

Research Article



A Retrospective Analysis of Organophosphate Poisoning cases and the incidence of Atropine induced Psychosis during the Treatment for Organophosphate Intoxication

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ABSTRACT

Organophosphate (OP) pesticide poison is an increasing problem worldwide especially in agrarian countries like India. An enhanced knowledge about organophosphate poisoning can help to formulate better preventive and management strategies. The main aim of this study is to assess the incidence, severity, clinical outcome, treatment patterns and the incidence of atropine induced psychosis among the organophosphate poisoning patients. A retrospective study was conducted on hospitalized patients admitted with poisoning. Data were collected from the registers kept in the medical records department after obtaining permission from medical superintendent. Among 11145 admitted cases, 49 were organophosphate poisoning cases with an incidence of 0.0043. Males 34 were predominant. Majority were in between 21-30 age. According to Poison severity scoring system 20(40.8%) cases were minor, followed by moderate 19 (38.8%). In terms of clinical outcome, we have seen improvement in 35(71.5%), 6 (12.2%) were died and 2 (4.1%) were discharged with morbidity. Majority of patients were treated with atropine (81.6%) followed by Pralidoxime (59.2%), Hydrocortisone (26.5%), Optineuron (12.24%) and haloperidol (20.40%). Among 40 patients received atropine, 10 (25%) developed atropine induced psychosis with an incidence of 0.25. This study revealed that men and young adults are more likely to suffer from Organophosphate poisoning. In the majority of patients, the intake was ingested intentionally as an act of self destruction. A specific concern should be raised toward pesticides availability and terms of sale.

Keywords: Organophosphate poisoning, Atropine, Psychosis.

INTRODUCTION

Intoxication, both deliberate and accidental, is one of the major causes of hospitalization and is a major public health problem¹. Insecticides are one of the major source of poisoning, of which organophosphorous compounds are the most common². Poisoning due to organophosphorous compounds is an increasing problem worldwide despite the benefits of organophosphate compounds. In agrarian countries like India, wide use coupled with easy accessibility i.e., over the counter availability of Organophosphorous compounds, make it the most common modality of poisoning. Organophosphate compound poisoning can occur through the oral, respiratory or transdermal routes. According to world health organization (WHO), 3 million cases of pesticide poisoning occur every year, resulting in an excess of 250,000 deaths. Of these, about 1 million are accidental, and 2 million are suicidal poisonings³. It is vital to know the nature, severity and outcome of acute poisoning cases in order to take appropriate planning, prevention and management techniques⁴. The principal pharmacological action of Organophosphate compounds is the inhibition of acetylcholinesterase and the inhibition of this enzyme leads to accumulation of acetyl choline at nerve synapses and neuromuscular junctions, resulting in over stimulation of acetyl-choline receptors. The initial over stimulation is followed by paralysis of cholinergic synaptic nerve transmission in the central nervous system, in autonomic ganglia, at para sympathetic and some sympathetic nerve ending and in somatic nerves.

The administration of atropine to a large population for treatment of intoxication carries the risk of allergic or toxic reactions in a small number of patients. It has been reported rarely in the literatures⁵. Psychotic symptoms such as restlessness and excitement, hallucinations, delirium may occur due to atropine⁶. Information regarding organophosphorous compound poisoning (OPCP) in a particular region will help in early diagnosis and treatment of cases, thus decreasing the mortality and morbidity rates. Therefore, early diagnosis, treatment and prevention are crucial in reducing the burden of poisoning related injury in any country.

Aims and Objectives

The main aim of this study is to assess the incidence, severity, clinical outcome, treatment patterns and the incidence of atropine induced psychosis among the organophosphate poisoning patients.

METHODOLOGY

A Retrospective study was conducted in Rajiv Gandhi Institute of Medical Sciences (RIMS), a tertiary care teaching hospital, Kadapa, Andhra Pradesh. We have collected the two months data (January-February 2017) of in-patients from medical record department after obtaining permission from medical superintendent. During this study, treatment charts, nursing notes, laboratory reports and discharge summaries were reviewed. This study includes all the organophosphate



poisoning cases admitted in the hospital during the study period.

