Poisoning Overview

This guideline provides an outline of the general approach to poisoning. Specific information about poisoning presentations can be obtained from Poisons Information: 131126 or refer to the Toxicology Handbook.

Background

- The vast majority of morbidity and mortality in toxicology arises from complication of the poisoning not the poisoning itself, particularly
  - Aspiration due to sedation
  - Urinary retention
- Good supportive care is the best way to prevent this
- Poisonings follow a highly predictable path
- Risk assessment is an essential cognitive step during assessment that outlines ongoing care
- If information is unclear always base the risk assessment upon a “worse case scenario”
- Know your list of “2 pills can kill” in a toddler.
  - Most accidental paediatric ingestions are only 1-2 tablets and a risk assessment will be low. Nevertheless, there are some toxins which can kill a young child with a very small exposure. These should be aggressively managed with early senior advice and/or Toxicology service input.

- The general approach to all poisonings should follow the “RRSIDEAD” format

R Resuscitation
R Risk Assessment
S Supportive Care
I Investigations
Management

Resuscitation

Follow traditional ABC approach with modification

- Airway
- Breathing
- Circulation
- Control/Correct
  - Seizures with midazolam (phenytoin contraindicated)
  - Hypothermia
  - Hyperthermia
    - Temperature > 38.5° requires core monitoring
    - Temperature > 39.5° is an indication for intubation, ventilation and paralysis

Risk Assessment

The following five factors will provide an accurate prediction of clinical course, potential complications and time course of poisoning to direct management.

- Agent/s
- Dose
- Time of ingestion
  - Use the latest possible time if uncertain
- Patient factors
  - Weight
  - Comorbidities that may affect prognosis, for example:
    - Heart disease complicating calcium channel overdose
    - Morbid obesity affecting airway patency
- Clinical status (features and progress)
  - Agents commonly affect the autonomic, CNS and neuromuscular systems and may produce a recognisable “toxidrome”
  - Does the clinical presentation of the patient fit with the predictable profile of the overdose?

<table>
<thead>
<tr>
<th>Anticholinergic</th>
<th>Sympathomimetic</th>
<th>Serotonergic</th>
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<tbody>
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### Examples

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
<th>Antihistamines</th>
<th>Antidepressants</th>
<th>Antipsychotics</th>
<th>Oxybutinin</th>
<th>Street amphetamines</th>
<th>SSRIs/SNRIs</th>
<th>TCAs</th>
<th>MAOi</th>
<th>MNDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomic</td>
<td>Vital Signs</td>
<td>Elevated</td>
<td>Elevated</td>
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<tr>
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<td>Temperature</td>
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<tr>
<td></td>
<td>Pupils</td>
<td>Dilated</td>
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<tr>
<td></td>
<td>Skin/Mucous Membranes</td>
<td>Flushed, Dry</td>
<td>Flushed, Sweaty</td>
<td>Flushed, Sweaty</td>
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<tr>
<td>CNS</td>
<td>Mental Status</td>
<td>Agitated delirium</td>
<td>Euphoria, Agitated</td>
<td>Agitated, Coma</td>
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<tr>
<td></td>
<td>Seizures</td>
<td>Rarely</td>
<td>Yes</td>
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<tr>
<td>Neuromuscular</td>
<td>Tone</td>
<td>Normal</td>
<td>Increased/Rigidity</td>
<td>Increased/Rigidity</td>
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<td></td>
<td>Reflexes</td>
<td>Normal</td>
<td>Hyperreflexic</td>
<td>Hyperreflexic/clonus</td>
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<tr>
<td>Complications</td>
<td>Urinary retention</td>
<td></td>
<td>Severe hypertension</td>
<td>Dysrhythmias</td>
<td>Myocardial infarction</td>
<td>Pulmonary edema</td>
<td>Rhabdomyolysis</td>
<td>Hyponatremia</td>
<td>SAH</td>
<td>Hyperthermia</td>
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<tr>
<td></td>
<td>Hyperthermia</td>
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<td>Rhabdomyolysis</td>
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<td></td>
<td>Injury to self</td>
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### Supportive Care and Monitoring

- Supportive care is tailored to the risk assessment and may involve:
  - IV hydration
  - Control of agitation and seizures with titrated benzodiazepines
  - Ensuring normoglycaemia
  - Bladder care (especially monitoring for urinary retention)

