

## **PBLD - Table #39**

### **Low-dose ketamine as a part of a multi-modal pain strategy for a neonatal CDH repair while on ECMO**

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#### **Objectives:**

Discuss the recognition and treatment of pain in neonates using a multi-modal strategy.

Discuss the recognition and management of agitation in neonates and the strategies to use for management of agitation.

Discuss the pharmacokinetics of opioids and analgesics in neonates and understand how ECMO alters the pharmacokinetics.

#### **Case History:**

A 28 day old, full-term 38 week gestation, male with a prenatally diagnosed left sided, large congenital diaphragmatic hernia (CDH) has been on extra-corporeal membrane oxygenation (ECMO) since DOL #5. He presents for left CDH repair.

How will you proceed with this case? What preoperative history and evaluation(s) are most important to guide intraoperative anesthetic management? How does ECMO affect your management? How would you manage his pain postoperatively? How does preoperative pain management affect your postoperative pain management strategies? Does the use of ECMO change any pain management modalities?

#### **Case History and Physical:**

He is on VA ECMO (right internal jugular vein and right internal carotid artery) for systemic hypotension, pulmonary hypertension, and oxygenation. He is intubated and ventilated on minimal settings in order to maintain physiologic PEEP. He undergoes left CDH repair with silo placement due to inability to close the abdomen due to limited domain. The operation proceeded uneventfully in the NICU. A left sided chest tube was placed intraoperatively due to pneumothorax. Postoperatively, the NICU calls 4 hours after the surgical procedure and mentions that they have had to double his midazolam infusion and the morphine infusion because he is "in more pain"

How do you recognize his pain? Is a physiologic or behavioral based scale more appropriate? Or both? What is your endpoint for pain management? How would you manage his pain now? What additional strategies would you suggest if the initial changes do not control his pain/agitation?

**Case continued**

Overnight, the morphine infusion is increased by 50 % every 4 hours until he is given 200 mcg/kg/hr. The NICU attending starts Phenobarbital every 4 hours as needed for agitation. The NICU asks for additional recommendations for pain and sedation.

What else is there to do? In light of rapidly increasing opioid requirements without apparent benefit, what other classes of medications or different modalities can be employed? Clinically, what could be happening with this neonate? What are the risks of ketamine in neonates? What are the benefits? Would you start ketamine in this child?

Five days later, the baby is scheduled for wound closure and PICC placement while on ECMO.

How would you handle this anesthesia and postoperative pain management? Does low-dose ketamine infusion affect your anesthetic plan? If further interventions are planned (bronchoscopy, pig-tail for thoracocentesis, bilateral hernia repair), does his opioid and pain history change your management for postop pain? When would it stop being an issue if it was an issue?

## References:

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