

HEMOPTYSIS FOLLOWING SUBCLAVIAN VEIN PUNCTURE FOR PACEMAKER IMPLANTATION

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Introduction

Subclavian vein access for pacemaker placement is a relatively safe and minimally invasive procedure for accessing the right heart. Complications rarely occur, but can include subcutaneous hematoma, pneumothorax, hemothorax, thoracic duct injury, brachial plexus injury, and hemoptysis. Here, we present a case of a 69-year-old female who developed coughing and hemoptysis after dual-chamber pacemaker placement.

Case Report

SJH is a 69 year-old female with past medical history of severe aortic stenosis, severe anemia secondary to iron deficiency, GERD, prepyloric hyperplastic polyp s/p partial gastrectomy (2014) who presented to the Emergency Department for dyspnea on exertion, chest pain, palpitations, cough, and edema.

Patient was found to have a hemoglobin of 4.3 and she underwent transfusion and EGD with treatment of anastomotic bleed

On hospital day 4, she underwent Transcatheter Aortic Valve Replacement (TAVR) for severe aortic stenosis. The surgery was uncomplicated and she was transferred to the cardiac telemetry floor. However, she developed recurrent episodes of complete heart block (42% burden) in the setting of long-standing right bundle branch block, causing symptomatic bradycardia.

Since no obvious reversible etiology was found, electrophysiology recommended dual-chamber permanent pacemaker placement. Her chest x-ray one day prior to surgery was relatively unremarkable (figure 1a). She underwent pacemaker placement on hospital day 6. She received aspirin 2 days before and the day prior to pacemaker placement.

The electrophysiology team used anatomic landmarks with fluoroscopy for left subclavian access. There was some difficulty accessing the vein initially, with a micropuncture of the left subclavian artery noted prior to obtaining venous access. Just after placing the second pacemaker lead – approximately 20 minutes after venous access – the patient developed forceful coughing fits following by hemoptysis with frank blood. She became hypoxic with SpO2 down to 72%, requiring increased supplemental oxygen via nasal canula. STAT H&H revealed a hemoglobin of 7.3; she was transfused 1 unit pRBC and transferred to the cardiovascular ICU.

Chest X-ray demonstrated a wedge-shaped opacity in the left upper lobe concerning for pulmonary embolism infarct (figure 1b). CTA chest was negative for pulmonary embolism, but did reveal patchy left upper lobe consolidation with ground glass opacities, mild bronchitis, and mild endobronchial secretions in the left lower lobe (Figure 2).

1 hour after surgery, patient was back to her baseline and breathing comfortably on room air. She was discharged home in stable condition on hospital day 8. At her follow-up visit in pulmonary clinic 1 month later, chest X-ray demonstrated complete resolution of wedge-shaped opacity.

