Pain Management for the Wounded Warrior
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Army Regional Anesthesia & Pain Management Initiative
Established in 2000, ARAPMI seeks to improve the availability of regional anesthesia and acute pain services at home and on the battlefield through improved education, research, and promotion in the United States military. Our goal is better pain management for soldiers.

Dr. Buckenmaier, Director of the APS, WRAMC in Iraq
Definition of Pain

“Whatever the experiencing person says it is, existing whenever the experiencing person says it does.” McCaffrey, 1986

Epidural & Peripheral Nerve Catheter Management

Learning Objectives

- Identify the benefits, indications and contraindications for epidural and peripheral nerve root analgesia
- Identify the basic anatomy involved in epidural and peripheral nerve blocks
- List the common medications used
- Identify potential complications
- Recognize common side effects
- Describe required nursing assessment and documentation
- Perform appropriate patient/family teaching
The Goal!
- To provide the best analgesia with the least amount of side effects.

Benefits of Regional Analgesia
- Effective, prolonged regional analgesia
- Opioid Sparing
- Local anesthetics and opioids can be used in combination and are believed to act synergistically
- Excellent overall analgesia
- Less sedation & side effects

Benefits cont.
- Earlier ambulation
- Decreased incidence of pulmonary complications
- Decreased incidence of venous thrombosis
- Earlier return of bowel function
- Patient Satisfaction
Indications
- High risk surgical patients or those recovering from extremely large or painful surgical procedures
  - thoracotomies, mastectomies, rib fractures
  - major upper abdominal surgery
  - orthopedic surgeries
  - amputations

Indications cont.
- Chronic pain
  - Acute exacerbation of Complex Regional Pain Syndrome (CRPS)
  - Cancer pain
  - Phantom limb pain

Contraindications
- Anticoagulation therapy
  - Increases risk of epidural hematoma which may lead to serious adverse effects such as permanent paralysis
  - Timing of catheter placement and removal is of paramount importance in the presence of anticoagulation therapy
  - The maximum Lovenox dose for patients with an indwelling epidural catheter is 40 mg QD, 30 BID for Peripheral Nerve Blocks
Contraindications cont.

- Decreased level of consciousness or inability to accurately report pain level
- Systemic infection - or sepsis may lead to an infection in the epidural space
- A localized infection at the insertion site of the epidural catheter - may also lead to an infection in the epidural space

Contraindications cont.

- Lack of qualified nursing care to monitor patients for side effects and complications

THE NURSE PATIENT RELATIONSHIP

- Excellent interpersonal and communication skills are fundamental to effective pain management.
As nurses we often hear from the patient
“Your presence is more important than the drugs....”
“Thank-you for looking beyond my disease, beyond my pain, and into my heart....you reminded me of who I am....”

Patient & Family Education

Patient and Family Teaching
- The patient / family should be instructed on:
  - the use of pain rating scales
  - the different routes of analgesic administration
  - the possible side effects of the analgesic and the management of these side effects
  - activity levels expected of the patient while receiving regional analgesia
Regional Anesthesia/Analgesia?

Regional anesthesia and analgesia refers to techniques that use needles, catheters, and infusion devices to deliver medications in close proximity to peripheral nerves, plexuses, nerve roots, ganglia, or directly into spinal fluid.


Epidural & peripheral catheters are placed so that all of the affected dermatomes can benefit from the infusion.

The Epidural Space

- The epidural space is a ‘potential space’ that contains fatty tissue and blood vessels;
Catheter Placement

The catheter and tubing should be clearly labeled as to the type of catheter it is.
- Epidural catheters may be placed either in the thoracic or lumbar spaces.
Supraclavicular Placement

NERVE STIMULATOR
Types of Peripheral Nerve Catheters

- Sciatic, Femoral, Lumbar Plexus for amputations or lower extremity injuries
- Interscalene for shoulder injuries
- Supra or Infraclavicular for upper extremity amputations and/or injuries
- Paravertebral for rib fractures or mastectomies

Sciatic Distribution

Sciatic Blocks
Cover the L4, L5, S1 dermatomes or the back of the thigh, part of the hip and knee joint, and the entire leg below the knee with the exception of the medial or saphenous aspect of the lower leg

SCIATIC NERVE PLACEMENT

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SCIATIC NERVE BLOCK
INDICATIONS AND COMPLICATIONS

- SURGERY OF THE KNEE ANKLE AND FOOT BELOW THE KNEE AMPUTATIONS
- COMPLICATIONS
- INFECTIONS USE STRICT ASEPTIC TECHNIQUE
- VASCULAR PUNCTURE IS NOT COMMON
- LOCAL ANESTHETIC TOXICITY
- NERVE INJURY

Sciatic & Femoral Blocks are frequently combined to provide coverage as seen below in this IED wound to right lower extremity.

