

Principles of Management of Acute Poisoning

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Point to be considered

- Incidence of poisoning
- Seriousness of poisoning
- Simple, serious, fatal

Sources of poison:

House-hold products

Medication, cosmetics, cleaners reagents,
chemicals, Plant poisoning ...

Food poisoning

Environmental

Toxic gases, pesticides, ext....

Occupational

Substance abuse

Routes of poisoning:

- Oral
- Inhalation
- Parenteral
- Dermal

Circumstances of poisoning:

- Accidental
- Suicidal
- Homicidal

General approach to management

- 1. Patient stabilization**
- 2. Complete patient assessment**
- 3. Poison decontamination**
- 4. Poison enhancement of elimination**
- 5. The use of antidote**
- 6. Continuous patient supportive care**

1. Patient stabilization

**Actions taken to stabilize the vital functions
of the patient**

Airways (A)

Breathing (B)

Circulatory system (C)

Drugs induced CNS depression (D)

Substance that can be administered for lethargic patient with possible overdose

- Oxygen
- Glucose
- Thiamine
- Naloxone
- Atropine ???

2. Complete patient assessment

Steps taken to diagnose the causative agent/agents and to evaluate the patient's condition

History

Physical examination

Laboratory investigations

LFT, KFT, CBC, Glucose.....

Toxicological analysis

Aims of **patient assessment**

Diagnose the patient

Are Antidotes needed

Know the pathphysiology of the toxic agents

Know how to direct therapy

Monitor organs functions

Protect organs functions

Supportive therapy

3. Poison decontamination

Removal of unabsorbed poisons from the exposure sites to decrease absorption and damage:

Gastro-intestinal tract

Skin

Mucus membranes

Gastro-intestinal tract decontamination

The followings points should be considered:

Patient status

Time since ingestion

Nature of the toxin ingested

Effectiveness of the selected procedure

Indication versus contraindication

What is the next step of management?

Methods of GIT decontamination

- Dilution???
- Emesis ???
- Gastric lavage
- Adsorbents
- Cathartics

Dilution

Applied only following corrosives ingestion to dilute the corrosive substance

- Think of using demulcents (milk, gelatin or egg white)
- Avoid using neutralizing agents

It is useful to add bulk to the stomach that may be needed for other procedures in GI decontaminations

It increases disintegration of drugs and enhances their absorption

Emesis

- Prompt removal effective of ingested agents
- Sounds logical, but the usefulness of emesis induction is questionable

Consider

- Indications versus contraindications
- Effectiveness, response rate, patient cooperation
- Time of poison ingestion

Induction of Emesis

Ipecac syrup

Apomorphine

Soft liquid detergents

Gag reflex

Hypertonic solution

Ipecac syrup

Acts locally by direct irritation and centrally by stimulating the vomiting center

Contains **emetine and cephaline**

Given orally

Response rate %90-95 within 30 minutes

Relatively safe for children and adults

Can be used at home and at hospitals

Apomorphine

- Opiate derivative
- Given by injection
- Quick response 3-5 minutes
- Contraindicated for children
- Leads to CNS depression
- Respiratory depression
- Hypotension

Soft liquid detergents

Can be used at home

**Effectiveness and response rate almost similar
to Ipecac syrup**

Dose 15-30 ml with 30 ml of water

Not toxic at these doses

Gag reflex

- Mechanical stimulation of pharynx
- Response rate and efficiency of emesis are low
- Incomplete and traumatic (injury of the pharynx)
- Bites
- Recommended with above cautions

Hypertonic solution

Concentrated sodium chloride solution

Concentration and amount are not known

Response rate and efficiency of emesis are low

Complicated by hyperosmotic dehydration

Should be avoided

Gastric lavage

- **Performed in hospital by experienced medical personnel**
- **Cooperative patients**
- **Left lateral position**
- **Airways protection**
- **Aspirate contents**
- **Wash with 200-300 ml of warm fluids**
- **Certain substance may have from concrete formation (iron, aspirin, paracetamol)**

Complications

- Laryngeal spasm, Aspiration pneumonia
- Esophageal and gastric lesions (hemorrhage or perforation)
- Pneumothorax, Ectopic beats
- Electrolytes disturbance

Contraindications

- Unprotected airways
- Ingestion of hydrocarbons
- Kerosene: **Aspiration** chemical pneumonitis

Adsorbents

Activated charcoal

Fine black powder with pores leading to tunnels,
mixed with suitable amount of water or other
fluids

Traps most organic poisons with molecule
weight of 100 – 1000 Dalton

Dose 1-2 gm/kg, Adults: 50 – 100g

Child: 15 – 20g

Binds to most substances, except:

- Metals
- Methanol and ethanol
- Acids/bases
- Hydrocarbons
- Inorganic salts
- Corrosives

Cathartics

Decrease contact time between the poison and absorption sites

Cautions:

- Absence of bowel sounds, intestinal obstruction
- Renal failure: Mg containing cathartics
- Heart failure: **Na** containing cathartics

4. Poison enhancement of elimination

Get rid of poisons that are present in the systemic circulation by:

1. Renal excretion
Forced diuresis and alteration of urinary pH
2. Gastrointestinal tract excretion
Interrupt entero-hepatic circulation of toxins, by Cathartics or Repeated doses of activated charcoal
3. Dialysis
4. Plasma Exchange
5. Exchange Transfusion

Acid and Alkaline Diuresis:

- Alteration of urine pH to enhance renal excretion by increasing the amount of the ionized form of the poison in the urine. The ionized molecules of the poison will not be available for renal reabsorption at the distal tubule of Henle and will be eliminated in urine

Alkalinization of urine by **Sodium bicarbonate**
will enhance eliminating acidic substances
(Salicylates, Phenobarbital)

Acidification of urine by **Ammonium chloride**
will enhance elimination of basic substance
(Amphetamines, Quinidine, Phencyclidine)

Cautions

- Pulmonary edema, cerebral edema,
Electrolyte disturbance

Dialysis

- Only few severely poisoned patients benefit from Dialysis.
- The toxin must be able to pass across the dialysis membrane (small M. Weight <500 d, water soluble, low protein binding).

- Peritoneal dialysis though it's easily performed, with least complications, is less effective than Hemodialysis.
- Hemodialysis is indicated in renal failure secondary to toxin exposure.

5. Use of poison antidote

- Oxygen
- Naloxone
- Flumazenil
- Ethanol or 4-methyl pyrezol
- N-acetyl cysteine
- Chelating agents...

6. Continuous patient supportive care

- Manage serious manifestations such as:
 - Hypothermia
 - Hyperthermia
 - Convulsion
 - Coma