

SECTION: R-3

PROTOCOL TITLE: Hyperdynamic Crisis/Overdose

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**GENERAL COMMENTS:** Also known as **sympathomimetics**, this protocol includes cocaine, methamphetamine, amphetamine, and MDMA (ecstasy). It may include other stimulants as well. Patient care should be focused on preventing/mitigating hyperthermia, agitated delirium, positional asphyxia, hypoxia, and physical self-harm. With true hyperdynamic crisis (tachycardia, agitation, hyperthermia, and/or hypertension) treatment with benzodiazepines is indicated in addition to rhythm specific therapy or anti-hypertensive meds (with the exception of beta-blockers).

**BLS SPECIFIC CARE:** See adult General Toxicological Care Protocol R-1

- Calm low stimulus environment
- Monitor temperature by whatever means feasible. Cool as appropriate.
- Allow for adequate heat dissipation.
- Attempt to identify co-morbid factors and other medical issues, including poly-pharm involvement.
- If pediatric patient, determine patient's color category on length based resuscitation tape (Broselow Tape.)
- Physical restraints as necessary.
- Obtain patient's temperature and cool/warm as necessary.
- Position patient as appropriate.

**ILS SPECIFIC CARE:** See adult General Toxicological Care Protocol R-1

- Use Metriset administration set on medical patients less than 8 years of age

**ALS SPECIFIC CARE:** See adult General Toxicological Care Protocol R-1

*Benzodiazepines for Hyperdynamic crisis, Acute Coronary Syndromes, as well as sedation.*

Do not administer/discontinue administration if:

- Systolic BP < 90 mmHg
  - Respiratory rate, SpO<sub>2</sub> and/or mental status diminishes
- Valium (diazepam) :
    - ♦ Adult: 2-5 mg IV/IO/IM every 5-10 minutes as needed to maximum of 20 mg
    - ♦ Pediatric:
      - IV/IO: 0.1mg/kg IV every 5-10 minutes as needed to maximum of 10 mg
      - IM: 0.5 mg/kg every 5-10 minutes as needed to maximum of 10 mg

- Versed (midazolam) IV/IO/IM
  - ♦ Adult: 0.5-2.5 mg every 5-10 minutes as needed to maximum of 5 mg
  - ♦ Pediatric: 0.05 mg/kg every 5-10 minutes as needed to maximum of 2.5 mg
- Haldol (haloperidol) IV/IM/IO
  - 2.0-5.0 mg every 5 minutes to a maximum of 10 mg
  - May possibly lower seizure threshold
  - Consider co-administration of Benadryl to mitigate possible EPS

*Anti-emetics:*

- Zofran (ondansetron) IV /IM/IO
  - ♦ Adult: 4 mg
  - ♦ Pediatric: 0.1 mg/kg to a maximum of 4 mg
- Benadryl (diphenhydramine) IV/IM/IO
  - ♦ Adult: 25-50 mg
  - ♦ Pediatric: 1-2 mg/kg to a maximum of 25 mg

*Drug induced acute coronary syndrome (ACS)*

- Aspirin
  - Four (4) 81 mg chewable tabs (324 mg total)
  - DO NOT administer if:
    - Patient history of aspirin allergy
    - Recent history of GI or other internal bleeding/disorders
    - *Do not administer if patient is taking other anticoagulants/platelet aggregation inhibitors*
- Nitrates:
  - DO NOT administer/discontinue administration if:
    - Systolic B/P < 90 mmHg
    - Suspected right ventricular infarction
    - The patient presents with altered mental status
    - The patient has taken medications for erectile dysfunction in the preceding 24 hours
  - Sublingual (SL) nitroglycerin spray
    - One pump (0.4 mg) every 3-5 minutes as needed
  - Transdermal (TD) nitroglycerin paste
    - Use if SL NTG effective in reducing pain/discomfort
    - Apply ½-1 ½" to a hair-free portion of upper anterior chest

