Epidural Analgesia

John Mrachek MD

2 September, 2008

54 year old man with solitary metastasis of colon cancer

- Limited H and P
- Past history COPD and alcoholism, prior withdrawal during hospitalization (not mentioned in H and P)
- Alcohol mentioned as “occasional”
- Only PTA med Zolpidem 10 mg at hs

Preop: Decision made to do epidural analgesia

- Epidural catheter placed preop at T10-11
- Test dose of 3 mL 1.5% lidocaine with 1:200000 epinephrine tolerated well

Surgery

- Wedge resection of segment IV mass
- Op note written at 1019
- Uneventful surgery
- In orders: Heparin 5000 units ordered preop and not given—cancelled 3 hours postop
- No postop VTE prophylaxis ordered.

PACU

- 1149 Pain described as 9/10 with epidural fentanyl/ropivacaine at 10 mL/hr—increased to 18 mL/hr
- 1407 BP in 80s Hextend 500 mL ordered: epidural level described at T4

POD 0—on the surgery unit

- 1836 pain severe—bolus 5cc and rate increased (sic) to 16 mL/hr
- 2006 pain controlled but legs numb and patient is unable to lift ehm off the bed
- 2146 Hospitalist postop visit identifies history of alcohol withdrawal
- 2222 still unable to move legs

POD 1

- 0600 Pain returns and unable to move legs block assessed at T4-T10 bolus 5 cc and rate increased to 16 mL/hr
- 0830 Pain control good but block assessed at T10-L3 Head of bed lowered to make block move higher
- 1000 pain control pretty good
- 2232 BP 76/51 treated with 250 mL of hextend

POD 2

- 0315 Hyp*er*tensive and starts alcohol withdrawal. Pain control not mentioned to be bad
- Withdrawal not severe
- Pain control pretty good

POD 3

- Epidural catheter found to be broken and exposed to air “for some time”
- Epidural catheter removed
- Uneventful pain control rest of hospitalization

POD 0-3

- No VTE prophylaxis
- Systemic analgesics: one dose of Ketorolac 30 mg on POD 0
- 3 total doses of nalbuphine 2 mg on POD 1 and 2
- Good pain control after rocky start the first day.

Case 2—68 year old woman with ovarian cancer

- Mass noted at preop for cataract, CT showed ascites, effusion, 17 cm ovarian mass and omental masses.
- Past history of hypthyroidism and hypertension and question of cognitive decline
- Meds Lipitor, hctz, paxil and l-thyroxine

Preop

- Epidural catheter placed at T10-11 and lidocaine epinephrine test dose administered.

POD 0—first night

- No comments about pain control
- Two boluses of saline given for hypotension and oliguria
- Phenylephrine run for hypotension
- Overnight in PACU and then to station 20

POD 1

- Phenylephrine for hypotension
- Pain 5/10 at 8cc/hr and increased to 10 cc per hour.
- Pain apparently stayed well controlled
- Phenylephrine given for several hours then discontinued morning of postop day 1

POD 2-5

- Stable epidural rate
- Pain controlled
- No VTE prophylaxis—calf pain developed but venous doppler negative.
- Epidural catheter removed POD 5
- No other analgesic given until a few doses of oxycodone given the day the catheter was removed.

Management of Acute Postoperative Pain Epidurals: *perspectives for Hospitalists*

John Mrachek, MD
Director Acute Pain Service
Northwest Anesthesia, PA
Abbott Northwestern Hospital

Northwest Anesthesia, PA Acute Pain Service: *Background*

- "Re-launched" April of 2007
- Based on MD/RN model
- 24h/7d pager coverage
- Rounding Service
- 2005-2006: 74 Epidurals
- 2007: 594
- 2008: projected 850

Northwest Anesthesia, PA
Acute Pain Service: *Background*

- Epidural Resource RN: Debi Henry
  pager 654-9464 mobile: 5-3930
- Acute Pain Anesthesiologist pager: 654-4291
- F1 (Anesthesiologist in charge) 24h/7d:
  mobile 863-5098

Epidural Analgesia for Management of Acute Postoperative Pain: *Why do we use them*

- Epidural Analgesia provide several advantages
- Parenteral Opiods provide incomplete analgesia with profound side effects
- We have a more comprehensive understanding of the mechanisms of acute pain
- We want to provide highly effective and efficient analgesia
- Significant morbidity and mortality associated with inadequate postoperative pain control

