A Case Study on Zinc Phosphide Poisoning in Tamil Nadu

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**ABSTRACT**

Zinc Phosphide has a long history of use and remains an important rodenticide for both commensal and select field rodents. Zinc Phosphide (Rodenticide) associated with both accidental and intentional ingestion. Despite its free availability in the Indian market for use to prevent rat. It is an uncommon poisoning in India with only a single case report described from India. We report single cases of fatal rodenticide poisoning from a tertiary care hospital in the south state of Tamil Nadu, India.

**Keywords:** - Rodenticide, Poisoning, Zinc Phosphide, Suicide, Mortality.

**INTRODUCTION**

Zinc phosphide is a commonly available rodenticide in India widely used to control the population of rats, mice, dogs, ground squirrel. Zinc Phosphide has indoor and outdoor use which is classified as food and non food depending upon the application methods. Food in which Zinc Phosphide used are grapes rangel, grasses, sugarcane and regional use on artichokes and sugar beets. In non food used in indoor and outdoor residential, commercial and agriculture area as rodenticides. Zinc Phosphide has a long history of use as rodenticides due to its characteristics consuming efficacy, safety and hazards. It is widely used for rodent control around the world\textsuperscript{1}.

It was first synthesized by Marggraf in 1740\textsuperscript{2} It was first used as rodenticide in 1911 to control field rodents in Italy and later in other European countries\textsuperscript{3,4}. In the united state Zinc Phosphide is used for control of commensal rodents (House rats and roofs rats) but its use relatively limited. It has also been evaluated in jack rabbits in Russia. Zinc phosphide has been explored as a foliar spray for microtine rodents (Microtus & related species)\textsuperscript{1}

Zinc phosphide was first registered as a pesticide in the U.S. in 1947. EAP issued a registration standard for zinc Phosphide in June 1982 (PB85-102499)\textsuperscript{6}. ADATA-call-In Notice (DCI) was issued in 1982 and another in 1991 requiring further data for registration\textsuperscript{7}.

When Zinc Phosphide reacts with stomach’s acid and water it convert in to phosphine gas and Zinc hydroxide. This phophine gas having emetics character so human emit because they having emetic sensor but rodent can’t having emetic sensation so they cannot emit it. After absorption in GI tract phosphine Inhibit cytochrome C oxidase, which is vital for mitochondrial respiration and inhibit energy production in the cell.

The symptoms of Zinc phosphide toxicity is weakness, anemia, toothache, jawbone necrosis, weight loss, vision loss and unconsciousness.

Zinc phosphide marketed in India under trade names of Arrex, Commando, Denkierin, Grains, Phosovin, Zinc Tox, Ratil, Rattle and Rate Shot etc.

We are finding that in the current era, peoples are use Zinc phosphide as homicide substances due to their economical and social problems.

**CASE REPORT**

A 28 year old male patient was admitted in the medical ward with history of ingestion of to packets of rodenticide (Zinc phosphide). The patient had giddiness and pain after ingestion of rodenticide. There was history of giddiness and pain. Patient developed hypotension attends ensorum with ABG showing metabolic acidosis and respiratory acidosis. Clinical examination revealed oral erosions and icterus. Rest of examination was normal, investigations showed serum was as 268 mg/dl and creatinine 8.9 mg/dl on admission. Total serum bilirubin was 42.8 mg/dl and conjugated was 32 mg/dl.
transaminas was raised. (SGOT- 312 IU and CGPT- 298 IU) The alkaline phosphatase was 460 KAV. On examination his temperature was 41.6°C; pulse rate 84/min; respirations 14 bpm, SPO2 -100; CBG-163; pressure was 80/50 mm/hg on admission. Patients were incubated, CVP secured and inotropes. Started patient went into ventricular fibrillation. CPR given and defibrillation done as per ACLS protocol but could not be revived and declared dead. Patient dead within 24 hours at to admission.

DISCUSSION

Morbidity and mortality due to acute poisoning is a worldwide phenomenon and has enormous medical, legal and social significance. The last quarter of the 20th century saw tremendous advances in the fields of agriculture, industrial technology and medical pharmacy. These advances have paralleled changes in the trends of acute poisoning in developing and developed countries. Self-poisoning is one of the oldest methods tried for committing/attempting suicide. There are reports available from different parts of the world highlighting various substances abused for acute poisoning and their toxicity. India is a predominantly agrarian country with large rural population. Zinc phosphide are used commonly as a rodenticide but in some cases publically used for suicide purpose.

Acute rodenticide self-poisoning is a significant problem in parts of Asia. The pacific and the Caribbean. The most frequent routes of exposure to zinc phosphide, either accidentally or intentionally, in human’s ingestions.

Zinc phosphide are readily absorbed via the gastrointestinal tract although the majority of acute effects are caused by phosphine, unreacted zinc phosphide contributes to liver and renal damage. An emesis action may occur in humans from ingesting zinc phosphide. Early characteristics of poisoning are nausea, vomiting, abdominal pain, chest tightness, excitement and chilly feeling. Treatment involves removal of ingested zinc phosphide by induced emesis or by gastric lavage in the health care facility. Clay (fuller’s earth) and activated charcoal are effective adsorbents.

Rapid identification of the symptoms of zinc phosphide toxicits (respiratory acidosis, metabolic acidosis, gastrointestinal irritation, abdominal pain, chest tightness) can facilitate early treatment intervention to limit absorption. According to our knowledge this is first case of zinc phosphide poisoning (Rodenticide) reported from the state of Tamil Nadu, India. This case is reported to highlight the high mortality rate associated with zinc Phosphide poisoning in spite of advances in treatment and supportive care.

CONCLUSION

Public education on poisoning and the potential hazards of zinc Phosphide are of vital importance for community health. Public should be aware and educate about the poisoning and home remedy.

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REFERENCES


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