General Principles & Management of Poisoning

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Poison:

Any substance introduced into the living body or brought into contact with any part will produce ill effects or death, by its local or systemic action or both
The word poison comes from the Latin word—*potare*—meaning to drink. But poisons can also enter the body in other ways: By breathing, Through the skin, By IV injection
From exposure to radiation

Action :

- Local effect: On the part they come in contact with
  e.g. Aconite cause tingling effect
- Systemic effect: On one or more organ systems after absorption into the systemic circulation e.g. Opiates – CNS, Digitalis- Heart
- Combined effect: Both local and systemic effects e.g. Oxalic acid

ED_{50} & LD_{50}

- ED_{50} – Dose to produce the desired effect in one half of all patients is known as median effective dose or effective dose.
- TD_{50} Dose of a drug that exhibits an undesirable toxic reaction in one half of all patients is termed as median lethal dose or TD_{50}
- LD_{50}

Poisoning Causes

- Foods
  - The mushroom that turns out to be poisonous
  - Drinking water contaminated by agricultural or industrial activities
  - Food that has not been properly handled
- Drugs
  - Drugs that are helpful in therapeutic doses may be deadly when taken in excess. E.g.
    - Beta-blockers are a type of medicine used to calm and slow the heart.
    - Coumadin is a blood thinner used to prevent blood clots. It is the active ingredient in many rat poisons and may cause heavy bleeding and death if too much is taken.
    - Vitamins—especially A and D—if taken in large amounts can cause liver trouble and death.

Types of Poisoning

- Fulminant: Produced by a massive dose of a poison. Death occur very rapidly, without symptoms i.e. collapse suddenly
- Acute: A single large dose or several small doses taken in a short period
- Chronic: Produced by small doses taken over a long period

General Management of Poisoning

- Assessment of Patient's Condition:

  If patient is in danger, priority should be to correct immediate life threatening problems of ABCD

  In the absence of crises, a through examination must be conducted like

- Level of Consciousness
- Respiratory Status
- Cardiac Status
- Body Temperature
- Pupillary Status

General Treatment Measures

- Management of Respiratory Failure
  - Maintenance of clear airway
  - Administer Nikethamide (IV 2ml)
  - Extreme case hooked up to a mechanical respirator
- Management of Circulatory Failure
  - Elevate foot end of the bed
  - Use vasopressors like dopamine, epinephrine

General Treatment Measures

- Management of Hypothermia & hyperthermia
- Hypothermia: A warm room & a blanket required, warm water bath (42^{o}C)
- Hyperthermia: Remove clothes & pack body with ice, or immerse upto neck in cold water bath (25^{0}C)
- Correction of fluid & Electrolyte imbalances
- Control of Convulsions
- Diazepam slow IV or
- Phenytoin 10mg/kg

General Treatment Measures

- Elimination of Poison
- Induction of emesis
  - Attempt only in the conscious & alert patient
  - Choice of drug to induce vomit is syrup of ipecac
  - Alternative is tickle the back of throat with finger or spoon handle
  - As a First aid measure freshly prepared solution of black mustard powder in water

General Treatment Measures

- Gastric Lavage
  - Ingestion only
  - 30 gauge Ryle's tube
  - 50 cm Adult, 30 cm Child
  - Use Vaseline or glycerin, mouth gage
  - Lavage fluid- warm water, Saline , oxidizing solution like potassium permanganate, tannic acid, iodinated water
  - Complications: vomiting, pneumonia, damage to esophageal & gastric mucosa.

General Treatment Measures

- Activated charcoal is considered to be the most effective single agent available. It is used after a person swallows or absorbs almost any toxic drug or chemical.
- Activated charcoal is estimated to reduce up to 60% of poisonous substances being absorbed.
- It works by adsorbing (soaking up) chemicals, thus reducing their toxicity (poisonous nature), through the entire length of the GI tract (stomach and small and large intestines).
- Activated charcoal itself is a fine, black powder that is odorless, tasteless, and nontoxic.
- Activated charcoal is often given after gastric lavage—the technique often called the stomach pump. Gastric lavage is only effective immediately after swallowing a toxic substance (within about one-half hour) and does not reach beyond the stomach as activated charcoal does.

Role of Antidote in Poisoning

- Counteract the effects of poison
- These are named as ‘Magic bullets’
- Universal Antidote:
  - Tannic acid or tea (1 part or 25 %): supposed to precipitate alkaloidal poisons, heavy metals.
  - Magnesium oxide or milk of magnesia (1 part or 25 %): supposed to neutralized acids.
  - Burned toast (2 part or 50 %): supposed to absorb alkaloid.

Some poisons have specific antidotes:

Poison/Drug	Antidote
Paracetamol (acetaminophen)	N-acetylcysteine
Vitamin K anticoagulants, e.g. Warfarin	vitamin K
Opioids	naloxone
Iron (and other heavy metals)	desferrioxamine
Benzodiazepines	flumazenil
Ethylene glycol	ethanol or fomepizole
Methanol	ethanol or fomepizole
Cyanide	amyl nitrite, sodium nitrite & sodium thiosulphate

- Poisonous Fumes or Gases
  Immediately carry or drag the person to fresh air. Minimize your exposure to the fumes. If the victim is not breathing, start artificial respiration immediately and continue it until the victim is breathing or help arrives. Send someone for help as quickly as possible.
- Poisons on the skin
  Brush off any dry poisons and flood the involved parts with large amounts of plain water. Then wash the skin with bar soap and water and rinse. Remove and discard all affected clothing.

- Poisons in the Eye
  Pour water from a glass on the bridge of the patient's eye and allow water to flood the eye gently for 15 minutes. Use plain lukewarm water. Do not allow the victim to rub his/her eyes.
- Swallowed Poisons/Medications
  Look into the victim's mouth and remove all tablets, powder or any material that is present. Examine the mouth for cuts, burns, swelling, unusual coloring or odor. Rinse and wipe out the mouth with a cloth.
- Calling for Help: Call the Poison Control Center or your doctor.


Thanks