Epidural Analgesia for Acute Postoperative Pain: *Advantages*

1. Decrease morbidity and mortality:
   - Cardiovascular
   - Respiratory
   - Gastrointestinal
   - Coagulation-related
2. Improve patient-oriented outcomes:
   - Improved pain control
   - Improved sleep
   - Higher health-related quality of life
   - Early return to work
3. Avoid side effect of parenteral opioids:
   - Respiratory depression
   - Sedation
   - Nausea/vomiting
   - Pruritus
   - Ileus

Epidural Analgesia for Acute Postoperative Pain: *Our Goals*

1. Improve Postoperative Pain Control
2. Avoid the side effects of parenteral opioids
3. Early ambulation

Thereby improving patient outcomes

Epidural Analgesia for Acute Postoperative Pain: *Disadvantages*

1. Loss of lower extremity motor function
2. Nausea/vomiting (with epidural opioids)
3. Pruritus (with epidural opioids)
4. Urinary retention (lumbar catheter)
5. PDPH (wet tap)
6. Back pain (at site of needle insertion)
7. Neurologic injury (potential)
8. Exacerbate hypovolemia

Epidural Analgesia for Acute Postoperative Pain: *Pseudodisadvantages*

aka, "things not caused by the epidural"

1. Generalized weakness
2. Jaw pain
3. Sciatica
4. Excessive sedation
5. Blurred vision
6. Excessive flatus
7. Uncooperative patient
8. Turning patient in to "nut job"
9. Bret Farve leaving Green Bay
10. Hillary not receiving Democratic nomination

Epidural Analgesia for Acute Postoperative Pain: *Contraindications*

Absolute:

- Patient refusal
- Infection at the insertion site
- Coagulopathy or Bleeding Diathesis
- Severe hypovolemia
- Increased ICP
- Severe Aortic Stenosis
- Several Mitral Stenosis

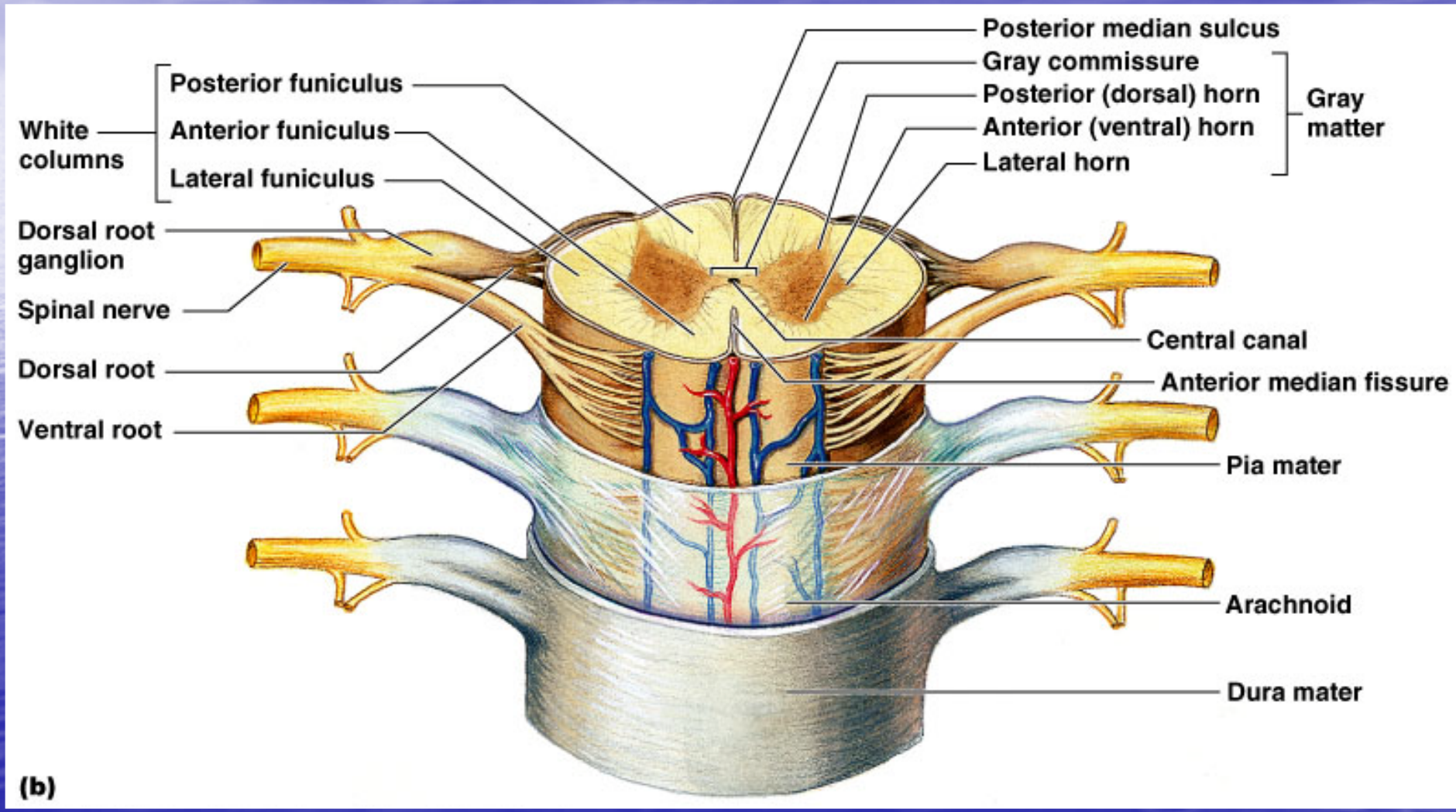
Relative:

