Ketamine Evaluation Program
ADULT DRUG VOLUME QUICK CHART- DOSES BY mL VOLUME
(Ketamine)

1. Verify dose for adults as per each individual protocol, and verify that the CONCENTRATION listed here is the drug concentration you currently have in service that you are about to administer.
2. Estimate weight (weight in kg = weight in pounds/2.2), verify correct dose in kilograms for approximate weight.
3. If all verifications are correct, and your partner agrees, administer the appropriate drug volume as per the chart below.

** This reference may include minimal "rounding" of doses and/or volumes for weight ranges and drug safety **
4. 5 mL vial 100mg/mL concentration for IM injection only

<table>
<thead>
<tr>
<th>COG Dosing</th>
<th>40kg (88lbs)</th>
<th>50kg (110lbs)</th>
<th>60kg (132lbs)</th>
<th>70kg (154lbs)</th>
<th>80kg (176lbs)</th>
<th>90kg (198lbs)</th>
<th>100kg (220lbs)</th>
<th>110kg (242lbs)</th>
<th>120kg (264lbs)</th>
<th>130kg (286lbs)</th>
<th>140kg (308lbs)</th>
<th>Max Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 mg/kg IM Burns/Pain</td>
<td>0.4mL</td>
<td>0.5mL</td>
<td>0.6mL</td>
<td>0.7mL</td>
<td>0.8mL</td>
<td>0.9mL</td>
<td>1.0mL</td>
<td>1.1mL</td>
<td>1.2mL</td>
<td>1.3mL</td>
<td>1.4mL</td>
<td>Max Dose</td>
</tr>
<tr>
<td>2 mg/kg IM Cardioversion</td>
<td>0.8mL</td>
<td>1.0mL</td>
<td>1.2mL</td>
<td>1.4mL</td>
<td>1.6mL</td>
<td>1.8mL</td>
<td>2.0mL</td>
<td>2.2mL</td>
<td>2.4mL</td>
<td>2.6mL</td>
<td>2.8mL</td>
<td>Max Dose</td>
</tr>
<tr>
<td>4 mg/kg IM Excited Delirium</td>
<td>1.6mL</td>
<td>2.0mL</td>
<td>2.4mL</td>
<td>2.8mL</td>
<td>3.2mL</td>
<td>3.6mL</td>
<td>4.0mL</td>
<td>4.4mL</td>
<td>4.8mL</td>
<td>5mL Max Dose</td>
<td>5mL Max Dose</td>
<td>Max Dose</td>
</tr>
</tbody>
</table>
Atrial Fibrillation with Rapid Ventricular Response

**History:**
- Medications (Aminophylline, Stimulants, Thyroid supplements, Decongestants, Digoxin)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical HX (A-fib, COPD, CAD)

**Signs and Symptoms:**
- QRS less than 0.12 sec
- Rate related (Dizziness, CP, SOB, Syncope / near syncope)

**Differential:**
- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia or Anemia
- Hypovolemia
- Drug effect / Overdose (see Hx)
- Hyperthyroidism
- Pulmonary embolus

**Legend**
- Medical Control (M)
- System Responder (S)
- EMT-B (B)
- EMT-I (I)
- EMT-P (P)
- Spcl. Ops. (SO)
- Stable
- Pre-Arrest (Severely altered or No palpable BP)

### Universal Patient Care Protocol U-01

- **QRS greater than 0.12 sec OR History of WPW**
- **Ketamine 2 mg/kg IM only x1 (CR-35)** OR **Sedation: Midazolam: 2.5 – 5.0 mg IV/O OR 5 mg IM/IN May repeat PRN max total dose 10 mg with SBP > 100 mmHg**
- **Synchronized Cardioversion at Max. Energy Setting Repeat @ Max. PRN**
- **Diltiazem 0.25 mg/kg IV over 2 min. (Max = 20 mg) (CR-35)**
- **If unsuccessful after 15 min. Diltiazem 0.35 mg/kg over 2 minutes (Max = 25 mg) (CR-35)**
- **12 Lead ECG after rate control or conversion**
- **Contact System Medical Director or Destination as needed**

