



GUIDELINE 9.5.1

EMERGENCY MANAGEMENT OF A VICTIM WHO HAS BEEN POISONED

INTRODUCTION

A *poison* is a substance (other than an infectious substance) that is harmful to human health if ingested, inhaled, injected, or absorbed through the skin. Substances that are benign or therapeutic at low levels (for example, pharmaceuticals and herbal remedies) may be poisonous at higher concentrations. *Toxins* are poisons that are produced by living organisms. *Venoms* are toxins that are injected by an organism.

RECOGNITION

- Poisons can cause harm by a wide range of mechanisms and can cause a wide range of symptoms including unconsciousness, nausea, vomiting, burning pain in the mouth or throat, headache, blurred vision, seizures, difficulty breathing, respiratory arrest, and cardiac arrest.
- Recognition of poisoning may be obvious from the circumstances of the incident, but this is not always true. A person may complain of physical symptoms without realising these are due to a poison. Alternatively, they may exhibit abnormal behaviour, which may be misinterpreted as alcoholic confusion or psychiatric disturbance.
- Most pharmaceuticals are poisonous in overdose. Some are relatively safe unless many times the recommended dose is taken, but many are lethal if less than a single pack is taken simultaneously.
- Poisons may have a rapid effect, but their effects may also be delayed. Speed of effect is determined by the nature of the poison, its concentration, and the time of exposure.
- It is important to seek medical assessment or advice after significant exposure to a poison, even if symptoms are initially mild or absent.

MANAGEMENT

The principles of managing a patient who has been poisoned are:

- *Prevention of poisoning of the rescuer.*
- *Decontamination* of the patient.
- *Resuscitation and supportive care*, using the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8).

- *Specific management of particular poisons: antidotes, techniques to remove the poison from the body, and the treatment of complications of the poison.*
[Class A; LOE Expert Consensus Opinion]
- If the victim is unconscious or is not breathing normally, commence resuscitation if necessary, following the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8)
- Ensure that an ambulance has been called

1. Prevention of poisoning of the rescuer

- During first aid and subsequent treatment, the suspected poison should be identified and safely handled to minimise further exposure. The victim may pose a danger if the poisonous substance can be transferred to the rescuer (for example, by contact with contaminated clothing).
- If the poisoning occurs in an industrial, farm or laboratory setting suspect particularly dangerous agents and take precautions to avoid accidental injury.
- If more than one person simultaneously appears affected by a poison, there is a high possibility of dangerous environmental contamination.
- The rescuer may need to wear personal protective equipment (PPE) during decontamination and resuscitation. The need for PPE will be guided by knowledge of the likely poison. If equipment is not available to safely decontaminate and treat a victim, rescue may not be possible. [Class A; LOE Expert Consensus Opinion]

2. Decontamination

- Separate the victim from the poisonous substance. How this is done will depend on the type of the poison. Examples are listed below.
- If the poison is **SWALLOWED**
 - Give the person who has swallowed the poison a sip of water to wash out their mouth.
 - **Do NOT try to make them vomit.** Do NOT use Ipecac Syrup. ^{1:2} [Class A; LOE IV]
- If the poison is **INHALED**
 - Immediately get the person to fresh air, without placing yourself at risk.
 - Avoid breathing fumes. Special breathing apparatus may be required, for example, with cyanide or agricultural chemicals poisoning.
 - If it is safe to do so, open doors and windows wide.
- If the poison enters the **EYE**
 - Flood the eye with saline or cold water from a running tap or a cup/jug.
 - Continue to flush for 15 minutes, holding the eyelids open.
- If the poison contacts the **SKIN**
 - Remove contaminated clothing, taking care to avoid contact with the poison.
 - Flood skin with running cold water.
 - Wash gently with soap and water and rinse well.

3. Resuscitation and supportive care

- If the victim is unconscious or is not breathing normally, commence resuscitation if necessary, following the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8).
[Class A; LOE Expert Consensus Opinion]
- Before commencing resuscitation, quickly wipe obvious contamination from around the mouth.
- Ensure that an ambulance has been called
- A self-inflating bag-valve-mask apparatus is the safest way to provide ventilation for the BLS rescuer. If this equipment is not available, mouth-to-mask or mouth-to-mouth ventilation may be considered depending on the chemical ingested. Mouth-to-mouth ventilation should be avoided if cyanide or organophosphate poisoning is suspected.
[Class A; LOE Expert Consensus Opinion]
- Inhaled poisons are unlikely to pose a risk during mouth to mouth ventilation unless the victim is contaminated with the liquid phase of the inhaled poison.

