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Inadvertent Pneumothorax After Central Venous Line Insertion

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Introduction

Central venous access is a routine perioperative procedure historically performed via landmark technique. With the advancement in ultrasound technology, it is more common to see perioperative procedures performed under ultrasound guidance due to increased visualization of surrounding structures. However, ultrasound guidance is not 100% guaranteed to prevent secondary injury. In this report, we present a case of an asymptomatic pneumothorax after central line insertion which was not identified until post-operative chest x-ray (CXR).

Case Description

A 60-year-old obese female with history of hypertension, hyperlipidemia, bipolar depression, chronic kidney disease, failed hardware lumbar spine, and known difficult intravenous access presented for elective T10-L5 posterior fusion with intraoperative neuromonitoring under total intravenous anesthesia in prone position.

Intraoperative Care

Due to inadequate peripheral access, decision made to place central line in the operating room after intubation and prior to positioning in prone for surgery. Multiple attempts required secondary to short, thick neck but successfully placed right internal jugular central line under ultrasound guidance.

Case uneventful from respiratory standpoint. Hypotension noted at end of procedure, hematocrit 21, two units packed red blood cells given prior to extubation. Patient extubated uneventfully and required phenylephrine infusion in post anesthesia care unit (PACU).

PACU

Postop CXR obtained for line placement showed >50% pneumothorax on right side (Figure 1) despite patient being asymptomatic. She was saturating mid 90s on 3L nasal cannula. Right-sided thoracostomy with chest tube placement performed with immediate near resolution of pneumothorax (Figure 2).

Follow-up

Chest tube discontinued POD#3 after resolution of pneumothorax.

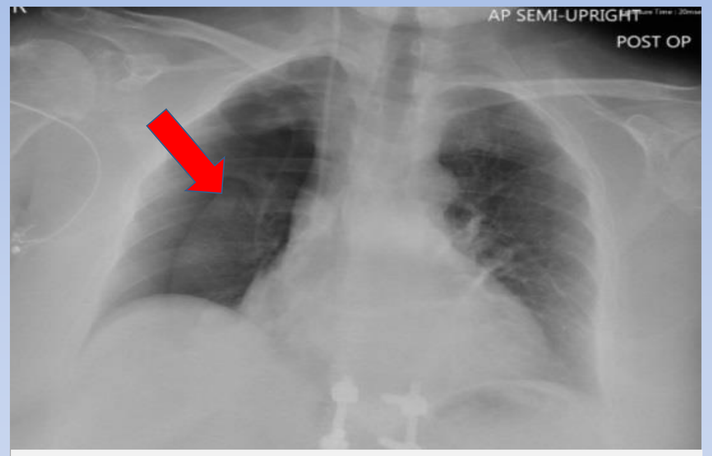

Figure 1: Post operative CXR with right sided pneumothorax (arrow). X-ray obtained from patient chart at Baystate Medical Center.

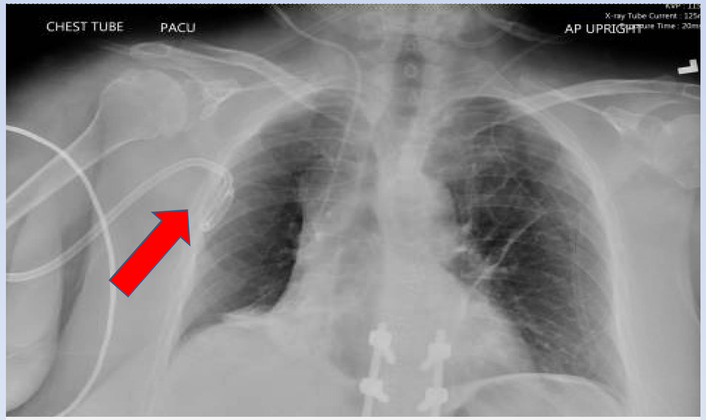

Figure 2: Post operative CXR status post right thoracostomy tube (arrow) placement. X-ray obtained from patient chart at Baystate Medical Center.

DISCUSSION

Central Line Insertion has known complications

Immediate	*Delayed*
✓ Arrhythmia	✓ Infection
✓ RV perforation	✓ Device dysfunction
✓ Vascular injury	✓ Venous thrombosis
✓ Pneumothorax	✓ Stenosis
✓ Chylothorax	
✓ Recurrent laryngeal nerve injury	
✓ Air embolism	

Prevention Strategies[2]:

- Position patient Trendelenburg to facilitate venodilation of internal jugular vein
- Ultrasound identification of structures
- Visualize needle under ultrasound guidance
- Transduce to confirm venous versus arterial insertion prior to dilation and cannulation
- Use transthoracic ultrasound to visualize placement[2]

Signs of Pneumothorax Under General Anesthesia[1,4]:

- Diagnosis of exclusion
- Difficulty with ventilation
- High peak airway pressures
- Unilateral breath sounds
- Desaturation
- Hypotension
- Abdominal distension
- Tracheal deviation
- High central venous pressure due to rise in intrathoracic pressure

Conclusion

Despite ultrasound guidance and lack of signs under positive pressure ventilation, inadvertent pneumothorax after central line insertion was not identified until routine CXR postoperatively.

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