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Original Research Article

A study of acute pesticide poisoning in a tertiary care centre in South India

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ABSTRACT

Background: Poisoning has been one of the common cause for mortality. According to WHO the incidence of poisoning has been increased. Poisoning can either be accidental exposure or suicidal in nature. In India pesticides are commonly used poisoning agents for suicide. This present study aimed to assess the incidence and outcome of acute poisoning presenting to our institute.
Methods: The study was conducted at RVMIMS for a period of one year from 2023-2024 in the deprtment of General Medicine. Retrospective data of the patients admitted with history of pesticide poisoning was collected and analysed. All patients who gave consent and >14 years were included in the study. Exclusion criteria were age <14 years, pregnant and lactating women and corrosive poisoning.
Results: Insecticide poisoning (53.6%) and herbicide poisoning (38.1%) were found to have high incidence. OP ompound is the most common poisoning out of the total cases studied which were 300. Male to female ratio was 3:2. Mortality rate is high due to paraquat poisoning (76.5%) and OP compound (17.6%) poisoning. Methemoglobinemia was seen in patients with plant protector poisoning.
Conclusions: We observed that in OP compound poisonings, early intubation with mechanical ventilator support in patients with very low serum pseudocholinesterase patients have good outcome.

Keywords: Herbicides, OP compounds, Paraquat, Poisonings, Rodenticides

INTRODUCTION

A poison is a substance that is capable of causing illness or harm to a living organism on contact or upon introduction to a living organism.[1] Poisoning refers to development of dose related adverse effects following exposure to chemicals or drugs. In the past three to four decades there has been remarkable change in incidence and type of poisoning. A number of new compounds have been recognized as life-threatening poisoning agents.[2] WHO estimated about 0.3million people die annually due to various poisoning.[3] There is a difference in nature of poisonings in developing countries vs industrialized nations depending on the socioeconomic factors and cultural diversity, availability and accessibility to poisons.[4] Studies have revealed that pesticides are commonly used poisoning agents for intentional poisonings in India.[5,6] Agriculture is a major profession in rural India , so pesticides are commonly and widely used for agricultural practices. Ingestion of pesticides has been the common mode of poisoning in farmers as they are easily available owing to financial stress.[7] Lack of education, chronic alcoholism, toddy consumption especially in females are the other factors increasing the risk of poisonings in our centre.

RVMIMS is a 1000 bedded tertiary care centre in Vantimamidi, Siddipet district of Telangana. This is a

tertiary care centre for several rural areas in this district. Vantimamidi is the major vegetable producer to entire district and also has the largest vegetable market in the state. So various pesticides are commonly used here for crop protection and storage. Many patients have been admitted to the emergency dept of RVMIMS due to pesticide poisonings. Pesticides like organophosphoprous compounds, paraquat, rodenticides are common among the various poisoning presenting to our centre. There has been an increased incidence of methemoglobinemia in patients presenting with consumption of plant growth enhancers.

This study aimed to study the incidence and outcome of various pesticide poisonings presenting to our centre.

METHODS

The study was conducted at RVM Institute of Medical Sciences, tertiary care hospital in Telangana from September 2023 to August 2024 in patients admitted in Department of General Medicine with history of poisoning with pesticides. Retrospective data was collected from medical records and analysed with respect to age, sex, mode and type of poisonings and their outcome.

Inclusion criteria

Patients greater than 14 years presenting to emergency department with history of exposure to pesticide poisoning were included.

Exclusion criteria

Child less than 14 years, pregnant and lactating women, corrosive poisoning were excluded.

Statistical analysis

Statistical analysis was carried out using SPSS version 22. Two by two analysis was done for group comparison and Chi square test was done and p value was calculated.

RESULTS

The present study gives prevalence of pesticide poisoning reported to our tertiary care centre in Telangana. So Acute pesticide poisonings contribute to 23% of total admissions in General Medicine Dept. Total number of poisoning cases studied were 300. The incidence of poisonings was slightly higher in males than in females. The male and female ratio was 3:2.

Insecticide poisoning was the most common (53.6%) followed by herbicide poisoning (38.1%). The remaining other poisons encountered were rodenticide, plant growth extractor and fungicide poison (Figure 1).

