Pharmacological Solutions for Chemical Restraints

Hale Borealis Conference
Stephen J. Parker, M.D.
Objectives

- Explore the complex legal, ethical and clinical issues regarding use of pharmacological restraint which requires careful consideration by a medical provider
  - When chemical restraint is indicated
  - Agitated Delirium/ ExDS
  - Process of restraint
  - Choice of medication
  - Complications of chemical restraint
Case 1

- The Physiognomy and articulation are rather those of fever and delirium
- Hands and tongue are tremulous, pupils either contracted or dilated...without intolerance of light.
- Expression is anxious
- Attacking any one who approaches him, with a blind fury. If held, he will struggle with the utmost desperation, irrespective of the number or strength of those who may be endeavoring to restrain him.
- No disposition to yield to an overpowering force.
- The pulse is small and rapid.
AMERICAN
JOURNAL OF INSANITY,

FOR OCTOBER, 1849.

---0||0---

ARTICLE I.

On a Form of Disease resembling some advanced stages of mania and fever, but so contrariwise distinguished from any ordinaril observed or described combination of symptoms, as to render it probable that it may be an overlooked and hitherto unrecorded malady: by Luther V. Bell, M. D., Physician and Superintendent of the McLean Asylum for the Insane, Somerville, Mass.
Case 2

- 35-year-old, 103-kilogram white man was exhibiting bizarre behavior in an urban alley.
- exhibited agitation, vocal perseveration, partial nudity, and incoherence
- remarkably strong and did not react to manual pain compliance-control techniques
- eight LEOs attempting to restrain an extremity, the head, or the buttocks, but instead being easily tossed around despite their advantageous numbers, training, equipment, and positioning
Case Conference

Successful Management of Excited Delirium Syndrome with Prehospital Ketamine: Two Case Examples

Jeffrey D. Ho, MD, Stephen W. Smith, MD, Paul C. Nystrom, MD, Donald M. Dawes, MD, Benjamin S. Orozco, MD, Jon B. Cole, MD, William G. Heegaard, MD, MPH
When/ Why do we restrain?

- Behavior
- Transport
- SAFETY!
- PATIENT CARE!
Safety from Violence

- From OSHA.Gov
  - The average annual rate for non-fatal violent crime for all occupations is 12.6 per 1,000 workers
  - The average annual rate for physicians is 16.2
  - For nurses, 21.9
  - For mental health professionals, 68.2

- Up to Date
  - 50% of Health Care providers will be victims of violence during their career
ED = Highest rate of violence in Hospital


The Big Reason?

Its all about the patient!
History/ Excited Delirium


- 7 cocaine-intoxicated patients who were apprehended because of violent or bizarre behavior, who then went on to have sudden death.
http://www.exciteddelirium.org/index.html

Introduction

Over the past decade, increased attention has been paid to the sudden and seemingly inexplicable deaths of some highly agitated subjects being held in police custody. In most of these cases, the force required to restrain or incapacitate the suspect was not sufficient to cause death.

Our colleagues in Miami-Dade County, Florida, first described the syndrome of excited delirium associated with cocaine abuse. The symptoms of excited delirium include bizarre and/or aggressive behavior, shouting, paranoia, panic, violence towards other people, unexpected physical strength, and hyperthermia. Throughout the United States and Canada, these cases are frequently associated with psychostimulant abuse, representing the extreme end of a psychiatric continuum of drug abuse effects. However, reports of acute exhaustive mania, physical restraint, Pepper Spray or TASER use, and sudden death have also been reported that are not related to abused drugs, suggesting further that an underlying central nervous system disorder was the precipitating cause of death. Such victims of excited delirium have provoked allegations of police misconduct, unnecessary force, and improper TASER deployment.

Medical examiners often have extreme difficulty in identifying the cause of death, but frequent drug intoxication is considered as a contributing factor or cause of death. While the precise cause and mechanism of these deaths remain controversial, we have demonstrated abnormalities in brain that define and confirm the occurrence of the excited delirium syndrome.

What to Know

Fact: ED is a medical emergency that presents itself as a law enforcement problem.
- Early and advanced coordination with EMS is key.

Fact: ED is not easy to recognize.
- Training is important so that dispatch or other personnel recognize behavioral signs.

