Your Tackle Box to Tackle Blocks

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OPioids Crisis
128 people die everyday from an opioid overdose
81,000 drug overdose deaths in 12 months ending May 2020
450,000 people have died from an opioid overdose from 1999-2018

‘Surgery – RISK FACTOR for development of chronic opioid use’
- 6% of patients prescribed a SINGLE DAY supply of opioids continued use at 1 year
- 25% of patients continued using prescription medications after a 12 day supply of opioids
- Refilling a prescription just ONE TIME doubled the risk of using opioids after 1 year
  (EBC, 2017)
- ‘Prescription opioids contribute to more overdose deaths than any other drug’
  (EBC, 2017)

Opioid Therapy is High Risk
Highly addictive
Respiratory Depression- Hypoxia
Hypotension
Cognitive Impairment-Unstable Gait/Falls
Slows GI Motility- PONV, Constipation
Immunosuppressive effects
Urinary Retention

Proven Benefits of PNB
Decreased Postop Pain
Decreased hospital LOS
Increased Patient Satisfaction

Preemptive Education
Preemptive medications
Acetaminophen
Opioids
Gabapentin/anticonvulsants
Ketamine / NMDA antagonist

Regional Anesthesia interrupts Pain Signals BETTER than any current modality
What is Regional Anesthesia?

It is an injection of local anesthetic near or around a cluster of nerves, or between fascial planes, that will cause numbness and possible motor weakness in a specific part or region of the body.

Image courtesy of NYSORA

Nerve Plexus

Fascial Plane

Popliteal Sciatic Nerve Block

Infiltration between Popliteal Artery and Capsule of the Knee/MIK

Single Shot

VS

Catheter

Continuous Nerve Block Catheter / CNB

• Provide pain relief for 3-6 days – months
• Limb procedures
• Sterile procedure
• Requires trained physician; more challenging
• Patient teaching – Care for CNB at home
• Greater risk of complications:
  • Nerve injury / rare
  • Prolonged numbness and motor weakness
  • Nerve catheter dislodgement
  • Infection

Other Considerations:
• How painful the procedure
• Surgeon preference
• Area needed to block
• Recovery

What are the Contraindications to having a PNB?

• Allergy to local anesthetics
• Systemic infection and/or infection at the site
• Significant Coagulopathies
• Unusual anatomy or pathology
• Combative or agitated
• Patient refusal

Anticoagulation guidelines for Regional Anesthesia

‐ PNB – low risk of bleeding
  ‐ Aspirin and NSAIDS – continue
  ‐ Antiplatelet therapy (ie. Plavix)
  ‐ Discontinue when high risk – deep PNB procedures

Local Anesthetic Agents used for Peripheral Nerve Blocks (PNB)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset</th>
<th>Duration</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amino Amides:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lidocaine</td>
<td>Rapid</td>
<td>1-2 hours</td>
<td>CNS toxicity: seizures</td>
</tr>
<tr>
<td>Mepivacaine</td>
<td>Slow</td>
<td>45-90 minutes</td>
<td>Great for PNB</td>
</tr>
<tr>
<td>*Bupivacaine</td>
<td>Slow</td>
<td>2-4 hours</td>
<td>Sensory block &gt; Motor CV toxicity: Hypotension, heart blocks, dysrhythmias</td>
</tr>
<tr>
<td>*Ropivacaine</td>
<td>Rapid</td>
<td>4-6 hours</td>
<td>Sensory block &gt;&gt; Motor Motor blockade &lt; than Bupivacaine CV toxicity Safe for OB use</td>
</tr>
</tbody>
</table>

* Longer acting

Adjuvants – Enhance effectiveness of the PNB

• Epinephrine – Vasoconstrictor – Slows absorption of LA – Prolong PNB
• Dexamethasone – Prolong duration PNB – IV = LA + PNB
• Alpha 2 Agonists – Precedex (Dexmedetomidine) – quick onset + prolong PNB and reduced opioid use
• Exparel – Liposomal bupivacaine – Prolong PNB – 72-96 hours - Only used with LA = BUPIVACAINE - Wrist band – avoid add LA – lead to LAST - Expensive -Approved for selective cases
**Patient Preparation for PNB**

- History and Physical
- Educate ‘what to expect’
- Pre-procedure Checklist – **TIME OUT**
- IV Sedation
- Patient Positioning
- Monitoring

