Whadayamean Ketamine?
Frightening Cases in the Emergency Department
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Case 1 Agitated Hypoxic Patient

- 62 year old arrives by ambulance hx of COPD in extreme respiratory distress
- Respirations 30, Retractions, SaO2 72%, BP 160/100 agitated, pulling oxygen mask off. Pulse unknown appears tachycardic
- IV established. Cannot keep ECG leads on pt.
- This patient is going to die if you don’t do something
Case 1 Agitated Hypoxic Patient

What do you do?
Delayed Sequence Intubation

- Sedation for the purpose of pre-oxygenation
- Use positive pressure ventilation
  - Due to shunt physiology, recruits collapsed alveoli
  - Use PEEP of 5-15 mm
  - CPAP, BiPAP or BVM with disposable PEEP valve
  - Bag slowly at 6-7 ml/kg over 1-2 seconds
- Apneic oxygenation: 15 l by nasal cannula
Delayed Sequence Intubation
Delayed Sequence Intubation

Source: Scott Weingart, in emcrit.org

Scott Weingart, MD, Annals of EM, March 2012
Case 1 Continued

- Patient given 1.5 mg/kg ketamine and placed on BiPap
- Patient became manageable. SaO2 brought up to 96% on BiPap at 100%
- Preparations made for RSI with backup plan
- Patient given succinylcholine and left on Bipap until apnea
- Apneic oxygenation initiated at 15 LPM by NC
- Intubated uneventfully *without* hypoxemia
- Placement confirmed
Ketamine Properties

- **Unique Sedative with dissociative properties**
- **The good:**
  - Excellent sedation and analgesia
  - *Maintains Airway reflexes*
  - Very low risk of hypotension (unlike other sedatives)
  - Extensive experience world-wide
- **The bad:**
  - Potential for larygospasm (rare, 0.3%)
  - Hypertension and tachycardia may be a problem with vascular disease or uncontrolled hypertension
  - Emergence Reactions (can be frightening)
  - Vomiting
Ketamine--Contraindications

- Contraindications
  - Age less than 3 months
  - Hydrocephalus or mass lesion
  - Acute globe injury or glaucoma
  - Schizophrenia

- Cautions
  - Porphyria
  - Hyperthyroid state
  - Coronary artery disease (no data)
  - Hypertension
Ketamine – Adverse Reactions

- Respiratory depression if given too rapidly (give over 30-60 seconds) 0.8%
- Emesis (during recovery) 8.4%
- Hypersalivation
- Laryngospasm (0.3%)
- Recovery Agitation (especially adults)
- Muscular hypertonicity
- Clonus
- Non-allergic rash to face and neck
Case 2 Hypotensive Trauma

- 26 Year Old male crashes his motorcycle into a bridge abutment
- Patient combative, agitated, Hypoxemic
- BP 60/p Pulse 140 Respirations Screaming
- How do you manage this patient?
Ketamine and ICP

- Traditional Dogma based upon old case reports suggested Ketamine adversely affected ICP.
- Recent Systematic Review of 10 trials including 953 patients showed no adverse effects upon Cerebral Perfusion Pressure or neurologic outcomes (Cohen, *Annals of Emergency Medicine*, January 2015).
- Hypotension is not good for Cerebral Perfusion.
Case 2 Hypotensive Trauma

- Patient undergoes RSI with succinylcholine and Ketamine
- Fluid resuscitation and blood is administered
- Patient stabilized for the OR
Why Ketamine?

- Safe Dissociative Anesthetic permits performance of painful procedures without impairing respirations or airway refluxes.
- Personal experience in Mexico with major abdominal surgery with Ketamine and diazepam only.
- Commonly used in 3rd world countries for major surgery where there is no anesthesiologist.
- Least likely to cause hypotension in the hemodynamically unstable patient.
- Side effects are all manageable: vomiting, emergence reactions, laryngospasm.
Case 3 Post-operative Patient

- Called to a “Code Blue” to find a middle-aged post-operative patient sitting bolt upright, holding his neck, cyanotic and extremely agitated
- RN history states just came out of OR after neck surgery and suddenly couldn’t breath?
- Patient is not moving air
- SaO2 can’t be measured due to agitation
- What do you do now? If you don’t do something quickly patient is dead
Case 3: Post-operative Patient

What do you do?
Case 3 Post-operative Patient

- Patient given 1.5mg/kg ketamine. This did not impair respiratory effort
- An attempt at BVM produced very little airflow
- An attempt at ETI produced inability to pass tube with Glidescope
- Cricothyrotomy performed and Trach tube placed
- Patient became oxygenated and placed on fentanyl drip en-route to the OR
- Patient discharged a few days later neurologically intact
Other Uses for Ketamine in the Emergency Department

- Caution: There is a paucity of research on these topics.
- Sedation of the Violent or Agitated Patient: Small studies show safe sedation with 4 mg/kg IM
- Analgesia as adjunct to opioid administration: Low dose (sub-dissociative doses) 0.1-.05 mg/kg IV
- Many routes of administration, including IV, IM, intranasal.
Questions?
Ketamine References

- Essentials of Emergency Medicine Course, SFO, Nov 2014
- http://emcrit.org/podcasts/dsi/
- Scheppke et al, Prehospital Use of IM Ketamine for Sedation of Violent and Agitated Patient, Western J. Emergency Medicine, November 2014
- Cohen et al, “Effect of Ketamine on Intracranial and Cerebral Perfusion Pressure and Health Outcomes” Annals EM, Jan 2015