REGional Anesthesia and Acute Pain Medicine Update: CRASH 2015

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"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 2014.
- In discussing this data, utilize evidenced based medicine to potentially implement changes into your daily management of perioperative pain.

Regional Anesthesia
- Combined spinal-epidural possess more reliable positioning, lower epidural replacement rates, and better first stage analgesia compared to traditional epidurals
- Thoracic epidurals remain the gold standard for thoracic and abdominal surgery
- Compared to TAP blocks and IV PCA
- Paravertebrals are a reasonable alternative for thoracic surgery

Peripheral Nerve Blocks
- Difficult to determine the "perfect" volume of local anesthetic required for a nerve block
- Likely somewhere in the range of 5-15mL when done under ultrasound (5 for UE and 10-15 for LE)
- Regional anesthesia for shoulder surgery in the beach chair position is not only safe but superior to general anesthesia
- Adductor Canal Blocks provide superior postoperative quad function

Pain control requires more studies
- Preferred analgesia for total hip arthroplasty remains lumbar plexus blocks, intrathecal morphine, or lumbar epidurals

Review of the 2013 Literature
- Outcomes
  - Neuraxial analgesia showed a decreased incidence of infection and conversion to chronic pain
- Adjuvants
  - Epidural ketamine, intrathecal magnesium, intrathecal dexmedetomidine, intravenous dexamethasone, and perineural clonidine appear to be beneficial adjuvant medications in the treatment of postoperative pain
  - More studies are required prior to increased use of liposomal encapsulated bupivacaine (exparel)
- Safety
  - Ultrasound-guided regional anesthesia was deemed safer than nerve stimulation with regard to local anesthetic systemic toxicity (LAST)
  - With the presence of many new anticoagulants on the market, we must re-evaluate the incidence of epidural hematoma

Disclosure
- I have no disclosures
NEURAXIAL ANESTHESIA

• Thoracic epidural anesthesia (TEA) improved recovery of gastrointestinal function when compared to systemic analgesia (Shi, Acta Anesth Scand, 9/14)

• Literature search of 12 studies and 331 patients

• TEA improved passage of flatus by 31 hours and passage of stool by 24 hours

• More hypotension in TEA group

PERIPHERAL NERVE BLOCKADE

• 50 postoperative TKA patients received either femoral or adductor canal blockade (ACB) with 30mL of 0.2% ropivacaine under ultrasound guidance (Grevstad, RAPM, 1/2015)

• Quad strength: ACB group had a clinically relevant and statistically significant increase in strength compared to femoral

• Pain: pain relief and opioid consumption was comparable between the two groups

• Retrospective chart review done at Ochsner compared femoral to ACB for patients undergoing TKA (Patterson, J Clin Anesth, 11/14)

• No significant differences in pain scores or opioid consumption between the two groups

• Gait distance superior in ACB group

• Patients undergoing total knee arthroplasty received a continuous femoral nerve block v. Continuous adductor canal block (Shah, J of Arthroplasty, 11/14)

• Adductor canal block provided better ambulation and early functional recovery

• Similar post op analgesia

PERIPHERAL NERVE BLOCKADE: IVRA

• 105 patients retrospectively reviewed after undergoing hand surgery with FOREARM bier blockade (Arslanian, Ann Plast Surg, 8/14)

• 25mL of 0.5% lidocaine

• Avg. tourniquet time 10.1 minutes

• Benefits seen such as shorter tourniquet time, less tourniquet pain, less OR time, and less chance of toxicity

• Medline search revealed 31 studies with 1523 patients receiving IVRA

• Good evidence that regional provided safe and effective IVRA with better postop analgesia

• Combination of fentanyl and muscle relaxant can reduce dose of local anesthetic by 50%
PERIPHERAL NERVE BLOCKADE: BREAST/ CHEST WALL
• 120 patients scheduled for unilateral mastectomy under GA randomized to pectoral blocks vs. no pectoral blocks (Bashandy, RAPM 1/2015)
• Opioid consumption, sedation, sedation, and PONV scores statistically lower in pectoral block group.

PERIPHERAL NERVE BLOCKADE: PARAVERTEBRAL
• 48 patients undergoing Right lobectomy randomized to a T7 paravertebral catheter for 24 hours (Chen, RAPM 11/2014)
• 10mL of 0.2% ropivacaine bolus followed by 0.2% @ 6mL/hour versus saline
• 20% reduction in post op opioid consumption
• Reduction in pain at rest and with coughing.

PERIPHERAL NERVE BLOCKADE: DOSE RANGING STUDIES
• ED50 and ED95 of ultrasound guided popliteal sciatic nerve block with 0.5% ropivacaine is 6ml and 16ml respectively (Jeong, Anesth and Int Care 1/2015)
• 90% sensory and motor block of both nerves by 30minutes.

PERIPHERAL NERVE BLOCKS: WOUND INFUSIONS
• 67 patients randomized to saline or 0.4% ropivacaine in a continuous preperitoneal wound infusion for 48 hours post operatively (Fustran, Colorrectal Dis 1/2015)
• 5ml/h for laparotomy and 2ml/h for laparascopy
• 23.5 mg v. 52 mg morphine consumption in rop v. saline groups
• 16 patients had surgical wound infections!!