FEMORAL NERVE DISTRIBUTION
FEMORAL NERVE BLOCK
INDICATIONS AND COMPLICATIONS
- INDICATIONS ANTERIOR THIGH, KNEE SURGERY, AKA & BKA
- COMPLICATIONS
- INFECTION USE STRICT ASEPTIC TECHNIQUE
- HEMATOMA
- VASCULAR PUNCTURE OF THE FEMORAL ARTERY, NERVE INJURY

LUMBAR PLEXUS BLOCK
- The lumbar plexus consists of a group of six nerves that supply the lower abdomen and upper leg. Combined with a sciatic nerve block the lumbar plexus block can provide complete analgesia to the lower extremity. This procedure is an alternative to neuraxial anesthesia which also anesthetizes the nonoperative leg and occasionally results in urinary retention. The lumbar plexus block is an excellent choice for hip surgery.

LUMBAR PLEXUS DERMATONES
- The lumbar plexus covers L1-L5 which supply the muscles and skin of the back the iliac crest, the abdominal muscles and the skin of the inguinal and pubic area along with the anterolateral surface of the thigh
LUMBAR PLEXUS PLACEMENT

LUMBAR PLEXUS COMPLICATIONS

- EPIDURAL SPREAD
- THE LUMBAR PLEXUS BLOCK IS CONTROVERSIAL BECAUSE OF THE POSSIBILITY FOR SIGNIFICANT BLEEDING INTO THE RETROPERITONEUM IN THIS NONCOMPRESSIBLE AREA OF THE BODY. ANTICOAGULATION STATUS MUST BE MONITORED VERY CLOSELY.

INTERSCALENE BLOCK

INDICATIONS & COMPLICATIONS

- THE INTERSCALENE BLOCK IS USEFUL FOR SHOULDER, ARM, AND ELBOW SURGERIES BUT IS NOT INDICATED FOR HAND SURGERY SINCE THE ULNAR NERVE IS NOT COVERED.
- A FREQUENT COMPLICATION IS HORNER'S SYNDROME, CONSISTING OF A HORSY VOICE WITH REDNESS AND IPSILATERAL PTOSIS OF THE EYE, AND NASAL CONGESTION. INSTRUCT THE PATIENT ON THE OCCURRENCE AND REASSURE THEM ABOUT IT'S BENIGN NATURE.
The patient is in the supine position with the head facing away from the side to be blocked.

Indications: Procedures of the upper extremity excluding the shoulder, from the midhumeral level down to the hand.

Complications: The most frequent complication is a pneumothorax. Signs and symptoms of a large pneumothorax include sudden cough and shortness of breath.

Position: Same as the intrascalene.
Placing a continuous Supraclavicular catheter

SUPRACLAVICULAR CATHETER

INFRACLAVICULAR CATHETER

- INDICATIONS: Surgery on the hand, wrist, elbow, or distal arm
- DISTRIBUTION OF ANESTHESIA
- Hand, wrist, elbow and distal arm
- POSITIONING: Same as supraclavicular
- COMPLICATIONS: hematoma, nerve injury, local anesthetic toxicity
- PNEUMOTHORAX
Bilateral continuous infraclavicular catheters.

PARAVERTEBRAL BLOCK

- INDICATIONS: Breast or thoracic surgery, rib fractures, bone harvesting from the iliac crest, as well as a useful adjunct in laproscopic cholecystectomies
- DISTRIBUTION OF ANESTHESIA: Ipsilateral spread two levels above and two levels below
- POSITIONING: Sitting on the side of the stretcher

Paravertebral Block
BOLUSING THE CATHETER

The catheter is tunneled to prevent dislodgement and prevent infection. Then it is secured with medical adhesive, steri-strips and op-site.

FIXATION

GOAL: BALANCED (MULTI MODAL) ANALGESIA
**ACUPUNCTURE**
- Acupuncture - restores energy pathways
- Performed with needles alone or needles plus electrical stimulation
- Electrical stimulation activates pituitary and hypothalamus gland
- Proven to release endogenous opioids since the effects have been reversed by Narcan
- Increases blood flow
- Effective in phantom pain

**PHARMACOLOGICAL CONCEPTS**

**Pain Pharmacology**
- Opioids
- All patients in the immediate postoperative period should be on a Morphine or Dilaudid PCA with IV and PO breakthrough pain meds as needed.
Pain Pharmacology (continued)

- All patients should also be on a NSAID's to augment the opioid based therapies.
- Celebrex 100-200 BID
- Motrin 400-800 TID with meals
- Toradol 30 mg IV Q 6hrs, for a maximum of 5 days to prevent kidney problems

