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

Hypotension: Treat with intravenous crystalloid. If hypotensive despite aggressive volume resuscitation, consider pressor therapy with alpha-adrenergic agonist (neosynephrine, 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 (ileus, obstruction) suspected

Seizures

Treat with benzodiazepines

Do **NOT** treat with phenytoin