Pearls and Pitfalls in Managing the Agitated Trauma Patient

Christopher B. Colwell, M.D.

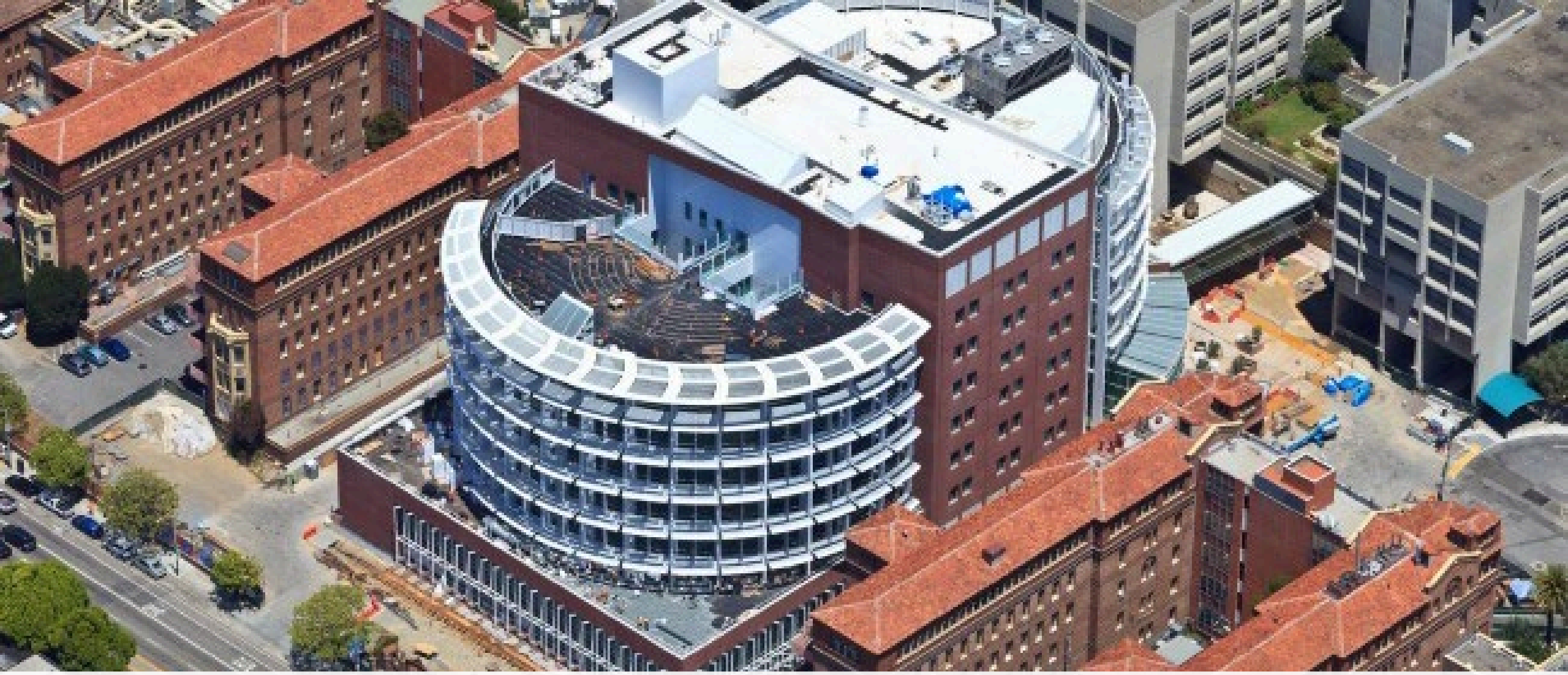
Department of Emergency Medicine

San Francisco General Hospital and Trauma Center

UCSF School of Medicine

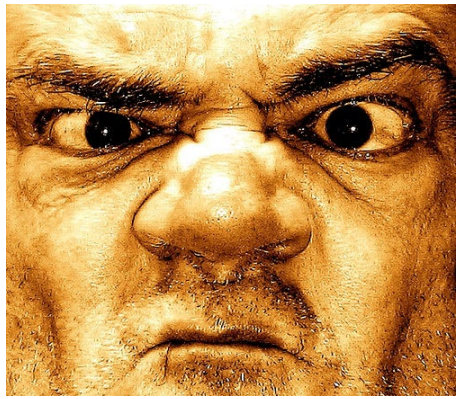
Disclosures

I have no financial disclosures to report



Level I Agitation Center!

Why agitated?



The Agitated Trauma Patient

- Decisions
  - Capacity?
    - If no
      - Sedate?
        - If sedation is needed
          - What to use?