### Investigations

Investigations are done for either specific purposes, to identify occult overdoses, or specific tests to determine the presence or level of a known ingestant

### Screening

- 12 lead ECG
  - Wide QRS (sodium channel blockade)
  - Long QT (potassium channel blockade, anti-psychotic overdose)
  - Heart blocks (calcium channel and beta blockers/calcium channel poisoning)
- Serum Paracetamol level (4 hours)
- Blood glucose level (BGL)

### Specific
• Drug levels
  ◦ Paracetamol (in known ingestion)
  ◦ Iron
  ◦ Alcohols
  ◦ Lithium
  ◦ Salicylate
  ◦ Theophylline
  ◦ Anti-epileptics
  ◦ Others

Other adjunctive tests as indicated:

• Blood gas:
  ◦ High anion gap metabolic acidosis
    ▪ TCA
    ▪ Salicylates (late)
    ▪ Iron
    ▪ Toxic alcohol
    ▪ Metformin
  ◦ Respiratory alkalosis
    ▪ Salicylates
  ◦ Respiratory acidosis
    ▪ Sedatives

• Abdominal X-Ray:
  ◦ Confirmation of iron or other heavy metal ingestion

• Blood tests:
  ◦ LFT (delayed paracetamol)
  ◦ UEC
  ◦ INR (Warfarin, delayed paracetamol)

Decontamination

• Consider but rarely required
  ◦ Activated charcoal
    ▪ Will not bind to hydrocarbons or alcohol, corrosives and metals
    ▪ Reserved for life threatening intoxications in which other measures are not expected to result in a good outcome
    ▪ Contraindicated in un-intubated patient if decreased conscious level, vomiting or seizures are expected
    ▪ Can be considered where the toxin is likely to remain in the gastrointestinal tract (generally within the first hour post ingestion for most agents)
  ◦ Other methods: e.g. whole bowel irrigation - should not be instigated in the ED and should only be commenced on advice of Poisons Information
Enhanced Elimination

- Consider but rarely required
  - Techniques include: multiple dose activated charcoal, urinary alkalinisation, haemodialysis, haemofiltration, charcoal haemoperfusion

Antidotes

- The risk assessment should determine if the potential benefit outweighs the possible adverse effects of the antidote

<table>
<thead>
<tr>
<th>Antidote</th>
<th>Poison</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-acetylcysteine</td>
<td>Paracetamol</td>
</tr>
<tr>
<td>Naloxone</td>
<td>Opiates</td>
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<tr>
<td>Flumazenil</td>
<td>Benzodiazepines</td>
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<tr>
<td>Desferrioxamine</td>
<td>Iron</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>TCAs</td>
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</tbody>
</table>

Disposition

- The disposition will be determined by:
  - The clinical risk assessment of the overdose
  - The psychiatric safety of the patient (for deliberate overdoses)
  - Other safety factors (parental neglect or drug use, domestic issues)
- Children should not be discharged home at night unless the risk assessment determines that the overdose is trivial and not requiring any form of observation

Discharge home with parental supervision:

- Trivial overdose with no requirement for observation
- Ensure safety issues such as accessibility to tablets are addressed and provide parents with [Kidsafe WA Poisoning Fact Sheet](#)
- Low risk overdose with minimal potential for deterioration during day-time hours
- Parents must be able to return to ED in the event of deterioration

Emergency observation ward

- Stable patient with low-risk overdose requiring observation
- Low risk overdose with minimal potential for deterioration during night hours

Medical ward

- Stable patient requiring medical or antidote therapy
• Any suspicion of NAI

**PICU**

• Unstable or intubated patient

**Psychiatric Ward**

• Medically cleared patient deemed at risk of deliberate self harm

**Nursing**

• Baseline observations include 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
• Nursing care specific to the presentation