Data was analysed based on socio demographic details like age, sex, social habits, mode of poisoning, treatment patterns, duration of hospital stay, and outcome.

Severity score was assessed by using poison severity scoring (PSS) system. PSS is a standardized scale for grading the severity of poisoning and allows qualitative evaluation of morbidity caused by poisoning. It is based on the severity of the symptom at the time of presentation.

Severity Grades

None (0): any symptom or signs related to poisoning;

Minor (1): mild, transient and spontaneously resolving symptoms;

Moderate (2): pronounced or prolonged symptoms;

Severe (3): severe or life threatening symptoms;

Fatal (4): death.

Statistical Analysis

Statistical analysis was done by using descriptive statistics and chi square test. Probability of occurrence < 0.05 was considered as statistically significant.

RESULTS

Among 11145 admitted cases, 49 cases were organophosphate poisoning cases with an incidence of 0.0043. Out of 49 cases male admissions were predominant (34 cases (69.4%)) when compared to female admissions (15 cases (30.6)). The mean age of the patients was 33.53 with a standard deviation of 21.14. The minimum and the maximum age was 3 and 65 respectively. The majority of the cases were in the age group of 21-30 years (26.5%) followed by followed by 31-40 and 41-50 years with the same percentage of cases (22.4%) with progressively smaller percentage with increasing age. [Table 1]

Table 1: Gender wise categorization

Parameter	No. of patients	% of patients
Gender		
Female	15	30.6
Male	34	69.4
Age		
≤10	2	4.1
11-20	8	16.4
21-30	13	26.5
31-40	11	22.4
41-50	11	22.4
>50	4	8.2

Average age - 33.53; SD-21.14; chi square statistic is 0.4179; p-value was 0.51799 which was not significant to $p < 0.05$

The most common mode of poisoning was oral with the intension of suicide (83.7%) followed by inhalation (spray) which is accidental (16.3%). [Table 2]

The severity of illness was determined and categorized as per the indicator-Poison severity scoring system. According to this, 20(40.8%) cases were found to be minor, followed by moderate 19 (38.8%) cases. [Table 3] We have also assessed duration of hospital stay and found majority of the patients 19(38.8%) stayed in hospital for 3-4 days followed by 13 (26.5%) for 1-2 days and a few patients 3 (6.1%) were stayed in the hospital for more than 9 days. [Table 4]

In terms of clinical outcome, we have seen improvement in 35 (71.5%) cases, 6 (12.2%) were died, 2 (4.1%) were discharged with morbidity and the outcome of 6 (12.2%) cases was unknown as they left the hospital against the medical advice. [Table 5]

Among the 49 cases 41 (83.7%) were referred to psychiatry for counseling. [Table 6]

In the treatment of poisoning, atropine (81.6%) was administered to the majority of patients followed by PAM (59.2%), Hydrocortisone (26.5%), Optineuron (12.24%) and haloperidol (20.40%). [Table 7]

Among 40 patients received atropine, 10 (25%) patients had developed atropine induced psychosis with an incidence of 0.25. [Table 8]

Table 2: Categorization of patients based on the mode of poisoning

Mode of poisoning	No. of patients	% of patients
Suicide	41	83.7
Accidental	8	16.3

Chi square statistic is 1.7658; p value is .1839 which was not significant at $p < 0.05$

Table 3: Distribution of patients based on severity

Severity	No. of patients	% of patients
Minor	20	40.8
Moderate	19	38.8
Severe	4	8.2
Fatal	6	12.2

Table 4: Categorization of patients based on the duration of hospital stay

Duration of hospital stay (Days)	No. of patients	% of patients
1-2	13	26.5
3-4	19	38.8
5-6	9	18.4
7-8	5	10.2
>9	3	6.1



Average - 3.97, standard deviation - 1.94, Chi square statistic is 0.1418; p value is .7065 which was not significant at $p < 0.05$

Table 5: Distribution of patients based on Outcome

Outcome	No. of patients	% of patients
Unknown	6	12.2
Improved	35	71.5
Discharge with morbidity	2	4.1
Death	6	12.2

