

SUSPECTED EPIDURAL MIGRATION OF A THORACIC PARAVERTEBRAL CATHETER AFTER ULTRASOUND-GUIDED PLACEMENT

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INTRODUCTION

- Thoracotomy requires effective analgesia to reduce complications and support recovery
- Thoracic paravertebral (TPV) catheters provide analgesia comparable to thoracic epidurals with fewer complications (1)
- Regional techniques such as TPV blocks also associated with lower rates of pulmonary complications compared with systemic analgesia (2)
- Rare complications, such as epidural placement or catheter migration, may occur

CASE PRESENTATION

FIGURE 1: PREOPERATIVE CT

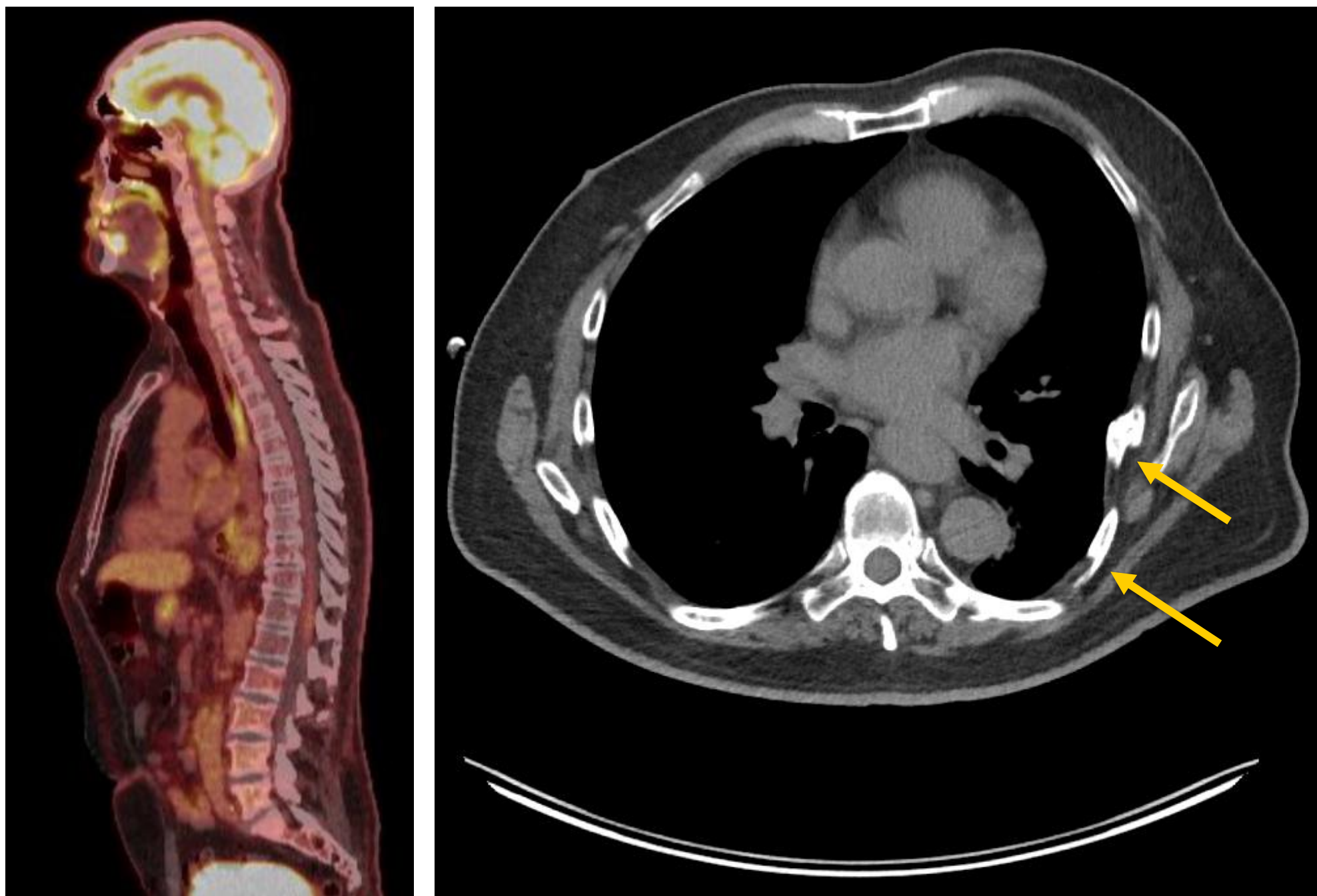


Fig.1. PET CT demonstrating evidence of chest wall deformity (yellow arrows) and sclerosis from prior injury. No other preoperative imaging studies performed.

- 60 yo male with history of left, posterior T3-8 rib fractures and stage III esophageal adenocarcinoma s/p neoadjuvant chemoradiation presented for esophagectomy via right thoracotomy and laparotomy incision
 - History of prior difficult epidural placement (3+ attempts) for rib fx pain management one year prior to this encounter
- Preoperative plan: thoracic epidural placement
 - Placement attempted at T7–8 via right paramedian approach with a 18g Touhy and 20g catheter without achieving LOR
 - Subsequent attempts by faculty regionalists at level below and above unsuccessful
 - Procedure aborted
- Postoperative Course
 - Remained intubated and admitted to ICU
 - Extubated on POD1

POST-OPERATIVE REGIONAL MANAGEMENT

- POD1: Patient reassessed for bilateral TPV catheter placement under ultrasound guidance. Technically challenging due to poor visualization
