

Prehospital Management of Severe Agitation

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Who I am, what I do

- EM Physician at Harborview
- First graduate of UW EMS Fellowship
- Medical Director for AMR in King and Snohomish County
- Assistant Medical Director for Seattle Fire

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Objectives

- Describe the spectrum of presentation of patients with agitation
- Describe the ideal treatment of the agitated patient
- Understand the pharmacology and side effects of treatments for agitation

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A Case....

- May Day
- Cal Anderson Park
- Dispatch - "Mid 30s male on the basketball court..."

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Case Example

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What is this?

- Is this excited delirium syndrome?
- Is this an agitated patient?
- Syndrome – (n) a collection of signs and symptoms without a known cause

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Excited Delirium Syndrome

- Features:
 - Delirium
 - Psychomotor agitation
 - Hallucinations
 - Speech disturbances
 - Disorientation
 - Violent and bizarre behavior
 - Insensitivity to pain
 - Superhuman strength
 - Hyperthermia
 - Inappropriate clothing




**EXCITED
DELIRIUM**

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Agitation

- Agitation is a spectrum



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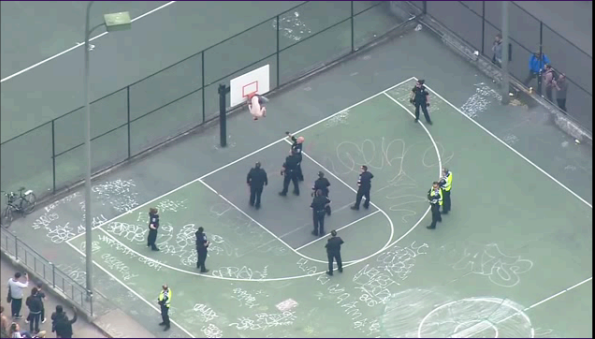
Excited Delirium



- Excited delirium is defined by death
- Ultimate end stage of agitation
- Felt to represent 3 syndromes
 - Acute exhaustive mania (Bell's Mania) - 1849
 - Excited delirium due to psychostimulants
 - Neuroleptic Malignant Syndrome (the attenuated variant)

Wetli 2005
Exciteddelirium.org

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The Traditional Seattle Approach



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The Seattle 2000's approach

- Chemical Sedation
- 42 year old male jumps off balcony
- On arrival of EMS, obvious tib / fib fracture that patient is walking on

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The Seattle 2000's approach (cont)

- Required EMTs, medics, and police to hold down
- Administered IM then IV benzodiazepines
 - Total 10 mg lorazepam and 30mg midazolam
- **Apnea!**
- Unable to intubate
 - 4 attempts (student, medic, medic, other medic)
- iGel LMA placed
- In ED, lit the tox screen up like a Christmas Tree!

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Sentinel Case

- Case review led to evaluation of other treatment strategies
- What is the optimal treatment of severe agitation?
 - Assume verbal de-escalation and physical restraints have already failed

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Ideal Agent Characteristics

- Sedative
- No effect on HR, BP, RR
- Blow dart (IM administration will have to do)
- Rapid, predictable response
- Appropriate duration of effect
- Minimal side effect profile

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What is Ketamine?

- Dissociative anesthetic
- Invented in 1962
- FDA approved in 1970
- Used often in wartime
 - Vietnam
 - Iraq / Afghanistan



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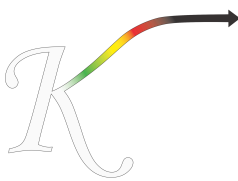
Ketamine - Function

- Blocks the NMDA receptor
 - Decreases sensory association areas of the cortex and limbic system
- Blocking the limbic system stops peripheral sensory signals from being integrated into memory
- Pt on ketamine is unable to process peripheral pain or form a memory
 - Completely unaware of the outside world

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Ketamine

- Most used anesthetic in the world
 - WHO list of essential medicines
- ICP concerns are totally debunked
- Low doses = pain control (0.1 mg/kg IV)
- Moderate doses = variable dose response
- Full dose = Dissociation (1 mg/kg IV, 5 mg/kg IM)




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Ketamine and Time

- IM onset is 2-3 minutes
- Duration of action given IM is ~30 minutes
- No expected respiratory depression
 - Underlying toxic ingestions!
- Can see laryngospasm, salivation
 - Uncommon and temporary

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Treatment Strategies

- Sedating
- Rapid Response
- Predictable
- Intramuscular
- Few side effects
- Cheap!

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Quality Improvement Study

- Began tracking patients in 2014
- Used benzos only
- In 2015, rolled out ketamine as an additional tool for severe agitation

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Indications for Ketamine

- Signs of severe agitation
- More than 2 police officers holding the patient down



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Ketamine Protocol

- Ketamine IM 5 mg/kg
- Initially thought 300 mg IM max dose
- Changed to 500mg IM max dose with anecdotally good results

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Case Identification

- Medical Director reads each case
- Cases with severe agitation or Excited Delirium were identified by physician review
- Data abstracted from EMS and hospital chart

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Case Counts

Prehospital treatment recieved	N	Percent of total cases
Benzo Only	96	54%
Benzo and Ketamine	26	15%
Ketamine Only	38	21%
No Medication given	17	10%
Total	177	

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Baseline Variables - Seattle

	Benz	Benz + K	K	No Meds	Total (missing %)	P Value
GCS avg	11.6 (2.7)	11 (2.7)	11.2 (3.2)	12.2 (3.0)	176 / 177 (0.6%)	0.537
Initial HR	130 (29)	120 (25)	130 (23)	132 (24)	174 / 177 (1.7%)	0.320
Initial SBP	148 (36)	157 (31)	157 (32)	150 (27)	158 / 177 (10.7%)	0.499
Initial RR	24 (10)	25 (8.5)	21 (6.9)	22 (8.8)	169 / 177 (4.5%)	0.072
Age	33.1 (10)	36.7 (10)	30.1 (14)	34.5 (11)	172/177 (2.8%)	0.096
Male	91.3%	84.6%	76.3%	88.2%	173/177 (2.3%)	0.148

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Side Effects – Seattle Experience

- Patients treated to cessation of agitation or hospital arrival
- No emergence reactions noted
- No laryngospasm noted
- No prehospital deaths

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Side Effects – Seattle Experience

Prehospital Airway Management – Endotracheal Intubation

Benzos Only

14 / 96
14.6%

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Lessons Learned

- Patients disassociated on ketamine look *different*
 - GCS "3K"
 - Education required for both EMS and ED staff
- Early signal of benefit to a ketamine only strategy

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Severe Agitation Takeaways

- Intervene early to prevent Excited Delirium Syndrome
- Ketamine may represent best available agent
 - Few side effects, reliable IM dosing and response
- Education, education, education!

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Ketamine patient



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Questions?

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