

## REGIONAL ANESTHESIA AND ACUTE PAIN MEDICINE UPDATE: CRASH 2014

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## Disclosures

- ▣ I have no disclosures

*“For every study, an equal and opposite study exists”*

*-Anesthesia attending, circa 2004*

## Objectives

- ▣ To present a thorough review of the relevant regional anesthesia and pain medicine literature for the year of 2013.
- ▣ In discussing this data, utilize evidenced based medicine to potentially implement changes into your daily management of perioperative pain.

## Review of the 2012 Literature

- ▣ 1. National guidelines/recommendations exist from the ASA and JCAHO that strongly recommend multimodal analgesia.
  - Minimizing opioids
- ▣ 2. Dexamethasone, Ketamine, and Dexmedetomidine are all useful multimodal adjuvants
  - Safe and effective at opioid sparing
- ▣ 3. Spinal Anesthesia possesses many benefits:
  - Lower Mortality/morbidity in elderly hip fracture patients
  - Lower incidence of infection, blood loss, and surgery length of stay in total knee arthroplasty patients

## Review Cont.

- ▣ 4. Epidural Analgesia possesses a complication rate of:
  - Insufficient Analgesia ~ 9% (Poorly Targeted Catheters)
  - Intravenous Placement ~ 3% (Elderly)
  - Dural Puncture ~ 1.5% (Elderly)
- ▣ 5. Epidural Analgesia benefits consist of:
  - Decreased morbidity in general surgery and orthopedic surgery populations
  - Decreased mortality in cancer patients?
  - Unique uses such as intractable ileus and vasoocclusive crisis
- ▣ 6. Incidence of Chronic Pain after joint replacement is significant and associated with poor perioperative pain control:
  - 38% for THA
  - 53% for TKA

## Review Cont.

- ▣ 7. Peripheral Nerve Blocks:
  - Are more beneficial when administered in a continuous fashion
  - Ideal anesthetic volume is a moving target
  - Permanent neurologic injury is a rare occurrence (1-1000) even with intraneural placement of needle
  - Paravertebral blocks are a reasonable alternative for thoracotomies
  - TAP blocks are best performed under ultrasound and inferior to IT morphine in the obstetric population
- ▣ 8. Anticoagulation and the neuraxis:
  - Thrice daily unfractionated heparin (5000U) appears to be safe when used in conjunction with epidurals
  - Incidence of epidural hematoma in the nonobstetric population is somewhere between 1:5000-1:10,000
- ▣ 9. Local Anesthetics
  - Liposomal encapsulated local anesthetics are still on the horizon
  - Knowledge of local anesthetic systemic toxicity (LAST) and the subsequent algorithm is essential to any practicing anesthesiologist

## Neuraxial Anesthesia

## Neuraxial Anesthesia: Thoracic Epidurals

- ▣ Epidurals superior to subcostal TAP blocks which are superior to intravenous opioids in patients undergoing radical gastrectomy (Wu et al., A and A, 8/2013)
  - 24 hour morphine consumption of 19mg, 33mg, and 52mg
- ▣ Epidurals in CABG surgery decreased postoperative pain significantly vs. IV opioids (Onan, J Card Surg 5/2013)
  - VAS scores of 0.05 v. 4.6
  - Decreased mechanical ventilation, ICU stays, and hospital stays
  - Decreased chronic pain
- ▣ Epidurals placed in 1016 low to moderate risk cardiac surgery patients (CABG, MVR, AVR) (Stenger, J Card Vasc Anesthesia 12/2013)
  - Epidural patients had lower 6-month mortality and less frequent dialysis

## Neuraxial Anesthesia: Thoracic Epidural Cont.

- ▣ Comparison of paravertebral block to thoracic epidural after thoracotomies (Kobayashi Surg Today 9/2013)
  - VAS scores comparable at 2,24, and 48 hours
- ▣ Comparison of paravertebral blockade/IT opioid vs. thoracic epidural after thoracic surgery (Dango BJA 3/2013)
  - Postoperative pain scores lower in epidural group (3.4 v. 4.6 at rest and 4.4 v. 5.7 with movement)
  - Clinical courses felt to be similar
- ▣ **Safe to assume that paravertebral blockade is a reasonable (but not superior) alternative to thoracic epidurals in patients undergoing major thoracic surgery**