OUTCOMES: INFECTION
• 7476 patients receiving peripheral nerve blockade at Toronto Western Hospital over 10 years (Alakkad, RAPM 1/2015)
• Low level disinfection technique (chloraprep and iodine), sterile gloves, and tegaderm covering probe were used
• No infections

• 101 patients undergoing thoracotomy with thoracic epidurals had their foley catheters removed on or before postoperative day 2 (Hu, J Cardiothor Vasc Anesth 10, 2014)
• Results were compared with historic controls
• Urinary retention rate was higher (27% v. 12%)
• Urinary tract infection rate was moderately lower (1% v. 3.8%)
OUTCOMES: PATIENT FALLS

- Review of electronic records over 10 years at patients undergoing total knee arthroplasty at Mayo Rochester (Johnson, Anesth Analg 11/2014)
  - 15,189 patients
  - Fall rate of 15.3 per 1000 patients
  - Odds of falling increased with older age (>70) and postop day 1-3 patients
  - Decreased with revision procedures
  - Most falls were elimination (bathroom) falls
  - Full education is essential, especially for high-risk patients

OUTCOMES: BLOCK COMPLICATIONS

- Retrospective look at 27,031 ultrasound guided axillary blocks performed at six French centers from 2009-2012 (Ecoffey, Eur J Anesth, 11/14)
  - Incidence of LAST was 1.5/1000
  - Persistent neurologic deficits were 0.37/1000

OUTCOMES: CANCER RECURRENCE

- Retrospective study looking at 1964 patients undergoing radical prostatectomy under either spinal or general anesthesia (Tseng, RAPM 7/14)
  - No difference in cancer recurrence (tentatively)

ADJUVANTS

ADJUVANTS: ACUPUNCTURE

- 60 patients randomized for total knee arthroplasty to receive real or sham acupuncture for three days (Chen, RAPM 1/2015)
  - Fentanyl consumption, nausea, vomiting, and time to first request nerve block in acupuncture group
  - (30%)

ADJUVANTS: INTRAVENOUS LIDOCAINE

- 71 patients undergoing breast cancer surgery randomized to placebo or IV lidocaine at 1.5mg/kg then 2mg/kg/h (Abdulbaky, RAPM 11/2015)
  - No difference with regard to opioid consumption, pain score, PONV or fatigue
  - IV lidocaine may not be beneficial across all types of surgery

- 47 patients undergoing laparoscopic nephrectomy randomized to receive intra/postoperative lidocaine vs. placebo (laout-Pet, J A Clin Pharm, 7/14)
  - Lidocaine ran at 1.5mg/kg/h for 24 hours
  - Significant reduction in morphine consumption (8 x 2H), pain scores, and hyperalgesia out to post op day 4
  - Time to first flatus (29 vs. 48 hours) and 6 minute walk test better in lidocaine group
ADJUVANTS: PERINEURAL DRUGS

• 150 patients undergoing arthroscopic rotator cuff repair under interscalene brachial plexus block randomized to buprenorphine, tramadol, or no perineural adjuvant (Alemanno, Minerva 11/2014)
  • 150mcg of buprenorphine and 100mg of tramadol
  • Postoperative analgesia longest with buprenorphine > tramadol > no adjuvant

• 64 patients undergoing upper extremity surgeries received supraclavicular brachial plexus blocks with 20mL of 0.75% Ropivacaine with 30mcg of clonidine or placebo
  • No difference in sensory or motor onset of block
  • Postoperative analgesia duration of 956 minutes (clonidine) vs. 736 minutes (placebo)

• Metaanalysis of 29 trials with 1695 participants receiving perineural dexamethasone (Albrecht, Anaesthesia 8/14)
  • Increased duration of short and medium action local anesthetics by a mean of 233 minutes
  • Increased duration of long term local anesthetics by 488 minutes
  • Increased duration of sensory blockade by a mean of 213 minutes
  • Extreme heterogeneity seen

ADJUVANTS: ESOMOL

• 60 patients undergoing septorhinoplasty randomized to esmolol vs. placebo (Cakli, Br J Anaesth 9/14)
  • Esmolol administered with methadone
  • 0.2mg/kg bolus of esmolol followed by 50mcg/kg/min infusion
  • Sensory analgesia and time to first analgesia (42 min. > 128 minutes) were less and significant in esmolol group

ADJUVANTS: GABAPENTIN/PREGABALIN

• 212 patients enrolled in a randomized trial to receive perioperative gabapentin vs. placebo when undergoing total knee arthroplasty (Clarke, Br J Anaesth 11/2014)
  • 600mg preop and 200mg TID post op
  • Also received celecoxib and femoral/sciatic blocks
  • Gabapentin group used less 24 hour morphine (25% reduction) and had improved range of motion
  • No difference in pain or physical function for up to 6 months

• 60 patients undergoing percutaneous nephrolithotomy receiving preoperative single dose pregabalin vs. placebo (Aydogan, Revista Brasileira De Anesth, 10/14)
  • Postoperative pain scores were significantly lower for the first two hours
  • Postoperative morphine consumption was significantly lower for 24 hours

• 90 patients undergoing gynecological surgery under spinal randomized to receive placebo, 600mg of gabapentin, or 150mg of pregabalin one hour before surgery (Bafna, J Clin Pharmac, 1/14)
  • Group C (pregabalin) had longest duration (330min) compared to group B (131 min.) and group A (200min)

SUMMARY

REFERENCES