Radiologic Results

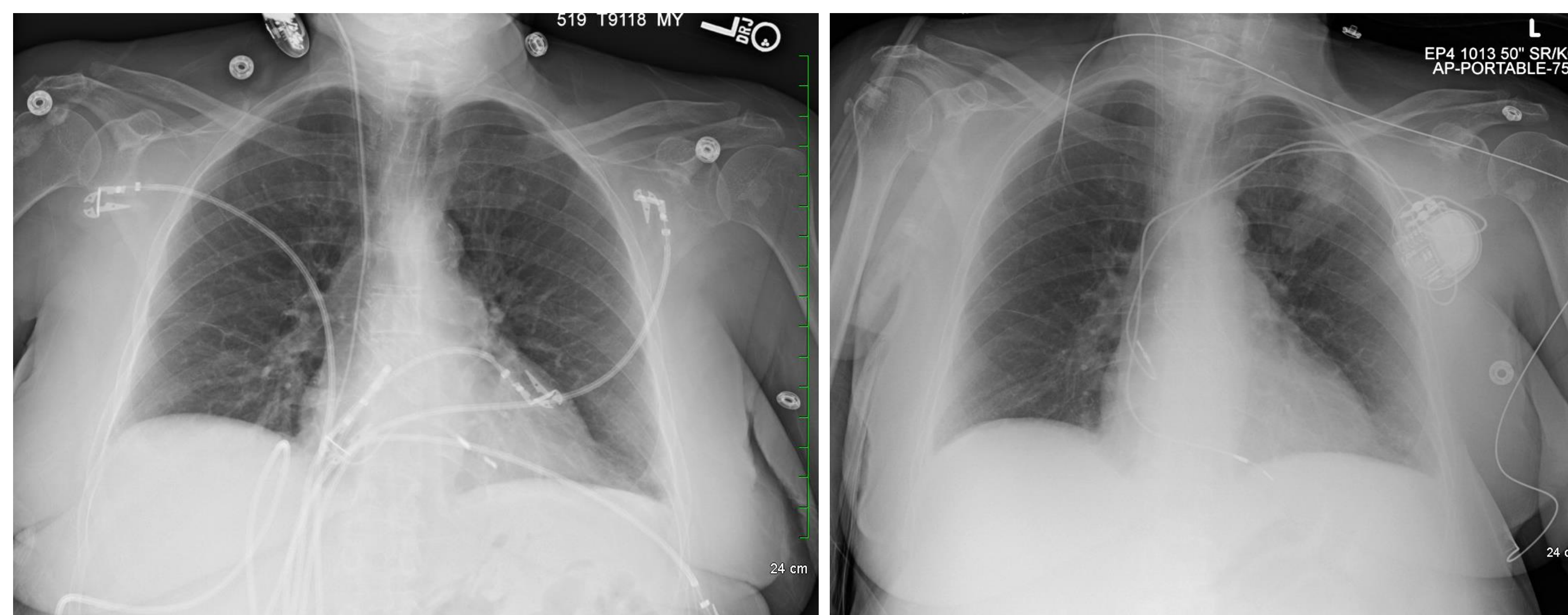


Figure 1a. Chest XR 1 day prior to pacemaker implantation
Figure 1b. Chest XR shortly after pacemaker placement; note wedge-shaped opacity in left upper lobe.

