Objectives

Identify 3 specific patient populations that may benefit from regional anesthesia
Identify 5 benefits of regional anesthesia
Identify 2 contraindications that would prevent a patient from receiving regional anesthesia
Identify 3 signs and symptoms systemic toxicity
Identify how to treat toxicity
Identify when to hold anti-thrombotic therapy.
Maryland Board of Nursing Regulations

According to the Board of Nursing ruling, RN’s including CRNP’s may assume care of the patient receiving analgesia catheter after:

- Successful completion of a competency based educational program with specified components (found in HealthStream)
- The physician or the CRNA has verified correct catheter placement, selected, and ordered initial dosing parameters of institutional approved medications
- The patient has stabilized vital signs

According to the Board of Nursing and UMMC policy, the RN, including the CRNP may not:

- Remove surgically implanted infusion catheter, including wound catheters (PNB catheters may be removed)
- Provide anesthesia via peripheral nerve block or wound catheter
- For the woman in labor, the RN may not bolus the catheter or titrate analgesia infusion


What is a Peripheral Nerve Block (PNB)?

A long acting local anesthetic, ropivacaine or bupivicaine, administered into an area to target a specific nerve or nerve plexus

“One Shot” vs. Continuous PNB

“One Shot” PNB is a one time injection of the long-acting local anesthetic which lasts 4 to 12 hours

Continuous PNB is when a catheter is inserted and remains allowing the long-acting local anesthetic to be infused continuously. Yellow tubing must be used for all PNB infusions.
Indications for PNB’s

- Complex dressing changes
- Surgery on an extremity
- Shoulder Surgery
- Rotator Cuff Repair
- Hand and Wrist Surgery
- Hip and Knee Arthroscopy
- Hip and Knee Arthroplasty
- ACL repair
- Knee Surgery
- Foot and Ankle Surgery
- Patients with asthma or in whom intubation is best avoided
- Obesity
- Sleep Apnea
- Confusion
- Delirium
- Elderly

Contraindications of PNB’s

- Patient refusal
- Active infection at the insertion site
- Severe systemic coagulopathy
- True allergy to local anesthetics

Advantages of PNB’s

- Decreased opioid use
- Improved patient satisfaction
- Decreased stress response to surgery
- Decreased risk for postoperative delirium
- Decreased postoperative nausea and vomiting
- Compared to epidurals, peripheral nerve blocks have:
  - No hypotension (i.e., no central inhibition of sympathetic nerves)
  - No respiratory depression
  - No risk of post-procedural headache
  - Less risk of urinary retention
- Potentially shorter hospital stays, and possibly, reduced costs
**Disadvantages of PNB’s**

- Not MRI compatible
- Placement is time-consuming
- May still require supplemental rescue
- Higher incidence of seizures due to the greater volume of local anesthetic administered than if given a single shot

**Complications of PNB’s**

- Allergic reaction to anesthetic
- Injury to the nerve
- Pneumothorax
- Ipsilateral diaphragm paralysis
- Potential localized injuries (skin breakdown or burns)
- Intravascular injection
- Block failure
- Technical complications such as:
  - Displaced catheters
  - Knotted or kinked catheters
  - Catheter shearing or breakage
  - Dislodged catheters
  - Disconnections

**Systemic toxicity**

- **Metallic taste**
- **Numbness in the lips**
- **Tinnitus (ringing in the ears)**
  - Treated with lipid infusion
- **Horner's Syndrome**
  - Ptosis (drooping eyelid)
  - Miosis (pupil constriction)
  - Anhidrosis (increased sweating)

**Antithrombotic Therapies and PNB’s**

- No need to hold anti-coagulants, including heparin drip, prior to placement and removal of most PNB catheters
- Lumbar Plexus and Paravertebral Catheters should be treated as an epidural (according to ASRA guidelines):  
  - **Heparin (Full Dose and IV Drip)**: Hold 4 hours prior to placement, contraindicated while catheter in place, and hold 2 hours after removal  
  - **Heparin (Lovenox) Daily Dosing**: Hold 12 hours prior to placement, 6-8 hours after placement w/2nd dose 24hrs later, 12 hours prior to removal, and 2 hours after removal  
  - **Heparin hcl sodium (Lovenox) BID Dosing**: Hold 24 hours prior to placement, contraindicated while catheter in place, and 2 hours after removal  
  - **Warfarin (Coumadin)**: Verify INR <1.5  
  - **Clopidogrel bisulfate (Plavix)**: 7 days  
  - **Acetyl salicylic acid (ASA)**: No specific contraindications
Troubleshooting Problems