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**Block Nurse Role: Assist Anesthesia with Placement of PNB**

- Sterile set up – catheter tray
- Assist with Ultrasound machine
- Assist with injection of LA
- Secure catheter and apply dressing
- Knowledgeable of site specific considerations
- Monitor for signs/symptoms of LAST

*Block RN Team – Orientation and competency checklist

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**DERMATOMES: Area of SKIN supplied by a SINGLE SPINAL NERVE**

<table>
<thead>
<tr>
<th>Sensory Level</th>
<th>Cervical Level</th>
<th>Dermatome</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2</td>
<td>Neck</td>
<td>Anterior</td>
</tr>
<tr>
<td>C3</td>
<td>Clavicle</td>
<td>Medial</td>
</tr>
<tr>
<td>C4</td>
<td>Upper</td>
<td>Upper lateral</td>
</tr>
<tr>
<td>T1</td>
<td>Thoracic</td>
<td>Upper chest</td>
</tr>
<tr>
<td>T2</td>
<td>Splenic</td>
<td>Upper abdomen</td>
</tr>
<tr>
<td>T3</td>
<td>Mid</td>
<td>Lower abdomen</td>
</tr>
<tr>
<td>T4</td>
<td>Lower</td>
<td>Pelvic</td>
</tr>
<tr>
<td>T5</td>
<td>Lumbosacral</td>
<td>Sacral</td>
</tr>
<tr>
<td>T6</td>
<td>Sacral</td>
<td>Gluteal</td>
</tr>
<tr>
<td>L1-5</td>
<td>Lumbosacral</td>
<td>Gluteal</td>
</tr>
<tr>
<td>S1-5</td>
<td>Sacral</td>
<td>Gluteal</td>
</tr>
</tbody>
</table>

*Source: ASPAN Redi-reference, 2015

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**How to Assess for Sensory / Motor Block**

**Sensory Assessment**

- Check sensation using alcohol/ice
- First place on unaffected area to establish baseline
- Ask patient close eyes and indicate when and where feel coldness
- Always compare with non affected side

**Motor Assessment**

0/5 = No movement
1/5 = Flicker – not enough to move
2/5 = Unable to overcome gravity
3/5 = Overcome gravity, no resistance
4/5 = Overcome some resistance
5/5 = Normal strength

*First have Sensory loss followed by Motor Loss - on return of function - Motor returns, then Sensation*

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**Cervical Plexus Block**

*LA spread around the superficial cervical plexus or deep into sternocleidomastoid muscle
- Provides anesthesia of the skin of anterolateral neck, ear regions and skin inferior to clavicle on chest wall

**Surgical Indications:**

- Carotid endartectomy
- Lymph node dissections
- Thyroidectomy
- Plastic repairs
- Superficial neck surgery
- Proximal clavicle fractures

**Nursing Considerations:**

- Allows patient to be awake for continuous neurological monitoring
**Intercalene Nerve Block**

**Injection of LA in the neck**
- Affects parts of the clavicle, scapula, 
  and whole shoulder
- Weakness of deltoid muscle and 
  some hand muscles
- Numbness extends to digits 1-3
- C5 - C7

**Surgical Indications:**
- Any surgery on shoulder or 
  muscles supporting the shoulder
- ORIF of clavicle or scapula
- Mid humeral shaft fracture

**Nursing Considerations:**
- Diaphragmatic paralysis on the blocked side
- Near 100% occurrence
- 25% reduction in pulmonary function
- Pneumothorax
- HORNER’S Syndrome: TEMPORARY
  hoarse voice
  constricted pupil
  drooping eyelid
  nasal congestion
- Bezold-Jarisch reflex: Bradycardia + Hypotension
- Local Anesthetic Systemic Toxicity/ LAST
- Safety measures - sling

**Horner Syndrome**

Common side effect after Intercalene block
Blockade of the stellate ganglion C6-7nerve plexus causes:
- Numbness (10-20%) to hand
- Ptosis — drooping of upper eyelid on affected/blocked side
- Anhidrosis — decreased sweating
- Nasal congestion — on affected/blocked side

**Nursing Considerations:**
- Patient experience is disconcerting but symptoms resolve with resolution of block
- Provide patient reassurance