**Pearls:**
- If patient has history of or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer Diltiazem.
- Adenosine may not be effective in identifiable atrial flutter/fibrillation, but is not harmful.
- Monitor for hypotension after administration of Diltiazem.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Continuous pulse oximetry is required for all Atrial Fibrillation Patients.
- Maximum Physiologic HR calculation 220 minus (-) age in years = Max HR
- Rapid ventricular response is defined as rate > 100 however rate related signs and symptoms are uncommon with HR ≤ 150/min in patients with healthy heart. Consider rate control at lower heart rates if symptomatic.
Burns (Ketamine)

History:
- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history and Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs & Symptoms:
- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress singsed facial or nasal hair, hoarseness / wheezing

Differential:
- Superficial (1°) red and painful
- Partial thickness (2°) blistering
- Full thickness (3°) painless and charred or leathery skin
- Chemical
- Thermal
- Electrical
- Radiation

Universal Patient Care Protocol U-01

Airway Protocol R-01
- Remove clothing or expose area
- Brush off any dry chemicals or powder

Thermal

Chemical

If burn < 10% body surface area
- Cool down the wound with Normal Saline or Sterile Water
- Remove rings, bracelets, and other constricting items

Cover burn with a Dry sheet or dressings
- NS IV per Parkland Burn Formula CR-18
- Ketamine 1 mg/kg IM only x1 (CR-35)
- Fentanyl: 1 mcg/kg IV every 5 min (Max total 400mcg) SBP > 100 mmHg Clinical Reference CR - 35

Contact System Medical Director or Destination as needed

Legend
- System Responder
- EMT - B
- EMT - I
- EMT - P
- Spcl. Ops.
- Medical Control
- SO
- O
- I
- P
- M

Pearls:
- Evaluate BSA : Use chart or use one side of patients hand = 1% BSA
- Critical Burns:
  - >20% 2° and 3° body surface area (BSA) age > 10;
  - >10% BSA age < 10 or > 50;
  - 3° burns >5% BSA;
  - 2° and 3° burns to face, eyes, hands or feet or genitalia; electrical burns; respiratory burns; deep chemical burns;
  - Burns with extremes of age or chronic disease; and burns with associated major traumatic injury.
- Minor burns (< 5% BSA 2nd and 3rd ) not complicated by airway compromise or trauma do not require transport to a trauma center.
- Potential CO exposure should be treated with 100% oxygen.
- Circumferential burns to extremities are dangerous due to potential vascular compromise 2° to soft tissue swelling.
- Burn patients are prone to hypothermia - Never apply ice or cool burns that involve >10% body surface area.
- Do not overlook the possibility of multiple system trauma or child abuse with burn injuries.
- 2nd or 3rd degree burn >10% BSA – Fluid therapy following Parkland Burn Formula.
- Parkland Formula = NS 2 mL/kg x % TBSA 2nd or 3rd burn over the first 8 hours.
- ET(I)CO2 if multiple doses of Narcotic Medication administered

COG Updated: 0x.xx.14 (MD 14 - xx)
# Excited Delirium (Ketamine)

## History
- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic alert tag
- Substance abuse / overdose
- Diabetes

## Signs & Symptoms
- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative violent
- Expression of suicidal/homicidal thoughts
- Very "hot" to touch

## Differential:
- see Altered Mental Status differential
- Hypoxia
- Alcohol Intoxication
- Toxin / Substance abuse
- Medication effect / overdose
- Withdrawal syndromes
- Bipolar (manic-depressive)
- Schizophrenia, anxiety disorders, etc

## Scene Safety

### Universal Patient Care Protocol U-01

### Restraint Procedure CP-50
- **Sedation: Ketamine 4 mg/kg IM only** x1
  - Max Dose 500 mg (CR-35)
  - Reassess patient after approximately 10 min.  
    Still Combative?