If signs and symptoms of reactions:
   Turn off the infusion and contact APMS
If the PNB is not working:
   Contact APMS
If the catheter comes out:
   Turn off the infusion, call APMS, and save the catheter so APMS can visualize the catheter tip
If leaking is noted:
   Reinforce the area with gauze and notify APMS
If dressing is loose:
   Reinforce dressing or change if needed
If the dressing comes off:
   Clean the site, reapply sterile dressing, and call APMS

Brachial Plexus Nerve Block Sites

Interscalene Brachial Plexus Nerve Block
Affects:
   Nerve roots of C3 through C7
   Shoulder
   Proximal Upper Extremity

Supravacular Brachial Plexus Nerve Block
Affects:
   Distal 2/3 of the upper extremity
   Site Specific Risks:
   Self-limiting hoarseness
   Self-limiting Horner Syndrome
   Self-limiting hemidiaphragmatic paresis
Brachial Plexus Nerve Block Sites

**Infraclavicular Brachial Plexus Nerve Block**
- Affects:
  - Lateral, Posterior, and Medial cords of the Brachial Plexus nerve
  - Distal 2/3 of the upper extremity
  - Axillary nerves
  - Musculocutaneous nerves

**Axillary Nerve Block**
- Affects:
  - Distal ½ of upper extremity

Intercostal Nerve Block Sites

**Thoracic Intercostal Nerve Block**
- Indications:
  - Rib Fractures
  - Breast Surgery
  - Thoracotomy
  - VATS
  - Chest Tube Placement
  - Upper Abdominal procedures
  - Herpes Zoster
  - Cancer

- Benefits:
  - Improved pulmonary mechanics

- Risks during placement:
  - Vascular Puncture
  - Pneumothorax
  - Total Spine Anesthesia
Paravertebral Nerve Blocks

Indications:
Analgesia at any level

Benefits:
Lower incidence of hypotension, urinary retention, respiratory issues, post-op nausea and vomiting

Risks during placement:
Pneumothorax
Vascular puncture
Epidural or intrathecal spread

Transverse Abdominis Plane (TAP) Block

Indications:
Abdominal incisions
Appendectomy
Cholecystectomy
Renal transplant
Midline and Transverse abdominal incisions
Lumbar Plexus Nerve Block

Indications:
Femoral shaft and neck repairs, knee procedures, anterior thigh procedures

Risks:
Iliopsoas or renal hematoma, epidural spread of local anesthetic

Ilioinguinal Peripheral Nerve Block
Indications:
Open inguinal hernia repair

Risks during placement:
Bowel perforation

Lower Extremity Peripheral Nerve Block Sites
### Lower Extremity Peripheral Nerve Block Sites

#### Sciatic Nerve Block
- **Area affected:** Complete anesthesia of the leg below the knee with the exception of a strip of medial skin innervated by the saphenous nerve.
- **Indications:**
  - Combined with femoral or saphenous nerve block, it provides analgesia of the distal thigh, knee, calf, ankle or foot.

#### Ankle Nerve Block
- **Indications:** Anesthesia of the foot and toes.
- **Areas affected:** Four branches of the sciatic nerve and one branch of the femoral nerve.

#### Femoral Nerve Block
- **Indications:** Total anesthesia of the anterior thigh and knee (ACL, patella, and quadriceps).

### Lower Extremity Peripheral Nerve Block Sites

#### Saphenous Nerve Block
- **Indications:** Ambulatory surgeries of the superficial and medial leg.
- **Areas affected:**
  - Medial ankle
  - Foot
- **Benefits:**
  - Preserves function of the quadriceps muscle, maintaining the ability to ambulate.
  - Four branches of the sciatic nerve and one branch of the femoral nerve

#### Popliteal Nerve Block
- **Indications:**
  - Anesthetizes the Sciatic Nerve in the popliteal fossa.

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### Questions??
References

Images came from www.UpToDate.com