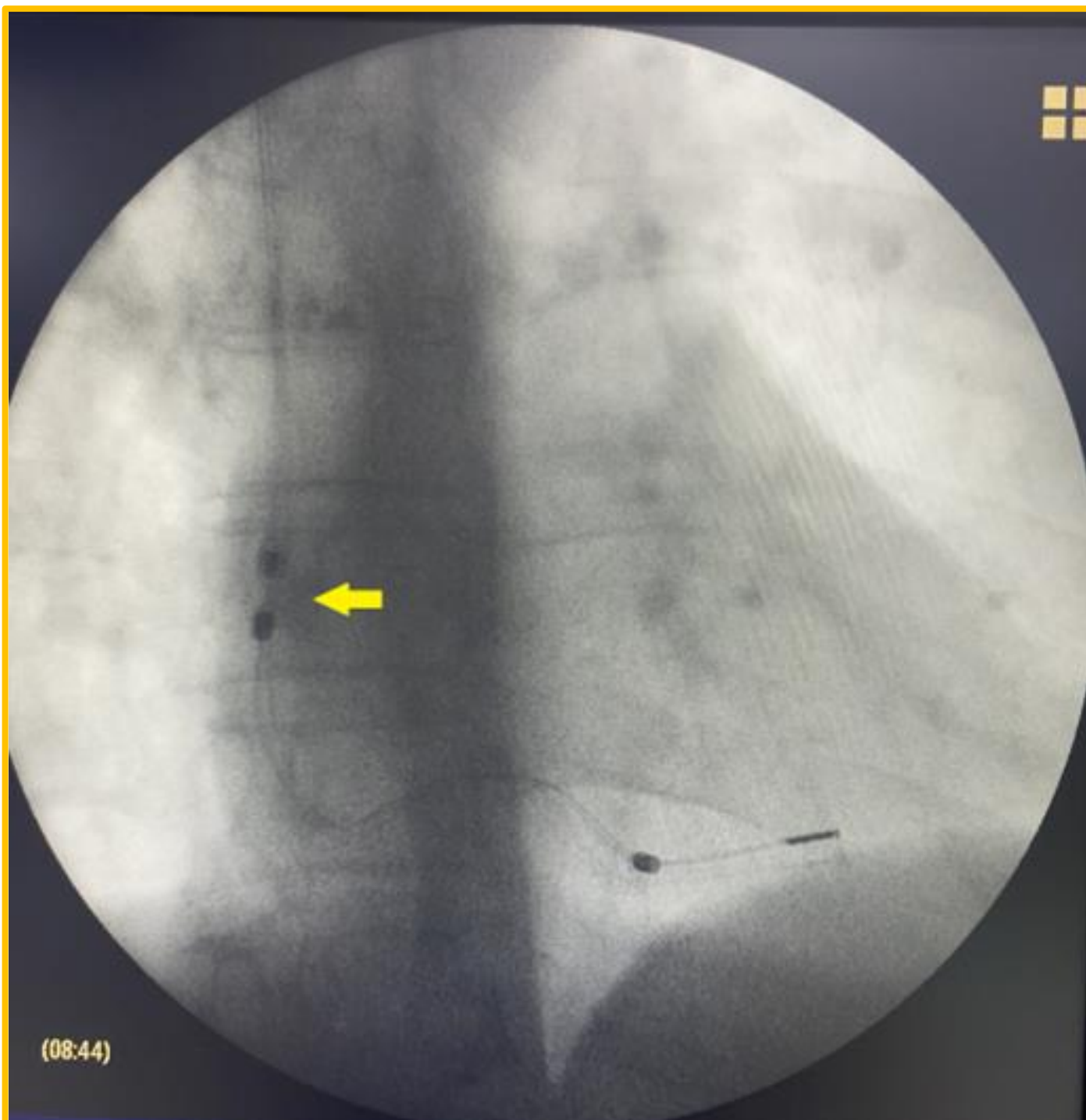


Figure 2. Intraoperative anteroposterior fluoroscopic image.

The lead shows an adequate intraventricular loop. The atrial sensing dipole is positioned close to the right atrial wall (yellow arrow), while the ventricular dipole is located in the region corresponding to the right ventricular apex.

It is defined as retraction and dislodgement of the leads resulting from rotation of the generator around its sagittal (transversal) axis, causing the lead to coil around the generator, either above or below it. Given the mechanism involved, all leads should be affected to some degree when more than one lead is present.⁵

This syndrome commonly occurs within the first month following implantation, as in the present case, and is usually not associated with damage to the pacing leads. This represents an important difference from Twiddler syndrome, in which lead damage may occur because of the way the generator rotates⁶. This feature has important therapeutic implications, as implanta-

tion of a new pacing system is not necessary when the leads are confirmed to be intact.⁸

To prevent this rotational phenomenon, several measures have been proposed at the time of implantation, including securing the generator to the underlying fascia or implanting it beneath the pectoral muscle.⁹

Another useful measure is to avoid creating an excessively large pocket and to make it as snug as possible to prevent unrestricted movement of the generator¹⁰. However, it is essential to ensure an appropriate match between the size of the pocket and the generator, since, conversely, an excessively small pocket may increase the risk of pressure-related complications. Some authors recommend, as a secondary preventive measure, the use of a Dacron pouch around the generator, which has been associated with favorable outcomes.^{11,12}

This case has at least two distinctive features that, in the authors' opinion, should be highlighted: the early diagnosis and the occurrence of the syndrome involving a VDD lead, a type of pacing lead that is now rarely used because of the advent of other pacing lead technologies. This unusual presentation involved loss of atrial sensing due to migration of the sensing dipole following coiling of the lead, which raised the initial suspicion of the complication and allowed timely intervention before a more serious complication developed, such as loss of ventricular capture, which may represent the natural progression of a lead coiling around the generator. Follow-up of measurable parameters during device interrogation and radiographic monitoring were essential for the early diagnosis in this case. These measures should be considered among the preventive strategies in patients at risk for this complication, allowing timely diagnosis and helping to prevent more serious complications.^{11,12}

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