Images in Cardiology

Ratchet-traction effect: An underdiagnosed mechanism of pacing lead dislodgement

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Abstract

Pacing lead dislodgement contributes substantially, to the list of causes of early pacemaker failure.

Reel's syndrome is a rare cause of pacemaker failure, resulting from the dislodging of pacing electrodes by manipulation of the pulse generator by the patient. We describe here an intriguing case of pacemaker lead dislodgement by a novel and frequently under-diagnosed mechanism that mimicked the fluoroscopic diagnosis of reel's syndrome.

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1. Case report

A 60-year old hypertensive male with recurrent syncopal episodes due to intermittent complete heart block, had undergone implantation of single chamber pacemaker (VVI, verity-St Jude Medical, St Paul, MN, USA). An active fixation screw in lead was placed into the right ventricular outflow tract septum with good stability and optimal pacing parameters (Threshold — 0.8 v, Impedance — 650 Ω). Pulse generator was stitched to the right pectoral muscle and underlying fascia. Proximal end of the lead was secured with suture sleeve and the pocket was closed in two layers. Patient was discharged in stable condition after optimal course of antibiotics. A routine pre-discharge chest X-ray (Fig. 1A) & pacemaker interrogation revealed normal pacemaker lead position and parameters respectively. Twenty days after implantation, patient presented with repeated muscle twitching on the right upper part of chest. His electrocardiogram showed sinus rhythm with prolonged PR interval & right bundle branch block without pacing spike. Magnet application failed to show pacing spikes. Chest fluoroscopic examination revealed that RV lead was coiled around the pulse generator and tip of the lead was retracted and placed outside the entry point of right axillary vein (Fig. 1B), without any change in the position of the pulse generator. Patient strictly denied any history of manipulation of the pocket area or the generator. His chest fluoroscopic image was suggestive of reel syndrome, but as the pulse generator was stitched to the pectoral muscle and underlying fascia, that precludes any vertical or transverse movement of the pulse generator. During re-implantation procedure,
original position of the suture sleeve and generator was confirmed, but the lead was easily movable through the sleeve, due to loosely tied suture. A new lead was placed in the same position and the lead was tightly secured using the sewing sleeve. At 4-month follow up after replacement revealed normal lead position & function.

Various mechanisms of pacemaker lead retraction towards the pulse generator have been described. The reel syndrome is characterized by rotation of pulse generator on its transverse axis and subsequent lead dislodgement with lead coiling around the pulse generator.\footnote{Carnero-Varo A, Perez-Paredes M, Ruiz-Ros JA, et al. “Reel Syndrome”: a new form of Twiddler’s syndrome? Circulation. 1999;100:e45–e46.} It differs from Twiddler syndrome in which pulse generator moves on its long axis. Both of these syndromes are due to inadvertent or deliberate manipulation of pacemaker generator by the patient. In our case, none of these etiologies could have been possible because of stitching of pulse generator to the underlying muscle and fascia. Probable cause of lead dislodgement in this patient was due to a ratchet-like mechanism\footnote{Von Bergen NH, Atkins DL, Gingerich JC, Law IH. “Ratchet” syndrome, another etiology for pacemaker lead dislodgement: a case report. Heart Rhythm. 2007;4:788–789.} through the loose suture sleeve, by which lead slowly moved towards the pulse generator with arm movement of the patient. After dislodgement from the endocardium, lead continued to ratchet through the sleeve, until the tip reached to the pocket area. This ratchet-like movement was further facilitated by a slight inward traction generated by the lead loops, placed over the pulse generator. This case highlights the importance of snugly fitting pocket without redundant space for the lead loops and tightly securing the lead to the suture sleeve.

**Conflicts of interest**

All authors have none to declare.

**REFERENCES**