

# Rat Poisoning

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# RODENTICIDE:

Any Substance that is used to kill rats, mice and other rodent pests.

- In India and in many parts of the world, huge quantity of grains is eaten up and destroyed by rats.
- Hence for preservation of grains use of rodenticidal agents has become imperative.
- Single feed baits are chemicals ,sufficiently dangerous enough to kill the rats at its first dose.
- Rodenticides are controversial due to secondary poisoning due to their risk to humans and pets.

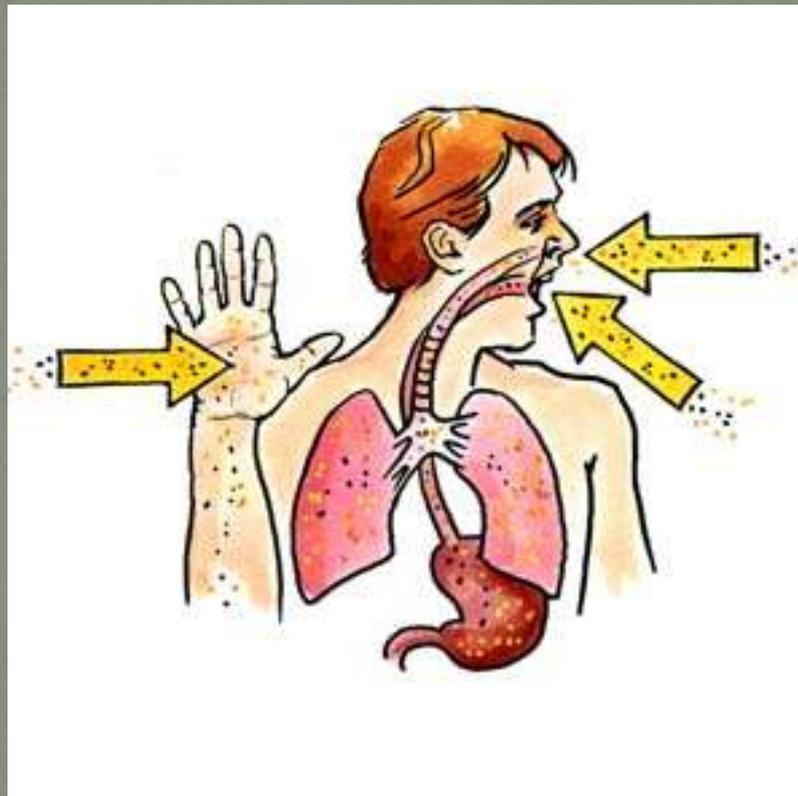


# Cont...

- These rat poisons have recently become a common means of self poisoning in Northern India , with a mortality rate of 60%.
- Poisoning may be:
  - Suicidal
  - Accidental
  - Homicidal
- Modes of poisoning:
  - Ingestion
  - Inhalation
  - Dermal contact



# Modes...



DERMAL CONTACT

INHALATION

INGESTION

# CLASSIFICATION:

- **Inorganic preparations:**

Barium carbonate, phosphorous, Thallium, Zn phosphide

- **Organic preparations:**

Fluoro acetate compounds

- **Convulsants:**

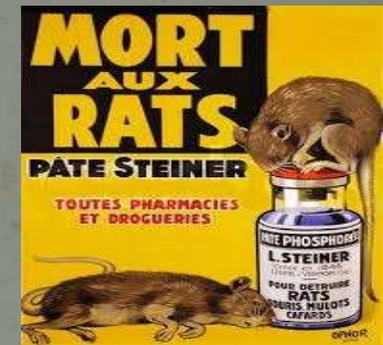
Strychnine

- **Anti coagulants:**

-First generation : warfarin, coumatetralyl

-Second generation : Brodifacoum, Difenacoum

- **Others:** Arsenic, Bromethalin, Endrin, Sodium fluoro acetate and Zyklon.



# MECHANISM OF ACTION:

- **Zinc phosphide:**

- It is a single dose fast acting rodenticide.

- Death occurs within 1-3 days after ingestion.

