Objectives

• Describe Multimodal pain management techniques.
• Explain the difference between epidural analgesia and peripheral nerve block analgesia
• Recognize sites and benefits of regional analgesia in the post-op patient
• Describe the nursing responsibilities of caring for the patient with a peripheral nerve block

From a historical standpoint….

Few things we do for patients are more fundamental to the quality of life than relieving pain”

Colleen J. Denneson MS, RN-BC
The Goals of Pain Management in 2008

- Manage the unpleasant experience of pain
- Minimize the physiological stress response generated by pain
- Optimize patient recovery and reduce hospital length of stay
- Minimize the development of chronic pain syndromes related to surgical procedures

Two major types of pain

**Nociceptive**
- Normal processing of stimuli
  - Somatic - bone, joint, muscle, skin or connective tissue; well localized
  - Visceral - visceral organs, related to tumor involvement (more localized) or obstruction; poorly localized

**Neuropathic**
- Abnormal processing of sensory input by the peripheral or central nervous system
  - Centrally activated - phantom pain, RSD
  - Peripherally activated - diabetic neuropathy

Processes involved in Nociception

- **Perception**
  - The pain experience becomes "conscious"

- **Transmission**
  - Occurs in the dorsal horn of the spinal cord

- **Transduction**
  - "cell damage"
  - At the site of injury

- **Modulation**
  - Substances are released to inhibit the pain impulses
What is “Multimodal” or “Balanced” Analgesia?

- A combination regimen using two or more medications or interventional techniques
- May include more than one route of administration
- The synergistic effects between different drug classes can enhance the analgesic effects of each drug
- Using different agents allows for reduced doses of each medication and subsequent reduced side effects
- Especially effective in patients who are at risk for the side effects of large doses of opioids:
  - frail elderly
  - obstructive sleep apnea
  - chronic pain patients

“Pre-Operative” Medication

- This concept takes the multimodal approach to analgesia an additional step
- The goal is to treat pain before it becomes perceived by the patient
- celecoxib (Celebrex®):
  - 200-400mg
  - Continued 5 days post op
  - Contraindicated in renal insufficiency/sulfa allergy
- pregabalin (Lyrica®):
  - 50, 75, or 150 mg
  - Continued 5 days post op
  - Dose depends on procedure, patient weight, and age
  - Oxycodone:
    - 10mg
    - Only used x 1 dose
    - pre-op
    - Physician-specific

The Main Components of “Balanced” or “Multimodal” Pain Management

<table>
<thead>
<tr>
<th>Opioids</th>
<th>Blocks the pain signal by binding to opioid receptor sites – in the CNS</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>PO or IV</td>
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<tr>
<td>NSAIDs (selective and non-selective)</td>
<td>Blocks the inflow of the pain signal from the site of injury – use with caution in patients at risk for side effects (GI bleeding)</td>
</tr>
<tr>
<td></td>
<td>PO or IV</td>
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<tr>
<td>Anti-convulsants (pregabalin and gabapentin)</td>
<td>Works to decrease the hyperalgesic response from the CNS</td>
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<td></td>
<td>PO or IV</td>
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<tr>
<td>Local Anesthetics</td>
<td>Blocks the inflow of the pain signal in the periphery</td>
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<td></td>
<td>PNB or Epidural</td>
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</tbody>
</table>
Opioids

- Relieve pain by binding to multiple types of opioid receptors in the central nervous system
  - Mu agonists
  - Agonist-antagonists

Non-steroidal Anti-inflammatory Agents

- celecoxib (Celebrex®)
- analgesic and anti-inflammatory
- Classified as Cox-1 (not recommended in surgical patients) and Cox-2
- Activity in peripheral as well as central nervous system
- Stops pain at the site of transmission (noxious stimulus)
**ketorolac (Toradol®)**

- The only parenteral drug in the NSAID class
- Non-selective
- Works in the peripheral nervous system
- Good to use in the immediate post-operative period when patients are NPO
- Limit use from 2 – 5 days
- Avoid use with impaired renal function

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**Anti-convulsant Medications**

- gabapentin (Neurontin®)
- pregabalin (Lyrica®)

  - This class of medications manage the spontaneous firing of sensory neurons associated with neuropathic pain
  - Reduces pain with movement and can reduce chronic post surgical pain syndromes caused by neuronal plasticity

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**Incidence of Post-Surgical Chronic Pain (Meta-Analyses)**

- Breast surgery 67%
- Thoracotomy 67%
- Sternotomy 33%
- Hysterectomy 67%
- Inguinal Hernia Repair 67%

Local Anesthetics

- Naropin (Ropivacaine®)

