

GENERAL MANAGEMENT OF POISONING

- Toxicom (Greek) arrow poison
- Toxicum (Latin) poison

LAW RELATED TO POISON

S.337-J PPC

WHOEVER ADMINISTER TO, OR CAUSES TO BE TAKEN BY ANY PERSON, ANY POISON OR ANY STUPEFYING , INTOXICATING, OR UNWHOLESOME DRUG OR SUCH OTHER THING WITH INTENT TO CAUSE HURT TO SUCH PERSON, OR WITH INTENT TO COMMIT OR TO FACILITATE THE COMMISSION OF AN OFFENCE, OR KNOWING IT TO BE LIKELY

THAT HE WILL THEREBY CAUSE HURT MAY, IN ADDITION TO THE PUNISHMENT OF "ARSH" OR "DAMAN" PROVIDED FOR THE KIND OF HURT CAUSED, BE ALSO PUNISHED.

Acute poisoning

- should be considered if the patient: has
 - symptoms that began shortly after exposure to a known poison
 - has been exposed to a poison known to have caused fatalities

Chronic poisoning

- Determine severity of exposure
- Determine magnitude of organ involvement.
- Careful history and physical examination

MEDICOLEGAL DUTIES OF DOCTOR

- PRELIMINARY PARTICULARS
- TREATMENT
- PRESERVATION OF EVIDENCE
- DYING DECLARATION/DEPOSITION
- INFORM AUTHORITIES

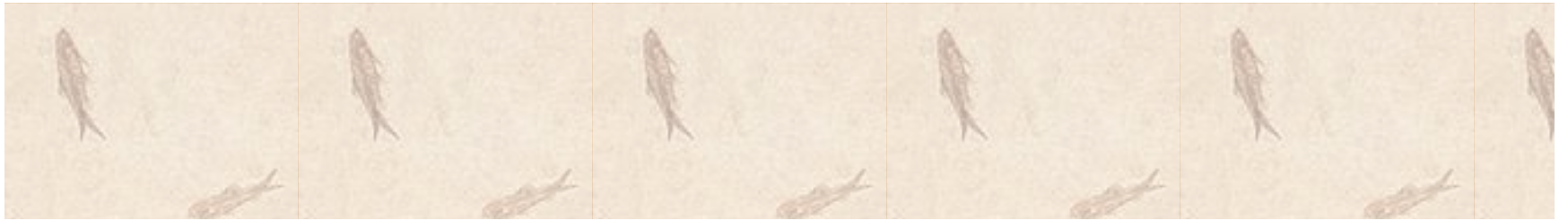
WRITTEN RECORDS

- In any case of poisoning in which there is a possibility of legal action at a later date
- The physician must keep careful written records of all relevant observations and findings.

PRESERVATION OF EVIDENCE

- Specimens should be placed directly in clean containers
- The bottles used for storing specimens should be clean and free from contamination by chemicals or metals.
- Gloves and instruments should not be contaminated by disinfectants or chemicals which may be transferred to specimens
- Store the specimens in a frozen state without any chemical preservatives.

- The container should be sealed with a glue-paper label extending over the cover and down onto the jar.
- Avoid using a seal such as adhesive tape, which can be removed and replaced.



- The physician's signature should be affixed to the label at the juncture between cap and bottle.

Evidence to be saved in non-fatal poisoning

- Prescription paper
- containers from which the poison was obtained.
- Urine (24-h specimen).
- Blood (10-50 ml).
- Vomitus and first two gastric washings.
- Feces.
- Body fat (obtained by biopsy).
- Hair clippings.
- Clippings of fingernails and toenails.
- Food.

Evidence to be saved in fatal poisoning

- The stomach and contents
- Liver (at least one-half)
- Kidneys (at least one)
- Blood (50-100 ml; should completely fill container)
- Bone (100 g)
- Lung (at least one)
- Brain (at least one half).

Legal chain of custody





SPECIAL PROBLEMS

Attempted suicide

Physician's Main Responsibilities

- Give immediate medical care and to prevent further attempts.
- The patient must be placed in quiet, protected surroundings, preferably away from the family.
- After the patient recovers from the immediate symptoms, a careful evaluation should be made, preferably by a psychiatrist, to minimize the possibility of further suicide attempts.

Successful suicide

- If a patient commits suicide
 - the physician is legally responsible for reporting the death to the police.

Homicidal poisoning

- The patient must be hospitalized until recovery.
- The circumstances should be reported to the police.
 - Further proof of attempted homicidal poisoning must be left to the police.
- If a patient dies as a result of a suspected homicidal poisoning, the physician is legally bound to report the death to the police.