Opioids

- Effective doses of opioids when administered intrathecally (spinal fluid) are even smaller due to the medication being deposited even closer to the receptor sites.
- When comparing 24 hour dose requirements of parenteral vs. epidural vs. intrathecal morphine, it has been found to be a sequential 10 fold decrease i.e.:
  - 50 - 70 mg of parenteral morphine =
  - 5 mg of epidural morphine =
  - 0.5 mg intrathecal morphine

TYLENOL

- DOSING ORAL /RECTAL
- 325-1000 MG Q 4-6 HRS ADULT
- 1-10 MG/KG, CHILD
- CEILING DOSE 4 GM/D HEALTHY ADULT
- 2.5 GM/D CHILD
- # 1 DRUG OF CHOICE FOR SUICIDE
Opioid Tolerant Patients

- Consider these long acting opioids in patients requiring prolonged pain management
- Methadone mild NMDA receptor antagonist excellent for phantom pain
- MS Contin or Oxy Contin
- Fentanyl Patch take 24 hours to start working

WINDUP

- With repeated episodes of moderate to severe pain N-methyl-D-aspartate (NMDA) receptors are activated, which produce a windup effect
- Pain intensity, duration, and distribution becomes greater than anticipated for a given stimulus
- Ketamine binds to the NMDA receptors and is very effective in this type of pain

(KCore Curriculum for Pain Management Nursing, 2002)

Ketamine

- **Mechanism**: NMDA antagonist.
- Used as an analgesic in patients with severe opioid resistant pain, neuropathic pain, phantom limb pain or chronic pain.
- Also used as an adjunct in opioid detoxification.
- Sympathetic nervous system stimulant does not cause respiratory depression or hypotension like opioids
- Can cause mild hallucinations usually pleasant.
Dosage

- **Recommended Dosage:** 60 - 120 mcg/kg/hr OR .06 - .12 mg/kg/hr
- **Ultra low dose or sub-anesthetic continuous infusions of 48-72 hours**
- **Onset of action:** rapid onset, characterized by glazed eyes & mild nystamus, short half life, no reversal agent

Meperidine “DEMONAL”

- **Not recommended as first line therapy**
  - Only use for post-operative “shivering”
  - Toxic Metabolite Normeperidine
    - Trembling hand with spread fingers
    - Anxiety/insomnia
    - Long muscle twitching
    - Facial/extremity muscles tight
    - Seizures

Opioid Side Effects

- **Frequent**
  - Nausea, vomiting
  - Constipation
  - Sedation
  - Mental clouding
  - Pruritis
- **Less Frequent**
  - Urinary retention
  - Delirium
- **Adverse Effects**
  - Respiratory depression
  - Seizures
CONSTIPATION

Regular bowel assessment
- Hydration
- Exercise
- Management
  - Laxative and stimulant prophylaxis
  - May need to increase aggressiveness of bowel management as opioid dose increases

Tricyclic Antidepressants/ Sleep Meds
- Pamelar (nortriptyline) 25-50 MG QHS
- Elavil (amitryptiline) 25-50 QHS
- Ambien (zolpidem) 5-10 HS PRN
- Serroquel (quetiapine) 25-50 HS PRN

Epidural & Peripheral Infusions
- Most Commonly Used at WRAMC:
  - Ropivacaine 0.2% (2mg/ml)
  - Very low cardiac toxicity
  - Provides more of a sensory block less of a motor block
- Common infusion rates - 5-14cc/hour
  - basal, 3-5 cc PCB Q 20-30 mins maximum dose 20 cc/hr
Nursing Assessment

General Patient Management
- maintain IV access while receiving epidural or peripheral analgesia and for 8 hours following the last administration of medication
- epidural medications should be sterile, preservative-free (due to the neurotoxicity of preservatives) and designated for intraspinal use
- do not use alcohol on the catheters or infusion tubing due to the potential for neurotoxicity

Nursing Assessment cont.

Review Physician Orders
- The location of the epidural or peripheral catheter
- Medication(s) ordered and the infusion rate
- Specific recommendations for patient assessment
- Orders to treat potential side effects/complications
- When to notify the Anesthesia Pain Service

Assessment of Analgesic Level

Assessment & Reassessment Following Interventions
- assess patient’s pain rating using patient-specific pain scale (e.g. 0-10) , both at rest and with activity
- assess dermatome level, note any sudden increased level of sensory block and inform Anesthesia Service immediately
Complications

- Infection
- Catheter displacement
- Horner's syndrome
- SOB
- Dysphasia
- Nerve injury
- Local Anesthetic toxicity
  - What to do
  - Compartment Syndrome

WHAT TO REPORT ASAP

- Uncontrolled Pain
- Catheter disconnection or dislodgement
- Shortness of Breath
- Difficulty Swallowing
- Redness, discharge from catheter site, warmth around catheter
- Fever of 101°F or greater
- Dizziness or light-headedness
- Metallic taste in mouth
- Ringing in the ears
- Severe drowsiness
- An impending sense of doom
- Tremors and or Seizure

HEEL DECUBITI
PRESSURE ULCER
PROTECTION & PREVENTION INITIATIVE
PATIENT AT RISK FOR
PRESSURE ULCERS PLEASE KEEP PRESSURE OFF THE HEEL BY
ELEVATING THE AFFECTED LEG!