Case #1

- 58 year old male RD in head-on MVA with two others transported from the scene
  - Moderate damage
  - EtOH on board
    - No slurred speech
    - Nystagmus
  - Refusing all care and demanding to speak to his lawyer
  - BP 132/90, HR 138, RR 22, Pulse Ox 98%

Case #1 - Continued

- Wife demands transfer to “real” trauma center
- Two adult children demand that you let him go
- Who decides?
  - Patient
  - Wife
  - Kids
  - Insurance carrier
  - Court
  - You
- Police are asking questions
  - “Hey Doc…..do I need to do a blood draw?”

Medical Issues

- Most important!
- Must consider
  - Head trauma
  - Hypoglycemia
  - Hypoxia

Head Trauma, Alcohol, or Both?

- Combative patient may be
  - Head injured
  - Intoxicated
  - Bad disposition
    - Combination of all 3
- When the patient is annoying you…
- In this case
  - Glucose – 134
  - Pulse ox – 98%

Legal Issues

- Who decides?
  - You do
    - “Reasonable person” standard
      - Courts have supported providers

Legal Issues

- Consent/Refusal of Care
  - Determination of medical decision-making capacity
  - Impact of substance use on the ability to consent or refuse care
  - Impact of alcohol levels/toxicology screens

Elements of Decision Making

- Is the patient able to
  - Understand the options presented and their associated risks and benefits?
  - Make a choice using a consistent set of values and goals?
  - Communicate their choice?
  - Make a decision specific to this problem and this treatment?

Assessing Capacity

- Does the patient understand
  - The problem at hand?
  - Proposed treatment?
  - Alternatives?
  - Consequences?
  - Influences on their decision?
- Clinical determination
  - Not based on a number

Mental Illness

- The mere presence of mental illness does not necessarily preclude a patient from having the right to participate in their care
- Our responsibility
  - Protect the patient and the public from harm
  - Respect patient's autonomy

Confidentiality

- Federal law
  - Health Insurance Portability and Accountability Act (HIPAA)
    - 1996
  - You can get and give information necessary to take care of your patient
    - Police requests?

Documentation

- Consent/refusal of care
- Restraint
- Tell a story
  - If abusive/uncooperative
- Control yourself
  - Don’t react
  - Don’t speculate
- Accurate
  - Macros
    - Template documentation
- “The chart should tell a story that can only have one ending”

Take Home Points

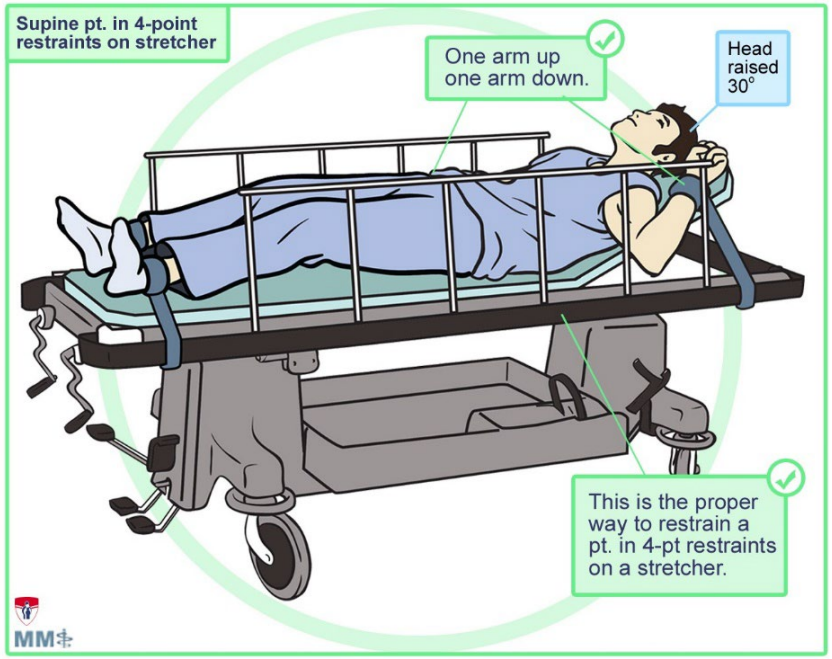
- Freedom to make bad decisions
  - As long as they have capacity
- Cannot be allowed to harm themselves
- Cannot be allowed to harm others
- Presence of alcohol or drugs does not determine capacity
- Duty to patient and duty to others
  - Staff
  - Other patients
  - Public
- What would you rather defend?