4. Specific Management of particular poisons

- If possible, ascertain what poison or pharmaceutical has been taken, how much, and when. Then obtain medical advice promptly. The source of medical advice will depend on the situation. Options include:
 - Australian Poisons Information Centre on **13 11 26** anywhere in Australia 24 hours a day, 7 days a week.
 - New Zealand poisons centre **0800 764 766** (0800 POISON)
 - Occupational health facilities
- Some poisons have specific antidotes, but (with some exceptions, such as cyanide) these are rarely used outside hospital. However, accurately identifying these poisons will help treatment so if there are packets or bottles they should go with the victim to hospital. Poisons with antidotes include:
 - Cyanide
 - Organophosphates
 - Iron
 - Paracetamol
 - Antifreeze
 - Methanol
 - some Antidepressants
 - Digoxin
 - Warfarin

5. If unable to get advice, or while waiting for help to arrive:

- Monitor the victim, especially the Airway, Breathing and Circulation, and manage according to the Australian Resuscitation Council and New Zealand Resuscitation Council Basic Life Support Flowchart (Guideline 8).
[Class A; LOE Expert Consensus Opinion]

SUBSTANCES COMMONLY CAUSING POISONING

- Paracetamol is the most common pharmaceutical overdose leading to hospital admission, and is also responsible for the most calls to Australian Poisons Information Centres.³ Paracetamol is involved in a large proportion of accidental poisoning in children. Without treatment, even small amounts of paracetamol are sufficient to cause an adult significant liver damage and even death and effects may be delayed. Any poisoning in excess of recommended doses requires immediate medical attention. The treatment for paracetamol poisoning is most effective if administered as early as possible.
- Organic substances such as glues, hair spray, aerosol paints, lighter fluid, dry cleaning fluid, nail polish remover and petrol may be deliberately inhaled to produce altered sensation. Poisonous effects include:
 - Hyperactivity, followed by drowsiness and unconsciousness
 - Irregular heartbeat, followed by cardiac arrest
 - Difficulty breathingThese dangers are increased by exercise, inhaling poison from bag, or inhalation in a confined space.
- In Australia, household chemicals are the third most common cause of poisoning in children after pharmaceuticals and venoms.⁴ Household chemicals may include caustic substances (e.g. dishwasher detergent) which have a risk of significant damage to the oesophagus and lung.⁵ Do not induce vomiting to prevent further damage to the oesophagus and possible lung damage due to aspiration.
- Fungi (mushrooms; toadstools) grow widely throughout Australia. Some are edible, but some are poisonous, causing hallucinations, vomiting, and diarrhea. Ingestion of even one *Amanita phalloides* mushroom can cause liver failure and death. Cooking does not neutralise the toxin. Most reported cases of mushroom poisoning are in children less than five eating mushrooms growing in their home gardens.⁶ The risk can be reduced by regularly checking for and removing garden mushrooms.
- Cyanide is not a common cause of poisoning but may occur from inhalation of fume during house or industrial fires or occupational exposure. As early treatment with an antidote can be lifesaving, workplaces with a risk of cyanide exposure should be adequately prepared. Depending on the risk, preparation should include:
 - frequent inspection of work practices,
 - plans for containment and decontamination of spills,
 - access to a resuscitation device capable of delivering high oxygen concentrations with the ability to assist ventilation if necessary, and
 - a cyanide antidote.The contents of a workplace Cyanide Emergency Kit should be determined by a qualified occupational health assessor, taking into account the nature of the threat, first aider training, and the proximity of external assistance. Several cyanide antidotes are commercially available.

Unlike other strategies, intravenous hydroxycobalamin (vitamin B₁₂) has few adverse effects.^{7,8} There is more evidence for the efficacy of hydroxycobalamin (three fair quality studies⁹⁻¹² and three poor quality studies¹³⁻¹⁵) than for the alternatives.

Adult patients with suspected severe cyanide poisoning (including those in cardiac arrest) should receive immediate intravenous hydroxycobalamin, 5mg over 15 minutes with repeat dosing up to 15mg. [Class A; LOE IV] Even if only BLS rescuers are likely to be immediately available, keeping hydroxycobalamin for use by pre-hospital ALS or hospital personnel may still be useful.