**Supravacular**

- Injection of LA between the trapezius muscle and clavicle
- Affects arm below mid humerus
  - Motor and Sensory loss
  - Entire arm below elbow

**Surgical Indications:**
- Any surgery midshaft humerus
- Biceps tendon repair
- ORIF elbow
- Surgery of forearm
- Surgery of hand and digits

**Nursing Considerations:**
- Phrenic nerve involvement
  - Less than ISB, around 50%
- Pneumothorax/ hemotherorax
- Horner’s Syndrome
- Safety measures- sling

**Pecs and Serratus Plane Blocks**

**PECs**
- LA injected in the fascial plane 
  between pectoralis major and minor muscles; C5-T1

**Serratus Plane Block**
- LA injected in the fascial plane of 
  serratus anterior muscles- to block upper intercostal nerves; T3-T9

**Surgical Indications:**
- After breast surgery
- Following thoracotomy
- Rib fractures
- Procedures axilla, medial upper arm and posterior shoulder

**Nursing Considerations:**
- SENSORY Block
- Low Risk
- Sling - if limb affected

**Paravertebral Block**

- LA injected alongside 
  THORACIC or LUMBAR vertebrae
  close to where spinal nerves 
  emerge from vertebral column
- T1-T6

**Surgical Indications:**
- Breast Procedures
- Thoracotomy incisions
- Noninvasive heart surgery
- Rib fractures
- Abdominal procedures

**Nursing Considerations:**
- High epidural/spinal blockade can occur
- Pneumothorax
- LAST

**Erector Spinae Plane Block**

Paraspinal fascial plane block
- LA injected deep into erector spine 
  muscles (vertical back muscles)
  superficial to thoracic processes of vertebrae
- Sensory block T3-T9 — spreads vertically
  and wraps around to front of chest and upper abdomen

**Surgical Indications:**
- Rib fractures
- Thoracic surgery (ie. VATS)
- Breast surgery
- Bariatric surgery
- Option cardiac surgery

**Nursing Considerations:**
- Best positioning - upright to place block
- Low risk
- Continuous catheter or single shot
**Transversus Abdominus Plane Block**
- LA injected in fascial plane between anterior abdominal muscles
- Done bilaterally, T6-L1 Sensory
- Reduces postoperative pain and opioid requirements

**Surgical Indications:**
- Any lower abdominal surgery including
  - Hernia repair
  - Appendectomy
  - Cesarean delivery
  - Abdominal hysterectomy
  - Laparoscopic surgery
  - Renal surgery / transplants
  - Prostatectomy

**Nursing Considerations:**
Complications are rare - can include: L.A.S.T., nerve injury, bleeding, infection and inadvertent peritoneal puncture

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**Quadratus Lumborum Block**
- Fascial plane block of the posterior wall of the abdomen and affects the back muscles
- SENSORY block to the abdominal and hip regions; T4-11, L3
- Approach and patient positioning varies by physician preference

**Surgical Indications:**
Upper and Lower Abdominal Surgeries
Some Hip Procedures
Cesarean Section, Hysterectomy
Renal Transplant, Nephrectomy
Iliac Crest Bone Graft

**Nursing Considerations:**
- Provide somatic and visceral pain relief
- Safe, low risk of LAST

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**Fascia Iliaca**
- LA injected under the inguinal ligament and above the iliosposas muscle; fascial plane
- Affects the upper leg and inside of lower leg
  - Weakness of quadriceps
  - Numbness felt in anterior thigh, medial leg and big toe

**Surgical Indications:**
- Total posterior/lateral hip replacements
- Hip and femoral fractures
- Knee surgeries
- AKA/BKA

**Nursing Considerations:**
- Fall Risk
- Protect limb-leg brace

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**Femoral Block**
- LA is spread adjacent to the femoral nerve
- Patient positioned supine
- Motor and Sensory loss
  - anterior thigh
  - anterior knee
- Sensory loss
  - medial calf/ ankle

**Surgical Indications:**
- Total knee replacement
- ACL reconstruction
- Knee arthroscopy
- ORIF patella
- Procedures – front of thigh
- Analgesia - Hip fractures

**Nursing Considerations:**
- FALL RISK - motor block/weakness to quadriceps
- Posterior thigh and knee will have FULL SENSATION - patients report pain – back of knee - require analgesics