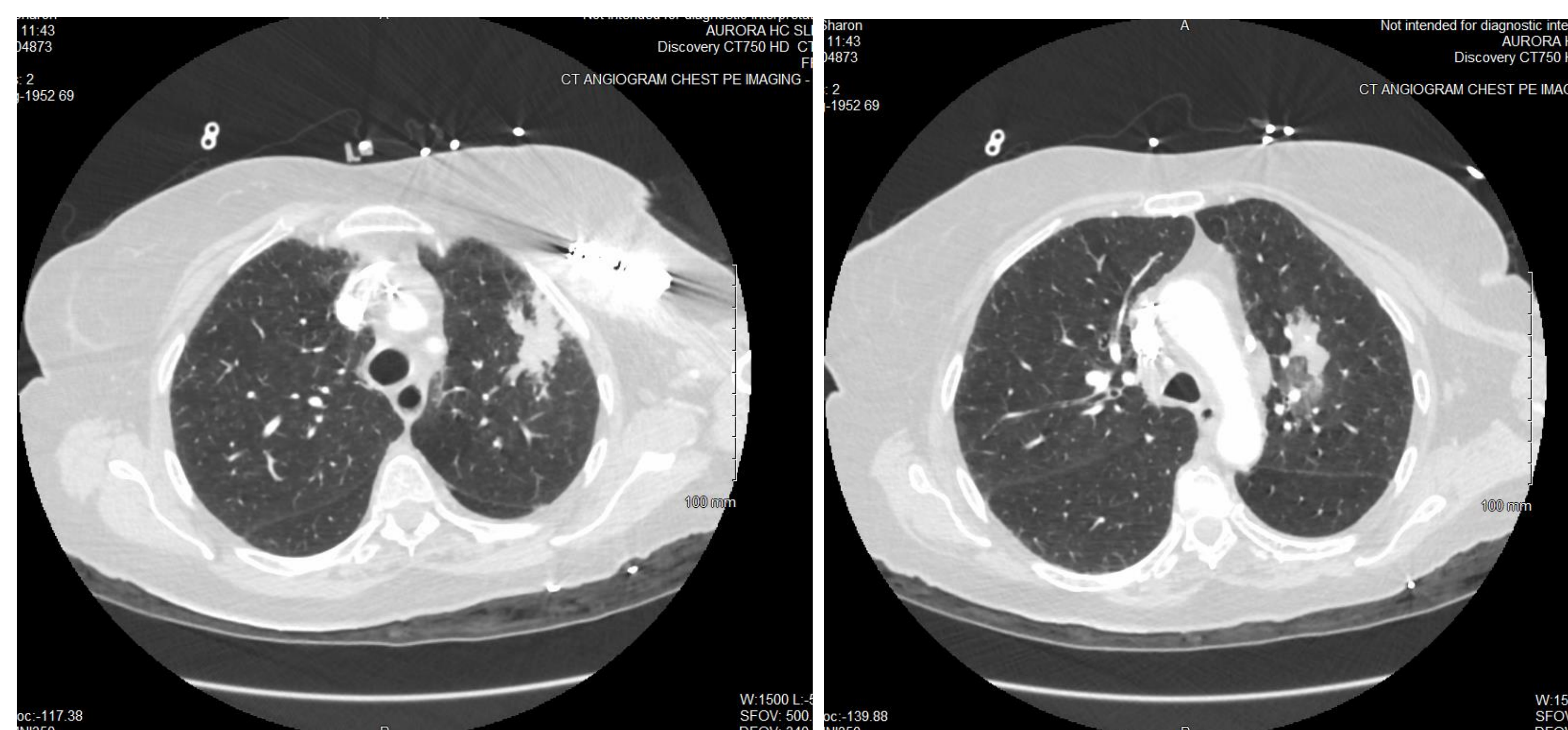


Figure 2a. Axial CT 1 hour after pacemaker placement superior to the aortic arch
Figure 2b. Axial CT 1 hour after pacemaker placement at level of aortic arch

