Reel syndrome, Lead Macrodislodgement.

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Introduction:

Lead Macro dislodgement (LMD) is a known but less frequent complication of Cardiac Implantable Electronic Devices (CIED) implantation with a range of presentation timelines, depending on the mechanism. We report a case of an unusually late presenting Reel type LMD in an elderly woman.

Case Report:

A 73-year-old Caucasian woman, with past medical history significant for hypertension, chronic obstructive pulmonary disease, chronic renal disease, and non-ischemic cardiomyopathy (NYHA class II, ACC/AHA stage C) who underwent a biventricular cardio-defibrillator (Medtronic- Viva Quad, active fix leads, single coil) implantation in 12/2015 for primary prevention. The following were the parameters during implantation: Right atrium sensing 1.9mV, Impedance 684Ohms, pacing threshold 1.75V at 0.4ms; right ventricle sensing 6.9 mv, Impedance 551 Ohms, pacing threshold 0.75V at 0.4ms, and left ventricle sensing 10.8mV, Impedance 475 Ohms, pacing threshold 2.25 V at 0.4ms, respectively.

Patient was lost to follow up since initial implantation. While inpatient for elective right shoulder surgery at an outside facility when her device was interrogated for syncope work up in January 2021, reportedly all leads parameters (details unavailable) were normal, without tachyarrhythmia or ICD therapies, however generator was noted nearing elective replacement indicator. She was referred and seen by our practice for further device management in March 2021.

During office visit, device implant site (left upper chest) showed no signs of local infection, dehiscence, or trauma. Patient didn't report further syncopal events. A 12- lead electrocardiogram (EKG) in office showed sinus rhythm with idioventricular conduction delay/left bundle branch pattern with QRS duration >140ms (Fig 1). Device interrogation office showed higher capture threshold for both right atrial at 3.75V at 1.5ms, and left ventricle 2.75V at 1.5ms with diaphragmatic stimulation at 4.5V leads, while right ventricular lead parameters were noted to be normal. We received RRT alert within three weeks of office visit. She was promptly scheduled for battery change. Her most recent left ventricular ejection fraction (LVEF) was 35-40% (improved from 25% at initial implant).

Her pre-op chest x-ray (CXR) (Fig 2 panel B) revealed migration of RA and LV leads into the superior vena cava - right atrial junction. Leads were noted coiled around, while generator was displaced caudally- medially dhen compared to the original sub clavicular location (Fig 2, Panel A). The RV lead, however, remained well positioned. After informed consent, a mutual decision was made to proceed with leads revision/extraction and re-implantation in the EP lab. We used mechanical Evolution® Shortie RL (Cook Medical LLC, Bloomington, IN), EZ^{TM} stylet (Philips, Andover, MA), and Bulldog Lead extender (Cook Medical LLC, Bloomington, IN) to perform a complete successful transvenous extraction of dislodged RA and LV leads. On gross examination, both extracted leads showed no signs of fracture or insulation break, except for RA lead which had adhesions at mid-segment and dense calcifications at distal end. The original CRT-D generator was replaced with single chamber ICD generator and connected to her original normal functioning DF-4 right ventricle lead.

Discussion:

Lead macro dislodgement (LMD) is an infrequent post-implantation complication of CIED, with reported incidence of about 1-8%[1-3]. Reel syndrome is one type of LMD[4]{Carnero-Varo, 1999, ReelSyndrome: a new form of Twiddler's syndrome?} (Twiddler and Rachet being other commonly known syndromes)[5]. Unlike other varieties, the generator rotates on its transverse/Z- axis in Reel syndrome resulting in lead coiling around the device. Unlike Twiddler syndrome, leads are usually not damaged in Reel syndrome. Older age, female gender, large device pocket, compulsive generator manipulation or underlying psychiatric history, obesity, and dementia[3,6],are established risk factors for LMD.

Although Reel syndrome present early after de novo implant (usually within one month) compared to other varieties of LMD, our patient exhibited features after an unusually long duration (5 years from original implant). Besides the technical aspects focused in preventing LMD such as adequate lead slack at implant time, careful suture sleeve fixation using non-absorbable sutures, appropriately matching pocket etc., routine

follow up and device interrogation are vital in early diagnosis of LMD. Unfortunately, the patient had lost follow up, potentially leading to excessive battery use (draining high currents for RA and LV leads with inappropriate captures).

Conclusion:

Reel syndrome is a relatively uncommon variety of LMD. Longitudinal periodic device monitoring is imperative for timely diagnosis and management.

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Figure Legend

Figure 1: EKG at the office with sinus rhythm and IVCD.

Figure 2: (A) Chest X-ry with intact leads and well positioned generator under the left clavicle. (B) The generator has been displaced medial-caudally (arrow) and leads wrapped around untwisted proximal migration of leads (triangle) except for RV lead (star).

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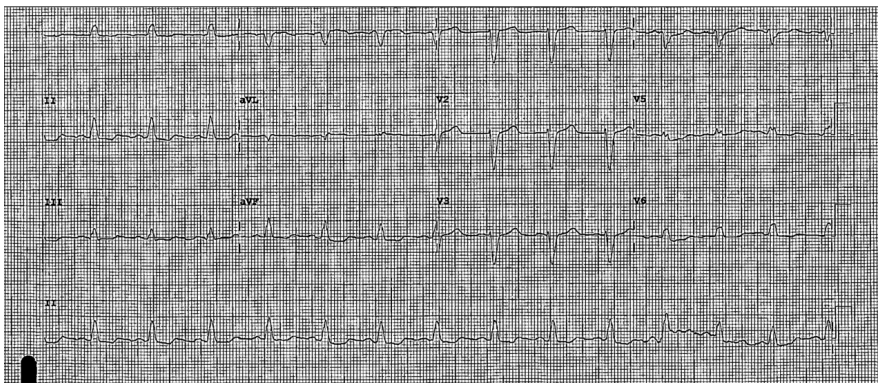

Figure 2: (A) Chest X-ray with intact leads and well positioned generator under the left clavicle. (B) The generator has been displaced medial-caudally (arrow) and leads wrapped around untwisted proximal migration of leads (triangle) except for RV lead (star).