PREVENTION

- Many poisons are substances that also have a useful purpose. Poisoning is particularly common in children and vulnerable adults. Ensuring poisons are only accessible by people who need and know how to use them reduces their risk of harm.
- Make a survey of your home or workplace and identify all poisonous substances.
- Remove poisons or medicines that are unwanted. Dispose of chemicals safely using their accompanying directions. Pharmaceuticals can be returned to a pharmacy for safe disposal, which is safer and more environmentally friendly than disposal in domestic waste or flushing down a toilet. The Poisons Information Centre can also advise on methods of safe disposal.
- Store poisonous substances in their original containers in locked or child-resistant cupboards or containers out of reach of children. Do not store medicines in the refrigerator unless advised to do so by a pharmacist.
- Use non-poisonous alternatives to cleaning products, insecticides, etc. when possible.
- Keep the amount of poisonous substances stored in a home to a minimum.
- When possible, choose substances available in child-resistant packaging. However, do not rely on child-resistant packaging to prevent a child's access to a poison.
- Read medicine labels and use according to the directions. Ensure the right:
 - medication
 - person
 - dose
 - route of administration
 - time and frequency of administration
- Wear the recommended personal protective equipment when using toxic or caustic chemicals, for example spraying, painting, or oven cleaning.
- Do not eat or drink near poisons.

FURTHER READING

ARC Guideline 8 Cardiopulmonary Resuscitation

ARC Guidelines 9.4.1 – 9.4.8 Envenomations

For information on specific poisons, consult the Australian Poisons Information Centre on 13 11 26 or New Zealand poisons centre 0800 764 766 (0800 POISON)

REFERENCES

1. Heard K: The changing indications of gastrointestinal decontamination in poisonings. *Clin.Lab Med.* 2006; 26: 1-12, vii
2. Greene SL, Dargan PI, Jones AL: Acute poisoning: understanding 90% of cases in a nutshell. *Postgrad.Med.J.* 2005; 81: 204-16
3. Daly FF, Fountain JS, Murray L, Graudins A, Buckley NA: Guidelines for the management of paracetamol poisoning in Australia and New Zealand--explanation and elaboration. A consensus statement from clinical toxicologists consulting to the Australasian poisons information centres. *Med.J.Aust.* 2008; 188: 296-301
4. Lam LT: Childhood and adolescence poisoning in NSW, Australia: an analysis of age, sex, geographic, and poison types. *Inj.Prev.* 2003; 9: 338-42
5. Turner A, Robinson P: Respiratory and gastrointestinal complications of caustic ingestion in children. *Emerg.Med.J.* 2005; 22: 359-61
6. Fungi poisoning. 1999. Melbourne, State of Victoria. Ref Type: Pamphlet
7. Uhl W, Nolting A, Golor G, Rost KL, Kovar A: Safety of hydroxocobalamin in healthy volunteers in a randomized, placebo-controlled study. *Clin.Toxicol.(Phila)* 2006; 44 Suppl 1: 17-28
8. Forsyth JC, Mueller PD, Becker CE, Osterloh J, Benowitz NL, Rumack BH et al.: Hydroxocobalamin as a cyanide antidote: safety, efficacy and pharmacokinetics in heavily smoking normal volunteers. *J.Toxicol.Clin.Toxicol.* 1993; 31: 277-94
9. Borron SW, Baud FJ, Barriot P, Imbert M, Bismuth C: Prospective study of hydroxocobalamin for acute cyanide poisoning in smoke inhalation. *Ann.Emerg.Med.* 2007; 49: 794-801, 801
10. Houeto P, Hoffman JR, Imbert M, Levillain P, Baud FJ: Relation of blood cyanide to plasma cyanocobalamin concentration after a fixed dose of hydroxocobalamin in cyanide poisoning. *Lancet* 1995; 346: 605-8
11. Espinoza OB, Perez M, Ramirez MS: Bitter cassava poisoning in eight children: a case report. *Vet.Hum.Toxicol.* 1992; 34: 65
12. Fortin JL, Desmettre T, Manzon C, Judic-Peureux V, Peugeot-Mortier C, Giocanti JP et al.: Cyanide poisoning and cardiac disorders: 161 cases. *J.Emerg.Med.* 2010; 38: 467-76
13. Fortin JL, Giocanti JP, Ruttimann M, Kowalski JJ: Prehospital administration of hydroxocobalamin for smoke inhalation-associated cyanide poisoning: 8 years of experience in the Paris Fire Brigade. *Clin.Toxicol.(Phila)* 2006; 44 Suppl 1: 37-44
14. Borron SW, Baud FJ, Megarbane B, Bismuth C: Hydroxocobalamin for severe acute cyanide poisoning by ingestion or inhalation. *Am J.Emerg.Med.* 2007; 25: 551-8
15. Pontal PG, Bismuth C, Garnier R: Therapeutic attitude in cyanide poisoning: retrospective study of 24 non-lethal cases. *Veterinary and Human Toxicology* 1982; 24: 286-7