Epidural or Spinal (Neuraxial) Analgesia - (with or without PCEA)

PURPOSE

To provide safe, effective, and appropriate pain relief for patients who have had surgery. This approach to pain relief may or may not include Patient Controlled Epidural Analgesia (PCEA). Neuraxial analgesia may permit an increase in mobility and improvement in respiratory status.

SCOPE

Pharmacy, anesthesia, and inpatient nursing units.

DEFINITIONS

- **Epidural analgesia** - A type of neuraxial analgesia where a catheter is inserted into the epidural space. Medication may be infused through the epidural catheter on a bolus, continuous, intermittent, and/or patient-controlled schedule.
- **Intrathecal analgesia** - Also called spinal analgesia, a type of neuraxial analgesia where a dose of medication is injected into the subarachnoid space. No catheter is left in place.
- **Neuraxial analgesia** - A category of pain management techniques where medication is injected in between the vertebrae into the epidural or subarachnoid space.
- **Patient Controlled Epidural Analgesia (PCEA)** - A pain management technique where a patient controlled device is attached to the epidural pump, allowing the patient to administer doses of pain medication on their own according to the anesthesia provider's order. Patient controlled analgesia (PCA) may also be administered through the intravenous route and is covered in the Patient Controlled Analgesia (PCA) policy.

POLICY

The anesthesia provider may determine that neuraxial analgesia is contraindicated in some conditions. When opioids are provided via the neuraxial route, only opioid orders written by the Department of Anesthesiology will be administered.

Patients with spinal or epidural analgesia may be placed on any acute care unit except observation. Epidural infusions will be administered using an infusion pump that is separate from other medications. The epidural infusion system shall be a closed system between the pump and the patient, there shall be no injection ports in the tubing. Tubing for epidural anesthesia will be clearly labeled for EPIDURAL use only. Spinal analgesia is administered by an injection and does not require the use of an infusion pump.

Contraindications to neuraxial analgesia:

- **Absolute:** Patient refusal, infection at proposed catheter insertion site, systemic infection, acute symptomatic hypovolemia, allergy to agent being considered for use.
- **Relative:** Coagulopathy, increased intracranial pressure, neurological disorder, spine deformity.

PROCEDURE

Commonly Used Medications

A. **Local Anesthetics** - Block three types of nerves: sensory, motor and autonomic. Potential side effects include hypotension, alteration in sensation and muscle weakness. The higher the concentration (strength) of local anesthetic, the denser the conduction block and therefore, the higher the risk of side effects.

Medication	Mechanism	Onset	Duration	Side Effects	Additional Information
Bupivacaine	Long-acting amide local anesthetic commonly used for intraoperative and postoperative analgesia	15-25 min	2-4 hours, Depending on dose and age	Hypotension to some degree often (not always) occurs. Usually this is not undesirable and may be treated with IV fluids and occasionally vasoactive medications. Accidental spinal injection may result in total spinal anesthesia. Accidental intravascular injection may result in dysrhythmias of the heart.	Maximum recommended dose is 2mg/kg injected into the epidural space over a short period of time.
Chloroprocaine	Short-acting ester local anesthetic.	Within 5 minutes	Approx. 30 minutes	-Procedural pain, hypotension, headache, hyperglycemia, injection site pain	

Lidocaine	Short-acting amide local anesthetic. In contrast with intrathecal administration of lidocaine, epidural injection of lidocaine has not been associated with transient neurologic symptoms.	5 to 15 minutes	90 to 120 minutes, addition of epinephrine can extend surgical anesthesia by 30 to 45 minutes	-CNS (Positional headache, shivering, radiculopathy, agitation, cauda equina syndrome, coma, confusion, disorientation, dizziness, euphoria, hallucination, hyperesthesia, hypoesthesia, temperature intolerance, lethargy, metallic taste, paresthesia, peripheral neuropathy, seizure, psychosis) -Cardiovascular (Bradycardia, arrhythmia, edema, flushing, heart block, hypotension, thrombophlebitis, vascular insufficiency, vasospasm) -Gastrointestinal (N/V) Respiratory (Bronchospasm, dyspnea, respiratory depression, respiratory insufficiency)	
Ropivacaine	Long-acting amide anesthetic.	15-25 minutes	90 minutes to 3 hours	Bradycardia, hypotension, nausea & vomiting, back pain, headache, paresthesia, anemia, fever, muscle cramps (these are most common side effects)	It is 40% less potent than bupivacaine when used for epidural anesthesia. Ropivacaine may cause less motor block than bupivacaine, at equivalent levels of sensory block. Ropivacaine may have a superior safety profile compared with an equal dose of bupivacaine.