- R TPV: Aborted, poor view due to posterior chest tube. Erector Spinae Plane (ESP) catheter placed instead
- Left TPV:
 - Placed using sagittal in-plane technique
 - Hydrodissection confirmed proper needle placement; wire-reinforced catheter threaded 4 cm beyond skin depth
 - After 20cc 0.5% ropivacaine bolus, patient developed exaggerated hypotension with stable HR
 - Examination demonstrated left lower extremity numbness and weakness, with bilateral T3–L5 sensory level
 - Patient remained alert and oriented. Fluid resuscitation and pressor support required for 15 minutes
 - Catheter removed due to concern of epidural migration, and neurologic deficits resolved within 6 hours
- Postoperative course:
 - Right ESP catheter provided inadequate analgesia, removed POD2
 - Low-dose ketamine infusion initiated POD2–POD5, then transitioned to enteral opioids
 - Transferred to ICU on POD7 for respiratory failure from suspected aspiration. Required HFNC, antibiotics, and diuresis
 - Eventual discharge to home on POD23

FIGURE 2: TPV PLACEMENT



Fig.2. Ultrasound image obtained under sagittal, paramedian, in plane technique. Narrow spaces appreciated. Touhy can be seen entering from the caudad (screen right) border.

DISCUSSION

- Epidural migration of TPV catheters is a rare but recognized complication of TPV catheter placement (3)
- Ultrasound guidance reduces risk, but migration remains possible, regardless of operator experience (4)
- Risk factors include:
 - Technical factors: use of landmark technique, depth of target
 - Patient factors: obesity, spinal deformity or anatomic variant, prior trauma, significant radiation

