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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</table>


### Examples

<table>
<thead>
<tr>
<th>Examples</th>
<th>Antihistamines</th>
<th>Street amphetamines</th>
<th>SSRIs/SNRIs</th>
<th>TCAs</th>
<th>MAOi</th>
<th>MNDA</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Anaphylaxis</td>
<td>Amphetamines</td>
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### Autonomic Vital Signs

| Temperature     | Elevated       | Elevated           | Elevated    |
| Pupils          | Dilated        | Dilated            | Dilated     |
| Skin/Mucous     | Flushed, Dry   | Flushed, Sweaty    | Flushed, Sweaty |

### CNS Mental Status

| Mental Status   | Agitated delirium | Euphoria, Agitated | Agitated, Coma |
| Seizures        | Rarely           | Yes                | Yes           |

### Neuromuscular Tone

| Tone            | Normal          | Increased/Rigidity | Increased/Rigidity |
| Reflexes        | Normal          | Hyperreflexic      | Hyperreflexic/clonus |

### Complications

<table>
<thead>
<tr>
<th>Complications</th>
<th>Urinary retention</th>
<th>Severe hypertension</th>
<th>Dysrhythmias</th>
<th>Myocardial infarction</th>
<th>Pulmonary edema</th>
<th>Rhabdomyolysis</th>
<th>Hyponatremia</th>
<th>SAH</th>
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</table>

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

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

### Theophylline
Seizures
Supraventricular tachycardia
Vomiting

### Tricyclic antidepressants
- Dothiepin

Coma
Seizures
Hypotension
Ventricular tachycardia

### Venlafaxine XR
Seizures

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### Non-pharmaceutical agents considered potentially lethal to children\(^2\)

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