Case # 2

- 32 year old male assaulted by “3 dudes” at a bar
  - Verbally and physically abusive to staff in the ED
    - Threatening everyone and demanding to leave
    - Screaming at staff and other patients
  - 150/100 118 24
  - No obvious abnormalities on exam

Restraints

- Why
  - Medical versus behavioral
    - Code of Federal Regulations (CFR) 482.13
- How
  - Supine
    - Not prone
    - Four or five-point
      - Not two
        - No partial restraint
    - Bed frame
      - Not railing



ACEP Task Force

- White paper on “Excited Delirium”
  - September, 2009
    - “May be amenable to early therapeutic intervention in some cases in the pre-mortem state”
    - “Physical restraints should be rapidly supplemented with chemical restraints…”
  - Hyperactive delirium with severe agitation in emergency settings
    - June, 2021
      - Ketamine, droperidol, olanzapine, midazolam

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Extreme Agitation

- Medical emergency
  - Just like
    - STEMI
    - Stroke
- Pathophysiology
  - Profound metabolic acidosis
  - Unchecked catecholamine surge
  - Our job
    - Interrupt the downward spiral

Chemical Restraint

- Options
  - Benzodiazepines
    - Midazolam
  - Anti-psychotics
    - Droperidol
    - Haloperidol
  - Atypical anti-psychotics
    - Olanzapine
  - Dissociatives
    - Ketamine

Chemical Restraint

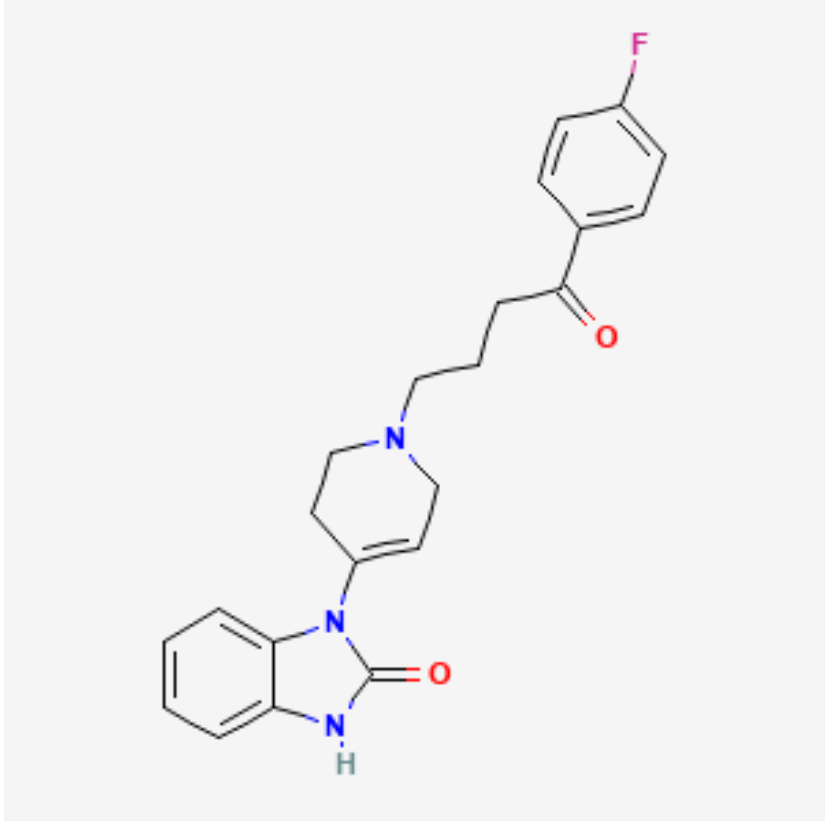
- Benzodiazepines work
  - Particularly for cocaine/methamphetamines
  - Midazolam
    - 0.05 to 0.1 mg/kg IV/IM
      - Typical dose 2-8 mg
  - Diazepam
    - 0.2 – 0.5 mg IV/IM
      - Typical dose 5-10 mg
  - Lorazepam
    - 0.1 – 0.3 mg/kg IV/IM
      - Typical dose 2-5 mg
  - Careful when combined with alcohol
    - Knott et al, Ann Emerg Med 2006