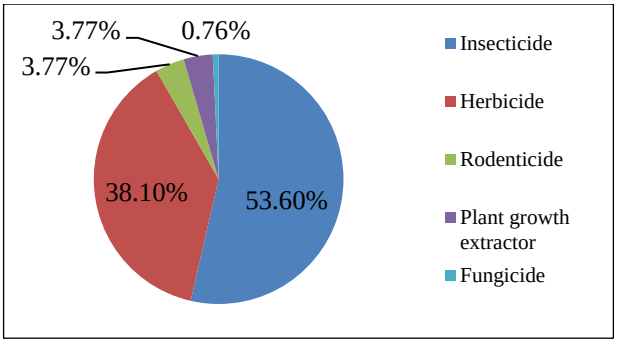

Figure 1: Categories of poisons.

Organophosphorus compound poisoning is the most common pesticide poisoning presenting to our centre. Monocrotophos 36%, chlorpyrifos 50% and 20%, profenos os 20% were various compounds presenting to our centre with acute poisoning (Figure 2).

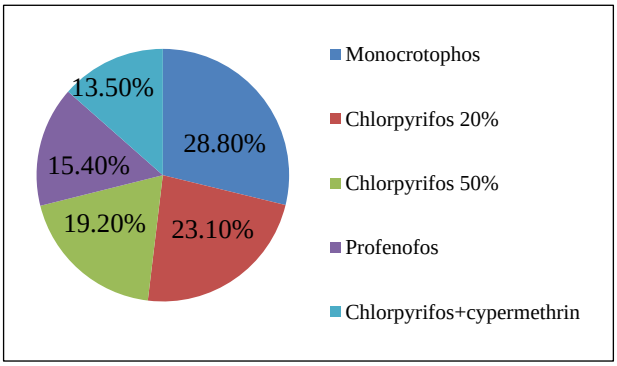

Figure 2: Percent of op compounds.

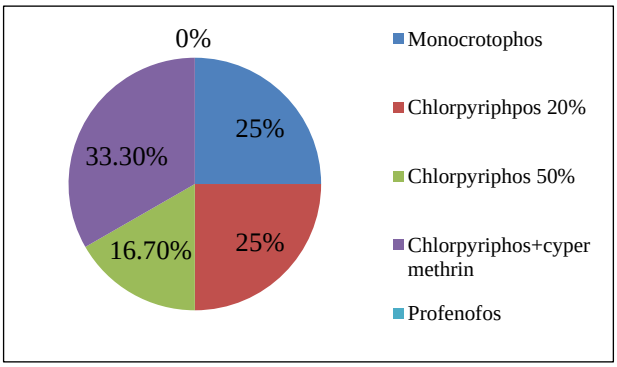

Figure 3: Mortality due to op compound poisoning.

Out of 101 OP poisoning cases presented, 99 were intentional poisonings and 2 were accidental exposure. Patients had acute cholinergic crisis and treated with atropine and pralidoxime. 50 patients were intubated - out of which 35 were recovered and 15 expired. 20 patients developed intermediate syndrome, out of which 17 recovered from the intermediate syndrome and 3 expired (Figure 3). It was observed that mortality rate was high with monocrotophos and chlorpyriphos 50%. Early intubation in patients with low serum

pseudocholinesterase patients had good outcome in OP poisoning.

The second most common agent used for poisoning in our study is rodenticide commonly aluminium/zinc phosphide. This pesticide is widely used for preservation at homes and ware houses. A total number of 10 patients presented with poisoning and all were intentional or suicides. Mortality rate was 2.94%. In the next place there is lambdacyclothrin incidence which was around 12.9% (Figure 4). No deaths were recorded.

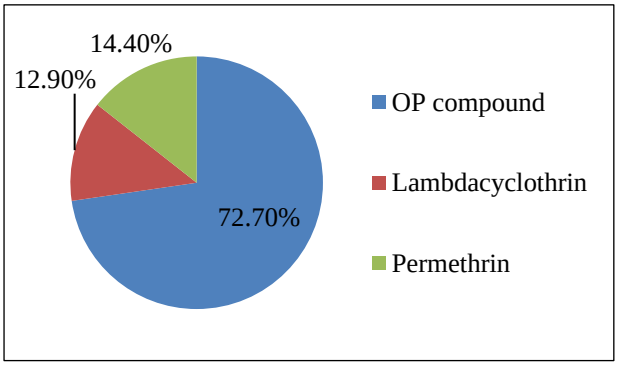

Figure 4: Percent of insecticide poisoning.