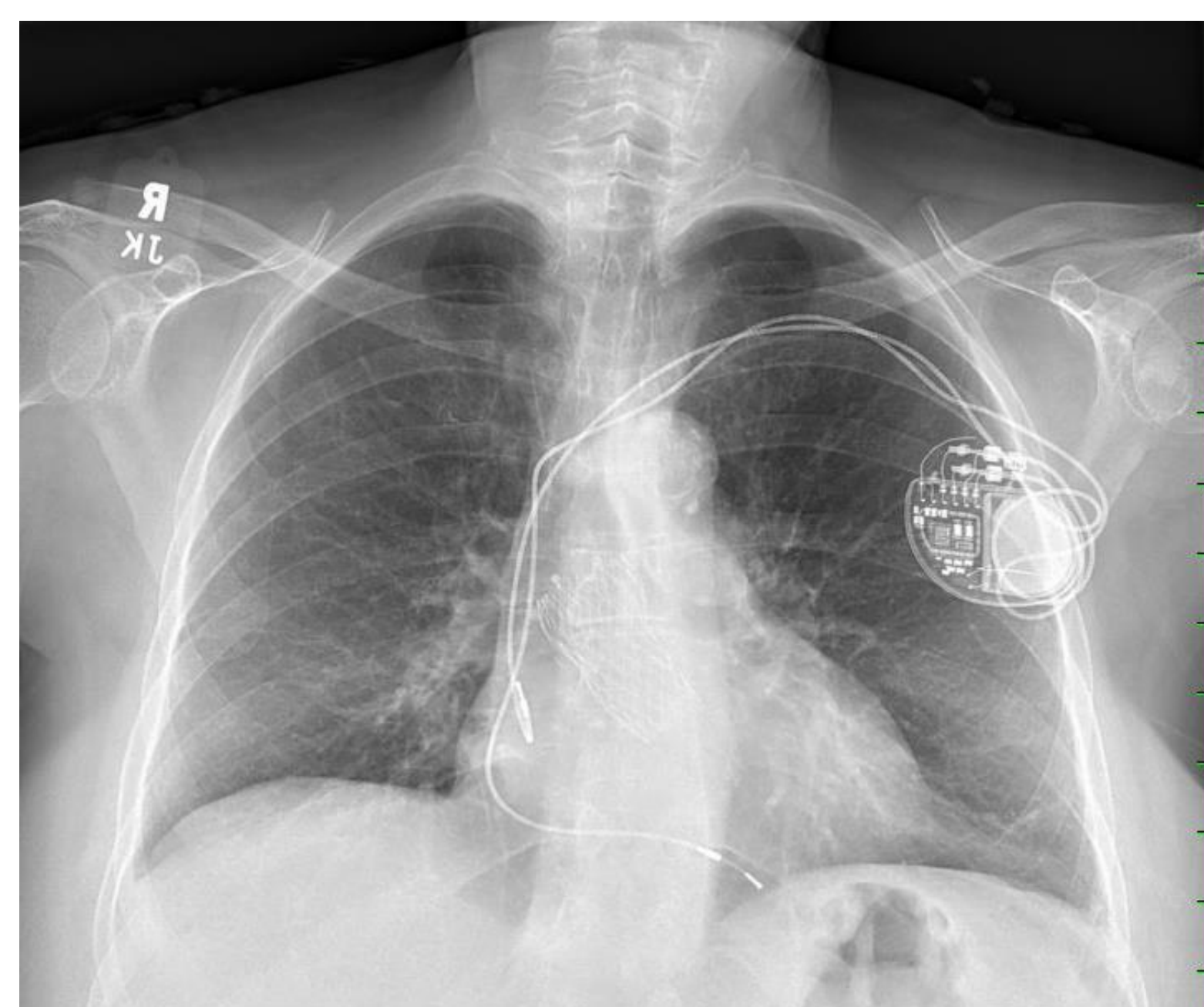


Figure 3. Chest XR one month after surgery demonstrates complete resolution of wedge-shaped opacity

Discussion

Subclavian access for pacemaker placement is a common and relatively safe procedure. However, there are several possible complications, including subcutaneous hematomas, pneumothorax, hemothorax, thoracic duct injury, brachial plexus injury, and hemoptysis.^{1-2, 4-6} The incidence of hemoptysis following subclavian access is estimated <0.1%.²

There are a few proposed pathophysiologic mechanisms causing hemoptysis. Puncture of the lung parenchyma may cause isolated alveolar hemorrhage; the clinical course is usually self-limited in such cases and resolves quickly. Alternatively, injury of the subclavian artery may cause more significant bleeding and may even create a fistula between the blood vessel and bronchus; recovery can be more prolonged and bleeding more significant in such cases, particularly in critically ill patients.⁴

There are several possible methods of preventing complications from subclavian access.

1. Guidance with venogram can be utilized in cases where access is difficult. However, venogram only provides transient guiding landmarks; additionally, usage is limited in cases of contrast allergy/intolerance or renal insufficiency.
2. Axillary venous access is an alternative; because the axillary vein is extrathoracic, there is no risk of pneumothorax or hemothorax, but this is usually more challenging than subclavian access.⁴
3. Wire-guided puncture of a distal superficial brachial vein (cephalic or basilic) may be considered for venous cutdown in difficult or high-risk patients (very obese, difficult anatomy, coagulation disorders).²
4. Ultrasound can be used to guide subclavian puncture; however, this is largely dependent on operator experience.

Conclusion

The incidence of hemoptysis as a complication of subclavian puncture is rare (<0.1%). The clinical course is usually self-limited and benign but can be serious in critically ill patients. We reviewed the available evidence of similar cases and propose several methods to prevent possible complications of subclavian access, including guidance with venogram or ultrasound, axillary venous access, and wire-guided puncture of brachial vein.

References

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