

## Extraction of late perforated high voltage defibrillator lead utilizing intra cardiac echocardiography

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**Keywords:** Intra cardiac echo, Cardiac CT, Extraction, ICD

### ABSTRACT

*Late perforation of rhythm device lead is a well recognized complication of implanted devices with varying degree of clinical presentation from asymptomatic patients to sudden cardiac death. We report a patient with incidental finding of late right ventricular lead perforation during routine device follow up. Endovenous extraction of the lead was performed uneventfully under intracardiac echocardiography guidance with cardiac surgery team backup.*

### CASE DESCRIPTION

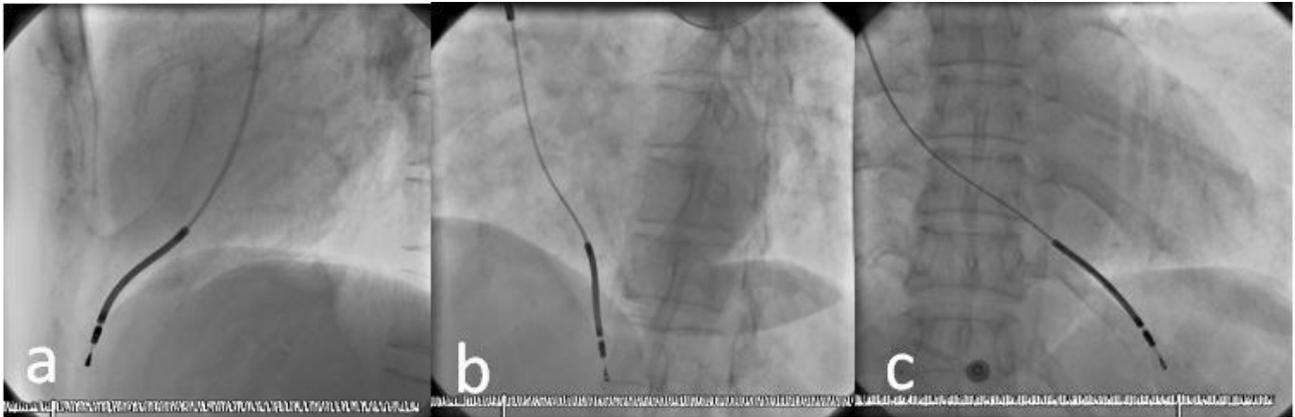
53 year old lady with long standing history of ischemic heart disease and aborted sudden cardiac death underwent single chamber defibrillator implantation as a secondary prevention. The implanted lead was passive fixation, dual coil, 65 centimeters, 7Fr, (Riata<sup>®</sup>, model 1560, St. Jude Medical). Chest X-ray (CXR) post implantation showed apical right ventricular (RV) lead position. Loss of capture with high pacing impedance was noticed during first routine device follow up six weeks after implantation. CXR showed suspicious lead migration confirmed by fluoroscopy ([Figure 1](#)). Trans-thoracic echocardiography showed RV lead perforating the

RV free wall and there was no evidence of pericardial effusion ([Figure 2](#)). Cardiac computed tomography (CT) with three dimensional reconstructions was performed to assess the exact site and the extent of perforation before attempting extraction ([Figure 3](#)). The procedure was performed under local anesthesia and conscious sedation with a cardiac surgical team standby. The perforating lead was explanted by simple traction under intra-cardiac echocardiography (ICE) guidance to check for immediate leak or tamponade ([Figure 4](#)). After removal of the old lead, a new RV lead (Medtronic sprint quarto 6947, 65cm) was implanted in RV septum with good sensing and pacing parameters. There was no evidence of Immediate Post-

operative pericardial effusion as well as before discharge as assessed by trans-thoracic

echocardiography. Routine device check six weeks later showed normal pacing parameters.