Table 6: Distribution of patients based on psychiatric referral

Psychiatric referral	No. of patients	% of patients
Yes	41	83.7
No	8	16.3

Chi square statistic- 1.7658; p value is 0.1839 which was not significant to $P < 0.05$

Table 7: Distribution of patients based on the drugs used for treatment

Drugs used	No. of patients	% of patients
Atropine	40	81.6
Pralidoxime	29	59.2
Hydrocortisone	13	26.5
Optineuron	6	12.24
Pantop	10	20.40
Haloperidol	10	20.40

Table 8: Distribution of patients based on the incidence of Atropine induced psychosis

Incidence of atropine induced psychosis	No. of patients	% of patients
Yes	10	25
No	30	75

DISCUSSION

The use of OPCs is widespread in developing countries. The increased availability of OPCs has increased the incidence of ingestion, resulting in increasing suicidal and accidental poisoning. OPP is an important preventable public health problem in developing countries. The majority of poisoning cases are men with a male to female ratio of 2.3:1. These results are consistent with the studies performed by Ali P et al and Ahmed SM et al^{7,8}. However there are additional studies which found that females represented the majority of poisoning patients^{9,10,11}. The majority of the patients are in the age group of 11-30 years which is similar to that reported by other studies Karki et al. similarly reported in their study in eastern Nepal that the majority (65%) of OPP patients were in the 15–30 years age group¹². Finally the study performed by Srinivas Rao et al. in south Indian hospital

revealed that two-thirds of Organophosphate poisoning cases were less than 30 years of age¹³. The distribution of the cases with regard to their age clearly shows that the majority of the cases fall under the productive age group. This age group represents the part of the population which was the most physically, mentally and socially active, which makes them prone to increased levels of stress. This age group often bears the burden of family responsibility and may have more exposure to Organophosphate compounds, making them a high risk group. Organophosphate poisoning can be absorbed by all routes including inhalation, ingestion and dermal absorption¹⁴. However the most common route of poisoning in this study was oral ingestion in the suicidal cases followed by accidental poisoning due to inhalation, these findings are consistent with the other studies¹⁵.

We have assessed the duration of hospitalization; the average duration of the stay was 3.97 with a standard deviation 1.94. We found that majority (38.8%) of the cases stayed in hospital for 3-4 days and only 6.1 % patients stayed for more than 9 days. In present study we assessed the severity by using PSS system in which we found 6 (12.2%) fatal cases, 40.8% minor and 38.8% moderate cases were observed in our study. Patient outcomes were assessed and we observed improvement in 71.5% of cases, 4.1% were referred to higher centers, mortality was observed in 12.2% of cases. This was aided by a study conducted by George EJ et.al.,

Treatment of Organophosphate poisoning, secondary to decontamination efforts by gastric lavage, is primarily aimed at reversing the effects of the compound through atropine administration¹⁶. Atropine is highly effective in antagonizing the actions of OPs at muscarinic receptor sites¹⁷, when the correct diagnosis has been made¹⁸. In the present study we have no information about the decontamination methods, coming to the drugs used for the treatment Out of 49, Majority of patients (40 i.e 81.6 %) were treated with atropine followed by Pralidoxime (59.2%), Hydrocortisone (26.5%), Optineuron (12.24%) and haloperidol (20.40%). This was supported by Rajesh Prazapathi t.al.,

Out of 40 patients treated with atropine 10 experienced atropine induced psychosis with an incidence of 0.25. Among the 10 atropine induced psychosis patients 8 were males and 2 were females. This was supported by a study conducted by Neethu Ros Tom et.al.

CONCLUSION

The results of this study revealed that men and young adults are more likely to suffer from Organophosphate poisoning. In the majority of patients, the intake was ingested intentionally as an act of self destruction. It is worrisome that the most affected part of the population seems to be the younger generation and that the number of cases is increasing every year. To combat this, it is essential to build up the governmental regulations on the availability of Organophosphate compounds. Additionally,



it is essential to fortify preventive measurable like educating people about the risks of Organophosphate compounds through health extension workers, establishing and promoting poison control centers, implementing separate toxicological units in hospitals. It is essential to counsel the patients psychologically to change their mindset regarding the suicidal thoughts.

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