- Sepsis
- Preexisting neurological deficits
  - Demyelinating lesions
- Stenotic valvular heart lesions
- Severe spinal deformity
- Uncooperative patient
- Hypertension

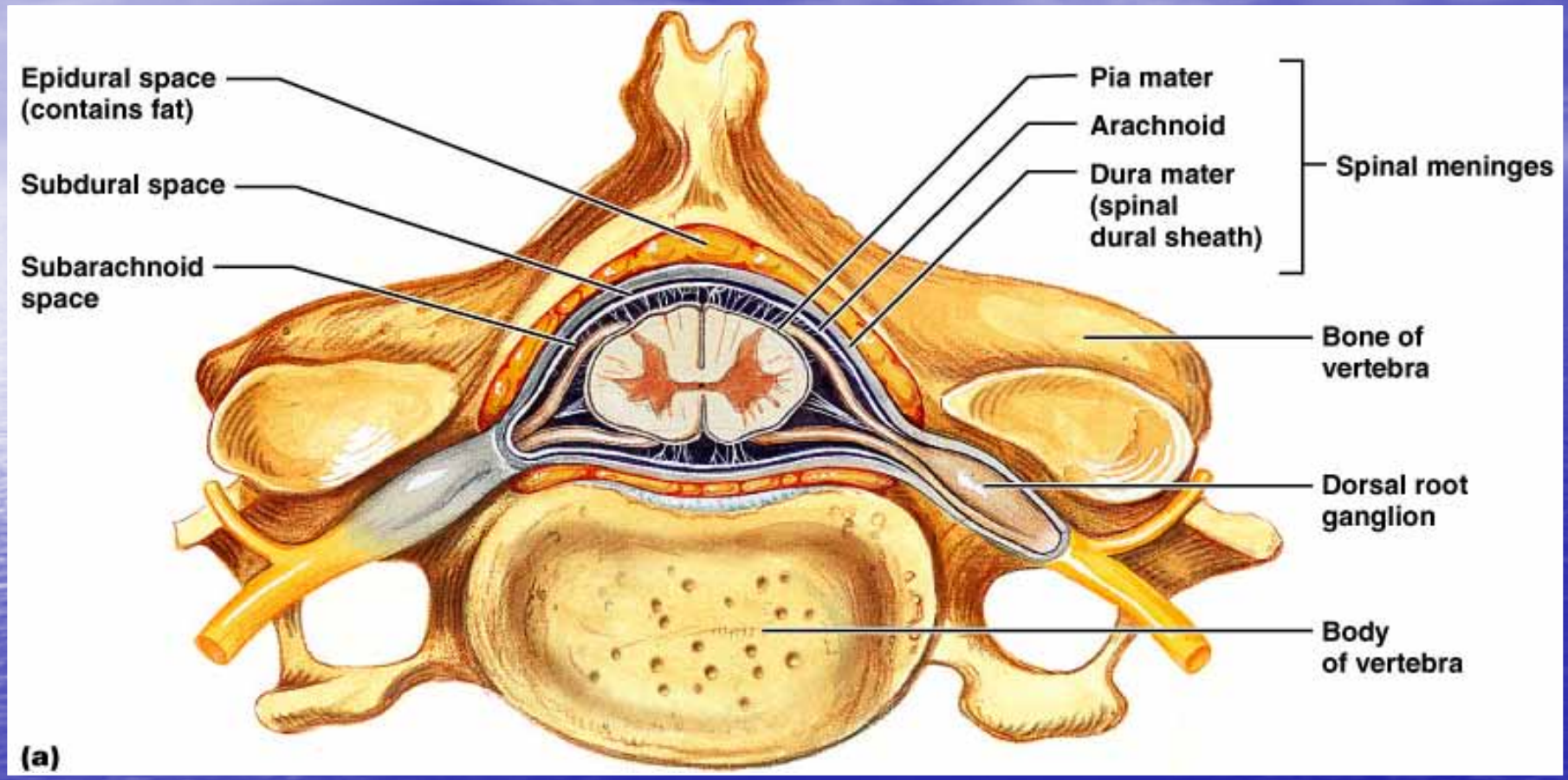
Controversial:

- Prior back surgery at the site of injection
- Inability to communicate with patient
- Anesthetized patient
- Positioning that compromises respiratory function
- Tattoos

Spinal Cord Anatomy



Spinal Cord Anatomy



As the afferent nerves enter the cord they pass by the epidural space. The nerves are bathed in local anesthetic (and opiods) to reduce, modulate, or eliminate pain perception.

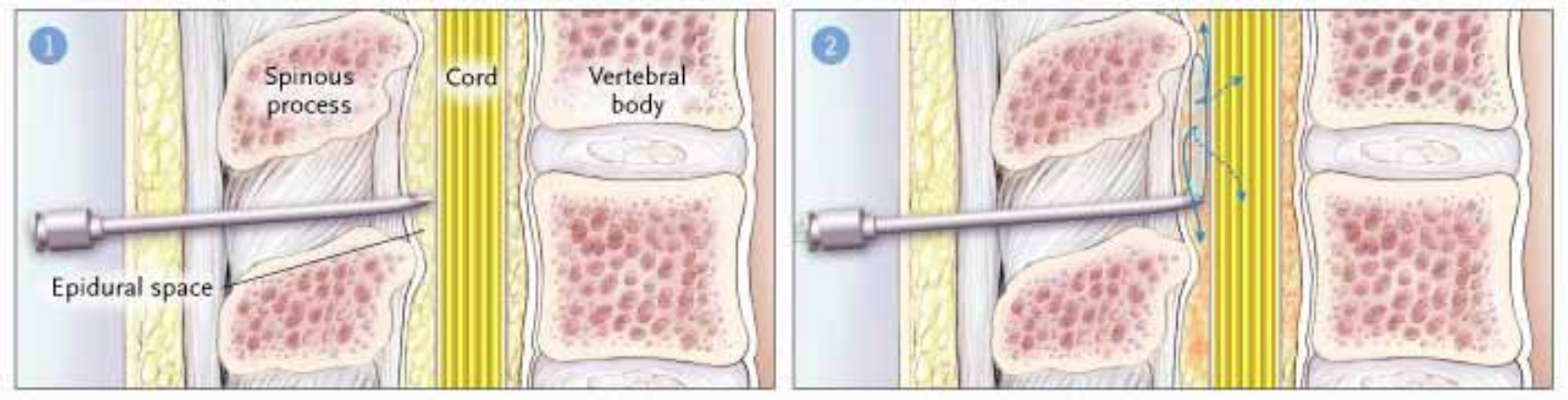
Spinal Cord Anatomy

- 31 Paired spinal nerves
- Combined nerves: sensory and motor
- Sensory fibers arise from neurons in DRG
  (temp, touch, pressure, pain, proprioception)
- Motor fibers arise from ventral horn
- Sympathetic outflow is thoracolumbar
- Parasympathetic outflow is cranial and caudal
- Epidural analgesia usually causes a
  sympathectomy leaving a more unopposed
  parasympathetic tone