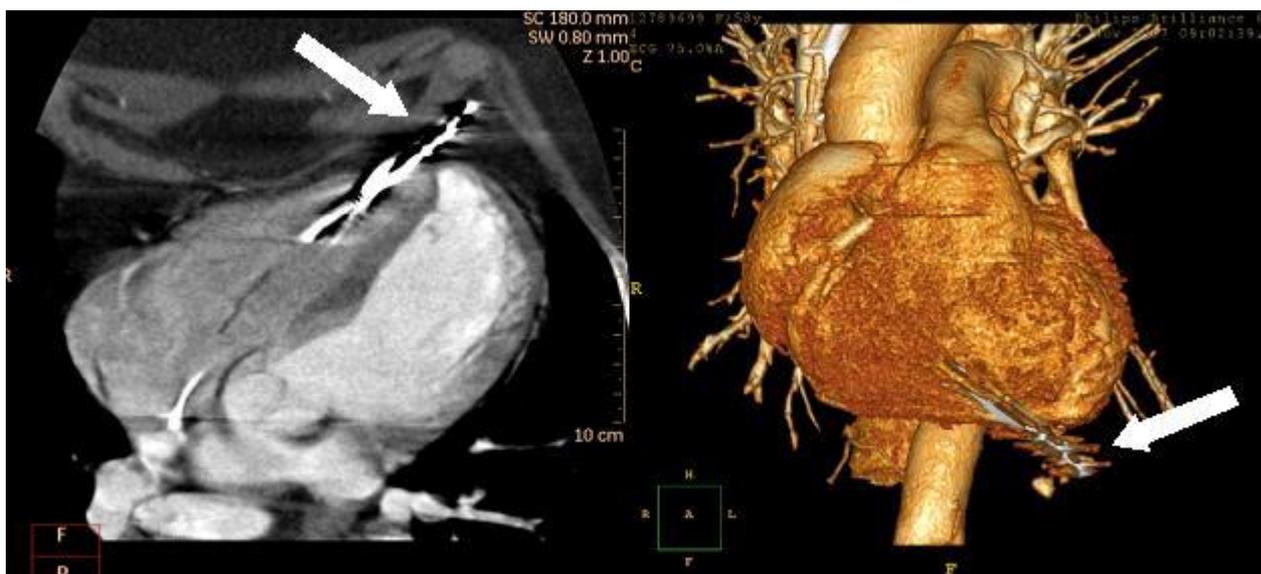
**Figure 1:** Lateral(a), Left anterior oblique (b) and postero-anterior (c) fluoroscopy of the heart showed right ventricular lead migration and the tip is just anterior to the left hemidiaphragm.



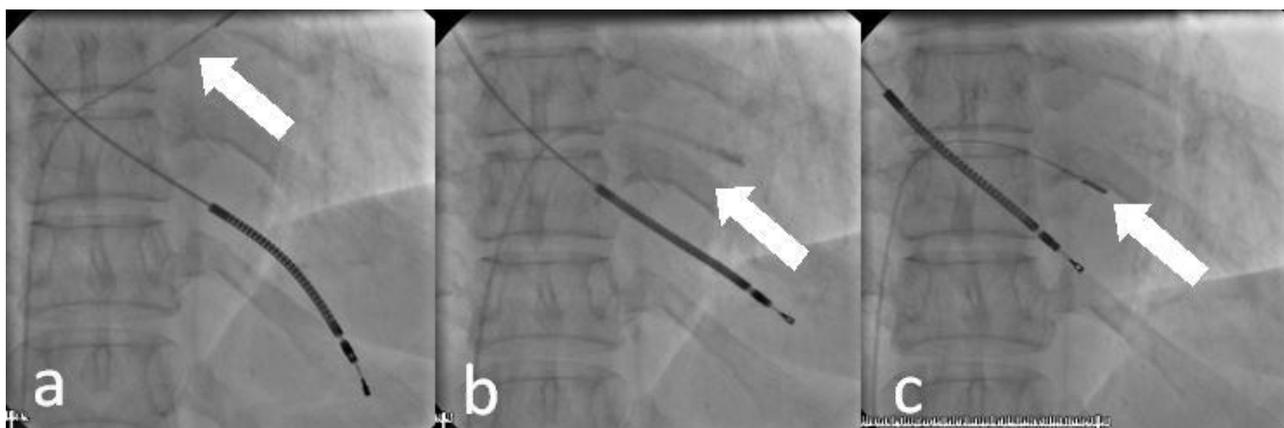
**Figure 2:** Apical four chamber trans-thoracic echocardiography view showed right ventricular lead perforating the right ventricular free wall (Arrow) with no signs of tamponade.



**Figure 3:** Cardiac CT with 3dimensional reconstruction demonstrating the site and the extent of the lead migration. Right ventricular lead is visible outside the outline of the heart (arrow).



**Figure 4:** Postero-anterior fluoroscopy of the heart during extraction stages (a,b,c) under intra-cardiac echocardiography (ICE) monitoring. Notices the ICE probe in the right ventricle (arrow).



## DISCUSSION

Delayed ventricular lead perforation is a rare but potentially life threatening complication of device implantation [1]. The clinical presentation of late perforation might vary widely from minimal symptoms to cardiac death [2, 3]. In our case, the patient was asymptomatic despite significant migration distance of the perforating lead. Although computed tomography might be necessary to delineate the site and the extent of perforation, the diagnosis can be confirmed by chest X-ray or echocardiography [1, 2]. Percutaneous lead removal can be performed with extreme caution under transthoracic and/or transesophageal echocardiography monitoring in operating room with cardiac surgery team backup

[4-6]. Furthermore, defibrillator passive fixation lead extraction might carry more risk because of bulky lead tip which may cause tissue damage during removal. Open chest surgery might be considered as a safe alternative but it may be associated with longer hospital stay. Use of intra cardiac echocardiography during invasive cardiac procedures has been accepted widely with accurate imaging and less requirement of general anesthesia [7, 8]. We described in this case the feasibility of intra cardiac echocardiography as alternative and adjunctive tool to monitor for possible complications such as tamponade during extraction procedure.

## CONFLICT OF INTERESTS

None.

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