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Forgotten but Not Gone: Dual-Fractured Retained Pacemaker Lead

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Introduction

Cardiac implantable electronic devices (CIEDs) have become a cornerstone in the management of bradyarrhythmias, heart failure, and other conduction system disorders. Device removal, though less frequent than implantation, is often required for infection, malfunction, or system upgrades.

Among these complications, CIED-related infections-particularly infective endocarditis-pose a significant risk, especially in older adults. Early identification and prompt multidisciplinary intervention are essential for optimizing outcomes in this population, where care often requires coordination between electrophysiologists, infectious disease specialists, and primary care providers.

Historically, early pacemaker implantation was performed through surgical cutdown of venous access, most commonly via the cephalic vein and, in certain cases, through the external jugular vein, before modern techniques using the subclavian and axillary veins became standard.

This case highlights the incidental detection of a dual-fractured endocardial pacemaker electrode nearly a decade after removal, emphasizing the importance of recognizing retained hardware and its implications in modern clinical care.

Case Presentation

A 75-year-old woman with a history of type 2 diabetes mellitus, hypertension, hyperlipidemia, multinodular goiter, ischemic stroke (2002) without residual deficits, and permanent pacemaker placement in 1992 (surgically removed in 2014) presented with transient dizziness and left upper extremity numbness. She was admitted for evaluation of a suspected transient ischemic attack.

A routine chest X-ray revealed a linear metallic structure coursing through the right hemithorax and superior mediastinum. It exhibited sharp discontinuities near the right clavicle, consistent with a fractured endocardial lead. The appearance was chronic, with no evidence of surrounding inflammation, displacement, or fluid collection.

A transthoracic echocardiogram showed normal left and right ventricular function, normal chamber sizes, and no valvular abnormalities. Electrocardiography showed sinus rhythm with premature atrial complexes and an incomplete right bundle branch block.

Her symptoms resolved spontaneously and were attributed to a transient ischemic attack. The retained pacemaker lead was deemed incidental and required no acute intervention.