Fact: ED containment requires backup personnel.
- Do not approach until it is safe to do so and always ensure several officers are present.

Fact: ED victims exhibit superhuman strength and are impervious to pain.
- Restraint positions and use of electronic control devices (TASER®) to override the CNS.
It is the consensus of the Task Force that ExDS is a unique syndrome which may be identified by the presence of a distinctive group of clinical and behavioral characteristics that can be recognized in the pre-mortem state. ExDS, while potentially fatal, may be amenable to early therapeutic intervention in some cases.
ExDS is a Syndrome

- Defined Clinically
- Subset of Delirium
- Altered mental status and combativeness or aggressiveness.
- Overlaps with other diseases
- Likely multifactorial etiology/ pathophysiology
<table>
<thead>
<tr>
<th>FEATURE</th>
<th>FREQUENCY % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Tolerance</td>
<td>100 (83-100)</td>
</tr>
<tr>
<td>Tachypnea</td>
<td>100 (83-100)</td>
</tr>
<tr>
<td>Sweating</td>
<td>95 (75-100)</td>
</tr>
<tr>
<td>Agitation</td>
<td>95 (75-100)</td>
</tr>
<tr>
<td>Tactile Hyperthermia</td>
<td>95 (75-100)</td>
</tr>
<tr>
<td>Police Noncompliance</td>
<td>90 (68-99)</td>
</tr>
<tr>
<td>Lack of Tiring</td>
<td>90 (68-90)</td>
</tr>
<tr>
<td>Unusual Strength</td>
<td>90 (68-90)</td>
</tr>
<tr>
<td>Inappropriately Clothed</td>
<td>70 (45-88)</td>
</tr>
<tr>
<td>Mirror/Glass Attraction</td>
<td>10</td>
</tr>
</tbody>
</table>
ExDS Pathophysiology

- Hyper metabolic state (Drug induced)
- Resistant against restraint
- Rapid severe metabolic acidosis
- Sudden cardiovascular collapse
Factors Associated With Sudden Death of Individuals Requiring Restraint for Excited Delirium

- stimulant drug use (78%)
- chronic disease (56%)
- Obesity (56%)
AMS = AEIOU TIPS

- A Alcohol
- E Epilepsy, Electrolytes, and Encephalopathy
- I Insulin
- O Opiates and Oxygen
- U Uremia
- T Trauma and Temperature
- I Infection
- P Poisons and Psychogenic
- S Shock, Stroke, Subarachnoid Hemorrhage and Space-Occupying Lesion, Seizure/post-ictal
<table>
<thead>
<tr>
<th>Letter</th>
<th>Type</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>Substrates</td>
<td>glucose (high/low), thiamine deficiency</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Sepsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Meningitis</td>
<td>all CNS infections, AIDS dementia, encephalitis, brain abscess or toxoplasmosis</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Mental illness</td>
<td>acute psychosis, medication noncompliance, mania, depression, malingering, rage, suicide intent (via police)</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>Alcohol</td>
<td></td>
<td>Intoxication, withdrawal</td>
</tr>
<tr>
<td>A</td>
<td>Accident</td>
<td></td>
<td>head trauma, CVA, cerebral contusion, subdural or epidural hematoma</td>
</tr>
<tr>
<td>S</td>
<td>Seizling</td>
<td></td>
<td>or postictal</td>
</tr>
<tr>
<td>S</td>
<td>Stimulants, hallucinogens, anticholinergics</td>
<td>Cocaine, amphetamines, caffeine, PCP, LSD, ketamine, psilocybin, antihistamines, atropine, scopolamine, jimson weed</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>Hyper</td>
<td></td>
<td>hypertension, hyperthyroidism, hypercarbia, hyperthermia</td>
</tr>
<tr>
<td>H</td>
<td>Hypo</td>
<td></td>
<td>hypotension, hypothyroidism, hypoxia, hypothermia</td>
</tr>
<tr>
<td>E</td>
<td>Electrolytes</td>
<td>hyper/hyponatremia, hypercalcaemia</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>Encephalopathy</td>
<td>hepatic, HIV, uremic, hypertensive, lead, Reye's syndrome, CNS tumor</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Drugs</td>
<td></td>
<td>Intoxication or withdrawal</td>
</tr>
<tr>
<td>D</td>
<td>Don't forget other drugs</td>
<td>carbon monoxide, lithium, steroids, salicylates, designer/street drugs, theophylline, MDMA, antipsychotics, toxins not on routine drug screen, others</td>
<td></td>
</tr>
</tbody>
</table>
Would it really have hurt to sedate me with ketamine, or some droperidol, or even a healthy dose of Versed?

