Tricyclic Antidepressant Overdose

Simulation Session
Cellular Effects

- Inhibition of pre-synaptic norepinephrine and serotonin reuptake
- Blockade of cardiac sodium channels
- Antagonism of central and peripheral muscarinic receptors
- Antagonism of peripheral alpha-1 receptors
- Antagonism of histamine and GABA receptors
Pharmacology

- Absorption from GI tract within 2 – 8 hours; antimuscarinic effect may delay absorption
- Large Vd and protein bound – diuresis or dialysis not helpful
- Half-life may be prolonged in overdose
Clinical Presentation

- **CNS**: sedation, confusion, delirium, hallucinations, seizures
- **Cardiovascular**: tachycardia, arrhythmias, conduction delay, hypotension
- **Anticholinergic effects**: hyperthermia, flushing, dilated pupils, ileus, urinary retention
Cardiac Effects

- QRS widening
- PR and QT prolongation
- BBB
- Conduction delay – similar to class 1A antiarrhythmics
- VT and VF: more common in severe poisoning with acidosis, hypotension and QRS prolongation
- Refractory hypotension is the main cause of mortality
Evaluation

- Serial ECGs
- QRS > 100 msec: risk of seizure and cardiac toxicity including ventricular arrhythmia
- TCA blood levels: in general, poor predictors of toxicity
Management

- Airway, Breathing, Circulation
- Charcoal 1 g/kg up to 50 g if within 2 hours of ingestion
- **Sodium bicarbonate**: for QRS > 100 or ventricular arrhythmia
- Initial bicarb dose 1 – 2 meq/kg; begin infusion if QRS narrows
  - pH goal 7.5 – 7.55
- Hypotension: NS, norepinephrine or phenylephrine
Management

- **Antiarrhythmics**
  - Na bicarb is the main antiarrhythmic
  - Class 1A and 1C contraindicated
  - Class III (amiodarone) may prolong QT

- **Seizures** = treat with benzos
## Tricyclic antidepressant intoxication overview

To obtain emergent consultation with a medical toxicologist, call the United States Poison Control Network at 1-800-222-1222, or access the World Health Organization's list of international poison centers (www.who.int/ipcs/poisons/centre/directory/en).

### Clinical features

**Neurologic**  
Sedation, coma, seizures

**Cardiac**  
Tachycardia, hypotension, conduction abnormalities

**Anticholinergic**  
Dilated pupils, dry mouth, absent bowel sounds, urinary retention

### Diagnostic evaluation

**Electrocardiographic changes in severe poisoning:**
- QRS duration >100 msec
- Rightward deflection of the terminal 40 msec of the QRS complex
- Deep S wave in leads I, AVL; tall R wave in lead AVR
- R wave in AVR >3 mm; R/S ratio in AVR >0.7

**Serum TCA levels do not help to guide therapy**

### Treatment

**Airway**  
Manage as indicated; many patients require tracheal intubation

**Breathing**  
Administer supplemental oxygen

**Circulation**  
Treat hypotension. If hypotensive despite aggressive volume resuscitation, consider pressor therapy with alpha-adrenergic agonist (noradrenaline, norepinephrine).

Conduction disturbances: If QRS > 100 msec, challenge with intravenous sodium bicarbonate (2 to 3 meq/kg IV push) and assess for QRS narrowing. If QRS narrows, begin continuous infusion (132 meq of sodium bicarbonate in 1 liter of D5W to run at 250 mL/hour in adults or twice the maintenance fluid rate in children).

**Gastrointestinal decontamination**  
Administer activated charcoal if patient presents within 2 hours of ingestion, unless gastrointestinal complication (bleed, obstruction) suspected

**Seizures**  
Treat with benzodiazepines

**Do NOT** treat with phenytoin