

NHS CATS
Children's Acute Transport Service



Clinical Guidelines

Poisoning

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Author	E Randle A Jones	Author Position	CATS Consultants
Document Owner	M Clement	Document Owner Position	CATS Operational and Nursing Lead
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Introduction

There may be a clear history of poisoning at presentation, but it should be considered in the differential diagnosis for any cases of unexplained encephalopathy (seizures or reduced level of consciousness) and/or metabolic acidosis; and in cases of unexplained respiratory, cardiovascular, liver, or multi-organ failure.

Poisoning can be accidental or intentional. Children aged 1–5 years are at particular risk of chemical exposure, accidental ingestion, or being deliberately fed prescribed or illicit drugs. Teenagers and older children more commonly present after an intentional overdose of prescribed or illicit drugs. It is important to take a history of any medication present in the household. It is not uncommon for there to be concurrent alcohol ingestion, and/or the ingestion of multiple substances.

Assessment

Ascertain the nature and time of poisoning, if possible. Remember that HAZMAT procedures may apply.

- Always check the [National Poisons Information Service \(NPIS\) online database](#)
- NPIS can also be contact for advice by telephone (0344 892 0111).
- Consider 'toxidromes' - a constellation of symptoms and signs due to the toxic effects of a particular chemical. RCH Melbourne provide a useful summary of [common toxidromes](#).

Initial resuscitation - ABCDE assessment and supportive care

- A standard approach to resuscitation is provided here. Deviation from standard management may be required depending on the poison or poisons involved. For example, phenytoin is not recommended in the treatment of seizures due to tricyclic antidepressant overdose.
- Treat hypoxia with oxygen and attend to airway management. Provide respiratory support as required. Involve anaesthetics early.
- Heart rate, respiratory rate, and the respiratory pattern may give clues as to the nature of the poisoning and should be carefully assessed and recorded.
- Treat shock with a 10ml/kg fluid bolus of balanced isotonic crystalloid (or 0.9% sodium chloride if balanced fluids not available). Assess for cardiac failure. If the child is requiring >20ml/kg fluid resuscitation, discuss with CATS.



- Inotropic/chronotropic drugs should be used with caution, as they could be arrhythmogenic in combination with some poisons; consider vasopressors first line, such as noradrenaline.
- Assess conscious level and pupillary size and response. Perform frequent neurological observations and use APLS guidelines as a starting point to treat status epilepticus.
- If the child is encephalopathic, consider the need for CT head where there is diagnostic uncertainty, and/or where there is a history of - or a suspicion of - trauma. Consider sending ammonia, creatine kinase and liver function.
- Measure blood glucose and treat hypoglycaemia.
- Measure electrolytes and correct significant abnormalities.
- An ECG should be performed for all cases of tricyclic antidepressants (TCA) overdose and where the full history of poisoning is uncertain. QRS prolongation may be a precursor to arrhythmia.
- Measure temperature and treat hypo or hyperthermia.
- Send urine for toxicology as soon as possible.
- Consider sending serum for salicylates and paracetamol

Decontamination

- Emesis is no longer recommended.
- Consider gut decontamination. Follow the poisons centre advice regarding charcoal administration.

Anion Gap

- Blood gas analysis and anion gap ($(\text{Na}^+ + \text{K}^+) - (\text{Cl}^- + \text{HCO}_3^-)$) should be performed. Elevated anion gap ($>16 \text{ mmol/L}$) is seen with methanol, ethanol, ethylene glycol, salicylates, ketones and iron poisoning (secondary to increased lactate).

Osmolar gap

- Calculated osmolarity = $(2 \times [\text{Na}^+]) + [\text{glucose}] + [\text{urea}]$.
- Osmolar gap = Osmolality (measured) – Osmolarity (calculated).
- Normal = < 10 .
- Gap > 20 is significant. This is seen with methanol and ethylene glycol.



Specific treatments

Specific treatments (see table below) should be given after discussion with the NPIS.

Paracetamol

- Attain history of timing and dose taken; serum level, at least four hours post ingestion, with AST/ALT, U+E, creatinine, blood gas, lactate and clotting.
- If hepatotoxic dose ingested (>75mg/kg) consider activated charcoal.
- Discuss management algorithms for acute, staggered, and repeated supratherapeutic ingestions and modified release formulations with medical toxicologist.
- If presenting at 4-8 hours the paracetamol level should be plotted on the [paracetamol overdose treatment graph provided in the BNFC](#) and treatment started with N-acetylcysteine (NAC) if the level is above the line.
- Start NAC empirically in any of the following circumstances:
 - Patient presents >8 hours after ingestion.
 - Serum paracetamol levels are not available within an 8-hour time window.
 - There is uncertainty over timing of overdose.
 - The patient is unconscious.
- Refer to the CATS Liver failure guideline and involve liver centre early.

Some poisons and their 'antidotes'

Poison	Specific treatment
Paracetamol	N-acetylcysteine (NAC)
Opiates	Naloxone
Salicylate or Tricyclics	Alkalinisation with sodium bicarbonate (1mmol/kg boluses should be considered)
Organophosphates	Atropine Pralidoxime
Beta Blockers	Atropine Isoprenaline or dobutamine Glucagon
Iron	Desferrioxamine



Indications for intubation in cases of poisoning

- Impaired airway reflexes
- Respiratory depression
- Severe cardiovascular compromise
- Altered level of consciousness, GCS ≤ 8
- Refractory seizures

Management following intubation

- Ventilate to normal parameters, unless otherwise indicated.
- Use end tidal CO₂ monitoring.
- Monitor cardiac rhythm and blood pressure; consider arterial line.
- Monitor blood glucose, and temperature.
- Regularly assess pupils and treat seizures.
- Continuous infusions of an analgesic and a sedative are likely to be required; consider possible interactions with the suspected poison.

Transport considerations

- Anticipate need for CRRT or ECMO and make the receiving centre aware.
- Draw up emergency drugs as appropriate, especially with cardiotoxic poisoning; and apply defibrillator pads for transport in high-risk patients (especially TCA/dysrhythmic agent overdose).
- Ensure relevant safeguarding information is handed over.

References

1. BNFC poisoning and emergency treatment <https://bnfc.nice.org.uk/treatment-summaries/poisoning-emergency-treatment/#paracetamol-poisoning> (no log in required).
2. RCH Melbourne Toxidromes poisoning https://www.rch.org.au/clinicalguide/guideline_index/Toxidromes_poisoning/#:~:text=A%20toxic%20syndrome%20or%20toxic,ome,of%20chemicals%20in%20the%20body (no log in required).
3. Toxbase www.toxbase.org Institutional log in details will be required, usually held by the hospital Emergency Department.