In the fourth place there is paraquat poisoning (Figure 5). A total of 60 cases were reported. The mortality rate was very high around 76.5% (Figure 6).

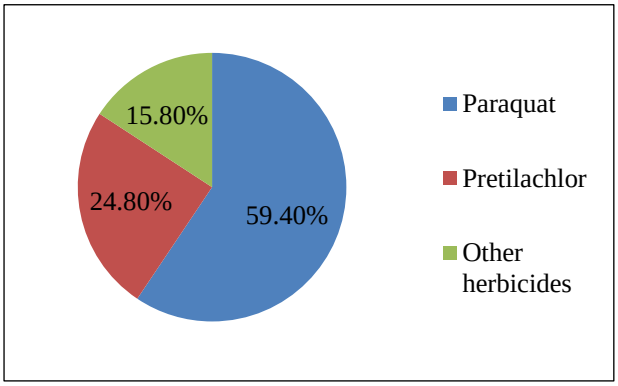

Figure 5: Incidence of herbicide poison.

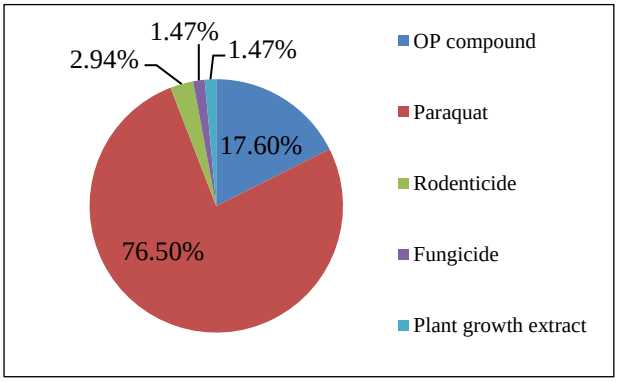

Figure 6: Mortality associated with poisons.

There has been methemoglobenemia reported in 6 patients who presented with plant protector poisoning to the emergency department.

DISCUSSION

The current study gives an insight on the different types of poisonings encountered in our institute. In the present study, male to female ratio was higher which was similar to other studies.[8,9] Organophosphorous compound poisonings is the most common pesticide poisoning presenting to our centre, which is similar to several studies.[10-12]

Mortality with rodenticide poisoning is lesser than compared to studies from North India done by Bajaj et al.[13] This decrease in mortality can be attributed to the change in formulations of the fumigant in 2021.[14]

Paraquat poisoning is similar to studies conducted at Tamil Nadu with 100% mortality in that study.[15] This poison has also increased in Orissa as per newspaper reports during 2018-2019.[16] Strict regulations of paraquat usage is the need of the hour. Otherwise it could cause a massive increase in deaths as seen in China before the ban in 2016.

The plant protector was composed of locally made ingredients and did not have proper mentioning of its components and their adverse effects. The mortality rate around which is considerable high. There are only few reports published on methemoglobinemia due to plant growth stimulant but the total number of cases are underestimated.[17] The public health commission was informed about this vital information so that we can further curtail the production of unlicensed pesticides.

Poisoning patients requires intensive care management and contributes for 28% of bed occupancy. This can impair the treatment of other patients requiring intensive care in limited resources especially in medical centres. Restricting the use of pesticides and prohibition on sales of highly lethal pesticides for paraquat is to be enforced.[18]

Many studies have concluded that strict restrictions of highly lethal pesticides by legal mechanisms and policy making actions drastically reduces death formulating new policies to reduce the accessibility through legal mechanism is needed.[19,20]

The study conducted at a single centre was a limitation of the study.

CONCLUSION

Poisoning is common cause of premature death and is preventable. Creating public awareness regarding toxic effects of poisonings and educating them about the first aid after poison ingestion is required. Banning of paraquat should be strictly implemented as the mortality is very high. Early intubation in patients with very low serum

pseudocholinesterase in OP compound poisoning was found to have good prognosis.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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