B. **Opioids** - Bind to μ-opioid receptors receptors of the spinal cord as well as travel to other receptors in the central nervous system. A potentially dangerous side effect is increasing sedation, decreasing respiratory drive, which can progress to respiratory depression.

Medication	Mechanism	Onset	Duration	Side Effects	Additional Information
Fentanyl	Lipid-soluble opioid. The body has a number of opiate receptors which have an affinity for different groups of opioids and have specificity for visceral or somatic pain. The mu receptor is sensitive to Fentanyl and the response can affect both visceral and somatic pain.	5 to 15 minutes	1 to 2 hours	Respiratory depression, chest wall stiffness, pruritus and nausea.	Usually administered in combination with local anesthetics as bolus doses of 50 to 100 mcg to optimize intraoperative anesthesia/analgesia. Rapid onset and short duration of action of fentanyl are desirable characteristics for continuous epidural infusion.
Morphine (preservative-free morphine for epidural use)	Hydrophilic opioid usually administered for postoperative analgesia. An opiate which acts as an agonist, binding with specific sites in the brain, spinal cord and other tissues, altering the perception of and emotional response to pain.	30-60 minutes	6-24 hours	Respiratory depression is a rare, but very serious side effect. Other side effects include urinary retention, pruritus, nausea and vomiting.	Preservative free morphine is used via epidural to prevent toxic neuro damage from preservatives. Provides relief from pain for an extended period without attendant loss of motor, sensory or sympathetic function.

C. **Combination** - when a local anesthetic and opioid are used together they are synergistic and the dose of each can be reduced. Side effects of both classes are possible.

Comparing Epidural Analgesics

Analgesic	Peak (min)	Duration (hr)
Morphine Sulfate	30-60	12-24
Fentanyl Citrate	10-15	3-6

Anesthesia Provider Responsibilities

A. Determine the patient's candidacy for neuraxial analgesia.
B. Select the appropriate technique: spinal or continuous epidural with intermittent re-bolus (with or without PCEA).
C. Counsel patient and support person(s) with regard to procedure, effectiveness, benefits and risks. Answer questions related to procedure.
D. Obtain informed consent.
E. Notify the patient's registered nurse that an epidural will be inserted or neuraxial analgesics are soon to be administered.
F. Obtain baseline physical assessment, including assessing for anticoagulation requirements and VTE prophylaxis.
G. If not already ordered, order saline lock or IV infusion for duration of epidural treatment.
H. It has not typically been the practice for the Dept. of Anesthesia to take care of all pain medications when patients have epidurals. Other services can write for ketorolac, acetaminophen, and opioids. If patients are receiving neuraxial opioids then there should be a discussion between the anesthesiologist and the primary team as to when/what opioids to order.
I. Insert epidural catheter and/or provide spinal injection per protocol.
J. Prepare epidural medication or infusion solution and tubing. Program pain management infusion pump, connect administration tubing to epidural catheter, and initiate the infusion (if not a nursing responsibility based on hospital policy).
K. Clearly label all associated medications, infusion solutions, the pump and tubing for EPIDURAL use only.
L. Make all required dosing changes. Physically increase or decrease rate of infusion as required. Administer bolus doses as needed.
M. Document all medications used in the patient's anesthetic record.
N. Remain on the hospital premises for 30 minutes post spinal injection or after catheter placement/initial dose.
O. Provide orders for nursing staff which will include (at a minimum) frequency of respiratory status evaluations, management of side effects and parameters that indicate when to notify the anesthesia provider.