Accidental poisoning

- May require 24 hours of observation.
- Food poisoning resulting from eating in a public restaurant or from eating contaminated commercial food must be reported to the local public health officer.
- Fatalities from suspected accidental poisonings must be reported to the police

Occupational poisoning

- If poisoning has resulted from occupational exposure
- A report must be sent to the proper authorities if the poisoning is reportable.

Dying declaration and dying deposition



SUPPORTIVE MEASURES

- Airway
- Breathing
- Circulation
- History
- Physical examination
- Decontamination

ALTERED MENTAL STATUS

- Check blood glucose level at bed side
- Seizures
 - (Diazepam 0.1-0.2mg/kg over 1-2 min)
- Comma cocktail
 - Dextrose (25g -50 ml of 50% solution)
 - 100mg of thiamine I/M or I/V infusion
 - Naloxone 0.4 -2 mg I/V
 - Flumazenil (in case of benzodiazepine)

Diagnosis of poisoning

- Toxidromes
 - Cholinergic
 - Anti cholinergic
 - Sympathomimetic
 - Opioids

- Odor of breath

- Garlic

- Arsenic ,organophosphate compounds

- Coal gas

- Carbon monoxide

- Bitter almonds

- Cyanide

- Pupil size
- Miosis
 - Opium ,organophosphorus compounds
- Mydriasis
 - Atropine

Color of skin and mucous membranes

- **Cyanosis**
 - Aniline, nitrobenzene, nitrates
- **Hyperemia**
 - Cyanide, alcohol
- **Jaundice**
 - phosphorus, carbon tetrachloride, acetaminophen
- **Pallor**
 - Benzene

Heart rate

- Tachycardia
 - Vasodilator
 - tricyclic antidepressant
- Bradycardia
 - calcium blocker
 - Clonidine
 - sedative hypnotic

- Pulse:

- Rapid

- Theophylline, amphetamines, cocaine, ephedrine

- Irregular

- Insecticides, tricyclic antidepressants

- Slow

- Morphine

- Temperature:

- Increased

- salicylates, atropine, cocaine

- Decreased

- Chloral hydrate, opiates, barbiturates

DECONTAMINATION

DECONTAMINATION

Inhaled Poison

- Remove from source of poison
- Give oxygen
- Inhalation of water aerosol (help to dilute inhaled irritants)
- Check for hoarseness and singed nasal hairs

CONTAMINATED EYES

- Wash with plain water or normal saline
- Do not use neutralizing solution
- Slowly dribble 50-100ml of saline through I/V tubing
- Check with pH paper
- Careful eye examination

CONTAMINATED SKIN

- Wash with plenty of water and dilute soap solution
- Discard contaminated clothes in a marked plastic bag
- Remove all particulate prior to irrigation
- Immersion of burns in
 - Ammonium salt soln.
 - 10% Calcium gluconate.
 - s/c inj of Calcium deep to burn

GASTRIC DECONTAMINATION

- Dilution
- Emesis
- Demulcents
- Gastric lavage
- Adsorption with activated charcoal
- Catharsis
- Whole Bowel Irrigation

DILUTION WITH WATER

- 1-2 cupfuls for child and 2-3 cupfuls for an adult
- Not universally recommended for solid dosage forms
- Chemicals and household products are best managed by dilution

EMESIS

- Syrup of Ipecac
- Potassium and antimony tartarate ,copper sulphate , zinc sulphate , mustard powder , salt solution are **NO LONGER** recommended

GASTRIC LAVAGE

- Laver (to wash)
- “It is the process of washing out the stomach with solutions , including water , saline , sodium bicarbonate, calcium salts , tannic acid and potassium permanganate.”

COMPLICATIONS

- Epistaxis
- Laryngeospasm
- Hypoxia
- Aspiration pneumonia
- Hyponatremia, hypocalcaemia
- Water intoxication
- Mechanical injury to gut

ADSORBENTS

- Activated charcoal
- Kaolin
- Fuller's earth
- Cholestyramine
- Pectin
- Attapulgite

ACTIVATED CHARCOAL

- Dose

 - 50-100g in adults

 - 25-50g in children

 - 1g/kg in infants

- 'Gut Dialysis'(multiple doses orally)

 - Carbamazepine, Dapsone, Theophylline etc

- Less Useful

 - Iron, Lithium, Potassium, Alcohol, Cyanides etc

CATHARTICS

➤ SALINE CATHARTICS

■ Sodium containing

- Na_2SO_4

10% (250 mg/kg children-15-20 gm in adults)

- Na_2SO_4 / $(\text{Na})_3\text{PO}_4$

(20ml in children- 40ml in adults)

■ Magnesium containing

MgSO_4 10% (250mg /kg body weight -5-10g in adults)

Magnesium citrate (4ml/kg in children-250-300ml in adults)