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**Anterior Sciatic Block**
- LA spread within the sciatic nerve sheath
- MOTOR and SENSORY blockade of
  - posterior knee
  - hamstring muscles
  - entire lower limb below knee- lateral ankle, foot and heel

**Surgical Indications:**
- Used with adductor and femoral nerve blocks for TKR
- ACL reconstruction; Knee manipulation
- Below knee amputation
- Foot and Ankle surgery

**Nursing Considerations:**
- FALL RISK - limited motor control and sensation to posterior thigh, lower leg and foot
- Foot drop – may occur; patients trip on their toes

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**I P A C K Block**
Infiltration between Popliteal Artery and Capsule of the Knee
- Provides analgesia to posterior knee
- SENSORY block only
- Spares the quad from motor weakness

**Surgical Indications:**
- Total knee
- ACL
- Other knee surgeries

**Nursing Considerations:**
- FALL RISK
- Assess motor strength prior to ambulation
**Popliteal / Sciatic Block:**
- LA injected within sciatic nerve sheath area
- Motor and Sensory block to lower leg below and behind the knee
  - medial leg and foot not blocked

**Surgical Indications:**
- Foot, Ankle and Achilles tendon surgeries
- Surgeries of lower leg — tibia/fibula fractures

**Nursing Considerations:**
- FALL RISK — Motor and Sensory block
- Position patient to reduce pressure on sciatic nerve injection site
- Foot drop, hematoma formation, LAST

**Contraindicated:** Diabetes and Neuropathies

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**Adductor Canal**
- LA injected inside the adductor canal around the femoral artery
- SENSORY block to anterior and medial knee, leg ankle and big toe

**Surgical Indication:**
- Knee surgeries: ORIF, Arthroscopy, ligament repair
- Tibia/ Fibula surgery
- Ankle surgery

**Nursing Considerations:**
- SENSORY BLOCK, no significant motor weakness
  + PAIN behind the knee or on the lateral side

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**Nerve Blocks**
- LA near or around a cluster of nerves (plexus)
- Superficial Cervical Plexus
- Intercalane
- Supracaudalicular
- Femoral
- Popliteal Sciatica
- Adductor Canal

**Effects/Concerns**
- SENSORY +
- MOTOR + (FI) /
- Risk of Nerve Injury NONE
- Risk of IA/V Injection MINIMAL

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**Local Anesthetic Systemic Toxicity / LAST**

<table>
<thead>
<tr>
<th>CNS symptoms — most common</th>
<th>CV symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early detection of toxicity: CNS</td>
<td>Hypertension</td>
</tr>
<tr>
<td>Perioral numbness</td>
<td>Tachycardia</td>
</tr>
<tr>
<td>Metallic taste in the mouth</td>
<td>Ventricular Arrhythmias</td>
</tr>
<tr>
<td>Tinnitus, Blurred vision</td>
<td></td>
</tr>
</tbody>
</table>

**TREATMENT**
- 20% LIPIDS — LIPIDS — LIPIDS — FAST with a FILTER
- AIRWAY / OXYGEN
- SEIZURE SUPPRESS
- Treat CPR

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**LAST KIT**
Patient Education

Safety Measures
- Slings/Braces
- Avoid hot/cold/pressure
- Fall Precautions

Patient Education

Catheter Care
- On Q ball
- How to remove at home

What to expect
- Return of sensation
- Multimodal meds
- ICE/Elevate

New Developments in PNB

- PENG Block
- PNB – one person technique
- New Single shot additives
- Use of PCA type electronic pump
- PNB advancements to provide opioid free surgery
- PNB beyond the OR - Treat PTSD

References


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References


Questions

This adjuvant prolongs the duration of the local anesthetic up to 96 hours and can only be combined with bupivacaine. When given this medication, patients wear an armband to alert medical staff from giving any additional local anesthetic.

a. Epinephrine
b. Dexamethasone
c. Exparel
d. Alpha 2 Agonists
Question

The most effective method to prevent wrong sided peripheral nerve blocks is to

a. Review the patient’s history and physical pre procedure
b. Complete the pre procedure checklist and time out before each block
c. Ask the patient which side is to be blocked
d. Have the surgeon initial the side to be blocked

Question

The perianesthesia nurse should be concerned about LAST in a patient exhibiting which of the following symptoms?

a. Confusion
b. Metallic taste
c. Ringing in the ears (tinnitus)
d. All of the above