Instead, I'm here and you're in court and nobody is happy.
What Forms of Restraint?  
Spectrum of Restraint

- Verbal
  - Reassurance
  - Redirection

- Physical
  - Soft
  - Hard

- Conducted Energy Devices (Electrical)
  - Taser

- Chemical
  - Anti-psychosis
  - Sedation
  - Paralysis
Physical Restraint

• Complications
  • Hypoxia
  • Asphyxia
  • *Hyperthermia*
  • Dehydration
  • Lactic acidosis
  • Rhabdomyolysis
Effects of Positional Restraint on Oxygen Saturation and heart Rate Following Exercise

- American Journal of Forensic Medicine and Pathology: 9(1); 16-18, 1988
- Delayed recovery
- No Hog tie
- Restrain supine
- Open airway
- Do not restrict the chest
A Word from Our Sponsor
Conducted Energy Devices

**Pros**
- Remote control
- Incapacitating
- Rapid onset
- Rapid offset

**Cons**
- Death?
- Induce arrhythmias
- Rhabdomyolysis
- Acidosis
- Puncture wounds
  - Globe
CED

- Animal Studies
  - Pig possible inducible VF
  - Sheep Tolerated

- Volunteer
  - Police/ Military

- Case Studies
  - Observational
1201 CEWs, 178 trans cardiac, Actual field data

No sudden death events suggestive of cardiac dysrhythmias (0% observed proportion, 97.5% CI 0.0–2.1%)

Significant injuries were rare overall (0.25%) and did not occur more frequently in the group with transcardiac CEW discharge.
Study of Deaths Following Electro Muscular Disruption: Interim Report
“Although exposure to CED is not risk free, there is no conclusive medical evidence within the state of current research that indicates a high risk of serious injury or death from the direct effects of CED exposure.

The potential for moderate or severe injury related to CED exposure is low.

CEDs can produce secondary or indirect effects that may result in death – Falls, Drownings, Explosions.

There is currently no medical evidence that CEDs pose a significant risk for induced cardiac dysrhythmia when deployed reasonably (<15s?).

Research shows that human subjects maintain the ability to breathe during exposure to CED.

Current human research suggests that the use of CED is not a life-threatening stressor in cases of excited delirium beyond the generalized stress of the underlying condition or appropriate subdual.”
How do we choose?

- Safety
  - Providers
  - Patient

- Agitated/Excited delirium (ExDS)
  - Medical Emergency
  - Death during restraint

- CHOICE OF RESTRAINT MAY DEPEND ON UNDERLYING PATHOLOGY AND PATIENT PRESENTATION
Exam?  Tx?
Safety

- Safety of providers
  - Planned coordinated response
  - Safety in numbers

- Safety of Patient
  - Minimize use of force
  - Minimize physical restraint
  - Optimize Medical Care
Restraint Process

- Blow dart
- Take Down
- Physical restraint
- Chemical Restraint
- Control/ Resolution
Figure 1. Flow chart of action for management of the agitated patient.
Take Down
The Royal Children’s Hospital Melbourne

Default positions

3. Head (RN 3 East)

1. Right shoulder and right forearm (Security)

2. Left shoulder and right forearm (Security)

4. Right thigh (RN 5th floor)

5. Right lower leg (RN 8th floor)

4. Left thigh (RN 5th floor)

5. Left lower leg (RN 8th floor)

RN ED: Code Grey backpack and medications

Roles may vary but must be negotiated prior to approaching the patient and in conjunction with the team leader.
Management of the agitated patient in the emergency department
Why is Chemical restraint necessary?

- Safety of providers and patient
- To prevent ongoing injury
- To facilitate medical eval and treatment
- Sudden death
- Hyperthermia
- Metabolic acidosis
- Rhabdomyolysis
What is the Ideal Medication?

