



Round : Anesthesia-Lecture.3.....

Group no : B³.....

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Anesthesia Overview

- Definition: Administration of chemical agents in non-toxic concentrations to cause a reversible loss of sensation and response.
- General Anesthesia: Used for major surgeries; blocks sensory, motor, autonomic, and cognitive functions. Requires supportive devices (e.g., mechanical ventilation).
- Local Anesthesia: Limited to a specific area; does not affect consciousness or vital functions.

Pain Pathway

- Pain sensed by free nerve endings (1st-order neurons) stimulated by mechanical, thermal, or chemical triggers.
- Process involves cation influx → depolarization → action potentials → synapse with 2nd-order neurons.
- Local Anesthetics block nerve transmission at their administration site.

Local Anesthetics

- Definition: Substances applied topically/injected to cause reversible regional loss of sensation by blocking nerve transmission.

Mechanism of Action:

1. Membrane Expansion Theory:

Local anesthetics expand the cell membrane, narrowing sodium channels (indirect action).

2. Specific Receptor Theory (more accepted):

Local anesthetics bind directly to receptors on sodium channels, blocking them (direct action).

Sites of Local Anesthesia

1. Surface (Topical): Applied to skin/mucosa.

- Examples: EMLA cream, sprays, gels.
- Used in ophthalmology, dentistry, and minor injuries.

2. Infiltration: Subcutaneous injection.

- Targets terminal nerve endings.

3. Nerve Block: Injected around nerve trunks or plexuses.

- Blocks larger areas supplied by the nerve.

4. Epidural Anesthesia:

- Injection site: Epidural space (between ligamentum flavum and dura mater).
- Indications: Orthopedics, obstetrics (e.g., C-section), urology, general surgery, and labor pain.
- Landmarks:
- C7 (cervical), T7 (lower scapula), and L3-L4 (iliac crest).
- Contraindications:
- Absolute: Patient refusal, coagulopathy, skin infection, raised ICP, severe hypovolemia, allergy to local anesthetics.

- Relative: Uncooperative patients, vertebral abnormalities, pre-existing neurological disorders.

Key Anatomy for Anesthesia

- Spinal cord ends at L1-L2 in adults (L3 in children).
- Dural sac ends at S2 in adults (S3 in children).
- Safe puncture zones: L3-L4 or below to avoid spinal cord damage.
- Landmark: Tuffier's Line (line connecting iliac crests) at L4-L5.

Technique of Epidural Anesthesia:

1. Preoperative Visit

- Patient Communication:
- Explain the process and effects of anesthesia.
- Assure the patient that sensations (e.g., weak legs) are normal and manageable.
- Inform about risks, complications, and the possibility of partial/failed anesthesia.
- Informed Consent: Mandatory before the procedure.
- Pre-anesthetic Assessment:
- Review cardiovascular health (e.g., valvular lesions).
- Assess neuromuscular conditions (e.g., contraindications like multiple sclerosis).
- Examine the back for abnormalities.
- Conduct coagulation tests (INR, PTT, platelet count).
- Premedication: Usually unnecessary; for anxiety, use diazepam (5-10 mg) 1 hour before surgery.

2. Intravenous Preloading

- Purpose: To ensure adequate circulation.
- Protocol:
- Insert a large IV cannula and administer fluids before the procedure.
- Prevent hypotension with 1000-1500 mL crystalloids (e.g., Normal Saline or Hartmann's).
- Avoid Dextrose 5%.

3. Patient Positioning

1. Lateral Decubitus Position: Most common; ensures optimal access to the epidural space.
2. Sitting Position: For low lumbar/sacral anesthesia or obese patients.
3. Prone Position: Used for specific surgeries (e.g., rectal, lumbar).

4. Equipment

- Preparation:
- Large-bore IV cannula (16-18 G).
- Skin preparation with alcohol/iodine.
- Sterile precautions (gown, gloves, mask).
- Needles: Tuohy needle (16-18 G, blunt bevel) with markings for guidance.
- Other Equipment:
- Catheters, syringes, preservative-free normal saline.
- Saline used for the loss of resistance technique to locate the epidural space.

5. Locating the Epidural Space

- Insert Tuohy needle between spinous processes.
- Confirm space using loss of resistance (saline or air).
- Advance catheter (10 cm, with 6 cm fixed inside).

6. Post-Procedure Care

- Catheter Maintenance: Can remain for days; check anticoagulation status before removal.
- Anticoagulation Protocol: Stop therapy 12 hours before removal; resume after 2 hours.

7. Complications

1. Cardiovascular: Hypotension, bradycardia if T2-T5 is affected.
2. Respiratory: High block can impair intercostal nerves, causing breathing distress.
3. Gastrointestinal: Enhanced peristalsis and relaxed sphincters.
4. Genitourinary: Common urinary retention.
5. Other Risks:
 - Spinal epidural hematoma, dural puncture headache, infections, neurotoxicity.
 - Cauda equina syndrome (severe neurological complications).
 - Transient neurological symptoms (mimic cauda equina without incontinence).

Epidural vs Spinal

Epidural	Spinal
Dose is high (10-20 ml) Volume dependent	Dose is low (1.5-2 ml) Concentration dependent
Onset is slow (25-30 min)	Onset is fast (5 min)
does not cause as significant neuromuscular block	Does cause as significant neuromuscular block We should always administrate a foley catheter
Multiple dosing possible #...	Single dose only #1
Can be given at various point along the Backbone	Can only be given at specific point along the Backbone to avoid damaging the spinal cord Decrease the dose in pregnant women

→ decreased more in pregnant's.

Info → **

★ Spinal is affected by the position, the age, pregnant or not, height etc.
EXCEPT WEIGHT AND GENDER dont affect spinal.

★ Before administrating local anesthetics when introducing the needle in epidural procedure, we administrate testing dose (lidocaine and epinephrine) to check we are at a correct location, IF motor block occurs rapidly, then we are at the subarachnoid space doing (spinal, intrathecal or subarachnoid.) (they're all the same) But not epidural space as motor block occurs lastly during epidural.