So Your Patient Wants an Epidural?  
A Look at Anatomy, Technique & Complications”

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Disclosure

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Objectives

• Understand the anatomy of the epidural space  
• Discuss indications and contraindications for epidural placement  
• Describe epidural placement  
• Delineate risks and benefits of epidural placement  
• Understand common complications of epidural anesthesia
Outline

- History
- Anatomy
- Indications/Contraindications
- Risks and Benefits
- Placement
- Common Complications
- Conclusion

History

- 1884-Carl Koller-Cocaine-eye surgery
- 1900-1930-first papers describing obstetrical applications-spinal, lumbar epidural, caudal, paracervical, pudendal
- Cleland-describes nerve pathways mediating labor pain
- 1942-Hingson and Edwards-continuous caudal anesthesia for labor analgesia

History

- Early 1940’s-Edward Tuohy-used a ureteral catheter through a large Huber-tipped spinal needle-continuous spinal anesthesia
- 1947-Curbelo in Cuba-used Tuohy’s technique for continuous epidural analgesia
- 1960-Bonica and Bromage-made epidural anesthesia for obstetrics popular
**Anesthesia** - medically induced insensitivity to pain; loss of sensation
- Unconscious-general anesthesia
- Numb body part-local, regional

**Analgesia** - stimuli are perceived but not interpreted as pain
- unawareness of pain
- treatment to control pain

**Techniques for Labor Analgesia**
- Nonpharmacologic analgesia
- Psychological techniques
- Alternative techniques
- Systemic medications
- Sedatives and tranquilizers
- Dissociative analgesia
- Opioids
- Inhalation analgesia
- Regional analgesia
- Spinal
- Epidural
- Combined spinal-epidural
- Paracervical block
- Lumbar sympathetic block
- Pudendal block

**Anatomy**
- Spinal canal—extends from the foramen magnum to the sacral hiatus
- 7-Cervical
- 12-Thoracic
- 5-Lumbar
- Sacrum and coccyx
Anatomy

- **Vertebra**—body, bony arch
- **Body**—two pedicles anteriorly
  ---two laminae posteriorly
  ➢ Transverse processes-formed by junction of pedicles and laminae
  ➢ Spinous process—formed by joining of each lamina
Anatomy-Epidural Space

- Potential Space-adipose and connective tissue
- Venous plexuses-prominent
- Bounded:
  - cranially by the foramen magnum
  - caudally by the sacroccygeal ligament

- anteriorly by the posterior longitudinal ligament
- laterally by the vertebral pedicles
- posteriorly by the ligamentum flavum and the vertebral lamina
**Labor**

- First Stage-Visceral Pain-T10 to L1 carry afferent impulses from the uterine contractions and the cervical dilation
- Second Stage-Somatic Pain-S2 to S4-vaginal and perineal in origin via the pudendal nerve

**Physiology**

- Local anesthetics produce nerve conduction block
  - Primarily sodium channels
  - Prevents propagation of neural impulses
### Mechanism of Action

- **Differential blockade**
  - Autonomic > sensory > motor
  - Sensitivity to blockade determined by axonal diameter, degree of myelination, anatomy
  - Sympathetic blockade (temperature) may be two dermatomes higher than sensory block (pain, light touch)

### Mechanism of Action

- **Differential blockade**
  - Sensory block may be two dermatomes higher than the motor blockade

### Nerve Fiber Classification

- **C fibers** - sympathetic
- **C Dorsal Root** - pain, temperature, touch
- **A Delta** - pain, cold temperature, touch
- **A Alpha** - pressure, proprioception, motor
Options
- First Stage Labor-Spinal, Segmental Epidural, CSE
- Second Stage Labor-Pudendal, local, extended epidural, spinal
- Paracervical blocks-no longer used
  - Fetal bradycardia
  - Uterine artery vasoconstriction
  - Placental insufficiency
  - High local anesthetic-fetal blood

Goals
- Segmental blockade
- Limited motor block
- Maintain stable hemodynamics
- Retain ability to push
- Have the ability to extend block for surgical anesthesia if needed
Indications

- Joint statement - ASA and the American College of Obstetricians and Gynecologists (ACOG) in effect since 1992 states, "Labor results in severe pain for many women. There is no other circumstance where it is considered acceptable for a person to experience severe pain, amenable to safe intervention, while under a physician’s care."
- ASA and ACOG have helped to clear this issue by declaring that a mother's request for pain relief is sufficient justification for her receiving it.

Pain

Contraindications

- Patient refusal
- Maternal coagulopathy
- Infection at the needle site
- Severe maternal hypovolemia
- Severe aortic stenosis or mitral stenosis
- Increased intracranial pressure

Benefits

- Effective pain relief without appreciable motor block
- Reduction in maternal catecholamines
- Provides a means to rapidly achieve surgical anesthesia
- Postoperative analgesia
Risks

- Bleeding at the site
- Infection
- Headache
- Failure to relieve pain
- Spinal block
- Intravascular injection-systemic local anesthetic toxicity
- Hypotension
- Subdural injection
- Nerve injury
What is needed?

- Nurse
- Prehydration
- Non-particulate antacid
- Monitors
- Position
- Preparation
- Emergency equipment, O₂
Complications

- Nausea
- Urinary Retention
- Backache
- Total Spinal Anesthesia
- Hypoventilation
- Post Dural Puncture Headache
- Transient Radicular Irritation

Complications

- Epidural Hematoma
- Epidural abscess
- Systemic Absorption
- Intravascular Injection
- Failure to Work Properly
- Subdural Injection
Conclusion

- History
- Anatomy
- How to do an Epidural
- Indications/Contraindications
- Common Side Effects/Complications

Questions??

References

- Stedman’s Medical Dictionary, 23rd Edition, Baltimore, MA, Williams & Wilkins Company, 1976
References