- Easy delivery
  - P.O., P.R., S.L., Inhalation, I.N., I.M., I.V., I.O.
- Rapid onset (rapid offset?)
- Wide therapeutic index
- Adequate Restraint/ sedation
- Low complications
  - Hemodynamically neutral
  - Adverse FX- QTc, EPS, Sz
Chemical Restraint Decisions

- Medication
- Delivery
- Monitoring
- Evaluation
- Maintenance
Pitfalls

- Stacking
- Drug interaction
- Underlying pathology
- Unrecognized Respiratory depression/ hypoxia

- Unrecognized Hypoxia and Respiratory Depression in Emergency Department Patients Sedated For Psychomotor Agitation: Pilot Study
  - 28/50 pts with resp depression
  - EtCO2 90% predictive
Medications

- Sedative-hypnotics
  - Benzos

- Antipsychotics
  - Haldol v Droperidol
  - New Generation

- Opiates

- Paralytics
  - Depolarizing
  - Non-depolarizing

- Dissociative
  - Ketamine
  - Etomidate
Paralytics- Depolarizing

- Succinylcholine
  - Delivery IV/IM
  - Rapid onset (1-1.5mg/kg, 30-60s IV, 2-3min IM)
  - Rapid off 4-6min
  - +/- Wide therapeutic index
  - Effective- Yes
- Complications
  - AIRWAY
  - BREATHING
  - Hyper K+

AIRWAY
BREATHING
Hyper K+
Paralytics-Non-Depolarizing

- Rocuronium (Vecuronium/ Pancuronium/ Cysatricurium)
  - IV/IM
  - Rapid onset (60-90s IV)
  - Slow off (30-40min)
  - Wide Therapeutic index (0.5-1.2mg/kg IV)
  - Effective - Yes
  - Complications
    - AIRWAY
    - BREATHING
    - Duration

- AIRWAY
- BREATHING
- Duration
PARALYTICS

- **Pros**
  - Rapid onset
  - Wide Therapeutic index
  - Absolute restraint
  - Decrease Metabolic demand

- **Cons**
  - AIRWAY
  - Breathing
  - No Pre-OX
  - Peri-intubation Code
    - Hypercarbia
    - Hypoxia
    - Hyper K
Opiates

- Fentanyl/ Morphine
  - Delivery = IN, SL, PO?, PR?, IM, IV
  - +/- Rapid onset (seconds-Minutes, IV)
  - Wide Therapeutic index
  - Effective- Min, Must titrate, use as adjunct
- Complications
  - AIRWAY
  - Breathing
  - Rigid Chest
  - Hypotension
OPIATES

• Pros
  • Delivery
  • Therapeutic index
  • Effect – Titrate
  • Use as adjunct with traumatic pain

• Cons
  • Must titrate
  • Complications
    • AIRWAY
    • Breathing
    • Hypotension
Antipsychotics

- Haloperidol/ Droperidol/ [ New (olanzapine)]
  - P.O., IM, IV, SL(ODT), Inhalation(?)
  - +/- Rapid onset (15-30 min IV)
  - Wide therapeutic index (?)
  - Effective
  - Complications
    - QTc?
    - Dystonia/ EPS
Haloperidol v. Droperidol

- “In this cohort of agitated patients treated with haloperidol or droperidol in the prehospital setting, there was no significant difference found in QTc prolongation, adverse events, or need for repeat sedation between haloperidol and droperidol.”

- Comparison of Droperidol and Haloperidol for Use by Paramedics: Assessment of Safety and Effectiveness

- July-September 2014, Vol. 18, No. 3, Pages 375-380
CHEMICAL RESTRAINT FOR THE AGITATED PATIENT IN THE EMERGENCY DEPARTMENT: LORAZEPAM VERSUS DROPERIDOL

• 202 patients, randomized
• lorazepam (< 50 kg) 2mg, (> 50 kg) 4 mg i.v.
• droperidol (< 50 kg) 2.5 mg, (> 50 kg) 5mg i.v.
• similar sedation profiles at 5 min
• Droperidol lower sedation scores at times 10, 15, 30, and 60 than lorazepam.
• More repeat doses of lorazepam were needed
• No signif comp, 1 dystonic Rxn
Midazolam v Droperidol

- There is no difference in onset of adequate sedation of agitated patients using midazolam or droperidol. Patients sedated with midazolam may have an increased need for active airway management. [Ann Emerg Med. 2006;47:61-67.]