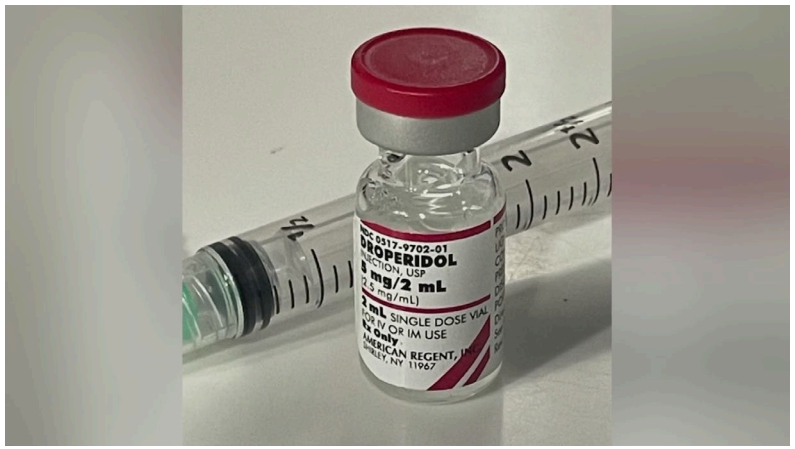
Chemical Restraint

- Droperidol (Inapsine)
  - Butyrophenone
  - Binds to GABA and dopamine receptors
  - Dose
    - 2.5 – 10 mg IV/IM
  - Cardiovascular effects
    - QTc prolongation (<1%)
    - TdP (<1%)
      - Dose dependent risks
  - Anti-emetic

Droperidol

- Safe
  - Chase PB, Biros MH, Acad Emerg Med 2002
  - Richards JR et al, J Emerg Med 1998
  - Szuba et al, J Clin Psychiatr 1992
  - Watcha M, Anesthesiol Clin North Am, 2002
  - Silverstein JH et al, Anesthesiology, 2002
  - Cohen J et al, Gastrointest Endosc, 2000
  - Magee LA et al, Am J Obstet Gynecol 2002





Droperidol

- Safe and effective in the treatment of agitation
  - Perkins et al
    - AAEM position paper
      - J Emerg Med, 2015
- Longest latency period from initial FDA approval to black box warning
- No clinical trial or systematic review has reported any adverse cardiac events

Chemical Restraint

- Haloperidol (Haldol)
  - Butryophenone
  - Blocks post-synaptic mesolimbic dopaminergic D1 and D2 receptors in the brain
  - Dose
    - 5 mg IV/IM

Chemical Restraint

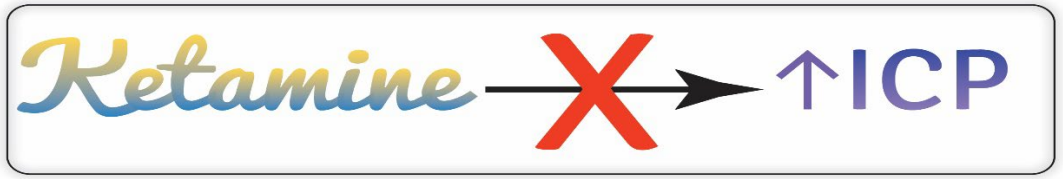
- Ketamine
  - First-line agent for severely agitated ED patients
    - Riddell et al
      - Am J Emerg Med, 2017
    - Lin et al
      - Am J Emerg Med, 2020
  - Safe and effective in the field
    - Burnett et al
      - Prehosp Emerg Care, 2012
    - Cole et al
      - Clin Toxicol, 2016

Increased ICP?

- Evaluated the available evidence on the effects of ketamine on intracranial and cerebral perfusion pressures
  - Cohen at al
    - Ann Emerg Med, 2014

Increased ICP?

- Conclusions
  - No adverse effect on
    - ICP
    - CPP
    - Neurologic outcome
    - ICU stay
    - Mortality



Ketamine in Head Injury

- No increase in ICP
- Improved CPP
  - CPP = MAP – ICP
- Possibly
  - Neuro-protective
  - Neuro-regenerative
- Safe in head injury
  - Himmelseher et al
    - Anesth and Analg, 2005
  - Torres et al
    - Cureus, 2020

