

# **EPIDURAL PAIN MANAGEMENT IN THE POSTOPERATIVE PATIENT**

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## **Objectives**

- Discuss the medications used in epidural pain management and the mechanism of action to include side effects and treatment of .
- Identify possible complications of epidural pain management and required action by the RN.
- Discuss nursing interventions of epidural pain management including patient safety and education.

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## **INTRODUCTION**

- Epidural is exceptional pain management –
  - Superior pain control compared with PCA
  - Most postop orders are written as PRN
  - Amounts of drugs are minimal (MS mcg not mgs)
    - Fewer side effects
  - Very safe procedure
    - Rare complications
- Nurses are responsible for knowing how to care for a patient with epidural pain management

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## Review the “Pain Process”

1. Transduction
2. Transmission
3. Modulation
4. Perception

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## Epidural Analgesia can Decrease the Surgical Stress Response

Stress causes Rapid changes in the  
Endocrine  
Nervous  
Cardiovascular  
Immune

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## VERTEBRA AND SPINAL CORD

- Vertebra consists of
  - Anterior body, laminae and spinous process – protection
    - Bones of laminae are bound by ligaments
- Spinal cord – protected by vertebral column and connective tissue (meninges)
  - Extends from foramen to L1-L2
  - Surrounded by subarachnoid space (CSF filled)
  - Separated by the pia mater
  - Dura and arachnoid mater separates epidural space from subarachnoid space

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## EPIDURAL SPACE

- Potential space – clinical significance
  - Contains
    - vasculature
    - Fat
    - Network of nerve extensions
      - 31 pairs of spinal nerves
      - 8 cervical, 12 thoracic, 5 lumbar, 5 sacral, 1 coccygeal (anterior and posterior)
      - Exit bilaterally – specific skin surface areas are innervated by a single spinal nerve or group of spinal nerves -- dermatomes

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## PLACEMENT OF CATHETER

- In OR while pt. in side lying or sitting position – open vertebral spaces
  - Chest and upper abdomen sensory blockade, placed in thoracic area between 5<sup>th</sup> and 8<sup>th</sup> thoracic vertebrae
  - For lower abdomen and legs– insert at lumbar region – usu. between 2<sup>nd</sup> and 4<sup>th</sup> lumbar vertebrae
  - Caudal placement for pediatrics

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## Intrathecal Analgesia

- Subarachnoid space - between spinal cord and the dura
- extends from the foramen magnum to the sacral hiatus & contains CSF
- administration of local anesthetic or opioid
  - rapid onset of analgesia/anesthesia
  - limited duration
- \*\*\*Medications are 10-20 times more potent than in epidural space

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## Combined Spinal and Epidural

- CSE
  - Needle through needle technique
  - Rapid onset of relief and effective analgesia
  - Allows mother to ambulate
  - No difference in the rate of cesarean delivery, the rate of instrumental vaginal delivery, or the length of labor

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## Benefits Combining Local Anesthetic with Epidural Opioids

- Synergistic analgesic action
- Reduced opioid dose
- Minimized opioid & LA side effects

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## Opioid Mechanism of Action

- Opiate receptors in brain, spinal cord and peripheral tissue,  $\mu$ ,  $\kappa$ ,  $\delta$ 
  - pain transmission is blocked in spinal cord when opioids are bound to these receptors
- Lipophilic opioids(e.g. Fentanyl):
- Hydrophilic opioids (e.g.. Morphine):

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**LOCAL ANESTHETICS**

- Mechanism of Action
  - Sodium Channel Blockers
- In sub-anesthetic doses, are analgesics
- High concentrations provide anesthesia

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**Local Anesthetics**

- Bupivacaine—moderate onset with long duration
- Lidocaine—fast onset with moderate duration
- Chloroprocaine—fast onset with short duration
- Ropivacaine—moderate onset with long duration

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**CLONIDINE**

Selective  $\alpha$ -adrenergic agonist  
no opiate or local anesthetic side effects, i.e. motor block, urinary retention, respiratory depression and pruritus

Used as adjunct to local anesthetics and opiates  
Can be given epidural, intrathecal, IV, IM, oral transdermal

Side effects – hypotension, bradycardia and sedation—dose related

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Adverse effects usually occur with concomitant IV/PO/IM opioids and/or sedatives with epidural opioids

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### Minor Problems Related to Opioids

