

PESTICIDES

Date

CARBAMATE POISONING

⇒ usual fatal dose:

(i) Extremely toxic (LD 50: 1 to 500 mg/kg)

- Amino carb
- Bendiocarb
- Carbofuryl
- Carbofuran
- Methomyl
- Oxamyl

(ii) Moderately toxic (LD 50: 501 to 5000 mg/kg)

- Aldicarb
- Bufencarb
- MPMCL
- MTMC
- Phinicarb

⇒ Mode of Action:

carbamates

↓

Inhibitors of the
acetylcholinesterase

↓

carbamylate the
serine moiety

↓

Reversible binding

↓

Less severe

symptoms

- Carbamates do not penetrate CNS, so CNS toxicity is likewise much less.

⇒ Clinical features:

- Miosis (severe and moderately severe poisoning)
- Pupil dilation (10% of patients)
- Sinus tachy with ST depression
- Dyspnoea
- Chest tightness
- Bronchospasm
- ↑ Pulmonary secretions
- Rales.

- Acute lung injury
- Headache
- Dizziness
- Blurred vision
- Tremor
- Paresis
- Mental depression
- Delayed neuropathies.
- Muscle twitching
- Weakness.

⇒ Diagnosis:

- Measurement of specific phenolic metabolites in urine

Eg: carbamyl carbonyl
phosphonate.

• CXR

- Check for pulmonary oedema.

⇒ Treatment:

(i) Oximes are generally not recommended while atropine can be given.

(ii) Oxime + Atropine can be used for the following:

- severe muscle weakness, fasciculation, paralysis and ↓ respiratory effort
- continued excessive requirements of atropine
- concomitant organophosphorus and carbamate exposure.

(iii) Convulsions - Diazepam/Lorazepam.

OR
Phenobarbitone (if persistent)

Atropine dose:
A: 2 to 4 mg IV every 10 to 15 mins
C: 0.05 mg/kg IV every 10 to 15 mins.

ORGANOCHLORINES:

- They are one variety of chlorinated hydrocarbons.

They have 4 distinct types:

(i) DDT and analogues -

Eg: DDT

Metoxychlor

(ii) Benzene hexachloride group -

Eg: BHC

Gamma-Hexachlorocyclohexane

(iii) Cycloienes -

Eg: Aldrin

Delthalin

Endosulfan

(Extremely toxic)

Endrin

Lobenzan

(iv) Toxaphene -

⇒ Usual fatal dose:

(i) DDT and lindane - 15 to 30 gms.

(ii) Aldrin, Endrin - 2 to 6 gms.

⇒ Toxicokinetics:

- Excretion of organochlorines does not follow 1st order kinetics

- All organochlorines can be absorbed transdermally, orally and by inhalation.

(i) Excreted within few hours to days.

- Endosulfan

- Endrin

- Methoxychlor

- Toxaphene

(ii) Excreted within several weeks to few months:

- Aldrin

- Dieldrin

- Heptachlor

- Hexachlorobenzene

(iii) Excreted only over several months or years:

- DDT

- BHC

- Kepone

- Mirex

⇒ Mode of action:

(i) DDT and analogues.

↓

affect sodium channel conductance

↓

Alter metabolism of serotonin, noradrenaline and acetylcholine.

(ii) Cycloienes and lindane

↓
Inhibit the GABA
mediated chloride
channels in
CNS.

⇒ Clinical features :-

(i) Acute poisoning -

(a) GIT: Nausea, vomiting, hyperesthesia or paraesthesia of mouth and face.

(b) CNS: Headache, vertigo, myoclonus, tremor, ataxia, amnesia, mydriasis, agitation, weakness and confusion.

(c) Other: Fever, aspiration pneumonia, renal failure. Convulsions, hypotension and sinus tachycardia may also occur.

(ii) Chronic poisoning -

• Long-term exposure leads to cumulative results such as weight loss, tremor, weakness, ataxia, apsoctonus, pseudotumor cerebri, oligospermia.

• It also increases tendency to leukemias, thrombocytic purpura,

aplastic anemia, hepatomegaly, centrilobular hepatic necrosis and liver cancer.

