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Study of Laboratory Profile in Rodenticide Poisoning

Periyasamy R Senior assistant professor, Department of Medicine, Tirunelveli medical college Hospital, Tamilnadu, India

Rajesh A Senior assistant professor, Department of Medicine, Tirunelveli medical college Hospital, Tamilnadu, India

*** Heber Anandan** Senior Clinical Scientist, Dr.Agarwal's Healthcare Limited, Tirunelveli, Tamilnadu, India, * Corresponding Author

ABSTRACT

Background: Anticoagulant Rodenticide is used to kill rats. Exposure of Rodenticide poison may cause prolonged prothrombin time.
Aim: To study the lab profile of Rodenticide poisoning cases.
Methods: 50 patients admitted with history of consumption of Rodenticide poison were included in study. Patients undergo basic blood investigations with liver function tests, prothrombin time, serum calcium and the toxic component is identified accordingly.
Results: Among the 50 patients who consumed Rodenticide poison, 28 were males and 22 were females. 56% of the patients presented with no symptoms. 24% of patients presented with bleeding manifestations such a petechial haemorrhages, sub conjunctival haemorrhage, melena, hematemesis. Identification of the toxic component in Rodenticide through clinical manifestations and investigations was done. The major rodenticides observed were barium chlorides, warfarin or super warfarin containing poisons and cholecalciferol containing rodenticides
Conclusion: Rodenticide exposure may cause prolonged prothrombin time. Complications may reduce in early presentation and identification of poisoning.

KEYWORDS Rodenticide, anticoagulant, superwarfarins, rat poison

INTRODUCTION

Two major types of rodenticides are used to kill rats, mice, moles, voles and squirrels. Single-dose rodenticides are fatal for rodents after a single feed. These include sodium mono fluoroacetate, fluoro acetamide, norbromide, red squill, thallium sulphate, aluminium phosphide and zinc phosphide, and some of the superwarfarins. The multiple-dose types require repeated dosing. The commonly used ones are the warfarin and superwarfarins. Rodenticide poisoning is a major public health problem in India and it is one of the commonest poisoning that requires hospital admissions[1]. It poses great challenge in treatment because three different components with varied clinical presentations occur in Rodenticide poisoning. Coumarin derivatives, zinc phosphide and cholecalciferol are the three different components used in Rodenticide. Coumarin derivatives cause bleeding manifestations, zinc phosphide liberates toxic phosphene gas and cholecalciferol causes hypercalcemia and end organ damage[2]. Efficacy of superwarfarins as Rodenticide results from high lipid solubility, affinity for hepatic tissue and slow elimination from the body[3]. Proper therapy followed, rodenticides poisoning resolve uneventfully[4]. In our study, laboratory investigations are directed against identifying the particular component and individualizing the treatment.

AIMS

To study the laboratory profile of Rodenticide poisoning cases.

MATERIALS AND METHODS

A prospective, observational study on Rodenticide poisoning was conducted in Department of Medicine, Tirunelveli Medical College. Patients admitted with Rodenticide poisoning were included in the study. Institutional Ethics committee approval and informed consent from the patient's relative were obtained. Patients undergo basic blood investigations with liver function tests, prothrombin time, serum calcium and the toxic component is identified accordingly.

RESULTS

50 Rodenticide poisoning cases were included in the study, 28 male and 22 female patients. 26 to 30 years male and female are high in poisoning. (Table 1)

Table 1 Age Wise Distribution of Patients with Rodenticide Poisoning

Age group	Males	Females
≤ 20	0	4
21-25	4	6
26-30	7	7
31-35	5	2
36-40	7	1
41-45	4	1
46-50	1	1
Total	28	22