- Pruritis
  - Very common
  - Avoid Benadryl – due to sedation and can mask LOC changes
  - Naloxone –mu antagonist 5 mcg/kg/hr
  - Nalbuphine—agonist-antagonist (adult 2.5mg)
- Nausea
- Urinary Retention

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**CONSTIPATION—not usually  
a problem in epidurals**

- Begin all patients on prophylaxis for PO or parenteral opioids
  - Docusate
  - Senakot
  - Dulcolax
  - MOM
  - Lactulose

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**SEDATION AND  
RESPIRATORY DEPRESSION**

- Level of sedation and respiratory rate assessment
- Determine if cause is the opioid
- If untreated can lead to respiratory depression
- Respiratory Depression is preceded by sedation—
- More likely if T4-T5 is effected

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**RESPIRATORY DEPRESSION**

- Resp rate <10 in adults, observe depth of resp
- More likely if T4-T5 is effected
- Raise HOB 30°
- Monitor sedation to prevent resp. depression
- Do not rely solely on O2 sat
- Monitor resp status q1-2 h during first 24 h
- If patient is minimally responsive or unresponsive stop opioid and consider giving naloxone

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## PREDISPOSING FACTORS TO RESPIRATORY DEPRESSION

- Large doses of opioids
- Concomitant use of parenteral opioids and sedatives
- High-risk patients
- Advanced age (>65 years)
- Opioid naïve patient (lack of tolerance to opioids)
- Intrathecal opioids (as compared with epidural)
- Use of water-soluble opioids

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## LATE ONSET RESPIRATORY DEPRESSION

- Can occur with bolus injection
- Can occur with continuous infusions
- Has occurred with morphine and fentanyl
- Usually preceded by sedation and decreased LOC

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## PATIENTS WHO REQUIRE NALOXONE

- Are unresponsive to physical stimulation
- Shallow respirations or respiratory rate <8/min
- Pinpoint pupils
- Stop administration of opioid
- Summon help
- Mix 0.4 mg (1 amp) of naloxone and 9 ml NS
  - Give slowly – 2.5 ml over 2 min and observe pt
  - If no response repeat up to total of 0.8 mg. or 20 ml of dilute naloxone
  - May need repeated dosing due to half-life

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## ADMINISTRATION OF NALOXONE

- When an excessive dose is given to treat acute overdose → abstinence syndrome
  - Anxiety, irritability → potentially life-threatening tachycardia and hypertension

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## UNWANTED EFFECTS OF EPIDURAL LOCAL ANESTHETICS

- Sensory and/or motor deficit
- Urinary retention
- Local anesthetic toxicity
- Adverse hemodynamic effects

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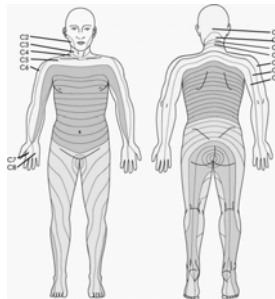
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## Spinal Dermatomes

Cervical Dermatomes (C2-C8): Anterior and Posterior Views



C=Cervical

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**Local Anesthetic  
Neuro-Toxicity....**

- Should not see in epidural LA administration
- Neurotoxicity
  - Circumoral tingling and numbness
  - Ringing in ears
  - Metallic taste, slow speech,
  - Irritability, twitching
  - Seizures
    - then can lead to CNS depression
    - cessation of seizures
    - coma
    - cardiopulmonary arrest

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**Local Anesthetic  
Cardio-Toxicity**

- Cardiotoxicity
  - Bupivacaine prolonged dwell time of 1.5 s
  - Lidocaine dwell time 0.15 s
  - Ropivacaine and levobupivacaine < bupivacaine
    - Larger margin of cardiac safety
  - PR interval prolongation
  - widening of QRS complex
    - can lead to bradycardia
    - atrioventricular conduction blockade
    - sinus arrest
    - myocardial depression

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**Increased risk of intravascular  
injection in OB patients**

- Due to anatomical and physiological changes
  - Relatively low venous pressure
  - Engorgement of epidural venous plexus
- Adverse hemodynamic effects
- Treat with IV fluid bolus

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## Hypotension in L & D

- Preprocedure hydration—500-1000mls crystalloid helps minimize sympathectomy
- place woman in lateral position and elevate legs
- Ephedrine IV—5-10mg up to 30mg
- Maternal signs
  - pallor
  - sweating
  - nausea
  - vomiting
  - changes in sensorium

