

Usefulness of metal artifact reduction algorithms from the pacemaker lead in diagnosis of late perforation: The right choice makes it easier to make a decision

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Dislocations of lead(s) in cardiac implantable electronic devices (CIED) often result in cardiac tamponade [1, 2]. The risk of lead dislocation is higher in very elderly patients (≥ 80 years). Additionally, the risk of complications increases in the latest methods of cardiac pacing including left bundle branch area pacing, where the overall incidence of lead dislodgments is about 1% [3]. A combination of various imaging techniques allows for a proper diagnosis and treatment. The biggest problem is artifacts from the exposed metal parts of the lead(s).

We present a case of massive asymptomatic lead dislocation, after implantation of a pacing and sensing capabilities in both the atrium and the ventricle (DDD) in 2007 due to sinus node dysfunction. The patient (woman) was admitted to the hospital for asymptomatic dislocation of the ventricular lead with perforation of the left ventricular wall and displacement to the pleural cavity, which was found in a routine chest X-ray examination. The patient denied fainting. The implanted device had been programmed in a pacing and sensing capabilities in the atrium, rate response active (AAIR mode; base rate 50/min; atrial pacing rate 12%).

The chest X-ray showed an abnormal location of the right ventricular lead with its tip projected below the contour of the left diaphragm, at the level of the gastric air bubble in the left upper abdominal quadrant (possibly in the intraabdominal adipose tissue).

To support the decision about lead extraction, we performed a computed tomography scan using a Siemens Somatom Force scanner. The obtained images showed the course of the ventricular lead along the interventricular septum and perforation of the wall of the right ventricle near the apex of the left ventricle. Then the lead ran subpleurally in the pericardial fat tissue, and its tip was located in the supradiaphragmatic fat tissue of the left costophrenic angle, at the level of the costochondral junction of the left VII rib.

Due to numerous lead artifacts, iterative metal artifact reduction (IMAR) techniques were superimposed on the image in various subroutines, as shown in Figure 1 [4, 5]. In our opinion, IMAR gives promising results, but not with pacemaker preset. Dental presets seemed to be the best in this rare case.

On Holter electrocardiography, no atrioventricular conduction disturbances were recorded. After the Heart Team's decision, the patient was qualified for further conservative treatment. The patient was in good general condition and was discharged home.

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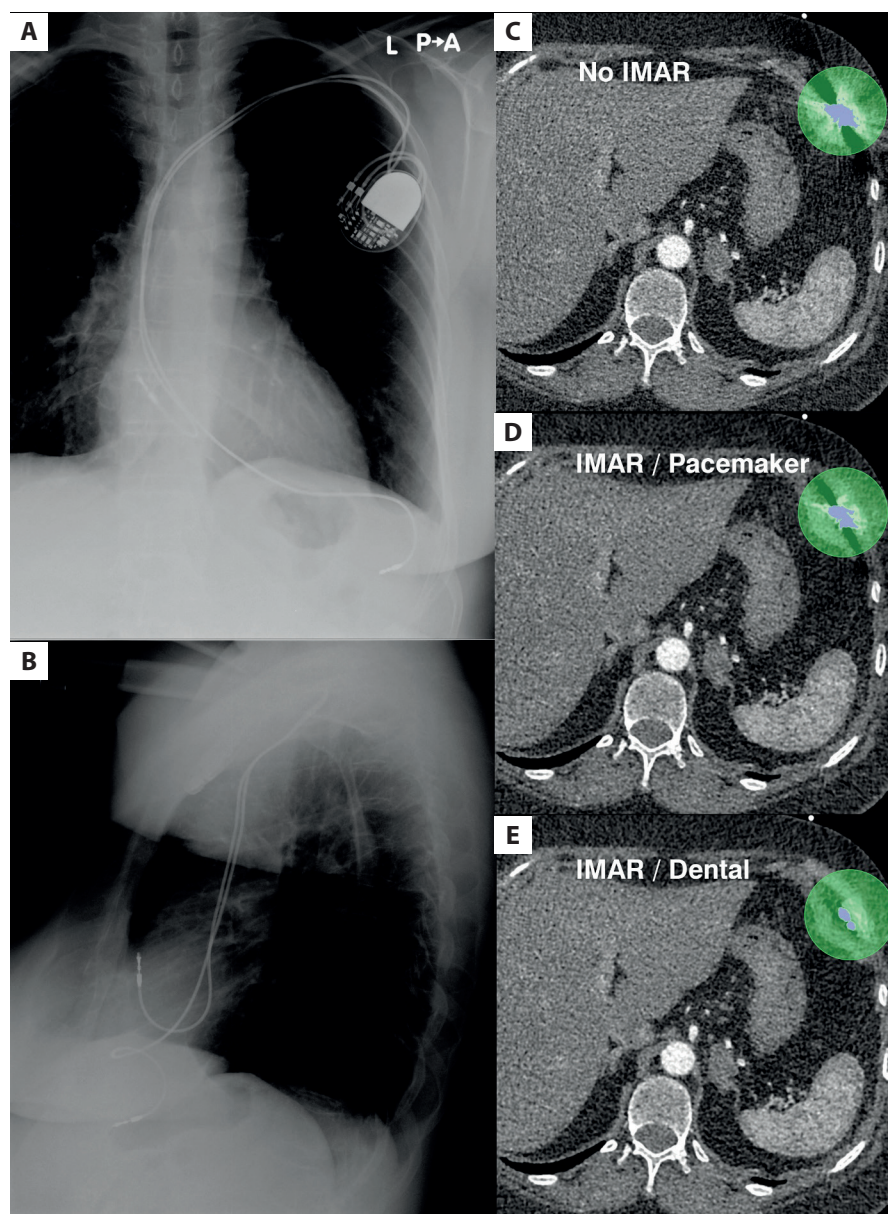


Figure 1. Posteroanterior (A) and lateral (B) chest X-ray shows the right ventricular lead projected under the left diaphragm. Native (C) and IMAR-filtered (D, E) computed tomography images showing reduction of the area of metallic artifacts around the lead tip, with best results with dental preset (E)

Abbreviations: IMAR, iterative metal artifact reduction

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