Poisoning and Drug Overdosage: Introduction

A drug may become poison while at a time a poison may become a drug.
The dose or inappropriate use make it the poison.

Poisoning

- Poisoning may be local (e.g., skin, eyes, or lungs) or systemic depending on:
  - The route of exposure.
  - The chemical and physical properties of the poison.
  - Its mechanism of action.
- May be acute (organophosphate) or chronic (lead).

- The severity and reversibility of poisoning also depend on the functional reserve of the individual or target organ, which is influenced by:
  - Age and
  - Preexisting disease.

How Poisoning occur

- Unintentional exposures:

---Improper use of chemicals at work or play.

---Label misreading.

---Product mislabeling.

---Mistaken identification of unlabeled chemicals.

---Uninformed self-medication.

---Dosing errors by nurses, pharmacists, physicians, parents, and the elderly.

How Poisoning occur

- Intentional exposures:

  ---Recreational use like ethanol.

  ---Use of drugs for psychotropic effects or euphoria.

  ---Attempted suicide.

  ---Excessive self-dosing (misuse)

Accidental poisoning is more common in children while intentional poisoning in young adults

Types of poisoning

- Deliberate:
  - Overdose as self-harm or suicide attempt.
  - Child abuse ± fabricated or induced illness by carers (formerly referred to as Münchhausen's syndrome by proxy).
  - Third party (attempted homicide, terrorist, warfare).
- Accidental:
  - Most episodes of paediatric poisoning.
  - Dosage error:
    - Iatrogenic
    - Patient error
  - Recreational use.
- Environmental:
  - Plants
  - Food
  - Venomous stings/bites
- Industrial exposures.

Routes of poisoning

- Oral route is the most common one.
- Inhalational route.
- Parenteral route. IV or IM.
- Local contact. Skin, conjunctiva or mucosa.
- Exposure to radiation.

Different forms of poisons

- Foods.
  ---Mushrooms.
  ---Contaminated water or food.
  ---Food allergies.
- Drugs.
  ---Most of drugs if used in excessive dose.
  ---Opiates.
  ---Sedatives.
  ---Antidepressants & antipsychotics.
  ---Warfarin.

Different forms of poisons

- Chemicals.
  ---Organophosphates.
  ---Lead.
  ---Cyanide.
- Gases.
  ---Carbon mono oxide.
  ---Methane.
- Radiations.
  ---X rays.
  ---Radioactivity.

Diagnosis

- Although poisoning can mimic other illnesses, the correct diagnosis can usually be established by:

  ---History.

  ---Clinical examination.

  ---Toxicology screen.

  ---Routine investigations.

  ---Characteristic clinical course.

History

- This may be unreliable but include the following:
- What was taken, how much, when and by what route?
- Was alcohol consumed too?
- Any vomiting since ingestion?
- Establish past medical history, current medications and allergies.
- Was a suicide note left?
- Is the patient pregnant?
- Histories from others including: family, friends, paramedics, police and observers.

Investigations

- 12-lead electrocardiogram.
- LFTs and clotting.
- Arterial blood gases.
- Drugs level.
- Comprehensive toxicology screens not normally indicated in the emergency treatment.
- Carboxyhemoglobin levels if carbon monoxide poisoning is suspected.
- Urinalysis - query rhabdomyolysis; save sample for possible toxicological analysis.
- CXR if pulmonary oedema/aspiration suspected.
- CT scan of the brain may be needed to exclude other causes of alterations in conscious level.

General management

❑ Resuscitation·

- **Airway** :
  - Open, suction, maintain and intubate as necessary.
  - Do not give mouth to mouth breathing.
- **Breathing**:
  - Assess work and effectiveness of ventilation.
  - Give oxygen ± assisted ventilation (avoid mouth-to-mouth).
  - Respiratory depression - consider opiates, benzodiazepines, early salicylate poisoning.
  - Tachypnoea - consider metabolic acidosis, eg salicylates, methanol.

General management

- **Circulation**:
  - Attach a cardiac monitor, assess pulse, blood pressure and perfusion. Establish intravenous (IV) access.
  - Tachycardia/irregular pulse - consider overdose of salbutamol, antimuscarinics, tricyclics, quinine, phenothiazine, chloral hydrate, cardiac glycosides, amphetamines and theophylline poisoning.
  - If hypotensive, consider giving fluid bolus (colloid) or, if necessary, inotropes.

Neurological assessment

Assess consciousness level (Glasgow Coma Scale)

- Coma may suggest benzodiazepines, alcohol, opiates, tricyclics, or barbiturates.
- **Check pupils and eye movements:**
  - Large - consider anticholinergics, sympathomimetics, tricyclics.
  - Small - consider opiates or cholinergics.
  - If opiates are suspected, give naloxone IV/intramuscularly (IM). Repeated doses may be required thereafter, as it has a shorter half-life than most opiates.
  - Unreactive - causes include barbiturates, carbon monoxide, head injury/hypoxia.
  - Unequal - slight variation can be normal - but consider head injury.
  - Strabismus - can be seen with carbamazepine overdose.
  - Papilloedema - associated with methanol, carbon monoxide.
  - Nystagmus - seen with CNS acting agents, eg phenytoin.

General measures

- Decontamination.

  ---Washing the skin, eyes & mucosal surfaces.

  ---Change the cloths if contaminated.

  ---Stomach wash. Contraindicated if corrosives or hydrocarbons poisoning occurred.
- Increase elimination.
  - Multiple doses of activated charcoal.
  - Forced diuresis - no longer recommended.
  - Haemoperfusion and acid/alkaline diuresis - rarely used now.
  - Haemodialysis - severe salicylate, ethylene glycol, methanol, lithium, phenobarbital and chlorate poisonings.

Seizure control

- Seizures - if prolonged/recurrent, initially give diazepam 5-10 mg IV (children: 0.25-0.4 mg/kg IV or PR) or midazolam (0.15 mg/kg) IM/IV.
- Many drugs can induce seizures, including tricyclics, theophylline, opiates, cocaine and amphetamines.

Correcting biochemistry

- Check blood glucose - if hypoglycaemic, give 50 ml 50% dextrose IV (children: 5 ml/kg of 10% dextrose IV).
  - Hyperglycaemia - organophosphates, theophyllines, monoamine oxidase inhibitors (MAOIs) or salicylate.
  - Hypoglycaemia - insulin, oral hypoglycaemics, alcohol or salicylate.
  - Check electrolytes. Diarrhea & vomiting may be a cause. Give IV hydration and electrolytes if indicated

Prevention

- Adult education.
- Double-check dosage before administration.
- Vigilance by health professionals to recognise the early signs of abuse and potential suicide.
- Put all medicines and household chemicals in a locked child-proof cupboard >1.5 metres off the ground.
- Safely dispose off medicines and chemicals which are not needed or are out of date.
- Keep all medicines and chemicals in their original containers with clear labels.