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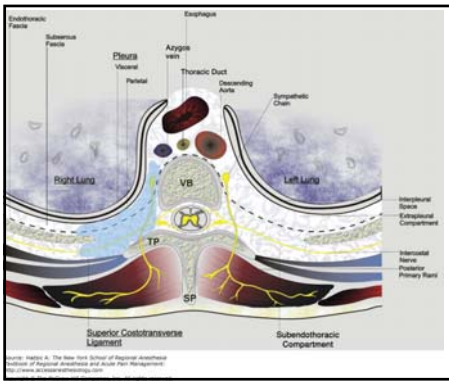
Thoracic Paravertebral Block (TPVB)

SCHOOL OF MEDICINE
Department of Anesthesiology
UNIVERSITY OF COLORADO ANSCHUTZ MEDICAL CAMPUS

Overview

- TPVB produces "ipsilateral, segmental, somatic, and sympathetic nerve blockade in contiguous thoracic dermatomes".[1]
- Indications[2]
  - Breast surgery (T3-5, unilateral or bilateral)
  - Thoracoscopic or open thoracic surgery (T5-7, unilateral)
  - Chest wall surgery (at dermatomal level, unilateral)
  - Upper abdominal surgery (T6-8, unilateral or bilateral)
  - Rib fractures (at fracture level, unilateral or bilateral)



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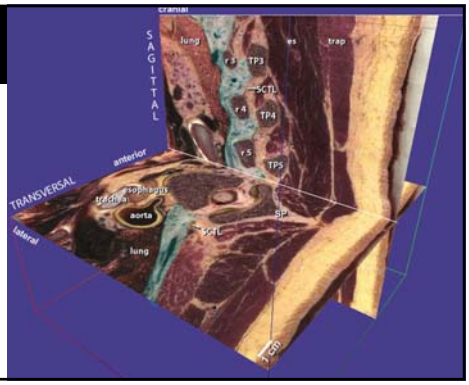
Anatomy

- Boundaries
- Contents

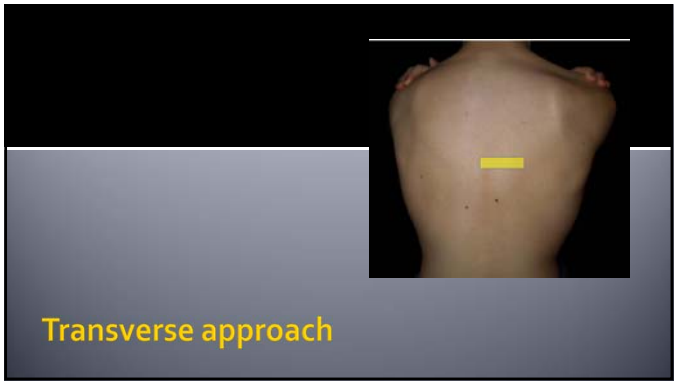


Paravertebral block

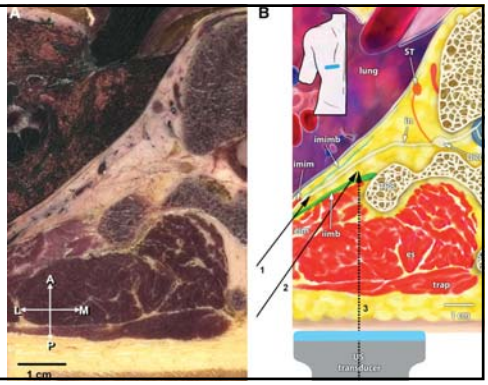
- May be unilateral or bilateral
- May perform at single or multiple levels
  - Spread with a single injection 4 (+/-2) segments
- Amenable to single-shot or continuous (catheter) technique
- Choice of local anesthetic
  - Long acting agent
    - 15-20mL Ropivacaine 0.5-0.75% or Bupivacaine 0.5% +/- epinephrine 2.5-5mcg/mL
      - Smaller amounts if multiple injections
    - Consider that this space is highly vascularized (rapid absorption), reduce dose in frail/elderly
    - Duration of anesthesia 3-4h; duration of analgesia 8-18h
  - Continuous infusion (catheter)
    - Ropivacaine 0.2% or Bupivacaine 0.125-0.25% at 0.1-0.2mL/kg/h after initial bolus

Ultrasound technique

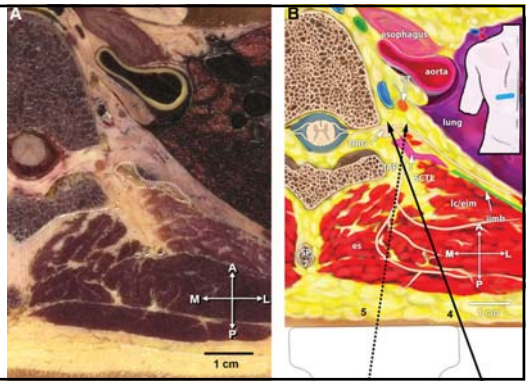
- Transverse approach
  - Place ultrasound lateral to spinous processes
  - Scanning cephalad or caudad finds acoustic window between the ribs and transverse processes (TPs)
- Sagittal approach
  - Place ultrasound sagittally 3-4cm from midline
  - Scanning mediolaterally, see 1-2 levels of TP (medially) or rib (laterally)
  - Tilt probe slightly laterally for better US visualization of the pleura and SCTL