## Neuraxial Anesthesia: Obstetrics

- ▣ Moore et al. concluded that labor epidurals **do not increase** the risk of caesarian section (Moore)
  - He also concluded that other independent risk factors, associated with early epidural initiation, do increase the risk of caesarian section
    - ▣ Labor augmentation, nulliparity, spontaneous rupture of membranes, and increasing maternal weight
- ▣ Two studies examined the efficacy of labor epidural vs. combined spinal epidural
  - Heesen concluded that although CSE is associated with more reliable positioning, lower epidural replacement rates, and lower unilateral block rates, no consistent benefit was seen. (Heesen Anesthesia 1/2014)
  - Gambling determined that CSE provided better first stage analgesia and required less top-up injections (Gambling Anesthesia and Analgesia 3/2013)

## Neuraxial Anesthesia: Obstetrics Cont.

- ▣ Use of ultrasound for spinal placement in pregnant patients (Sahin J Anesth 10/2013)
  - Preinsertion scanning performed in obese and lean patients
  - High level of success utilizing the prepuncture ultrasound-determined point
  - In all patients (especially obese), ultrasound can facilitate fast and reliable spinal anesthesia

## Peripheral Nerve Blockade

### Peripheral Nerve Blockade: Upper Extremity

- ▣ Dose ranging studies: MEV90 of 0.5% bupivacaine with epinephrine required for ultrasound guided interscalene block (Falcao BJA 3/2013)
  - MEV90 was 0.95mL
  - However, 2.34-4.29mL required for adequate postoperative analgesia
    - Reduced diaphragmatic paralysis seen with these volumes
- ▣ Literature review to provide recommendations for shoulder analgesia (Bovens Anesth Res Pract 2013)
  - Recommends single shot blocks for procedures of mild to moderate pain
  - Continuous interscalene blockade for procedures of moderate to severe pain
  - Ultrasound reduces the amount of local anesthetic required (compared to nerve stim)
  - Dorsal scapular and suprascapular blocks are inferior to interscalene blockade
  - Intraarticular injections should be avoided due to potential chondrolysis

### Peripheral Nerve Blockade: Upper Extremity cont.

- ▣ Stroke and shoulder surgery
  - Intraoperative and Postoperative stroke are both extremely rare when shoulder surgery is conducted in the beach chair position in conjunction with regional anesthesia (Rohrbaugh RAPM 1/2013)
  - Patients undergoing shoulder surgery had less cerebral oxygen desaturation events when receiving only regional anesthesia for their anesthetic (Koh J Shoulder Elbow Surgery 10/2013)

### Peripheral Nerve Blocks: Lower Extremity

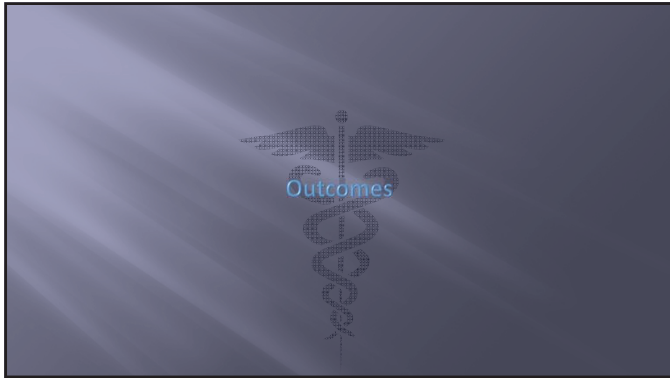
- ▣ Dose Ranging Studies
  - 10mL of 0.5% bupivacaine necessary for onset of sensory and motor block within 60 minutes (Nader RAPM 11/2003)
    - Volumes greater than 10mL did not induce block any faster
  - 15mL of 0.93% lidocaine required for successful ultrasound guided femoral nerve block in 90% of patients (MEAC 90, Minimal Effective Anesthetic Concentration) (Taha BJA 6/2013)
- ▣ Adductor Canal (Saphenous Nerve) Blockade
  - Adductor Canal Blockade and local infiltration analgesia (LIA) are superior to LIA alone (Henning RAPM 3/2013)
    - Patients ambulated well in both groups
  - Ultrasound guided adductor canal block resulted in significantly greater quadriceps strength as compared to femoral nerve block (Kwofie RAPM 7/2013)

### Peripheral Nerve Blocks: Lower Extremity Cont.

- ▣ Adductor Canal Blocks cont.
  - Adductor Canal Blockade resulted in better quadriceps strength than femoral nerve block in patient's undergoing TKA (Jaeger RAPM 11/2013)
    - Pain was the same
  - Continuous adductor canal blockade in combination with LIA resulted in better pain control than LIA alone in TKA patients. (Andersen RAPM 3/2013)
  - Adductor Canal Blockade and LIA was superior to femoral nerve block for ambulation after TKA (Perlas RAPM 7/2013)
    - **From these five studies, it is safe to assume that adductor canal blockade provides some level of analgesia with little quadriceps weakness after TKA. However, only one study directly compares adductor canal vs. femoral nerve blockade for pain. More studies are needed**