⇒ Diagnosis :-

(i) Abdominal radiograph detect certain organochlorines.

(ii) Gas chromatography of serum, urine and adipose tissue.

(iii) Organic halogens in urine (1mg/100ml of urine indicates toxicity.)

⇒ Treatment :-

(i) Monitor for respiratory distress.

(ii) Administer 100% humidified supplemental oxygen, perform endotracheal intubation and provide assisted ventilation as required.

(iii) Administer inhaled beta adrenergic agonists if bronchospasm develops.

(iv) Wear absorbent pesticides.

(v) DO NOT give oils by mouth. They tend to increase intestinal absorption of these lipophilic toxicants.

(vi) seizures should be controlled with Benzodiazepines, phenytoin and phenobarbitone.

↓

Attenuate use of sodium thiopentane.

(vii) Evaluate for hypoxia, electrolyte disturbances and hypoglycemia.

↓

iv dextrose : 50 ml iv (A)
or 2 ml/kg of 25% dextrose (C)

(viii) molestyramine (16 gm/day)

↓

Enhance fecal excretion of organochlorides.
(particularly CHLORDECON).

(ix) contraindications:

- oil based cathartics
- Adrenaline
- Atropine
- Adrenergic amines

↓

↑ Myocardial irritability and produce refractory ventricular arrhythmias.

PYRETHROID POISONING:

- These are the active extracts of the chrysanthemum plant and include Pyrethrum and Piperonyl butoxide.

↓
Esters of pyrethric and chrysanthemic acids

↓

Pyrethrin & Pyrethrin.
I II

↓

Most insecticidally potent.

⇒ usual fatal dose:
Range from 10 to 100 gms

⇒ Mode of action:
Structurally, they are of 2 types
Type II - contains a cyano group
Eg: Deltamethrin

Type I - Does not contain a cyano group
Eg: Permethrin

Pyrethroids



Prolong the inactivation of
of Sodium channel



Inhibits the GABA
mediated inhibitory
chloride channels

⇒ Clinical features:

(i) Skin contact -

- Dermatitis (Bullous dermatitis may occur.)
- Blistering
- Localised paraesthesiae.

(ii) Eye contact -

- Mild to severe corneal damage
- ↓ visual acuity
- chemical conjunctivitis.

(iii) Inhalational -

- Rhinorrhoea
- sore throat
- wheezing
- Dyspnoea
- Hypersensitivity pneumonitis with chest pain
- Eosinophilia

(iv) Ingestion -

- Paraesthesiae
- Nausea / vomiting / Abdominal pain
- Fasciculations
- Hypertension
- Altered mental status (10 to 60 mins)
- Pulmonary oedema
- Coma



⇒ Diagnosis:

- (i) Serum cholinesterase - Normal.
- (ii) ECG - ST-T changes, sinus tachy and ventricular premature beats.

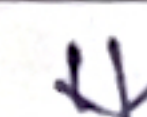
⇒ Treatment:

(i) Skin - Decontaminate with soap and water.

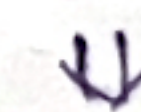
(ii) Eye - Irrigate with normal saline or water for 10 to 15 minutes.

(iii) Systemic -

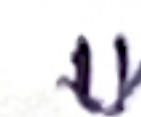
- Mild to Moderate allergic reactions.



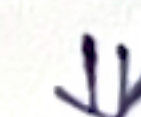
Diphenhydramine 50 mg PO/IV/IM



25 to 50 mg PO every
4 to 6 hours



with or without inhaled beta
agonists, corticosteroids



Methyl prednisolone 1 to 2 mg/kg
IV every 6 to 8 hrs.

- severe anaphylaxis



Oxygen supplementation, aggressive airway management, adrenaline, ECG monitoring and IV fluids.

- Activated charcoal is beneficial.
- Prednisone 60mg/day (A) or 1 to 2mg/kg/day (C).



significant bronchospasm.

- seizures - diazepam 30mg or 10mg (A) (C)

- Hypotn - 500 to 2000 ml crystalloid initially (20ml/kg in children)