FIGURE 3: THORACIC
PARAVERTEBRAL ANATOMY

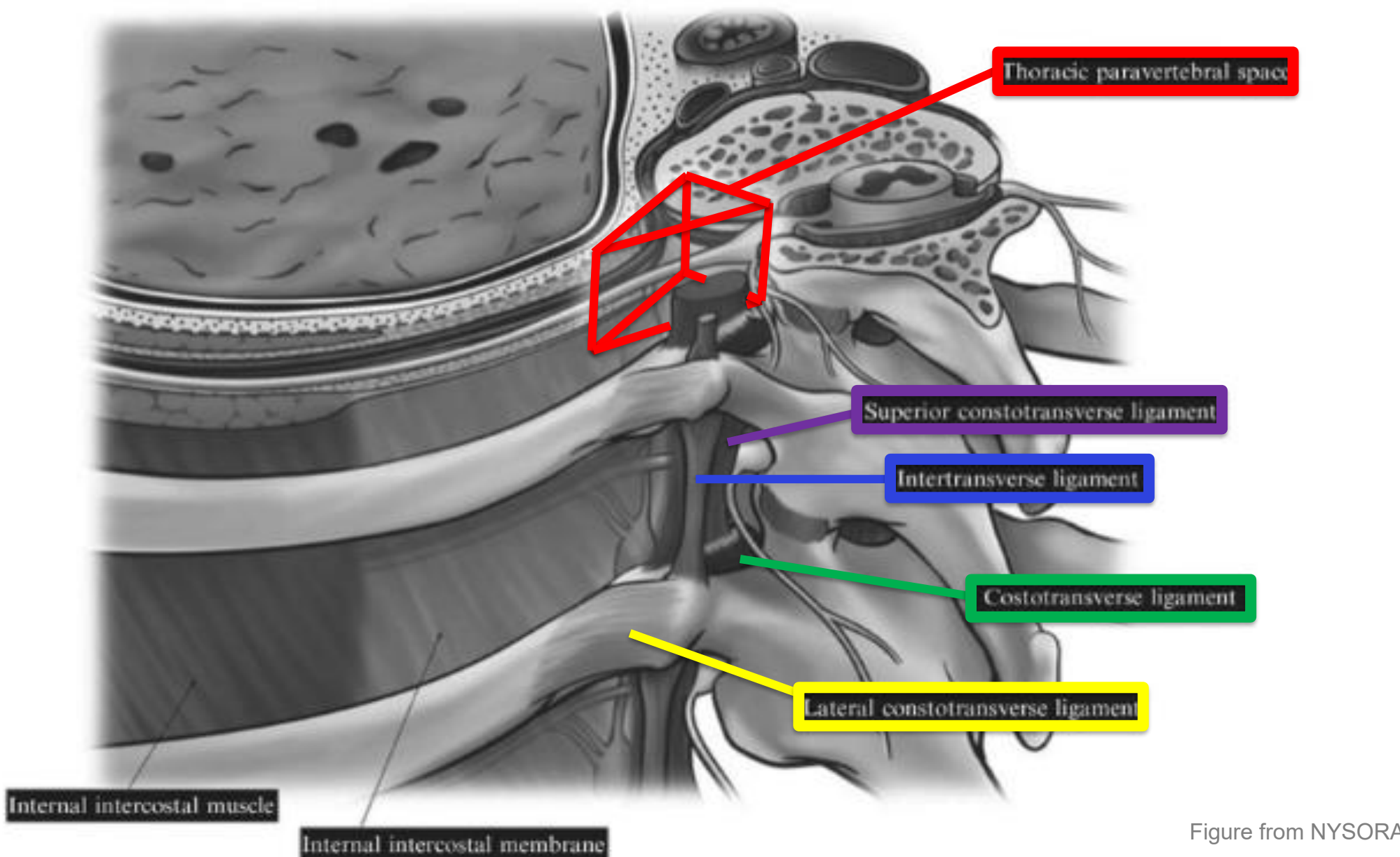


Fig.3. Diagram of the paravertebral space and surrounding ligaments. The PVS is contiguous with the epidural space.