- Intramuscular droperidol and midazolam resulted in a similar duration of violent and acute behavioral disturbance, but more additional sedation was required with midazolam. Midazolam caused more adverse effects because of over sedation, and there was no evidence of QT prolongation associated with droperidol compared with midazolam. [Ann Emerg Med. 2010;56:392-401.]
Droperidol v Ziprasidone v Midazolam
ACADEMIC EMERGENCY MEDICINE 2005; 12:1167–1172

- Double blind randomized 144 pts
- Droperidol 5mg, Ziprasidone 20mg, Midazolam 5mg IM
- Midazolam required additional sedation
- Droperidol faster onset than Ziprasidone
Next Generation Antipsychotics

- Olanzapine ODT/IM
  - Better than Haldol or Lorazepam for Psychosis, Mania, Alzheimer's

- Aripiprazole- po/IM

- Ziprasidone- po/IM

- Faster onset of action, lack of over-sedation, superior efficacy, reduced EPS
Antipsychotics

- Pros
  - Delivery
  - Onset +/-?
  - Effective

- Cons
  - Effective ?
  - May have to re-dose
  - Complications
    - QTc = not Droperidol!
    - Dystonia
    - Synergistic effects
IMPORTANT SAFETY INFORMATION

ADASUVE® (loxapine) inhalation powder, for oral inhalation use, can cause bronchospasm that has the potential to lead to respiratory distress and respiratory arrest. Administer ADASUVE only in an enrolled healthcare facility that has immediate access on-site to equipment and personnel trained to manage acute bronchospasm, including advanced airway management.

THE FIRST AND ONLY... Orally inhaled medicine indicated for the acute treatment of agitation associated with schizophrenia or bipolar I disorder

When agitation escalates...

HOW LONG CAN YOU WAIT?

ORAL INHALATION
Administered using a breath-actuated, single-use inhaler

FAST ONSET
Statistically significant reduction in agitation at 2 hours, with improvement rapidly achieved at 10 minutes post-dose

RAPID DRUG DELIVERY
What is STACCATO® technology?
Sedative Hypnotics- Benzos

- Midazolam/ Lorazepam/ Diazepam
  - IN, P.O., P.R., IM, IV
  - +/- Rapid Onset– (Midazolam 3-5min IV, 10-15 IM) Lorazepam 2-4min IV, 15-30min IM)
- Wide Therapeutic index
- Effect- Titrate
- Complications
  - Airway
  - Breathing
  - Hypotension
Benzos

- **Pros**
  - Delivery
  - Rapid
  - Safe
  - Anti-epileptic
  - Especially for
    - Withdrawal
    - Tox

- **Cons**
  - Respiratory
  - Hemodynamics
A Prospective, Double-blind, Randomized Trial of Midazolam versus Haloperidol versus Lorazepam in the Chemical Restraint of Violent and Severely Agitated Patients

- 111 patients randomized, convenience
- Midaz (5mg), Loraz (2mg), Haldol (5mg) IM
- Midazolam has a significantly shorter time to onset of sedation
- more rapid time to arousal than lorazepam or haloperidol.
- The efficacies of all three drugs appear to be similar.
Pharmacological management of agitation in emergency settings
A Yildiz, G S Sachs, A Turgay

- Review of studies comparing Benzos, Classic anti-pysch, atypical anti-psych and combinations
- Classic Anti-psych + Benzo is better
- Atypical Anti-psych may be as good especially in psychiatric patients
  - Oral = IM
Atypical/ Dissociative

- Ketamine
  - IM, IV, (IN?)
- Rapid onset (~ 60s IV, 3-4min IM)
- Off ~30-40min
- Wide therapeutic window
  - Threshold dose
- Effective
- Complications
  - Laryngospasm
  - Emergence Reaction
  - Vomiting
Ketamine

Pros
- Delivery, IV/IM
- Rapid onset
- Safe
  - Airway/Resp intact
  - No hypotension
  - No hyperthermia

Cons
- ?ICP, 5 studies say no
- Laryngospasm
- Hyper salivation
- Vomiting
- Drug interactions?
The Combative Multi-Trauma Patient: A Protocol for Prehospital Management

