Thoracic Paravertebral Block (TPVB)

Overview
- TPVB produces "ipsilateral, segmental, somatic, and sympathetic nerve block in contiguous thoracic dermatomes".1
- Indications²
  - 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)

Anatomy
- Boundaries
  - Contents
- Transverse approach
- Sagittal approach

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% (+/- epi 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 8–12h
  - 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 caudal 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 (latterally)
  - Tilt probe slightly laterally for better US visualization of the pleura and SCTL
Transverse approach

Transverse approach: Anatomy

Sagittal approach at rib (more lateral)

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

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.
Always aspirate prior to injection of LA to reduce the risk of intravascular injection.
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.
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