PUPPI

Side effects
Respiratory Depression/Sedation
- An increased sedation level will occur prior to
respiratory depression and can occur with catheter
migration to a blood vessel.
- Turn off the pump and give Narcan, administer O2
and monitor Pulse OX
- Notify the Anesthesia Pain Service

Assessment and Management of Side Effects cont.
- Naloxone is an opioid antagonist that
reverses the effects of opioids
  - must be given slowly because naloxone may cause
cardiopulmonary symptoms such as ventricular
tachycardia and pulmonary edema
  - dose may need to be repeated every 3 - 5 minutes
until the symptoms have been reversed
  - patients should be monitored closely after naloxone
administration because respiratory depression may
recur due to the short half-life of naloxone (approx.
55 minutes)
Assessment and Management of Side Effects cont.

- **Urinary retention**
  - Patient may have a foley catheter placed, or be straight catheterized prn.
  - If the patient requires a second straight catheterization consider placing a foley catheter
  - Risk of urinary retention is greater in men and with lower/lumbar catheter placement

Orthostatic Hypotension

- **Monitor BP & HR per protocol**
  - Ensure adequate hydration and fluid replacement
  - Assess for orthostatic changes prior to ambulating
  - Notify the Anesthesia Service if changes are greater than 20% from baseline
  - Monitor BP and HR for 30 mins after a bolus dose based on a specific physicians order
  - Orthostatic Hypotension is most common with thoracic epidurals and doses should be monitored closely

Sensory Motor Function or Loss

- Assess the patient for changes in sensory/motor function at least every hours and more frequently if there are changes
- Ask the patient to point to numb and tingling skin areas, and to bend their knees, wiggle their toes or fingers and lift the buttocks or arm off the mattress
- If the patient complains of weakness, heaviness, or numbness/tingling in the lower extremities do not ambulate
- Notify the Anesthesia pain service of any changes in the patient’s sensory/motor function
LOCAL ANESTHETIC TOXICITY

- Assess for symptoms of local anesthetic toxicity, notify the pain service for any of these changes
- Ringing in the ears
- Numbness or metallic taste in the mouth
- Muscle twitching
- Hypotension, trembling or dizziness
- An impending sense of doom
- Seizures, coma, respiratory arrest death

LOCAL ANESTHETIC TOXICITY WITH CARDIAC COLLAPSE

- Intralipids 20%
- 1cc/kg q 3-5 minutes up to 3 cc/kg
- Then 0.25cc/kg/minute for 2.5 hrs
- Use along with ACLS

Epidural Complications

- Epidural abscess
  - Assess catheter insertion site for signs of infection i.e.: tenderness, erythema, swelling, drainage
  - Assess for changes in sensory/motor function unexplained back pain, bowel or bladder dysfunction, fever, or neck stiffness
  - Notify the Anesthesia Pain Service of any changes of Fever above 101
Epidural Complications cont.

- **Epidural hematoma**
  - assess the catheter insertion site every 4 hours for pain and/or swelling at the site
  - assess for changes in sensory/motor function
    - progressive numbness, weakness, or bowel and bladder dysfunction

Complications cont.

- **Subdural Puncture/Catheter Migration**
  - catheter may migrate into the subarachnoid space, or blood vessels causing an overdose of medication
  - side effects include rapid onset of sedation, loss of sensory and motor function and hypotension
  - notify the Anesthesia Pain Service immediately

WHY WE DO WHAT WE DO!
REFERENCES


www.nysora.com

ASPMN: Nursing Practice Standards

- Standards of Clinical Nursing Practice for Pain Management, 1996
- Standards of Clinical Practice for the Specialty of Pain Management Nursing, 1998
- Core Curriculum
- Position Papers
- Self-learning Modules
- National Conferences (Annual)
- Certification Review Materials
- ANCC Certification

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REFERENCES

- McCaffrey, M & Pasero, C (1999) PAIN, CLINICAL MANUAL FOR NURSING PRACTICE, (2nd Ed) The CV Mosby Company, St Louis
QUESTIONS?