P. Remain readily available (in the facility or by phone or pager), and respond to any contact related to side effects or complications.
Q. Restart pump after patient evaluation whenever infusion has been stopped (applies to continuous epidural with or without PCEA).
R. Change epidural tubing and dressing every 72 hours and as needed (if not a nursing responsibility based on hospital policy).
S. Remove epidural catheter when infusion complete (except in the case of obstetric patients as noted above).
T. Provide a follow-up visit within 24-48 hours for post-procedure evaluation of the patient.

Nursing Responsibilities and Standards of Practice

A. Preparation:
    1. Acquire appropriate equipment: multi-parameter vital signs monitor including BP, HR, and SpO2. Include EKG if requested.
    2. Epidural cart outside of patient's room.
    3. Patent IV with minimum 18 gauge cathlon.
    4. Lactated ringers solution (or other IV solution as ordered).
    5. Epidural/spinal tray.
    6. O2, suction, vasopressors readily available.
    7. Infusion pump for continuous epidural.
    8. Patient controlled (epidural) analgesia remote if PCEA ordered.
B. Review procedure including benefits, risks, and side effects with patient, support person(s).
C. If ordered, complete PCEA teaching using Patient Controlled Analgesia Teaching Record (paper or EMR) and Using a Patient Controlled Analgesia Remote for an IV (PCA) or Epidural (PCEA). Document patient education on Patient Controlled (Intravenous or Epidural) Analgesia Teaching Record (paper or EMR).
D. Educate patient and support person(s) to notify nurse if any of the following occur:
    1. Difficulty breathing.
    2. Pain is unrelieved.
    3. Headache occurs.
    4. Change in clarity of thoughts or altered level of consciousness.
    5. Pain at catheter site.
    6. Feeling of bladder fullness or voiding small amounts.
    7. Metallic taste.
    8. Numbness of lips, tongue, mouth.
    9. Ringing in ears.
    10. Dizziness.
    11. Itching.
    12. New neurologic symptoms
E. Educate patient and support person(s) regarding the increased risk for falls. The patient shall press the button only when sitting or lying down and shall remain sitting or lying

down for 15 minutes after the bolus. Patients shall not try to mobilize or ambulate without the assistance of staff.

F. Have the patient empty bladder just prior to the procedure.
G. Prepare epidural medication or infusion solution and tubing. Program pain management infusion pump, connect administration tubing to epidural catheter, and initiate the infusion (if not an anesthesia provider responsibility based on hospital policy).
H. The necessity of a bolus for the non-OB patient shall be considered by the ordering provider and on a case-by-case basis.
I. Prior to injection or placement of epidural catheter, establish baseline vital signs including BP, HR, RR, Sp02, level of sensory and motor response, and level of consciousness.
J. BP, HR, RR, respiratory rhythm and depth, and Sp02 are taken every 5 minutes for 20 minutes or thereafter until stable, then every 1 hour for 4 hours, then every 4 hours, or as ordered by the provider.

Just before procedure

A. Perform and document a time-out to validate the correct patient, procedure, and site.

During procedure

A. Maintain BP, HR, RR, and SpO2 monitoring. Document Q5 minutes or as indicated by patient condition. Include EKG if ordered.
B. Position patient as indicated by anesthesia provider. Assist patients with maintaining proper position during procedure.

After insertion, injection, bolus, re-bolus, or initiation of continuous infusion

A. Assess BP, HR, RR, and SpO2 Q5 minutes x 4 (20 minutes) or longer until hemodynamically stable. Continue to monitor VS every 1 hour for 4 hours, then every 4 hours or as ordered by the provider.
B. Change epidural tubing and dressing every 72 hours and as needed (if not a nursing responsibility based on hospital policy).
C. Reposition patient for comfort. Initially maintain semi-fowler's position (head of bed to 30 degrees). Once initial dose has taken effect, upright positioning may be considered.