- **Sedation: Midazolam: 2.5 – 5.0 mg IV/IO OR** 5 mg IM/IN
  - May repeat PRN max total dose 10 mg with SBP > 100 mmHg

- Continuous ETCO₂, Pulse OX, Cardiac Monitor and Document
- **Temperature > 101:** Initiate cooling measures
- Normal Saline 1000 ml bolus
  - May repeat (Max 2 Liters)

### Contact System Medical Director or Destination as needed

## Pearls:
- Consider your safety first. Physical Restraint should be performed/assisted by Law Enforcement when available.
- All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.
- Any transported patient who is handcuffed or restrained by Law Enforcement should be accompanied by an officer whenever possible. If not possible law enforcement must be immediately available.
- Be sure to consider all possible medical/trauma causes for behavior (hypoglycemia, overdose, substance abuse, hypoxia, head injury, etc.)
- If patient is suspected of excited delirium suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early.
- Restrained patients should never be maintained or transported in a prone position.
- Cold saline boluses 30 ml/kg with temperature $\geq$ 104 (up to 2 liters max in adults)
### History:
- Age
- Location
- Duration
- Severity (1-10)
- Past Medical History
- Medications
- Drug allergies
- Medications taken prior to arrival

### Signs and Symptoms:
- Severity (pain scale)
- Quality
- Radiation
- Relation to movement, respiration
- Increased with palpation of area.

### Differential:
- Per the specific protocol
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural / Respiratory
- Neurogenic
- Renal (colic)

### Signs and Symptoms:
- Severity (pain scale)
- Quality
- Radiation
- Relation to movement, respiration
- Increased with palpation of area.

### Pearls:
- Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.
- Vital signs should be obtained pre, 5 minutes post, and at disposition with all pain medications.
- Monitor patient closely for over sedation - refer to overdose protocol if needed
- Head injury patients should not receive pain medication
- Do not administer Acetaminophen to patients with history of liver disease.

### Differential:
- Per the specific protocol
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural / Respiratory
- Neurogenic
- Renal (colic)

### Pearls:
- Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.
- Vital signs should be obtained pre, 5 minutes post, and at disposition with all pain medications.
- Monitor patient closely for over sedation - refer to overdose protocol if needed
- Head injury patients should not receive pain medication
- Do not administer Acetaminophen to patients with history of liver disease.

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**Universal Patient Care Protocol U - 01**

**Patient care according to Protocol based on specific complaint**

**Pain severity > 6 and/or Patient requests pain medication or Contraindication to PO medication**

1. Traumatic Limb Amputation/near Amputation
2. Angulated Limb/Limb Joint Fracture/Dislocation
3. De-gloving injury or Severe abrasions ≥ 9% Body Surface Area (Refer to CR-32 for BSA calc.)

**Reassess patient after approximately 5-10 min. for relief or reduction of pain to < 3**

**Fentanyl: 1 mcg/kg IV/IM/IN up to 100 mcg may repeat 50 mcg q 10 min (Max total 300mcg)**

**SBP > 100mmHg Clinical Reference CR- 35 As needed until improvement.**

**Continuous Pulse Ox and ETCO2 Reassess q 5 min**

**Contact System Medical Director or Destination as needed**

### Medication Protocol:
- Acetaminophen up to 1 Gram PO or Ibuprofen up to 600 mg PO

### Legend:
- **S** System Responder
- **B** EMT - B
- **I** EMT - I
- **P** EMT - P
- **SO** Spcl. Ops.
- **M** Medical Control

### Protocol:
- **SO/M - 16**

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**Clinical Operating Guidelines**

**COG Updated: 02.17.16 (MD 16 – 02)**
Supraventricular Tachycardia (Ketamine)

History:
- Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical history
- History of palpitations / heart racing
- Syncope / near syncope

Signs and Symptoms:
- QRS less than 0.12 Sec
- Rate related (Dizziness, CP, SOB)
- Potential presenting rhythm
  - Sinus tachycardia
  - Atrial fibrillation / flutter
  - Multifocal atrial tachycardia

Differential:
- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia
- Hypovolemia or Anemia
- Drug effect / Overdose (see Hx)
- Hyperthyroidism
- Pulmonary embolus

Pearls:
- If patient has history of or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer Diltiazem, go to VT with Pulse.
- If patient requires multiple conversion attempts without resolution consider alternative cause of dysrhythmia
- Adenosine may not be effective in identifiable atrial flutter/fibrillation, but is not harmful.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Continuous pulse oximetry is required for all SVT Patients.
- Serious S/S are uncommon with HR < 150. Patients with impaired cardiac function may become symptomatic at lower HR.
- Maximum physiologic heart rate (Sinus Tachycardia) is 220 bpm-age in years.