### Peripheral Nerve Blocks: Lower Extremity cont.

- ▣ Total Hip Arthroplasty (ideal mode of analgesia)
  - Comparison of LIA (ropivacaine 300mg, Ketorolac 30mg, and epinephrine 0.5mg) with intrathecal morphine (Kuchalik BJA 11/2013)
    - Morphine group had lower pain intensity
    - Analgesic consumption, pain on mobilization, and side effects were lower in the LIA group
  - 5 year review of HVLIA in TKA and THA patients determined that it is impossible to state that this technique provides any benefits for postoperative pain (Fowler Anesth Intensive Care 7/2013)
  - Comparison of fascia iliaca block v. sham block in THA patients (Shariat RAPM 5/2013)
    - No benefit of fascia iliaca compared to sham
  - **Gold standard should remain lumbar plexus, intrathecal morphine, or epidural analgesia after THA**



### Outcomes

- ▣ Implementation of a regional anesthesia block nurse team: (Russell J Perianesth Nurs. 2/2013)
  - Improves patient safety
  - Improves perioperative efficiency and productivity
- ▣ Patients receiving spinal anesthesia (v. general) for total knee arthroplasty had a lower complication rate (Pugely J Bone Joint Surg Am 2/2013)
  - Lower superficial infection rate and less blood transfusions
  - Reduced length of surgery and reduced hospital length of stay
- ▣ Patients receiving spinal anesthesia for TKA had lower adjusted odds of both pneumonia as well as any systemic infection (Liu A and A 10/2013)
  - Mortality was the same
- ▣ Addition of a single shot or continuous sciatic nerve block does not affect long term pain or disability at 3 and 12 months after TKA (Wegener RAPM 1/2013)

### Outcomes Cont.

- ▣ POISE trial refutes the safety of neuraxial anesthesia (Leslie BJA 9/2013)
  - Neuraxial block in patients with increased risk for cardiovascular morbidity suffered a higher incidence of adverse cardiovascular outcomes
  - Findings unexpected and recommendations have yet to be made
- ▣ Tranexamic acid reduces both blood loss and transfusion requirements in joint replacement surgery (Lee J Clin Anesth 2013)
- ▣ Patients undergoing total hip arthroplasty under spinal anesthesia are at low risk of urinary retention (Miller J Bone Joint Surg Am 2013)
  - May not require foley catheter

### Outcomes Cont:

- ▣ Intermittent bolus dosing v. continuous infusions
  - Patient intermittent epidural bolus (PIEB) is superior to patient controlled epidural analgesia (PCEA) (Sia Anesthesia 2013)
    - Higher satisfaction scores with similar side effects
  - Decreased PCA consumption in femoral nerve block population (Hillegeass J Clin Anesth 2013)
    - Standard infusion v. intermittent bolusing
- ▣ Chronic Pain after high risk surgery
  - Study assessing the efficacy of regional anesthesia versus conventional analgesia in high risk surgery patients (Andrae BJA 2013)
    - Breast surgery and thoracotomies
    - Epidural analgesia and paravertebral blockade prevented postoperative pain in 1 out of every 4 to 5 patients undergoing thoracotomy or breast surgery

### Adjuvant Medications

- ▣ Ketamine
  - Epidural ketamine (not FDA approved in the US) superior to epidural ropivacaine in patients undergoing thoracic surgery (Feltracco A and A 2013)
- ▣ Alpha-2 Agonists
  - Dexmedetomidine Metaanalysis (Abdallah A and A 2013)
    - Beneficial when administered intrathecally but not enough data to support its perineural use
  - Clonidine
    - 2mcg/kg v. 1mcg/kg of clonidine when administered as an adjuvant for brachial plexus blocks hastened the onset and prolonged duration of both the sensory and motor block
    - Higher dose did cause more sedation

### Two Content Layout with Table

	Group A	Group B
Class 1	82	85
Class 2	76	88
Class 3	84	90

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- ▣ Third bullet point here

### Two Content Layout with SmartArt

- ▣ First bullet point here
- ▣ Second bullet point here
- ▣ Third bullet point here

The diagram consists of three horizontal bars, each representing a group. Each bar has a blue header and a white body with a dotted pattern. The groups are labeled 'Group A', 'Group B', and 'Group C'. Group A contains 'Task 1' and 'Task 2'. Group B contains 'Task 1' and 'Task 2'. Group C contains 'Task 1'. A decorative graphic of a hand holding a gear is positioned to the left of the bars.

- Task 1
- Task 2

- Task 1
- Task 2

- Task 1