*Analgesics:*

DO NOT administer/discontinue administration if:

- Systolic B/P < 90 mmHg
  - Respiratory rate, SpO<sub>2</sub> and/or mental status diminishes
- Morphine sulfate IV/IM/IO:
- 2-5 mg IV/IM every 5-10 minutes as needed.
  - Maximum dose 20 mg
- Fentanyl IV/IM/IO:
- For patients with history of opioid allergies
  - 25-50 mcg IV/IM every 5-10 minutes as needed
  - Maximum dose 100 mcg

*Cardiac Arrhythmias:* Follow with rhythm specific therapy for symptomatic refractory cases. Do not use procainamide.

- Lidocaine (Xylocaine) *for Ventricular Tachycardia REFRACTORY to Benzodiazepines*
- IV: 1-1.5 mg/kg every 3-5 minutes to a max of 3 mg/kg
  - ETT: 2-3 mg/kg (2 times IV dose) every 3-5 minutes to a max of 3 mg/kg
  - Maintenance Infusion 2-4 mg/minute titrated for effect, to be initiated if ectopy resolves. Must rebolus with lidocaine in 5-10 minutes after initiation of drip to reach therapeutic levels (unless max bolus dose has been reached)
  - Always give full initial dose, but reduce all subsequent doses by ½ for elderly (>70) or with impaired hepatic function
- Magnesium Sulfate *(for Torsades REFRACTORY to Benzodiazepines)*
- IV: 2 g given SLOWLY. Take 2 g (4cc), dilute to 20 cc to make 10% solution. Do not give faster than 1 g/minute

**PHYSICIAN PEARLS:**

The Hyperdynamic (stimulant) Toxidrome generally consists of:

- Restlessness
- Excessive speech and
- Excessive motor activity
- Tremor
- Insomnia
- Tachycardia
- Hypertension
- Hyperthermia
- Hallucinations
- Seizures

**Management of agitated or combative patients:** Use of sedatives (Benzodiazepines) is highly recommended for even moderate agitation from hyperdynamic use, and may decrease heat production, decrease cardiac toxicity, and improve outcomes, as well as improve provider safety.

**Use of Haldol** with patients under the active influence of hyperdynamics is relatively contraindicated due to these drugs effects on seizure threshold, heat production and general side effects that may complicate care.

**MDMA**, and the more toxic drug PMA, have both amphetamine and hallucinatory like effects. The stimulant effects of MDMA/PMA, which enable users to perform physical exertion (like dancing) for extended periods, may also lead to dehydration, tachycardia, and hypertension. MAOI's may potentiate toxic effects. While any of the hyperdynamics can be dangerous, MDMA and PMA especially have been known to cause a marked increase in body temperature (malignant hyperthermia) leading to rapid onset of muscle breakdown, DIC, renal failure, and cardiovascular system failure, as well as seizures.

**Symptomatic tachycardias refractory to Benzodiazepines:**

Lidocaine is the anti-arrhythmic of choice for refractory monomorphic ventricular tachycardia (VT). Magnesium Sulfate remains the anti-arrhythmic of choice for polymorphic VT (Torsades), although should be used with caution when hypotension is present.

**Cocaine is known to widen the QRS, therefore procainamide is contraindicated in this situation.**

**Pacing VT:** While large broad spectrum studies have not been performed, overdrive pacing at a rate of 100-120 PPM has been reported to terminate drug induced polymorphic VT (Torsades) refractory to other therapies. The AHA lists this intervention as *class indeterminate*; therefore it is not yet a standard intervention. Contact medical control for guidance.

**Drug induced Acute Coronary Syndromes (ACS):** The AHA notes that: "...Cardiac Catheterization studies have shown that nitroglycerine and phentolamine reverse cocaine induced vasoconstriction" and "Therefore, nitroglycerine and benzodiazepines are first line agents". **Beta-blockers in this setting remain controversial at best, and in many cases out right contraindicated.**