<table>
<thead>
<tr>
<th>Two Tablets - Potentially Lethal to a 10kg Child²</th>
<th>Principle Features of Severe Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amphetamines</strong></td>
<td>Agitation</td>
</tr>
<tr>
<td>• Amphetamine</td>
<td>Confusion</td>
</tr>
<tr>
<td>• Metamphetamine</td>
<td>Hypertension</td>
</tr>
<tr>
<td>• MDMA (ecstacy)</td>
<td>Hyperthermia</td>
</tr>
<tr>
<td><strong>Baclofen</strong></td>
<td>Coma</td>
</tr>
<tr>
<td><strong>Calcium Channel Blockers</strong></td>
<td>Delayed onset of bradycardia</td>
</tr>
<tr>
<td>• Diltiazem CD</td>
<td>Hypotension</td>
</tr>
<tr>
<td>• Verapamil SR</td>
<td>Conduction defects</td>
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<td></td>
<td>Refractory shock</td>
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<tr>
<td><strong>Chloroquine Hydrochloroquine</strong></td>
<td>Rapid onset of coma</td>
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<tr>
<td></td>
<td>Seizures</td>
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<tr>
<td></td>
<td>Cardiovascular collapse</td>
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<tr>
<td><strong>Dextropropoxyphene</strong></td>
<td>Ventricular tachycardia</td>
</tr>
<tr>
<td><strong>Opioids</strong></td>
<td>Coma, respiratory arrest</td>
</tr>
<tr>
<td>• Oxycodone</td>
<td>Note: May be delayed with diphenoxylate/atropine and controlled release morphine</td>
</tr>
<tr>
<td>• Methadone</td>
<td></td>
</tr>
<tr>
<td>• Morphine Sulphate</td>
<td>Coma</td>
</tr>
<tr>
<td>• Diphenoxylate/Atropine</td>
<td>Seizures</td>
</tr>
<tr>
<td>• Dextropropoxyphene</td>
<td>Ventricular tachycardia</td>
</tr>
<tr>
<td>• Propranolol</td>
<td>Coma</td>
</tr>
<tr>
<td></td>
<td>Seizures</td>
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<tr>
<td></td>
<td>Ventricular tachycardia</td>
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<tr>
<td></td>
<td>Hypoglycaemia</td>
</tr>
</tbody>
</table>
### Sulfonylureas
- Glibenclamide
- Glibenclamide/Metformin
- Gliclazide
- Glimepiride

Hypoglycaemia
Note: Onset may be delayed up to eight hours.

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### Theophylline

Seizures
Supraventricular tachycardia
Vomiting

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### Tricyclic antidepressants
- Dothiepin

Coma
Seizures
Hypotension
Ventricular tachycardia

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### Venlafaxine XR

Seizures

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### Non-pharmaceutical agents considered potentially lethal to children

<table>
<thead>
<tr>
<th>Agent</th>
<th>Dose of concern for a 10kg child</th>
<th>Clinical Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organophosphate and carbamate insecticides</strong></td>
<td>Single sip</td>
<td>Cholinergic symptoms, Seizures, Depressed level of consciousness</td>
</tr>
<tr>
<td><strong>Paraquat/Diquat</strong></td>
<td>Sip</td>
<td>Oro-pharyngeal burns, Multiple organ failure, Pulmonary fibrosis</td>
</tr>
<tr>
<td><strong>Hydrocarbons</strong></td>
<td>Sip</td>
<td>Rapid depressed level of consciousness, Seizures, Aspiration pneumonia</td>
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<tr>
<td>- Solvents</td>
<td></td>
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<tr>
<td>- Eucalyptus oil</td>
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<tr>
<td>- Kerosene</td>
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<tr>
<td><strong>Camphor</strong></td>
<td>5mL of 100%</td>
<td>Rapid depressed level of consciousness, Seizures, Hypotension</td>
</tr>
<tr>
<td><strong>Corrosives</strong></td>
<td></td>
<td>Gastro-oesophageal injury including perforation</td>
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<tr>
<td>- Sodium hydroxide</td>
<td></td>
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<tr>
<td>- Strong acids</td>
<td></td>
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</tr>
<tr>
<td><strong>Naphthalene</strong></td>
<td>One mothball</td>
<td>Methaemoglobinemia, Haemolysis</td>
</tr>
<tr>
<td>NB: Most mothballs contain paradichlorobenzene, which is non-toxic after a single accidental ingestion</td>
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<tr>
<td><strong>Strychnine</strong></td>
<td></td>
<td>Rapid onset of generalised muscle spasm, Death by respiratory failure</td>
</tr>
</tbody>
</table>
References