- MOA:

Acid in the stomach reacts with the phosphide to yield toxic phosphine gas which is a potent pulmonary toxicant.

- **Calciferols:**

- MOA:

On ingestion in toxic doses these affect calcium and phosphate homeostasis causing hypercalcemia.

# Cont...

-On accumulation in stomach , kidney , lungs , blood vessels and heart are all calcified/mineralised.

-It has a synergistic effect with anticoagulant , thereby increasing the chances of death and decrease in the time involved.

- ANTI COAGULANTS:

-After ingestion of lethal dose , it effectively blocks the vit-k cycle , resulting in inability to produce essential blood clotting factors mainly factors II and VII.

## Cont...

- massive toxic doses of 4-hydroxycoumarin cause damage to tiny blood vessels , increasing their permeability , causing diffuse Internal Bleeding.

-These effects are gradual , developing over several days.

-This is the preferred type of rat bait , as the antidote is available i.e, Vit-K.

# CLINICAL FEATURES:

- WITH ZINC PHOSPHIDE:

-Via Inhalation : Cough, Nausea , Vomiting, Headache  
Fatigue.

-Via Ingestion: Abdominal pain , Cough , Diarrhoea ,  
Dizziness , Shortness of breath ,  
Unconsciousness , Nausea , Vomiting  
Uncoordinated movements.



# With calciferols:

- Nausea , Vomiting , Anorexia , Fatigue , Itching and Weakness.
- Acute Intoxication: Polyneuropathy.
- Chronic Intoxication: Extreme depression , Apathy , Confusion , Fatigue.



# With anti-coagulants:

- Do not have onset symptoms , which might manifest days later.
- Haematuria
- Bloody diarrhoea
- Extensive Bruising
- Epistaxis
- Haematemesis
- Low Blood pressure
- Confusion , Lethargy , Altered mental status
- Shock
- With Warfarin: Pin point Purplish red spots



# Others:

- WITH BARIUM: Nausea , Weakness , Abdominal pain.
- WITH THALLIUM: Acute GI distress , Anorexia ,  
Myalgias , Painful neuropathy and  
hair loss.
- WITH STRYCHNINE: Anxiety , Generalized seizure like  
appearance without loss of  
consciousness , Muscle twitching ,  
Facial grimacing.
- WITH ARSENIC: Nausea , Vomiting , Bloody diarrhoea  
and garlic taste in mouth.

# Management:

- APPROACH CONSIDERATIONS:
- Complete blood count
- PT
- INR
- Activated PTT
- BT
- Platelet count
- Lab verification of Brodifacoum , Difenacoum.
- CPK
- LA
- Blood test for arsenic & Thallium



# Cont...

- Abdominal Plain Film Radiography
- Detecting phosphine in exhaled air/stomach aspirate using either a silver nitrate impregnated strip or specific phosphine detector tube is diagnostic.
- But Gas chromatography provides the most sensitive indicator.



# Pre hospital care:

- Always look for a container , so that the specific product can be determined.
- Decontamination may be necessary.



# Treatment:

- Secure airway and place IV lines in Haemodynamically unstable patients.
- ACTIVATED CHARCOAL is used as soon as possible to prevent further systemic absorption of ingested toxin.
- GI EVACUATION in cases of huge over dosage and in which the patient presents early to an emergency facility.
- Inducing Vomiting is likely only with in after ingestion.



# Specific treatment:

- ZINC PHOSPHIDE:

- Supportive therapy remains the only available form as there is no specific antidote.

- Gastric lavage with vegetable oil to reduce the release of toxic phosphine.

- Patients with severe respiratory compromise require endotracheal intubation for ventilatory support.

- Severe haemolysis from phosphine gas may require exchange transfusion of RBCs.



# Anti-coagulants:

- If no coagulopathy is found in the setting of an anti-coagulant exposure ,prophylactic treatment with Vit-K is absolutely contraindicated.
- If a coagulopathy is documented , Vit-K therapy is suggested.
- Patients who present with life threatening haemorrhage , in addition to Vit-K, Prothrombin complex conc. and/or fresh frozen plasma may be needed to reverse anti coagulation.



T h a n k

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