

SECTION: R-4

PROTOCOL TITLE: TCA Overdose

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**GENERAL COMMENTS:** Tricyclic Antidepressants (TCA's) are a leading cause of death in intentional overdoses. Aggressive care at onset of S/S is essential, as the patient can decompensate quickly. Early s/s includes widening of the QRS, tachycardia, hypotension and altered LOC.

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

- Trendelenburg for hypotension.
- If pediatric patient, determine patient's color category on length based resuscitation tape (Broselow Tape)
- In addition to obtaining standard medical history attempt to obtain
  - Name of ingested substance(s)
  - Quantity ingested
  - Time of ingestion
  - Has vomiting occurred?

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

- Aggressively treat hypotension with IV crystalloid solution
- Use Metriset administration set on medical patients less than 8 years of age

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

- Continuous EKG monitoring is mandatory, 12 lead is recommended as stability permits.

*Specific Pharmacological Therapy*

- Sodium Bicarbonate for s/s of TCA toxicity
  - IV Adult and Pediatric: 1 meq/kg IV (minimum 50 meq for adults)
  - REBOLUS in 5-10 min at 0.5 meq/kg if s/s persist
  - OPTIONAL INFUSION: 50-100 meq/1000 cc, minimum infusion rate of 150 cc/hr

*Anti-Arrhythmics*

- Magnesium Sulfate (*for Torsades in conjunction with Sodium Bicarbonate*)
  - 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.
- Lidocaine (Xylocaine) *for Ventricular Tachycardia REFRACTORY to Sodium Bicarbonate*
  - 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

TCA OVERDOSE

- 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

Vasopressors for refractory hypotension.

- Epinephrine infusion:
  - Adult: 2-10 mcg/min
    - See, "Adult Epinephrine Infusion Chart"
    - Titrated to adequate heart rate and/or blood pressure response
  - Pediatric: 0.1-0.2 mcg/kg/min
    - See, "Pediatric Epinephrine," preparation/infusion chart
    - Titrated to adequate heart rate and/or blood pressure response
- Dopamine infusion:
  - Adult and Pediatric: 2-20 mcg/kg/min.
    - Titrated to adequate heart rate and/or blood pressure response
    - See, "Adult Dopamine Infusion Chart," for adult infusion
    - See, "Pediatric Dopamine Infusion Chart," for infusion

*Anticonvulsants:*

- Valium (diazepam):
  - Adult:
    - IV/IO: 2-10 mg every 5-10 minutes as needed to a maximum of 20 mg
    - IM: 5-10 mg every 5-10 minutes as needed to a maximum of 20 mg
  - Pediatric:
    - IV/IO: 0.1-0.2 mg/kg every 5 minutes as needed to a maximum total dose of 10 mg
    - PR/IM: 0.5 mg every 5 minutes as needed to a maximum total dose of 10 mg

- Versed (midazolam):
  - Adult:
    - IV/IO: 2.5 mg to a maximum of 5 mg
    - IN (Intranasal): 5mg (2.5 mg each nare)
    - IM: 5mg to a maximum dose 5 mg
  - Pediatric:
    - IV/IO/IM: 0.05-0.2 mg/kg every 5-10 minutes as needed to a maximum total dose of 10 mg
    - IN/PR: 0.2-0.4 mg/kg every 5 minutes as needed to a maximum total dose of 5 mg
- For hemodynamically UNSTABLE patients presenting with wide complex tachycardias, perform immediate synchronized DC cardioversion.
- Consider sedation prior to cardioversion if it will not cause unnecessary delays.
  - DO NOT administer if:
    - Systolic BP < 90 mmHg
    - Low respiratory rate, SpO2 and/or diminished mental status
- Versed (midazolam) IV/IM/IO
  - 0.5-2.5 mg
  - Maximum 5 mg

*Synchronized DC cardioversion:*

- For unstable monomorphic ventricular tachycardia:
  - Initial energy setting of 100J (or as per manufacturer's recommendation)
  - If no response, escalate energy settings as follows:
  - 200J→300J→360J (or as per manufacturer's recommendation)
- If unable to obtain synchronization with QRS complexes, (as with torsades de pointes) proceed with unsynchronized cardioversion as detailed below

*Unsynchronized DC cardioversion:*

- For unstable torsades de pointes (polymorphic wide complex tachycardia)
  - Use unsynchronized defibrillation energy settings
  - 200J → 300J → 360J (or as per manufacturer's recommendation)

## *Antidysrhythmics:*

- For dysrhythmias unresponsive to sodium bicarbonate therapy
  - 2% lidocaine
- Adult:
  - IV/IO bolus dose: 1-1.5 mg/kg initial bolus as needed every 5-10 minutes at ½ bolus to a maximum of 3 mg/kg
  - ETT: 2.0 mg/kg
- Lidocaine infusion:
  - If, following lidocaine therapy, dysrhythmia is terminated
    - 2-4 mg/min.
    - Administer using 60 gtt/ml administration set
  - To prepare: dilute 1 g lidocaine to 250 ml to yield a solution of 4 mg/ml
    - 1.0 mg/kg bolus total = 2mg/min (30 gtts/min)
    - 2.0 mg/kg bolus total = 3 mg/min (45 gtts/min)
    - 3.0 mg/kg bolus total = 4 mg/min (60 gtts/min)
  - Pediatric:
    - IV/IO bolus dose: 1 mg/kg initial bolus
    - Repeat as needed every 5-10 minutes to a maximum of 3 mg/kg
    - ETT: 2.0 mg/kg

**PHYSICIAN PEARLS:**

- **Procainamide and Amiodarone are contraindicated**, as are other drugs that widen the QRS.

Due to dopamine blockade, as well as catecholamine depletion, Epinephrine is considered a more effective vasopressor than dopamine, although fluids should be aggressively administered first.

In adults,

- 10-20 mg/kg is considered a moderate to serious exposure where coma and cardiovascular symptoms are expected
- Approximately 35 mg/kg is thought to be a lethal dose without medical intervention

In children,

- Doses of greater than 3.5 mg/kg seem to increase the risk of asymptomatic EKG changes
- Ingestions greater than 1.5 mg/kg should be referred to an Emergency Department

The drug overdose history correlates reasonably well with the clinical outcome. Generally, at less than 10 mg/kg, few fatalities are found; 35 mg/kg is the approximate LD50; and 50 mg/kg, death is likely (Spiker and Biggs 1976). Patients have survived ingestions of 10 g of amitriptyline (Burks et al 1974), but overdoses as small as 500 mg have been fatal. (Manoquerra Weaver 1977).

**ALL TCA OVERDOSES SHOULD BE EVALUATED AT A HEALTHCARE FACILITY.**

*EKG screening*

Boehnert and Lovejoy in NEJM, 1985 Studied 49 patients with known first generation cyclic antidepressant overdose and found that QRS widening was an excellent predictor of complications from elevated TCA levels.

- QRS>100 msec, 1/3 of patients had seizures
- QRS>160 msec, 1/2 of patients had ventricular dysrhythmia's
- Bundle branch blocks, usually right, are also common, appearing early and persisting late
- *Persistent tachycardia is usually the first sign of toxicity*

Protocol

**R-4**

**TCA OVERDOSE**