Study of Laboratory Profile in Rodenticide Poisoning

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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. 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. Efficacy of superwarfarins as Rodenticide results from high lipid solubility, affinity for hepatic tissue and slow elimination from the body. Proper therapy followed, rodenticides poisoning resolve uneventfully. 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>
<thead>
<tr>
<th>Age group</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 20</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>21-25</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>26-30</td>
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<td>7</td>
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<td>31-35</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>36-40</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>41-45</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>46-50</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>28</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 1 Age Wise Distribution of Patients with Rodenticide Poisoning
56% of the patients presented with no symptoms. There was just alleged history of Rodenticide poisoning. 24% of them presented with bleeding manifestations such as petechial haemorrhages, sub conjunctival haemorrhage, melena, 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. 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 po-