- 11 patients, (young men 18-36 yo)
- Trauma (Blunt, penetrating, Blast)
- Long transport (38-255min)
- Ketamine +/- midazolam
- No adverse events
A flow chart of the prehospital protocol for a combative patient.
The combative multitrauma patient: a protocol for prehospital management.
Ketamine sedation for patients with acute agitation and psychiatric illness requiring aeromedical retrieval

- Flying Doctor Service Australia
- 3 years, 18 patients, psych dx
- 0.5-1 mg/kg IV if additional in <60min then infusion 1-1.5 mg/kg/hr, +/- Benzo
- Patients had received meds pre-transport
- Complications: hypertension, Tachy, vomit
Ketamine ExDS

- The Emergency Department Experience with Prehospital Ketamine: A Case Series of 13 Patients

- Aaron M. Burnett, MD, Joshua G. Salzman, MA, EMT-B, Kent R. Griffith, RN, EMT-P, Brian Kroeger, PhD, Ralph J. Frascone, MD. October-December 2012, Vol. 16, No. 4, Pages 553-559
### Table 6. Sample EMS Protocols for ExDS symptoms

<table>
<thead>
<tr>
<th>City, State</th>
<th>Sedation</th>
<th>Fluids</th>
<th>Hyperthermia</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami, FL</td>
<td>Midazolam (Versed) 5mg IN [max 20mg]</td>
<td>Normal Saline 1 liter bolus IV</td>
<td>Cold (&lt;60°F) IV fluid Cold packs</td>
<td>Sodium Bicarb. 1 amp (50 mEq) per liter of Normal Saline</td>
</tr>
<tr>
<td>Nashville, TN</td>
<td>Midazolam (Versed) 2mg IV or 5mg IM [may repeat]</td>
<td>Normal Saline @ 500 cc/hr IV</td>
<td>Evaporative Cooling Cold packs</td>
<td></td>
</tr>
<tr>
<td>Clark County (Las Vegas), NV</td>
<td>Midazolam (Versed) 2-5mg IN, IV, pr [max 10 mg]</td>
<td>Normal Saline 500cc over 20 min</td>
<td>Evaporative Cooling Cold packs</td>
<td></td>
</tr>
<tr>
<td>Columbus, OH</td>
<td>Midazolam (Versed) 2-5mg IN, IV, pr [max 10 mg]</td>
<td>Normal Saline 1 liter bolus IV</td>
<td>Evaporative Cooling Cold packs</td>
<td>Sodium Bicarb. ½ amp (25 mEq) per liter of Normal Saline</td>
</tr>
<tr>
<td>Minneapolis, MN</td>
<td>Ketamine 5 mg/kg IM or 2 mg/kg IV</td>
<td>Normal Saline up to 2 liter bolus IV</td>
<td>Evaporative Cooling Cold packs</td>
<td>Sodium Bicarb. 2 amps (100 mEq) IV push</td>
</tr>
<tr>
<td>Rochester, MN</td>
<td>Lorazepam (Ativan) 1-4 mg IV/IM or midazolam (Versed) 1-5 mg IV/IM</td>
<td>Normal Saline</td>
<td>Evaporative Cooling Cold Packs</td>
<td>Sodium Bicarbonate 1mEq/kg IV push in cardiac arrest</td>
</tr>
</tbody>
</table>

IV: Intravenous; IM: Intramuscular; IN: Intranasal; pr: per rectum; Normal Saline: 0.9% Sodium Chloride
<table>
<thead>
<tr>
<th>Class</th>
<th>Agent (Trade Name)</th>
<th>Available Routes</th>
<th>Dosing (mg)*</th>
<th>Onset (min)</th>
<th>Duration (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>Versed</td>
<td>IN</td>
<td>5</td>
<td>3-5</td>
<td>30-60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IM</td>
<td>5</td>
<td>10-15</td>
<td>120-360</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>2 - 5</td>
<td>3-5</td>
<td>30-60</td>
</tr>
<tr>
<td>Lorazepam</td>
<td>Ativan</td>
<td>IM</td>
<td>4</td>
<td>15-30</td>
<td>60-120</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>2 - 4</td>
<td>2-5</td>
<td>60-120</td>
</tr>
<tr>
<td>Diazepam</td>
<td>Valium</td>
<td>IM</td>
<td>10</td>
<td>15-30</td>
<td>15-60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>5 - 10</td>
<td>2-5</td>
<td>15-60</td>
</tr>
<tr>
<td>†Haloperidol</td>
<td>Haldol</td>
<td>IM</td>
<td>10– 20</td>
<td>15</td>
<td>180-360</td>
</tr>
<tr>
<td>††IV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>†Droperidol</td>
<td>Inapsine</td>
<td>IM</td>
<td>5</td>
<td>20</td>
<td>120-240</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>2.5</td>
<td>10</td>
<td>120-240</td>
</tr>
<tr>
<td>Ziprasidone</td>
<td>Geodon</td>
<td>IM</td>
<td>10– 20</td>
<td>10</td>
<td>240</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>Zyprexa</td>
<td>IM</td>
<td>10</td>
<td>15-30</td>
<td>24 hrs</td>
</tr>
<tr>
<td>Ketamine</td>
<td>(Ketaset, Ketalar)</td>
<td>IM</td>
<td>4-5 mg/kg</td>
<td>3-5</td>
<td>60-90</td>
</tr>
<tr>
<td></td>
<td></td>
<td>IV</td>
<td>2 mg/kg</td>
<td>1</td>
<td>20-30</td>
</tr>
</tbody>
</table>