The Ketamine Effect on ICP in Traumatic Brain Injury

F. A. Zeiler · J. Teitelbaum · M. West · L. M. Gillman

Published online: 11 February 2014

Abstract Our goal was to perform a systematic review of the literature on the use of ketamine in traumatic brain injury (TBI) and its effects on intracranial pressure (ICP). All articles from MEDLINE, BIOSIS, EMBASE, Global Health, HealthStar, Scopus, Cochrane Library, the International Clinical Trials Registry Platform (inception to November 2013), reference lists of relevant articles, and gray literature were searched. Two reviewers independently identified all manuscripts pertaining to the administration of ketamine in human TBI patients that recorded effects on ICP. Secondary outcomes of effect on cerebral perfusion pressure, mean arterial pressure, patient outcome, and adverse effects were recorded. Two reviewers independently extracted data including population characteristics and treatment characteristics. The strength of evidence was adjudicated using both the Oxford and GRADE methodology. Our search strategy produced a total 371 citations. Seven articles, six manuscripts and one meeting proceeding, were considered for the review with all utilizing ketamine, while documenting ICP in severe TBI patients. All studies were prospective studies. Five and two studies pertained to adults and pediatrics, respectively. Across all studies, of the 101 adult and 55 pediatric patients described, ICP did not increase in any of the studies during ketamine administration. Three studies reported a significant decrease in ICP with ketamine bolus. Cerebral perfusion pressure and mean blood pressure increased in two studies, leading to a decrease in vasopressors in one. No significant adverse events related to ketamine were recorded in any of the studies. Outcome data were poorly documented. There currently exists Oxford level 2b, GRADE C evidence to support that ketamine does not increase ICP in severe TBI patients that are sedated and ventilated, and in fact may lower it in selected cases.

Keywords Ketamine · ICP · Traumatic brain injury

Introduction

Ketamine's use as a dissociative anesthetic agent has afforded its application in a variety of instances where the side effect profile of standard anesthetics has negated their use [1, 2]. The quick action and lack of significant hemodynamic derangements with ketamine make it attractive as

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F. A. Zeiler (✉) · M. West
Section of Neurosurgery, Department of Surgery, University of Manitoba, Winnipeg, MB, Canada
e-mail: umzeiler@cc.umanitoba.ca

F. A. Zeiler · J. Teitelbaum
Section of Neurocritical Care, Montreal Neurological Institute, McGill University, Montreal, QC, Canada

J. Teitelbaum
Section of Neurology, Montreal Neurological Institute, McGill University, Montreal, QC, Canada

L. M. Gillman
Section of Critical Care Medicine, Department of Medicine, University of Manitoba, Winnipeg, MB, Canada

L. M. Gillman

Head Injury

- Greatest predictors of bad outcome
  - Hypotension
  - Hypoxia

Head Injured Trauma Patient

- Intoxicated
- Combative
- Uncooperative
- Non-compliant
  - Spinal immobilization
- End-result
  - Raised ICP
  - Risk of spinal injury
  - Risk to providers

Head Injury

- Benzodiazepines
  - Drop MAP
  - Decrease respiratory drive
    - Especially with high levels of alcohol!
      - Knott et al, Ann Emerg Med 2006
- Ketamine
  - Increases MAP
    - Weak sympathomimetic
  - No decrease in respiratory drive

Ketamine in Trauma

- Ketamine use in prehospital and hospital treatment of the acute trauma patient: a joint position statement
  - Morgan et al
    - Prehosp Emerg Care, 2020
  - ACEP, ACS-COT, NAEMSP, NASEMSO, NAEMT consensus statement
  - Endorsed by AAST, EAST, WTA, PTS, ASHP, ACCP

Ketamine in Trauma

- Consensus statement
  - Indications
    - Analgesia
      - Alone or with opioids
    - Procedural sedation
    - Intubation
    - Acute agitation/excited delirium
  - Safe and effective
    - TBI
      - Minimal effect on ICP
      - No effect on CPP or neurologic outcomes
    - Eye injuries
      - No clinically significant effect on IOP

Ketamine in Trauma

- Dosing
  - Analgesia
    - 0.1-0.3 mg/kg IV
      - 0.5-1 mg/kg IN
  - Procedural Sedation
    - 1 mg/kg IV
      - Max – 100 mg
  - Induction/RSI
    - 2 mg/kg IV
  - Acute agitation
    - 3-5 mg/kg IM
    - 1-2 mg/kg IV

Dexmedetomidine

- PRECEDEX
- Dose
  - 0.6-0.7 ug/kg/hr
    - No bolus
    - Onset in 5-10 minutes
    - Off 15 minutes after stopping
      - Bring to CT and stop as you start the CT scan

Medpage Today

Dozens of Deaths Show Risks of Injecting Sedatives Into People Restrained by Police

- The practice has spread but is built on questionable science
  - Associated Press April 27, 2024

Summary

- Extreme agitation is a medical emergency
- Have a management plan
  - Methamphetamines/cocaine
    - Benzodiazepines
  - Alcohol/psychiatric/undifferentiated
    - Droperidol
      - Haldol
  - Extreme agitation
    - Ketamine is safe and effective in trauma patients
      - Dexmedetomidine is another alternative

Comments, thoughts, frustrations…..

- My E-mail:
  - Christopher.Colwell@ucsf.edu