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A Rare Case of Right Ventricular Pacemaker Lead Perforation Into The Left Pleural Cavity; Two Weeks After Implantation

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INTRODUCTION

Cardiac pacemaker placement is a relatively common procedure in the United States, with increasing incidence as people continue to live longer with significant but well-managed cardiovascular disease. In the US, based on data from the National Cardiovascular Data Registry (NCDR) ICD Registry by the American College of Cardiology, 5.4% of patients experience complications requiring hospitalization or surgery, within 90 days of Implantable Cardioverter-Defibrillator (ICD) implantation, with cardiac perforation even rarer still at only 0.14% of all cases. Although no similar database exists solely for permanent pacemaker devices (PPD), complication rates are generally agreed to be comparable.

CASE PRESENTATION

A 70-year-old female presented to the Emergency Department (ED), two weeks following the initial implantation of a dual-chamber cardiac pacemaker. She complained of left-sided chest pain over the past day, which had then acutely worsened in severity overnight. She noted that the pain was localized behind the left breast and felt similar to her previous myocardial infarction (MI). Initial chest X-Ray and Computed Tomography (CT) imaging demonstrated a large left pleural effusion, with tension and mediastinal shifting to the right. At this time, while returning to the ED from her CT, she began to hypoventilate and her hemodynamic status acutely deteriorated. She experienced cardiac arrest during emergent intubation and was successfully resuscitated per Advanced Cardiac Life Support (ACLS) protocol. An intensivist then placed a pigtail catheter into the left chest, which drained 400ml of bloody fluid, and cardiothoracic (CT) surgery was then consulted.

Figures:

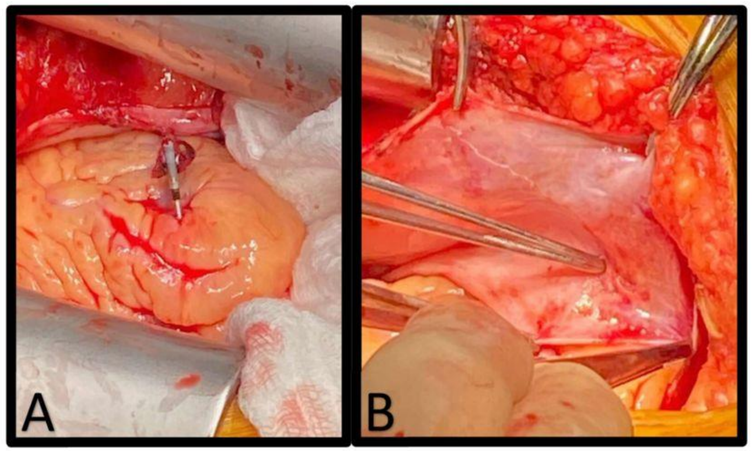


Figure 1: (A) demonstrating the pacemaker lead perforating out of the left ventricle, and (B) indicating the exact area of perforation through the myocardial wall.

A review of the radiological images was concerning to the surgeon for a pacemaker lead perforating into the left pleural space, causing a large hemothorax. The patient was quickly taken to the Operating Room (OR) for an emergent exploratory median sternotomy. The pericardium was opened, and a moderate amount of bloody fluid was evacuated. Once the heart was exposed, a pacemaker lead could be seen protruding 2cm out from the anterior wall of the left ventricle near the apex. Also noted was a small blood clot at the tip of the lead and a 0.5cm laceration in the pericardium directly in front of the exposed lead, which exited into the left pleural cavity. The right ventricular lead was then withdrawn and replaced with a new permanent screw-in lead, and the lacerated left ventricle was repaired. Finally, the left pleural cavity was evacuated from approximately 800ml of non-clotted blood. The patient was returned to the Post-Anesthesia Care Unit (PACU) in stable but critical condition postoperatively.

DISCUSSION

This patient ultimately expired due to multi-organ failure, as a result of her initial hemorrhagic shock. Her findings on the initial presentation were more concerning for pneumonia or malignant effusion. Cardiac perforation by a pacemaker lead two weeks following initial implantation is an extremely rare occurrence. For these reasons, the diagnosis was not considered during the initial workup until a large amount of bloody fluid was drained from the chest and a CT surgeon consulted. Our aim with the presentation of this case is to shed light on an unlikely complication, encourage more rapid identification and treatment, to prevent long-term morbidity or mortality secondary to hemorrhagic shock or other complications from this condition.

REFERENCES

Zhou, X., Ze, F., Li, D., Wang, L., Guo, J., & Li, X. (2020). Outcomes of transvenous lead extraction in patients with lead perforation: A single-center experience. *Clinical Cardiology*, *43*(4). https://doi.org/10.1002/clc.23327

Demo, H., & Megaly, M. (2017). Late perforation of a passively fixated pacemaker lead through the right ventricle. A report and review of literature. *Journal of Cardiology Cases*, *16*(5). https://doi.org/10.1016/j.jccase.2017.07.002

Song, Y. J., Seol, S. H., Song, Y. S., Kim, S., Kim, D. K., Kim, K. H., & Kim, D. il. (2019). Pacemaker lead induced cardiac perforation presenting with pneumothorax. In *Journal of Geriatric Cardiology* (Vol. 16, Issue 4). https://doi.org/10.11909/j.issn.1671-5411.2019.04.010

Koyama, S., Itatani, K., Kyo, S., Aoyama, R., Ishiyama, T., Harada, K., & Ono, M. (2013). Subacute presentation of right ventricular perforation after pacemaker implantation. *Annals of Thoracic and Cardiovascular Surgery*. https://doi.org/10.5761/atcs.cr.11.01863