

Unusual embolization of a pacemaker lead fragment during lead extraction

Sing-Chien Yap, MD, PhD, Corstiaan A. den Uil, MD, PhD, Tamas Szili-Torok, MD, PhD

From the Department of Cardiology, Erasmus Medical Center, Rotterdam, The Netherlands.

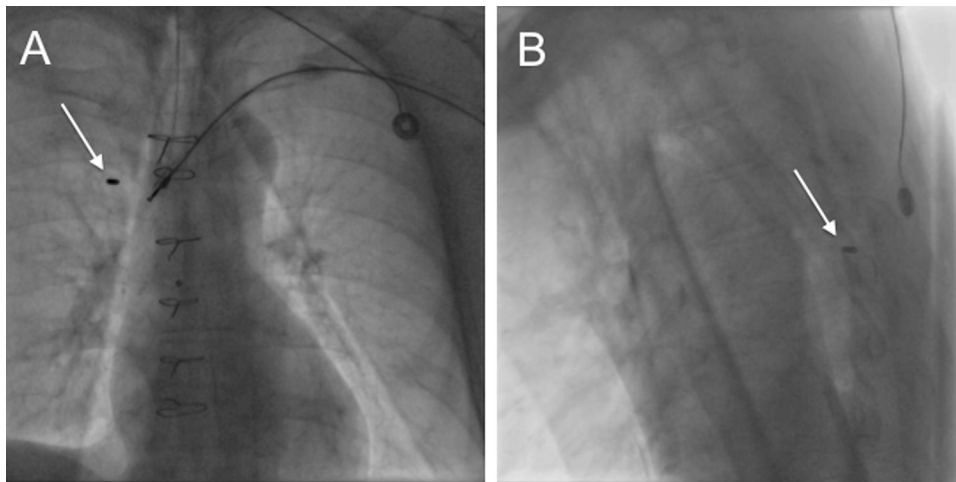


Figure 1 Embolization of the lead tip fragment (arrows) into an intercostal vein: (A) anteroposterior cine-fluoroscopic image; (B) lateral cine-fluoroscopic image.

Introduction

One of the complications of lead extraction is fragmentation and embolization of a pacemaker lead. We present a case with an unusual path of lead fragment embolization.

Case report

In 2014, an 84-year-old man with pacemaker erosion was referred to our center. He underwent coronary artery bypass graft surgery in 2008 for multivessel coronary artery disease. In 2009, he developed sick sinus syndrome and received a Biotronik Cylos 990 DR-T DDD pacemaker with a 7.2-F Biotronik Selox SR 53 active fixation atrial lead and a 4.8-F Sorin Xfine TX26D passive ventricular lead. In July 2014, he developed pacemaker erosion after failed antibiotic treatment of pacemaker pocket infection. To prevent systemic infection, we decided to perform full system extraction. The procedure was performed under general anesthesia, with the

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Address reprint requests and correspondence: Dr Sing-Chien Yap, Department of Cardiology, Erasmus Medical Center, 's-Gravendijkwal 230, 3015 CE, Rotterdam, The Netherlands. E-mail address: s.c.yap@erasmusmc.nl.

patient prepared for thoracotomy. The atrial lead could be unscrewed. Locking stylets (Liberator Beacon, Cook Medical, Inc, Bloomington, IN) were advanced to the tip of both leads, and One-Tie compression coils (Cook Medical Inc) were placed on the proximal end of the leads. Both leads

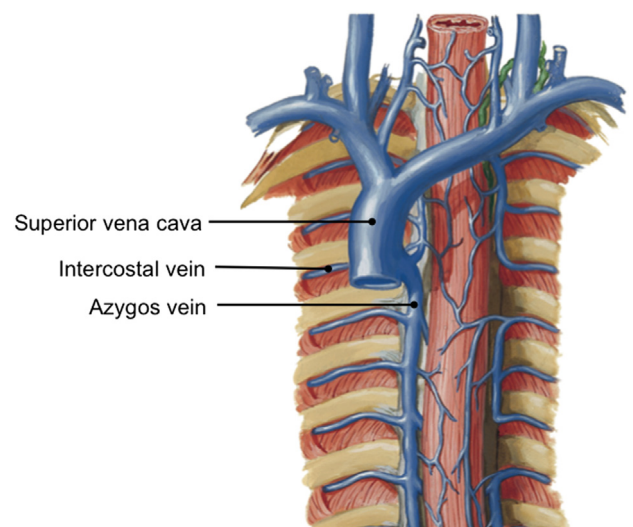


Figure 2 Schematic drawing of the azygos vein and intercostal veins. Netter medical illustration used with permission of Elsevier.

KEY TEACHING POINTS

- Fragmentation and embolization of a lead fragment during lead extraction is a known complication but is relatively rare.
- Embolization of the lead fragment into the pulmonary vascular bed is the most frequently observed complication.
- When embolization during lead extraction occurs, there is a possibility of embolization into the azygos vein.

were pulled into the superior vena cava under fluoroscopic guidance. We encountered significant resistance; therefore, we decided to proceed via the femoral approach to prevent the leads from getting more stuck in the scar tissue in the brachiocephalic vein.

The free-floating ventricular lead was captured with the Amplatz GooseNeck snare tool. During extraction, the lead tip disintegrated partially and the proximal electrode broke at the level of the high right atrium. The proximal electrode was embolized into an intercostal vein (Figures 1A and 2; Online Supplemental Video 1). The position of the proximal electrode in the intercostal vein was confirmed by lateral fluoroscopy (Figure 1B). The atrial lead was manually extracted through the subclavian vein without complications. No attempt was made to retrieve the lead fragment. During short-term follow-up, no complications occurred secondary to the procedure.

Discussion

Several tools have been developed to improve the efficacy of pacemaker lead extraction. The femoral approach for lead extraction using a snare tool has been proved successful,

with low complication rates.¹ Fragmentation and embolization of pacemaker/defibrillator leads is a rare but known complication of lead extraction.² The fragment lodges most frequently in the pulmonary arterial bed.³ We present a unique case of embolization of a lead tip fragment into an intercostal vein. In our case, the lead tip most likely disintegrated when the proximal electrode was trapped in fibrous vascular attachments. The tension on the lead during extraction probably provided the force that catapult the lead tip fragment retrogradely toward the azygos vein and subsequently an intercostal vein (Figure 2). The positive intrathoracic pressure due to inspiratory flow of the mechanical ventilation could have contributed to this phenomenon. In this case, the position of the lead fragment could easily be misinterpreted as pulmonary embolization, which is most likely to occur. However, Online Supplemental Video 1 clearly shows that the fragment never passes the tricuspid valve and the lateral fluoroscopic image confirms the position of the posterior intercostal veins. It is generally accepted that small lead fragments can be left in situ, especially when there is no evidence of systemic infection.

Appendix Supplementary data

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.hrccr.2014.11.004>.

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