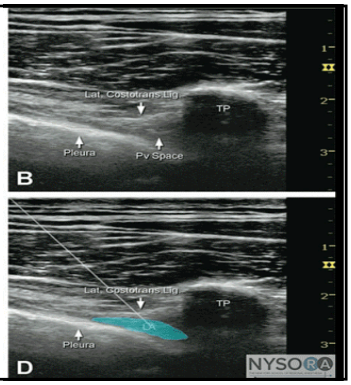
Transverse approach: Anatomy

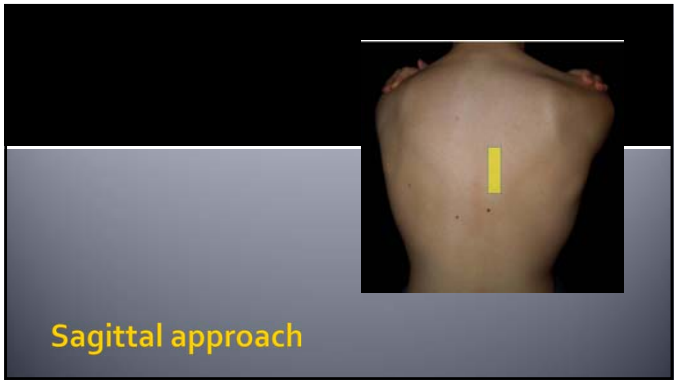


Transverse approach: Anatomy

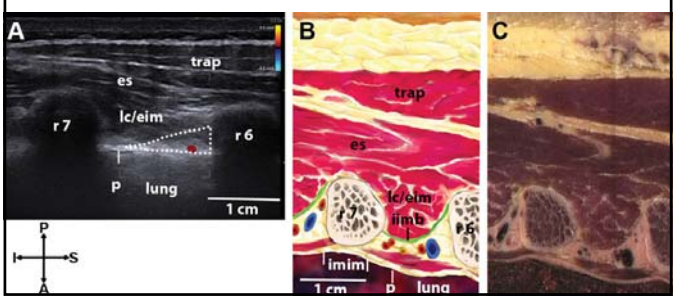


Transverse approach: Ultrasound

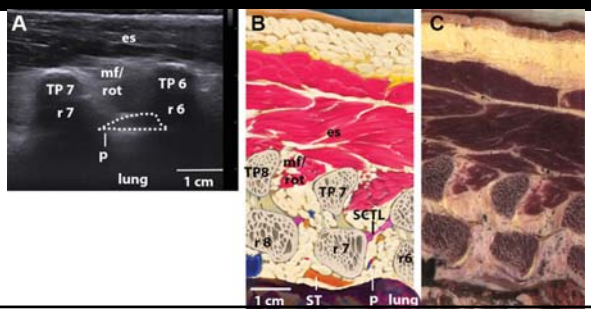




Sagittal approach at rib (more lateral)



Sagittal approach at TPV space (more medial)



Sagittal Approach: Ultrasound

Potential complications

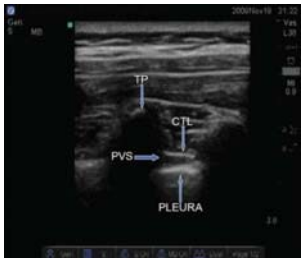
- Epidural spread/epidural catheter migration
- Needle entry into intervertebral foramen
  - Neuraxial block, spinal cord injury
- Pleural puncture/pneumothorax
- Intravascular injection

Troubleshooting/Tips for Success [1, 2]

- The further laterally the block is performed, the thinner the PV space. Therefore, the smaller margin of error to pleural puncture.
- In-plane advancement of the needle requires visualization of the needle path at all times to reduce the risk of needle entry into unwanted locations (pleura, neuraxial space).
- Orient bevel of Touhy away from pleura to decrease risk of pleural puncture.
- May feel a "pop" or loss of resistance as needle penetrates internal intercostal membrane/costotransverse ligament.
- Always aspirate prior to injection of LA to reduce the risk of intravascular injection.
- Slowly inject 15-20mL of LA in small increments to reduce the risk of epidural spread.
- If using continuous technique, advance catheter no more than 2 cm into space to avoid catheter migration.
- Adjuncts including 10mg PF dexamethasone may prolong analgesia.

Three Pearls: Thoracic Paravertebral

- Superior Costotransverse Ligament must be punctured.
- After puncturing SCTL, pleural depression will be seen with local anesthetic injection.
- The further lateral the block is performed, the more likely pleural puncture becomes.



References

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2. Vandepitte, C., Pintaric, T. S., & Gautier, P. E. (2013, September 20). Thoracic Paravertebral Block. Retrieved February 2, 2016, from http://www.nysora.com/techniques/neuraxial-and-perineuraxial-techniques/ultrasound-guided/3277-thoracic-paravertebral-block.html
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4. Tighe, S. Q., Green, M. D., & Rajadurai, N. (2010). Paravertebral block. *Continuing Education in Anaesthesia, Critical Care & Pain*, 10(5), 133-137. Retrieved February 2, 2016, from http://www.medscape.com/viewarticle/728574_1