Figure 1 Proportion of Toxic and Non Toxic Patients

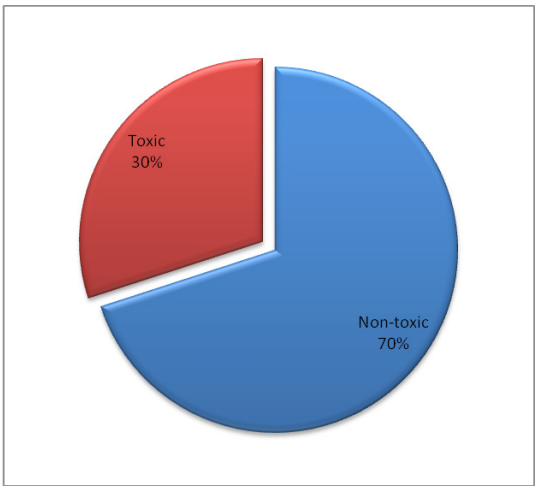
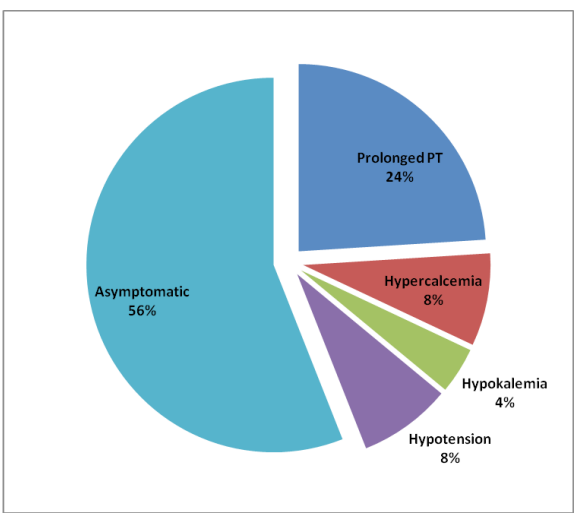


Figure 2 Types of Manifestations observed in study patients



56% of the patients presented with no symptoms. There was just alleged history of Rodenticide poisoning. 24% of them presented with bleeding manifestations such a petechial haemorrhages, sub conjunctival haemorrhage, malena, hematemesis. (Figure 2) Investigations showed prolonged prothrombin time. Hypotension was present in 8% of the patients. Most of them presented with systolic BP of less than 80 mm of Hg. Pulse were feeble or impalpable. Hypokalemia was present in 4% of the cases. Hypercalcemia occurred in 8% of the patients. Identification of the toxic component in Rodenticide through clinical manifestations and investigations was done. Those of them who were asymptomatic probably had taken multiple dose rodenticides with barium chloride being the major toxin. Those who presented with bleeding manifestations had either warfarin or super warfarin in the Rodenticide they had ingested. Hypercalcemia was caused by cholecalciferol containing rodenticides.

DISCUSSION

In our study we reported 24% patients were having prolonged prothrombin time. Single-dose anticoagulants are more toxic because they bind more tightly to the enzyme that makes blood clotting agents. They can also interfere with other steps in Vitamin K recycling. Second-generation, or single-dose anticoagulants, are not easily excreted from the body, and they can be stored in the liver[5]. Anticoagulant Rodenticide exposure can lead to uncontrolled bleeding in any part of the body, but this is not always obvious. Difficulty breathing, weakness, and lethargy have been seen in animals poisoned with anticoagulant rodenticides. Less common signs include coughing, vomiting, stools marked with blackened, tarry blood, paleness, bleeding from the gums, seizures, bruising, shaking, abdominal distention and pain[6]. 8% of patients shown hypercalcemia, after ingestion of a lethal dose, the free calcium levels are raised sufficiently that blood vessels, kidneys, the stomach wall and lungs are mineralised/calcificated leading further to heart problems, bleeding (due to capillary damage) and possibly kidney failure[7]. 56% of patients were asymptomatic, but the patients were with intravenous fluids and antibiotics. 8% of patients had hypotension probably taken phosphorous containing Rodenticide either aluminium or zinc phosphide. They are treated with inotropic agents such as dopamine infusion[8].

CONCLUSION

Rodenticide poisoning is a major health problem, middle age people are more inclusive in this poisoning by accidental or suicidal. Early presentation and identification will prevent mortality and may reduce the complications.

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