Poisoning - Tricyclic Antidepressant

This guideline is a general approach to tricyclic antidepressant poisoning. For specific details please contact **Poisons Information: 131126** or refer to the Toxicology Handbook.

**Agents:**

- Amitriptyline
- Clomipramine
- Dothiepin
- Doxepin
- Imipramine
- Nortriptyline
- Trimipramine

**Background**

Tricyclic antidepressants (TCAs) act on a variety of receptors whose actions include:

- Noradrenaline reuptake inhibition
- Central and peripheral anticholinergic effect
- Fast sodium channel blockade in the myocardium
- Peripheral alpha₁-adrenergic receptor blockade

The life threatening effects of acute tricyclic antidepressant (TCA) overdose are:

- Rapid onset of coma
- Seizures
- Cardiac dysrhythmias
Hypotension and central and peripheral anticholinergic effects may also be seen

**Risk Assessment**

- Most acute accidental paediatric exposures do not result in life threatening toxicity
- A 10kg child can develop life threatening poisoning with the ingestion of a single tablet (e.g. 150mg amitriptyline)
- Patients who ingest a large dose of TCA usually develop evidence of intoxication within 2-4 hours, and always within 6 hours
- If there is suspicion of deliberate self poisoning patients are to be referred for evaluation in hospital, regardless of the dose ingested

**Typical Clinical Course**

Common effects following acute TCA ingestion include:

- Drowsiness
- Ataxia
- Sinus tachycardia
- Dilated pupils
- Decreased bowel sounds
- Ileus and Urinary retention

Life threatening effects following acute TCA overdose are:

- Coma
- Seizures
- Ventricular dysrhythmia
- Hypotension
- Central and Peripheral anticholinergic effects may also be seen

<table>
<thead>
<tr>
<th>Ingested Dose</th>
<th>Symptoms and Disposition</th>
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<tbody>
<tr>
<td>&lt; 5 mg/kg</td>
<td><strong>Minimal toxicity</strong></td>
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<td>Patients do not require decontamination or referral to hospital except in cases of deliberate overdose</td>
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<tr>
<td>5 - 10mg/kg</td>
<td><strong>Major symptoms unlikely</strong></td>
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<td><strong>Mild anticholinergic effects may be present</strong></td>
</tr>
<tr>
<td></td>
<td>• Drowsiness</td>
</tr>
<tr>
<td></td>
<td>• Tachycardia</td>
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<td>Patients should be referred to hospital for evaluation and observation and may be discharged if asymptomatic at 6 hours post ingestion.</td>
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</table>
| > 10mg/kg | Life threatening effects:  
• Coma  
• Seizures  
• Cardiac dysrhythmias  
• Hypotension  
Anticholinergic effects are likely but often masked by coma  
Patients are to be admitted to the PICU. Intubation and hyperventilation may be required. |
| > 30mg/kg | Severe toxicity with pH-dependent cardiotoxicity and coma expected to at least >24 hours  
Patients are to be admitted to PICU. Intubation and hyperventilation may be required. |

Investigations

Screening (for deliberate overdose):

- BSL  
- Paracetamol level (if deliberate ingestion)

Specific

- Serial 12 lead ECG  
  - Prolonged QRS interval (sodium channel blockade)  
    - > 100ms predicts risk of seizures  
    - > 160ms predicts risk of ventricular tachycardia  
  - Large terminal R wave in aVR  
  - Increased R/S ratio (> 0.7) in aVR  
  - Prolonged QT interval (potassium channel blockade)
- Blood gas (pH)

Management

Resuscitation

Overdose may be life-threatening and should be managed in a resuscitation bay with cardiac monitoring. Cardiac monitoring should continue for at least 6 hours post-ingestion or until resolution of toxicity.

Potential early life-threats that require immediate intervention include:

- Coma  
- Respiratory compromise  
- Seizures  
- Cardiac dysrhythmia  
- Cardiac arrest
Life-threatening overdose will require intubation and hyperventilation to a pH of 7.50-7.55. Bicarbonate boluses may be required just prior to intubation to optimise cardiovascular status.

### Reduced level of consciousness

- Intubation and hyperventilation are indicated if the GCS falls below 12

### Ventricular dysrhythmias

- Sodium bicarbonate boluses (100mmol or 2mmol/kg) IV every 1-2 minutes is given until restoration of the perfusing rhythm and normalisation of the QRS.
- Cardioversion and defibrillation are unlikely to be effective.
- Type Ia antidysrhythmic agents (e.g. procainamide), amiodarone and beta-blockers are contraindicated.
- Serial ECGs should be performed every 5-10 minutes until ECG abnormalities are stabilised.

### Hypotension

- Treat with IV crystalloid solutions (10–20 mL/ kg) and assess response
- Refractory hypotension may require sodium bicarbonate and adrenaline or noradrenaline infusion

### Seizures

- Benzodiazepines are first-line treatment
- Phenytoin is contraindicated

### Decontamination

Activated charcoal 1gram/kg indicated for ingestions > 10mg/kg but should not be given until the airway is secured by ETT and after dealing with resuscitation requirements.

### Enhanced Elimination

No role

### Antidote

Sodium bicarbonate, as above

### Disposition

- Any patient who is asymptomatic at 6 hours can be medically cleared.
Patients who have mild ECG or mental state changes should be admitted to a medical ward and require ongoing careful observation and regular ECGs.

Patients with significant TCA overdose will require PICU admission.

**Nursing**

- Baseline observations: heart rate, respiratory rate, oxygen saturation blood pressure and neurological observations
- Minimum of hourly observations should be recorded whilst in the emergency department
- Any significant changes should be reported immediately to the medical team
- Baseline ECG on arrival and as required throughout presentation
- Continual cardiac monitoring
- Blood sugar level for patients with reduced level of consciousness
- Ensure the patient is always aided when ambulating to prevent a fall
- Fluid balance (urinary retention is a common anticholinergic effect)

**References**

2. Poisons Information Service 131126
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<tr>
<th>Endorsed by:</th>
<th>Medical Advisory Committee</th>
<th>Date:</th>
<th>30 September, 2015</th>
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