Thoracic Surgery and Analgesia

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Overview

• Surgical aspects
• Analgesic options
  • Epidural
  • Paravertebral
  • Adjuvant
• Ultrasound guidance

Surgical Approach

• Thoracotomy
• VATS

Treating Pain after Thoracic Surgery

Neuraxial Techniques

Epidural Catheters and Paravertebral Blocks

Traditional Anatomic Approach
OR...

Ultrasound Guided

Thoracic Epidural

Benefits
• Decrease acute incisional pain
• Reduce parenteral opioid requirements
• Decrease splinting, improve cough
• No effect on shoulder pain
• Adjuvant therapy necessary

Contraindications
• Patient refusal
• Bleeding diathesis
• Infection at site of injection
• Other relative contraindications
Anatomy

Anterior Posterior


Paramedian US of Epidural Space


US Guided Epidural Access


Paravertebral Blocks

Paravertebral space – Anatomy

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Safety Considerations

• Pneumothorax is very rare
• Use of small Tuohy needle
• Every dose is a "test dose"

Contraindications

• Anti-coagulation: relative contraindication
  • PT>14
  • PTT>40s
  • Platelet count < 50,000/µl
• Local infection
• Empyema

• Spread: Cranial + Caudal
• Caudal: lumbar plexus via the endothoracic fascia
• Spinal nerve → intercostal nerve → dorsal ramus
• Sympathetic chain
Paravertebral block

- **Indications:** Thoracotomy, breast surgery, cholecystectomy, rib trauma, renal surgery
- **Landmarks:** Spinal process at the desired thoracic dermatomal levels
- **Needle insertion:** 2.5 cm lateral to midline
- **Transverse process:** 2 – 5 cm in adult
- **Target goal:** needle insertion 1 cm past the transverse process (4 – 6 cm)
- **Local anesthetic:** 3 - 5 mL per level
US guided paravertebral block out of plane

- Identification of desired spinous process
- Lateral movement of the probe until transverse process is visible
- Oblique movement until the typical double layer of internal intercostal membrane, transverse process and the pleura is seen in one image
- Needle is positioned 1 cm caudal from the probe
- Tip of the needle is positioned between the IIM and the pleura

Ultrasound image of the PVS between the IIM (internal intercostal membrane), the transverse process (TP), and the pleura

Ultrasound illustration of the PVS (between the arrows) before (a) and after administration (b) of 12 ml of local anaesthetic.

Conclusion

- TEA for open thoracotomy
- PVB for VATS lobectomy or as a rescue
- Consider adjuvant therapy for VATS/VATS lobes