1. Pruritus without rash
    - Give medications as ordered
2. Nausea/vomiting
    - Protect patient from aspiration.
    - Antiemetic
    - Provide oral hygiene every 4 hours and prn.
3. Urinary retention

- Observe for bladder distention – discomfort, frequency, urgency, decreased output.
- Catheterize x2 for distention then obtain order for foley catheter for inability to void. Insert foley catheter upon provider order.
- Monitor I/O every 8 hours.

4. Excessive sedation or respiratory depression. If respiratory rate <12, stimulate patient; if less than 9 or excessive sedation:
    - Stop infusion
    - Support ventilation
    - Notify Anesthesia immediately.
    - Administer naloxone as ordered.
      * Note - Respiratory depression can occur even after 24-26 hours in the elderly.
5. Postural hypotension
    - Assess BP and HR before ambulation.
    - Assist with ambulation at first, and then assist PRN.
6. Coagulatopathy
    - Report to anesthesia regarding changes in anticoagulation status, and signs of coagulopathy including abnormal INR, aPTT, fibrinogen, platelet count.
    - Thrombocytopenia (platelet count <80,000–100,000/μL), elevated INR (≥1.5), or prolonged aPTT are considered significant risk factors for coagulopathy in the context of epidural analgesia especially at times of catheter insertion and removal.
7. Toxicity
    - Observe for circumoral cyanosis, complaints of tinnitus, and/or signs of CNS irritability.
    - Notify anesthesia immediately.
8. Catheter problems
    - Assess dressing and catheter site every 8 hours and document.
    - Be sure the catheter and filter are taped and secure to the patient.
    - Assess luer locks (if present) and taped connections.
    - Teach the patient/family that the patient should not slide side-to-side on back causing sheering force on the catheter.
    - Use a draw sheet or patient repositioning equipment if the patient is unable to move themself.
    - Keep hand over insertion site when moving patient or when patient moving self to further prevent sheering.
9. Potential for impaired mobility - paresthesia
    - Assess motor strength and sensation in lower extremities every hour for the first 4 hours, then every 4 hours and prior to getting out of bed.

- If change in or loss of motor strength or sensation, notify Anesthesia immediately.
- Encourage ROM.

10. Infection
    - Do not irrigate or manipulate catheter.
    - Maintain dry sterile dressing.
    - Observe for drainage, hematoma, backache, epidural abscess, redness and general systemic symptoms including fever. If present, report to Anesthesia.

D. Monitor for side effects as above. Stop the epidural infusion if there is a safety concern or per the order of the anesthesia. Notify anesthesia if you need to stop the epidural infusion for safety concerns.
E. Effectiveness: Using 0-10 scale, assess level of pain 30 minutes after initial dose, re-bolus, or dose change then every hour for the first four hours, then every four hours and PRN. Notify Anesthesia if pain is not controlled.
F. Revisit education with the patient/support person(s) including:
    1. Expected outcomes.
    2. When to notify RN.
    3. Use of PCA/PCEA remote (button) if being used. Reinforce that only the patient is to push the button.
    4. Increased risk for falls.
G. Patient Safety:
    1. Assure call light within easy reach of the patient.
    2. Assure PCA/PCEA remote (if using) is within easy reach of the patient.
    3. The epidural catheter is securely taped to the back.
    4. Resuscitative equipment and medications readily available.
H. Changing pump batteries:
    1. The alarm will be both audible and visual.
    2. The pump will have entered the STOP mode due to low battery levels.
    3. Notify Anesthesia of need to replace batteries and re-start pump.

Discontinuing Epidural

A. The Department of Anesthesia is responsible for removing the epidural catheter and documentation of integrity (intact tip).
B. Pain medication yields to the primary provider once the catheter is removed.
C. The nurse is responsible for applying Band-Aid to the catheter insertion site after the catheter is discontinued.
D. Waste any remaining solution per hospital policy.
E. Confirm plan for resumption of anticoagulation with the anesthesia team.

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