A Neonate with multiple congenital anomalies for thoracotomy: Risks and benefits of multi-modal analgesia in the youngest patients.

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Goals:
Discuss multi-modal analgesia for neonates/infants with respect to:
Regional Anesthesia
Opioids
NSAIDs
Non-opioid

Case stem:

A 2 week old, 40 week gestational age, 3.2 kg male, presents with increasing tachypnea due to prenatally diagnosed large, right sided congenital pulmonary airway malformation. The surgeon plans a right thoracotomy with mass excision and possible lobectomy. The child's medical history includes VACTERL association. The neonatology attending consults you for postoperative pain management.

Would regional anesthesia be an option in this case? Are there limitations because of the child's age? What are possible ways to approach the epidural space? Would a caudal single shot be an option? What about spinal analgesia? What physical conditions in the child or clinical conditions would be contraindications to regional anesthesia? What preoperative evaluation would you like to have completed before performing regional anesthesia?

Clinical case continues:
The anesthesiologist threads a caudally inserted epidural until the tip is confirmed between thoracic levels 5 and 6. The intraoperative anesthesiologist bolused ropivacaine 0.2% 1.5 mL before extubating the child in the operating room. In the NICU, the child is uncomfortable with a pain score of 5/10 by the CRIES pain scale.

How can the epidural tip position be confirmed? What epidural infusion would you run for postoperative pain management? Would there be any additives like fentanyl, morphine or clonidine? Are there differences in the risks of amide vs ester local anesthetics? How would you manage intermittent breakthrough pain? Would your management strategy change if the child required emergent re-intubation 4 hours postoperatively?

Clinical case continues:

On the night of POD #0, the patient spikes a temperature to 38.1 degrees, which is treated with intravenous Tylenol. When the epidural insertion site is inspected, you notice the dressing is loose and there is erythema at the insertion. The catheter has migrated 6 cm out from the intraoperative placement measurement of 16 cm at the skin. The infant has required frequent intravenous rescue medication overnight due to observed pain scores ranging from 3-6/10. He has not tolerated any oral intake.

What options exist for pain management now? Would a continuous infusion of opioids be a better option over nurse or parent controlled analgesia (NCA)? Are NSAIDs are an option in this patient age group?

Clinical case CHANGE:
Another 2 week old comes to the operating room for the right thoracotomy and mass excision after having been in the NICU since birth. He has needed escalating ventilatory support and was intubated 48 hours prior to arrival in the operating room and was administered sedation by morphine and midazolam continuous infusions. He has undergone multiple painful procedures. His parents tell you he has "a high tolerance to pain".

Is regional anesthesia still an option? If you continue the infusions, how much do increase each medication? How often do you evaluate for pain? If the pain scores escalate despite increasing the opioid infusion and rescues opioids for break though pain, what are other strategies to employ for pain management? Can ketamine be considered for pain management in neonates?

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