Differential Blockade

- The effect of LA on nerve fibers varies according to:
  1. size of nerve fiber
  2. whether or not it is myelinated
  3. concentration of LA achieved
  4. duration of contact with LA
  5. specific LA
- Smaller myelinated (pain) fibers are more easily blocked
- Allows differential blockade (pain before motor)

Epidural Catheter Insertion



After the epidural space is achieved, the catheter is inserted 5cm or more cm beyond the needle tip. The needle is removed and catheter is then secured with a Tegaderm™ and tape

Epidural medications and dosages

- Epidural analgesia usually consist of a combination of the dilute local anesthetics and opioids (+/- vasoconstrictor)
- Ropivacaine or Bupivacaine
- Dilaudid or Fentanyl
- The doses are different for IV vs Epidural vs Intrathecal medication
- IV 1 mg = Epidural 0.1 mg = Intrathecal 0.01 mg, so epidural dose is $1/10^{th}$ and spinal dose is $1/100^{th}$
- Less medication, less side effects and often better pain control

Side effects

Epidural analgesia HAS side effects. The side effects are usually well tolerated and easily relieved. The side effects are often less than with other analgesic modalities. We tolerate the side effects because the benefits out way the risks. When the burden of the side effects out weigh the benefits, we remove the epidural.

Side effects: *hypotension*

- Most often occurs as a result of hypovolemia! Patients who are euvolemic will not become hypotensive with epidural analgesia
- Results from sympathectomy and a loss of vascular tone. Exaggerated in hypovolemic patients
- Just a little bit of an epidural can result in a sympathectomy, but just a little bit of an epidural will not relieve pain!
- Do not “wean or titrate” the epidural, weaning an epidural will not relieve hypotension
- Give volume, 250-500 cc colloid--may repeat as necessary.
- Nearly all surgical patients will have periods of hypovolemia (under resuscitation, inadequate intraoperative volume replacement, third-spacing, etc)
- Do not miss postoperative hemorrhage

Side effects: *nausea and vomiting*

- Significant side effect…poor outcome high patient dissatisfaction rating
- Nausea and vomiting—often due to opioid or hypotension
- May consider removing opioid, however, would likely need opioid for pain relief at 10 x dose if delivered parenterally
- Solution: Nalbuphine 2-4 mg IV may repeat dose x 1 or fluid resuscitation

Side effects: *Pruritus*

- Significant side effect…poor outcome high patient dissatisfaction rating
- due to opioid binding to μ receptor in spinal cord
- May consider removing opioid, however, would likely need opioid for pain relief at 10 x dose if delivered parenterally.
- Solution: Nalbuphine 2-4 mg IV may repeat dose x 1

Side effects: *paraesthesia*

- Paraesthesia (numbness) likely due to high conc. of local anesthetic at nerve root. Rx: decrease infusion, concentration of LA, or maybe nothing*
- Can be a complication of placement
- Patients should be able to move lower extremities
- Patients should not have numbness in hands or arms

* Call anesthesia

Side effects: *urine retention*

- Epidural block may eliminate patients ability to feel a full bladder
- RN to assist (remind) patient to void
- If UO has decreased have patient try to void
- If unable to void, check residual volume with bladder scan if >300 cc straight cath or place foley catheter

Misconceptions of Epidural Analgesia: *Hypotension*

Fallacy: Epidurals cause Hypotension

Fact: Epidurals Unmask hypovolemia

Background: Initial dosing may cause transient drop in BP

Body compensates by:

- redistribution of blood flow
- increasing HR
- increasing contractility
- increasing venous return above block level

Why: Rate of epidural is decreased and pain increases, driving sympathetic tone leading to increase in blood pressure. Epidural rate decreased and now BP is improved (but pain is increased). Conclusion—epidural causes hypotension.

Misconceptions of Epidural Analgesia: *Urinary retention*

Fallacy: Pt with epidural must have foley catheter

Fact: Thoracic epidurals do not cause urinary retention

Background: Low thoracic epidurals may block sensory fibers to the bladder, but not motor function to sphincters or smooth muscle. Patient unable to sense full bladder, but has the motor function to urinate when attempting.