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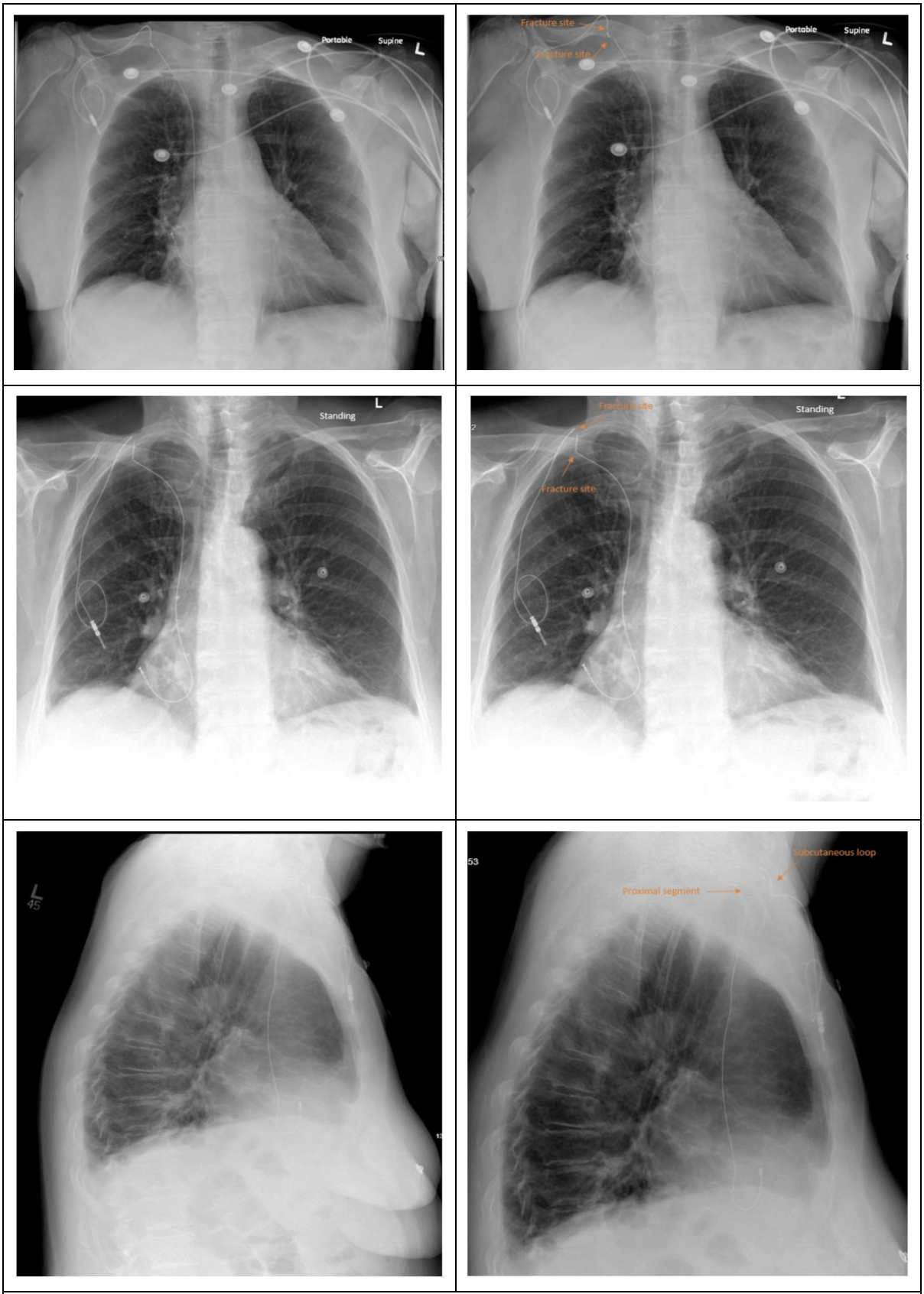

Figure: Supine and standing anteroposterior (AP) and lateral chest radiographs showing a retained epicardial pacemaker lead with two distinct fracture sites. On the labelled supine AP image, the distal segment is looped subcutaneously over the right second and third anterior ribs, while the proximal fragment projects inferiorly toward the cardiac silhouette. The generator is absent. The retained structure represents a single electrode, most likely the atrial lead.

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Discussion

Endocardial leads, which traverse the venous system to attach inside the cardiac chambers, are more difficult to retrieve completely and are often intentionally left in place to avoid tissue damage. Modern studies estimate that retained lead fragments are present in up to 25% of extractions, depending on the indication and technique used [1,2].

Although often asymptomatic, retained leads can result in serious complications, including infection (such as infective endocarditis), vascular injury, thrombosis, or embolic events [3]. In rare cases, lead fragments have migrated into the pulmonary artery, contributed to paradoxical embolism via a patent foramen ovale, or caused upper extremity deep vein thrombosis [4,5].

Accurate identification of retained leads on imaging is crucial to avoid diagnostic confusion and ensure patient safety during follow-up care.

Importantly, device extraction techniques vary worldwide, and procedural decisions should account for the potential long-term consequences of retained hardware. Interventional cardiologists should be mindful of these risks and tailor their approach accordingly.

Informed consent should explicitly address the possibility of retained lead fragments and their potential complications. This discussion not only promotes shared decision-making but also reinforces the importance of ongoing follow-up with an electrophysiologist, particularly for elderly patients and their caregivers who may otherwise assume removal is definitive.

Conclusions

This case illustrates how retained pacemaker leads, particularly endocardial fragments, can remain undetected for years and may only come to light during unrelated evaluations. Their presence, while often clinically silent, can carry diagnostic and procedural implications. Clinicians should maintain a high index of suspicion for retained hardware in patients with a history of device explantation and ensure that this possibility is addressed during preprocedural counseling and long-term follow-up planning.

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