

## Journal Club Synopsis

16 April 2013

Discussion Leader: technically it was supposed to be Michael Mack DO

Host (and most of the discussion leader): Roy Johnson MD

Is it safe and effective to take the acutely traumatized patient with a traumatic brain injury shopping at K-mart?

OR

Is ketamine a safe and effective drug for pain control in an acutely traumatized patient?

### Clinical Scenario:

You are working in your tertiary care facility when you receive a 24 year-old male s/p an explosion at the local power plant. He suffered traumatic amputation of both lower extremities and evidence of a right-sided pulmonary contusion as well as a TBI. He is in severe pain. VS: 90/40, 130, 28, 98F. You want to control his pain, but you're concerned about his hypotension. You've heard about dropping him into the K-hole, and would like to know if that is safe and effective in a patient with hypotension and TBI.

### Introduction:

There is a lot of anxiety and apprehension when a patient arrives acutely traumatized, hypotensive, and in severe pain. We want to care for their pain adequately without worsening their hypotension. What drug to use? Most reach for fentanyl. But, is there another option? Is there a better option? Many have heard of ketamine, some have even used it. However, just as there is anxiety and apprehension for the acutely traumatized patient, so too is there anxiety and apprehension at the thought of ketamine. There is a concern for a reemergence reaction, possible hypertension, and questionable increase in ICP.

### Article 1:

Ketamine does not increase cerebral blood flow velocity or intracranial pressure during isoflurane/nitrous oxide anesthesia in patients undergoing craniotomy; Mayberg, Teresa, et al.; *Anesth Analg* 1995;81:84-89.

This was a prospective experimental study that took 20 patients undergoing craniotomy for brain tumor or cerebral aneurysm. The subjects were induced with thiopental and anesthesia was maintained with isoflurane and nitrous oxide in oxygen. Ketamine then was administered and MAP, CPP, ICP, and middle cerebral artery blood flow velocity were measured. MAP, CPP, AVDO<sub>2</sub> were unchanged and ICP decreased.

### Article 2:

Prehospital use of ketamine in pediatric trauma; Bredmose, P.P. et al.; Acta Anaesthesiol Scand; 2009;53: 543:545.

This is a retrospective database review identifying all pediatric patients <16 years of age who were administered ketamine prehospital by a physician-paramedic staffed helicopter service between 01 May, 1999 and 30 Nov, 2004. Their SOP was co-administration of midazolam. The dominant MOI was traffic accident. There were no documented cases requiring use of basic airway maneuvers. Thirty one of the patients were under the age of 3, the youngest being 3 months. There were no documented cases of oxygen desaturation in this group. There were no clinically significant episodes of reemergence reactions

Article 3:

Morphine and Ketamine is superior to morphine alone for out of hospital trauma analgesia: A randomized control trial; Jennings, Paul, et al.; Annals of Emergency Medicine; Vol. 59, NO.6: June 2012; 497:503.

This, as the title suggests, was an out of hospital randomized controlled open-labeled trial of trauma patients with moderate to severe pain despite an initial dose of 5 mg of morphine IV. Patients were randomized to receive further doses of morphine or ketamine. The ketamine group required less morphine for pain control and reached clinically significant pain reduction in less time.

Discussion:

My lit search yielded a paucity of literature in general and an even greater paucity of good literature. The first study I chose because of the general fear of using ketamine in patients with a concern for increased ICP. While the patients in this study are NOT our patient population the results did demonstrate that in a group of extremely standardized patients there was no increase in ICP with ketamine administration. The second study showed one group's extensive use, efficacy, and safety of ketamine in acutely traumatized pediatric patients in the out of hospital setting. The last study showed the effectiveness of ketamine as an adjunct to morphine in acutely traumatized patients.

The group discussed the overall poor quality of all these studies. The third study seemed to be the best quality, but represented a generalized "duh" statement. However, I think we can agree that while this seems to be a no-brainer, it officially puts into the literature the effectiveness of ketamine, which is a start. The pediatric study was only a retrospective database review and can only help to develop a theory and not actually answer a question. However, it does show successful, effective, safe use of ketamine in our patient population

We all agree there is a lack of literature and even more so a lack of good literature on the use of ketamine. The plus side is that this allows bright young minds, like those of my colleagues, to perform such studies and answer these questions for me.

Bottom Line:

We feel ketamine is likely safe and effective for pain control. It's a great "If you can have one medication on a desert island?" medication, because it can be used for sedation and pain control, or recreationally (since you are on a desert island). There is still some concern as to the safety in TBI. There is a lot of room for great research to be done. Our Headmaster and professors Wightman and Johnson feel we each need to decide if we are going to use the drug. If so, start using it, and start building our personal mental database of appropriate patients that will benefit from this medication. It will likely improve my overall spinal manipulation practice as it will finally allow patients to relax and let me move their body parts for them. Just since this Journal Club I have used it 3 times at Good Samaritan.

Thank you all for your participation, and, as always, expelli-embulus. Make sure the wand makes the full clockwise 360 degree rotation at the wrist with the finishing wrist snap forward at the end.

Michael Mack "The DO"