Universal Patient Care Protocol U-01

Wide Complex Tachycardia with Pulse Protocol C-05

If readily available Consider Adenosine
12 mg rapid IV repeat X1 (Max. 24 mg)
10 mL flush after each dose

Ketamine 2 mg/kg IM only x1 (CR-35)

Sedation: Midazolam: 2.5 – 5.0 mg IV/IO
5 mg IM/IN May repeat PRN (max total dose
10 mg) with SBP > 100 mmHg

Synchronized Cardioversion at Max.
Energy Setting Repeat @ Max. PRN

12 Lead ECG

Valsalva’s Maneuver CP-69

Adenosine
12 mg rapid IV repeat x 1 (Max. 24 mg)
use10 mL flush after each dose

Diltiazem 0.25 mg/kg IV over 2 minutes
(Max dose 20 mg) (CR-35)
May repeat x1 at 0.35mg/kg IV q 15 min.
(Max dose 25mg) (CR-35)

Contact System Medical Director or
Destination as needed

Clinical Operating Guidelines

Protocol SO/C - 04

COG Updated: 0x.xx.14 (MD 14 – xx)
Wide Complex Tachycardia With A Pulse (Ketamine)

**History:**
- Past medical history / medications, diet, drugs
- Syncope / Near syncope
- Palpitations
- Pacemaker
- Allergies: Lidocaine / Novocaine
- CAD, CHF, Cardiomyopathy

**Signs and Symptoms:**
- Ventricular Tachycardia on ECG (Runs or Sustained)
- Conscious, rapid pulse
- Chest Pain, Shortness of Breath
- Dizziness
- Rate usually 150-180 bpm for sustained V-Tach

**Differential:**
- Artifact / Device Failure
- Cardiac
- Endocrine/Electrolyte
- Hyperkalemia
- Drugs/Toxic exposure
- Pulmonary disease

**Universal Patient Care Protocol U-01**

- **Appropriate Protocol**
  - Palpable Pulse and QRS >0.12 sec?
  - Yes → Stable
  - No → Palpable Pulse and QRS >0.12 sec? → Severe altered or no palpable radial pulse

**Ketamine 2 mg/kg IM only x1** (CR-35)

- Sedation: Midazolam: 2.5 – 5.0 mg IV/IO OR 5 mg IM/IN May repeat PRN (max total dose 10 mg) with SBP > 100 mmHg

- Synchronized Cardioversion at Max. Energy Setting Repeat @ Max. PRN

**Amiodarone 150mg** IV over 10 minutes. May repeat x2 150 mg q10 min (max. total dose 450 mg)

**Legend**
- S: System Responder
- B: EMT - B
- I: EMT - I
- P: EMT - P
- M: Medical Control

**Patients:**
- 12 Lead ECG
- Amiodarone 150mg IV over 10 minutes. May repeat x2 150 mg q10 min (max. total dose 450 mg)

**Sedation:**
- Midazolam: 2.5 – 5.0 mg IV/IO OR 5 mg IM/IN May repeat PRN (max total dose 10 mg) with SBP > 100 mmHg

**Synchronized Cardioversion** at Max. Energy Setting Repeat @ Max. PRN

**Pearls:**
- For witnessed / monitored ventricular tachycardia, try having patient cough
- Slow wide complex consider Hyperkalemia
- If Lidocaine converts: Drip: 2-4 mg/min
- If torsades de pointes: Magnesium Sulfate 50% 2 grams slow IV /IO push over 5 minutes.
- Maximum dose of antiarrhythmic should be given before changing antiarrhythmic.
- If hyperkalemia or tricyclic OD consider Sodium Bicarbonate 1 mEq/kg early in intervention.
- Amiodarone: allow 10 minutes after dose completed before next dose.