➤ SORBITOL 1-1.5g/kg

Contraindication

- Obstruction, ileus, or electrolyte imbalance.
- Do not use oil based products
 - castor oil increases the absorption and toxicity of chlorinated insecticides.
 - Never use irritant cathartics
- Do not give magnesium-containing or hypertonic cathartics to patients with
 - renal disease or those exposed to nephrotoxins,
 - myoglobinuria or hemoglobinuria

WHOLE BOWEL IRRIGATION

Commonly used solutions are

- Sodium sulfate
- Polyethylene glycol electrolyte solution

Given by N/G tube 1-2 l/h

Never confuse Polyethylene glycol with ethylene glycol

Indication for whole bowel irrigation

- Iron
- Lithium
- Sustained release drugs
- Enteric coated drugs
- Body packers(cocaine)

Contraindication for whole bowel irrigation

- Patient with hemodynamic compromise
- Ileus

ANTIDOTES

Antidote are substances which counteract the effect of poisons without causing appreciable harm to the body

ANTIDOTES

Based on mode of action:

- Mechanical / Physical Antidotes
- Chemical
- Physiological
- Functional
- Dispositional
- Universal

MECHANICAL ANTIDOTES

- These are the substances which impede the absorption of poison by their presence

MECHANICAL ANTIDOTES

- Demulcents

fat, oil, milk, egg albumin

not to be used in fat soluble poisons

- Bulky food

- Activated Charcoal

CHEMICAL ANTIDOTES



CHEMICAL ANTIDOTES

- Formaldehyde poisoning
 - NH_3 converts it to hexamethylenetetramine
- Oxalic acid poisoning
 - calcium salts reacts with oxalic acid and produce calcium oxalate
- Mercuric ion
 - Sodium formaldehyde converts it to less soluble metallic mercury

PHARMACOLOGICAL ANTIDOTES

- These agents produce effects which are opposite to that of the poison

PHARMACOLOGICAL ANTIDOTES

- Atropine - Pilocarpine
- Morphine - Nalaxone
- Organophosphates - Atropine & Oximes
- Benzodiazepines - Flumazenil
- Cyanides - Sodium Nitrite
Amyl Nitrite
Sodium Thiosulphate

Dispositional Antidote

Involves alteration of

- absorption
- metabolism
- Distribution
- excretion

- Acetaminophen over dosage
 - Conversion of toxic intermediate compound to non-toxic form by conjugation with glutathione(sulfhydryl donor)
 - N-Acetylcysteine

Functional antagonist

- Acts on one biochemical system to produce effects that are opposite from those produced on another system
 - During anaphylactic reaction after administration of drug intense bronchoconstriction occurs
 - Epinephrine reverses this effect

Chelators

Chela = claw

antidote against heavy metals

- Binds with metal ions to form stable complexes
- Chelate is cyclic complex formed between metal and a compound that contain two or more binding sites
- Five or six membered ring are more stable

Chelators

- British antilewisite (BAL)(dimercaprol)
 - Arsenical gas
- Ethylene diamine tetra -acetic acid (EDTA)
 - Lead , iron , zinc , copper
- Pencillamine
 - Lead, mercury
- Deferoxamine
 - Ferrous and ferric ions
- Succimer
 - Lead

Elimination of absorbed poison

METHODS TO ENHANCE ELIMINATION

- pH alteration
 - Alkaline diuresis
 - Acid diuresis
- Multiple dose activated charcoal
- Dialysis
 - Hemodialysis
 - Peritoneal Dialysis
- Heamoperfusion

METHODS TO ENHANCE ELIMINATION

- Alkaline diuresis
 - Phenobarbitone
 - Salicylate

Check plasma potassium level and RFT's

I/V bicarbonate 1-2 mEq/kg over 3-4 hours

aiming urine pH -7.5-8.5

METHODS TO ENHANCE ELIMINATION

- Acid diuresis
 - Amphetamines
 - Phencyclidine

ammonium chloride 75mg/kg/24 hours
aiming urine pH 5.5-6

METHODS TO ENHANCE ELIMINATION

- Dialysis

- Peritoneal Dialysis

Severely intoxicated patients

Governed by laws of osmosis

Increased recovery of water soluble

Chemical by hypertonic fluid

METHODS TO ENHANCE ELIMINATION

- Dialysis

hemodialysis

Low molecular weight

Small molecular size

Low volume of distribution

Complication

hypotension

convulsions

infections

Indication for haemoperfusion

Salicylates

Ethylene glycol

Lithium

Theophylline

Charcoal haemoperfusion

Carbamazepine

theophylline

Complications

Hypotension

Air embolism

Sepsis

Bleeding

Thrombocytopenia

General treatment

Oxygen for respiratory failure

Morphine for pain

Diuretics for pulmonary edema

Diazepam for convulsion

Saline infusion

Glucose

Potassium /sodium