Local anesthetics “block” the inflow of pain signals from the peripheral nervous system to the brain—stopping the noxious signal from becoming conscious pain

- “electrical silence”

- PNB is regional analgesia using the PERIPHERAL nervous system
  - uses local anesthetics alone
  - “epidural” is regional analgesia using the CENTRAL nervous system
  - uses local anesthetics, opioids, or a combination

PNB Indications by Site…

| Interscalene | shoulder, especially rotator cuff and shoulder replacement |
| Infra/supra clavicular | hand, wrist, elbow, distal arm |
| Continuous Lumbar Plexus + single sciatic | hip, especially hip replacement, I&D |
| Continuous Femoral + Continuous Sciatic | knee, especially knee replacement |
| Continuous Sciatic alone | foot, knee, above and below the knee amputations |
| Continuous Paravertebral | chest wall, thoracic, breast, many abdominal surgery, iliac crest bone graft |
| Single Paravertebral | inguinal hernia, prostatectomy, hysterectomy |
Pain is not just an unpleasant experience

- ACTH
- Cortisol
- Catecholamines
- Tumor necrosis factor-alpha
- Insulin
- Fibrinolysis
- Limb flow
- Venous emptying
- Hypercoagulability

Stress Response

- HTN
- Coronary ischemia
- DVTs & PE

Nursing Responsibilities...

- Assessments
  - Pain/Sedation (still receiving some opioids)
  - Sensory and Motor function (if extremity)
  - Insertion site, catheter/dressing integrity
  - S/S local anesthetic toxicity
  - Safety precautions
  - Patient/family education
Pain...
• The goal is to decrease the amount of opioids used to control pain
• Bolus the nerve block first...
• Use opioids to augment the nerve block
• Anticipate pain: medicate prior to activity
• ASSESS and RE-ASSESS!

Sedation...
• Your patient will have opioids and anesthetic agents on board
• Sedation always precedes respiratory depression
• Obstructive Sleep Apnea patients at higher risk

Motor/sensory function...
• A femoral block: associated with a weak quadriceps muscle
• A sciatic block: watch foot function
• Important to assess before ambulation
• If unable to ambulate: call and have the rate of the infusion decreased
• The patient may need an supportive device
Maintain the catheter...

- Held in place with steri-strips/tegaderm
- Accidental dislodgement? It happens
- A disconnect? Can be reconnected
- Maintain the infusion...
- If all is lost? Continue to assess pain, use medications that are ordered for breakthrough pain...call the pain team if needed

Local Anesthetic Toxicity...

What to look for:

Early S/S: circumoral numbness, metallic taste, dizziness, blurred vision, tinnitus, decreased hearing

Late S/S: restlessness, tremors progressing to seizures, cardiac arrhythmia's

Patient Safety...

- "I feel good..."
- Educate patients not get OOB without assistance when an extremity is blocked
- Utilize an immobilization device to a lower extremity if needed
- PT should evaluate prior to getting OOB
• The numbness can be alarming – leg feels “heavy”
• If dorsi/plantar flexion is lost, reassure that this is probably temporary
• Reinforce AGAIN, don’t attempt to get OOB without assistance

Patients and families need reinforcement about a pain management technique they may not be familiar with.

MIS
Anticoagulation?

- Chelly, J.E., Szczodry, D.M., & Neumann, K.J.
- Published 2008
- Volume 101
- Page 250-254

Distribution of INR and PT (median)

Distribution of Warfarin Dosing

<table>
<thead>
<tr>
<th>Dose (mg)</th>
<th>POD 0</th>
<th>POD 1</th>
<th>POD 2</th>
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<tbody>
<tr>
<td>0 – 2.5</td>
<td>86</td>
<td>598</td>
<td>330</td>
</tr>
<tr>
<td>&gt;2.5 -5.0</td>
<td>75</td>
<td>27</td>
<td>324</td>
</tr>
<tr>
<td>5.0 – 7.5</td>
<td>434</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>&gt; 7.5</td>
<td>75</td>
<td>28</td>
<td>5</td>
</tr>
</tbody>
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Thromboprophylaxis vs. therapeutic anticoagulation

UPMC Shadyside AIPPS

- Started in July of 2002
- 2 Anesthesiologist attendings/week
- 3 - 5 fellows/residents/week
- Average 22-24 catheter/placements per day
- 35-55 patients on the Service every day
- Over 10,000 patients seen on rounds/year

Basic Guidelines for Programs

- Mission
- Scope of services
- Policy/Procedures
- Staff education and development
- Financial/billing procedures
- Supplies and Equipment
- Personnel
- Quality Assurance Measures
References