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## Allergic Reaction to LA

- Very rare
- Symptoms range from
  - mild urticaria
  - laryngeal edema, bronchospasm, anaphylaxis
  - profound hypotension

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## DURAL PUNCTURE

- During insertion or with migration of catheter
- Most common complication, in up to 5% of pts.
- More common with numerous attempts and if CSF was withdrawn on placement check
  - Post dural headache common due to leakage of CSF
  - Worse when sitting or standing
    - May have nausea, vomiting, sweating, dizziness, stiff neck, tinnitus, photophobia, double vision, trouble focusing, or see spots before the eyes
  - Blood patch if headache does not cease
  - Caffeine injections

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## EPIDURAL HEMATOMA

- Serious but rare complication
- Can occur within skull or along spine
  - During or after neuraxial analgesia
- Be cautious with patients on anticoagulants, esp LMWH
  - Also – NSAIDS, platelet inhibitors
- Change in sensation or motor function without cause
- Presence of severe back pain, lower ext paresthesia
- Loss of tendon reflexes
- Surgical Emergency!

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## ANTICOAGULATION THERAPY

- Catheter insertion – With LMWH, placement should occur at least 10-12 hrs after last dose (preferably longer)
- Catheter removal – delay for at least 10-12 hrs after last dose (preferably 24 hrs)
  - Resume LMWH at least 2 hrs later
- Postop initiation should occur sooner than 24 hrs
- Antiplatelet or oral anticoagulant meds with LMWH may increase risk of hematoma

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## PATIENT EDUCATION WHEN ON ANTICOAGULANT

- Instruct pt on reporting signs of sensory and motor changes immediately
  - Report any new symptom
- Instruct pt that changes may occur after catheter dc'd and after discharge

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## INFECTION

- Serious but rare complication
  - Review of 1620 pts over a 6-yr period in peds study
- Risk is greater the longer catheter in place
  - 1.4% - 3.4%
- Assess for signs of infection at insertion site
  - If dressing is loose, reinforce and notify APS
  - Do not change dressing

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## EPIDURAL ABSCESS

- 2.8 pts/10,000 of all hospital admissions
  - Assess for Signs of infection
    - Fever, leukocytosis,
    - flaccid paralysis followed by spastic paralysis
    - Severe back pain, severe headache with nuchal rigidity
    - New onset sensation and/or motor function changes
- Medical or Surgical Emergency! Morbidity related to promptness of treatment.
- Mortality ranges from 6.9 – 23%

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## NERVE INJURY

- Difference between epidural complication or complications not associated with epidural
- Can occur in obstetric patients
- Assess S/S of Lumbosacral Nerve Injury
  - Paralysis
  - Hypoalgesia
  - Slight weakness
  - Femoral nerve (rare)
    - Quadricep paralysis
    - Loss of patellar reflex
    - Hypoalgesia over front of thigh

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## CAUDA EQUINA SYNDROME

- Rare
  - motor weakness in lower extremities
  - sensory deficits, “saddle” anesthesia
  - Urinary retention
  - Bowel incontinence
  - Back pain
- Caused by compression of nerves below the end of the spinal cord at L1-2 and can lead to permanent damage or paralysis

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## CATHETER RELATED PROBLEMS

- Catheter migration to intrathecal space
  - Nausea, decreased BP, loss of motor function without a definable cause, increased analgesia, seizures, respiratory depression, cardiovascular collapse, death
- Catheter occlusion from blood clot
- Catheter shearing – from improper insertion or removal
- Retained catheter tip – noted on discontinued cath
  - May require surgical removal
- Inadequate pain control due to migration

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## Single-shot Duramorph

- 0.2mg Intrathecal injection
- <4mg epidural injection
- Higher doses increases risk of side effects
- Monitor level of sedation and RR Q1H X 16 hrs

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- ASSESSMENT INCLUDES:
  - MONITORING V/S, LOC, SEDATION, PAIN
  - ASSESS SITE
  - ASSESS FOR SIDE EFFECTS for UP TO 24 HRS. AFTER EPIDURAL DC'D
  - ASSESS FOR COMPLICATIONS
  - ASSESS SENSATION AND MOTOR FUNCTION
  - ASSESS CATHETER, MEDICATION AND PUMP
  - ACCURATE DOCUMENTATION
  - PATIENT AND FAMILY EDUCATION

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