FIGURE 4: THORACIC
PARAVERTEBRAL SONOANATOMY

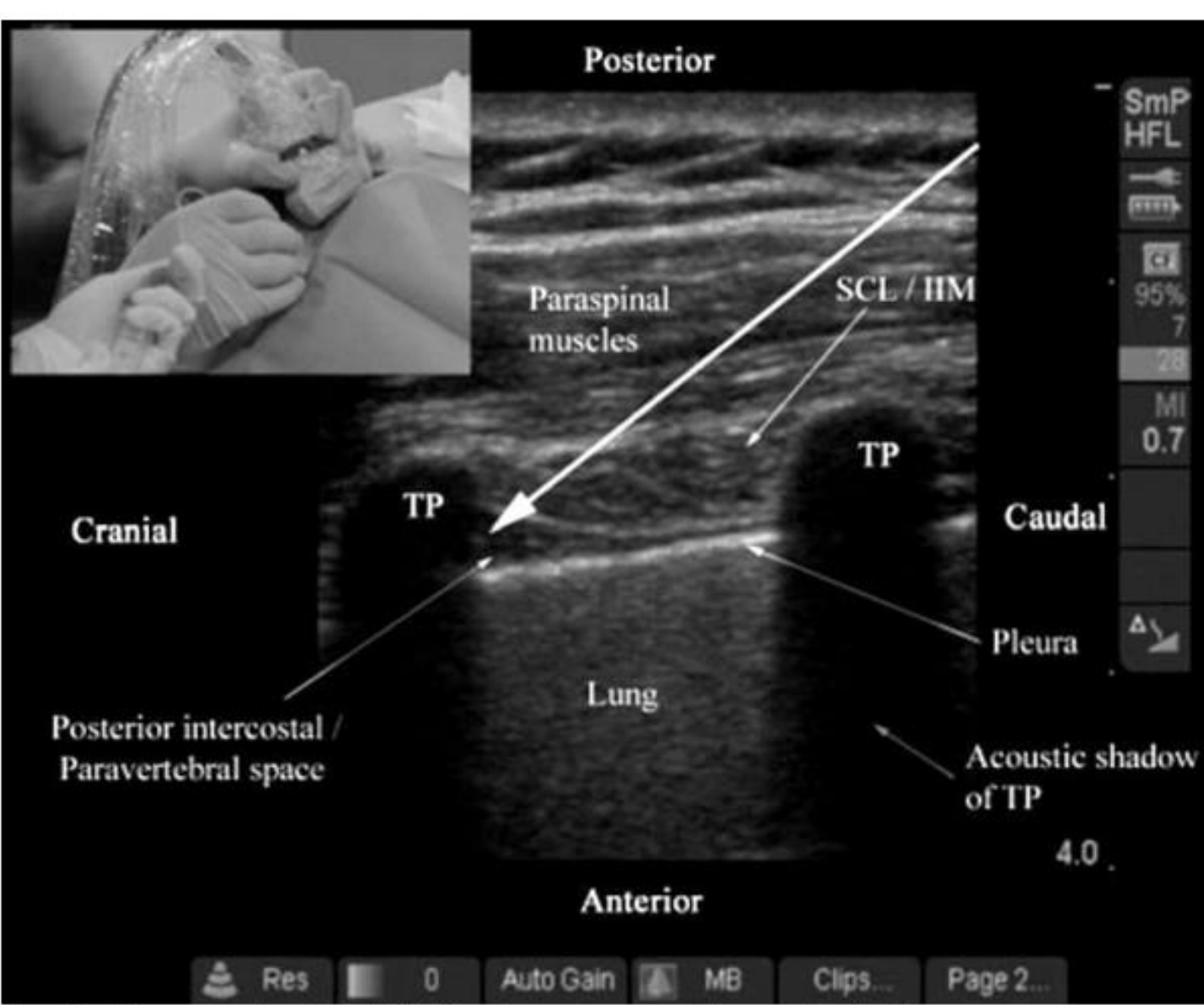


Fig.4. Sagittal, paramedian ultrasound imaging of the PVS. Transverse process, costotransverse ligament, and pleural are all clearly visualize.

CONCLUSIONS

- Thoracic paravertebral catheters are effective alternatives to epidurals but are not without risk
- Catheter migration remains possible even with ultrasound guidance (5)
- Providers must remain vigilant for signs of misplaced catheters, such as hypotension, unexpected sensory level, or motor deficits
- In this case, the patient's prior traumatic rib fractures and radiation history likely predisposed him to the risk of catheter migration and subsequent complications

Consent

Informed consent was obtained for submission of this case report. As the case report is devoid of identifiable information, per University of Iowa Health Care IRB policy, it is exempt from IRB review

References

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