Why: Patient dose not sense full bladder, UO decreases, RN scans bladder, large volume, straight catheter placed and bladder drained. This is repeated and then a foley is placed. Instead the patient simply has to be reminded to void. “if they can walk, they can pee”.

Misconceptions of Epidural Analgesia: *Pruritus should be treated with diphenhydramine*

Fallacy: Itching is mediated by histamine in CNS

Fact: Likely due to spinal opioid receptor

Background: Patient often complains of itching of the face upper chest and shoulders when epidural opioids are being infused. This is due to opioid triggering μ-receptor in the spinal cord

Why: Patient now sedated seems to improve with diphenhydramine

Misconceptions of Epidural Analgesia: *Nausea and vomiting should be treated with 5-HT_3 receptor antagonist*

Fallacy: N/V is triggered by receptors in the chemotrigger receptor zone in the CNS

Fact: Likely due opioid binding to μ-receptor in the spinal cord

Background: Patient often complains of nausea and/or vomiting. This is due to opioid triggering μ-receptor in the spinal cord

Why: 5-HT3 receptor antagonist First line treatment for PONV. We give everyone Zofran!

Neuroaxial Analgesia and Anticoagulation:

what can and cannot be used

Neuroaxial Analgesia and Anticoagulation: Medications that CAN BE USED with indwelling epidural catheter

- Based on consensus statement of the American Society of regional Anesthesia (ASRA)

  http://www.asra.com/

- Standard (Unfractionated) Heparin minidose subcutaneous prophylaxis
- NSAIDS (including aspirin)
- LMWH held 12 hours prior and 2 hours post

Neuroaxial Analgesia and Anticoagulation: Medications that THAT WE USE at Abbott Northwestern

- Standard (Unfractionated) Heparin minidose subcutaneous prophylaxis ≤ 5000U subcutaneously every 12 hours!

  (all orders are approved by an anesthesiologist)

- NSAIDS (including aspirin)
- Toradol

Neuroaxial Analgesia and Anticoagulation: Medications that CAN NOT BE USED with indwelling epidural catheter

- Oral anticoagulants (Coumadin)
- Antiplatelet medications Thienopyridine derivatives (ticlopidine and clopridogril) and platelet GP IIb/IIIa antagonists (abciximab, eptifibatide, tirofiban)
- Direct Thrombin Inhibitors (agatroban)
- Fondaparinux

Local Anesthetic Toxicity

Subjective Signs

- Dizziness
- Visual disturbance (inability to focus)
- Auditory disturbance (tinnitus)
- Drowsiness
- Disorientation

Local Anesthetic Toxicity

Objective Signs

- slurred speech
- shivering
- muscle twitching
- tremor in facial muscles and extremities
- CNS depression --> convulsions

Local Anesthetic Toxicity

- Stop infusion immediately
- Call the Anesthesiologist
- Monitor patient directly until the Anesthesiologist arrives

When to call the Anesthesiologist

- Pt complains of significant back pain
- Pt unable to move leg(s)
- Suspected LA toxicity
- Dressing issues
- Catheter disconnect or migration
- Signs of local infection
- Nothing elss seems to be working
- Better to call early than late

This is what happens when your dad is an anesthesiologist

Lily 4 years

Ingrid 15 months

Jack 6 years

Thank you for your time

Questions?

Line disconnect

- Apparently this has been an issue
- If the line has come disconnected, call the Anesthesiologist
- If the line connection has simply unscrewed, wipe ends with alcohol and reconnect and continue infusion

Air in the line

- Apparently this has been an issue
- Air—is not a problem
- The whole line is filled with air at the start
- If you see air, check fittings, but continue as is.

Epidural Catheter Dressing

- Should check dressing periodically (every shift)
- DO NOT REMOVE DRESSING OR CHANGE DRESSING—if needed call anesthesia
- If dressing is coming off apply more tape

Trouble shooting

- One sided block—concentration differential L vs R. Rx: place patient's painful side down
- Numb leg—concentration too high on one side. Rx: place patient's numb side up

Trouble shooting cont.

- Poor pain relief:
  1. Rate is too low
  2. Concentration too low
  3. Bag has run dry
  4. Pt not using PCEA
  5. Catheter disconnect
  6. Inadequate concentration of local anesthetic bolus vs increase dosage.
  7. Catheter migration no longer in epidural space or no longer high enough Rx: call anesthesia