IN: Intranasal; IM: Intramuscular; IV: Intravenous
Ensure staff safety
Attempt to calm patient using verbal techniques
Place physical restraints if necessary
Establish IV/O2/monitor if possible

Is rapid sedation needed?

No

Assess for medical causes of agitation:
- Hypoglycemia
- Hypoxia
- Drug overdose/poison
- Infection
- Intracranial lesion
- Others

Yes

Chemical restraint

<table>
<thead>
<tr>
<th>Severe violent PT</th>
<th>Intoxication with CNS stimulant or undifferentiated PT</th>
<th>Intoxication with CNS depressant (e.g., ethanol)</th>
<th>Known psychotic/psychiatric disorder</th>
<th>Cooperative PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Droperidol 2.5 to 5 mg IM/IV titrate as needed OR Midazolam 2.5 to 5 mg IM/IV titrate as needed OR Midazolam 2.5 to 5 mg IM/IV PLUS Droperidol 2.5 to 5 mg IM/IV titrate as needed OR Haloperidol 5 mg IM/IV PLUS</td>
<td>Lorazepam 2 to 4 mg IM/IV OR Midazolam 2.5 to 5 mg IM/IV OR Lorazepam 2 mg IM/IV PLUS Haloperidol 5 mg IM/IV</td>
<td>Haloperidol 2.5 to 5 mg IM/IV OR Droperidol 2.5 to 5 mg IM/IV</td>
<td>Haloperidol 2.5 to 5 mg IM/IV OR Droperidol 2.5 to 5 mg IM/IV OR Haloperidol 5 mg IM/IV PLUS Lorazepam 2 mg IM/IV</td>
<td>Lorazepam 2 to 4 mg orally OR Risperidone 2 mg orally OR Olanzapine 5 to 10 mg orally</td>
</tr>
</tbody>
</table>

In elderly patients reduce the dose of any antipsychotic by half

Sedation achieved?

Yes

Establish IV/O2/monitor if not already in place
Obtain ECG to check QT interval as needed

No

Titrte chemical restraints to desired effect
My 2 Cents

- Routine Craziness
  - Offer oral Olanzapine

- Severe Craziness/ Danger
  - Haldol + Lorazepam

- ExDS
  - Ketamine

- Tox not ExDS
  - Midazolam or Lorazepam
Case 1

- Things continued so much the same that it is hardly worth while to abridge the case book, for a week longer, when, on the 28th, he died.
- No examination was made, post mortem.
Case 2

- 500-mg intramuscular (IM) injection of ketamine hydrochloride in the buttocks administered through clothing
- EMS providers reported excellent sedation within 4 minutes after the ketamine administration
- T102.4 (F/39.1 °C), HR122, RR32, BP 128/58, SpO2 100% RA, pH 7.00, UDS = Cocaine
- Intubated, D/C at baseline after 96 hours
Questions?

- ???
Summary

- Delirium should be approached as a medical condition
- Agitated/excited delirium is a Medical Emergency
- Restraint should be performed in a systematic approach—Make a Plan!
- Chemical restraint should immediately follow physical restraint
- Pick medication based on suspected problem
- Hyperthermia is an ominous and immediately life threatening sign