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Original Research Article

Profile of organo phosphorous poisoning at a tertiary medical centre in Jharkhand, India

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ABSTRACT

Background: Poisoning is the most common method, employed for the act of deliberate self-harm. The wide availability, lack of rules and regulations for the sale of pesticides resulted in wide spread use of Organophosphate as one of the most common poison used for deliberate self-harm.
Methods: In this study, authors aim to find out clinical profile with respect to different O.P. compounds, prognosis and outcome of each patient in relation to the delay in getting medical attention. Present study objective is to find out if there is any specific clinical finding which can predict bad outcome.
Results: Out of 344 cases, 189 cases had type 1 respiratory failure, while in 34 cases type II respiratory failure present. 61 cases expired and out of these 61 cases 47 cases died within 24 hours and 11 cases died in next 48 hours.
Conclusions: Maximum number of cases were in the age group of 21 - 30years. The maximum number of deaths were in the first 72 hours. Number of cases were more in males as compared to females. Chances of survival was better in persons who reached early to the hospital.

Keywords: Clinical profile, O.P. management

INTRODUCTION

This entity of chemicals was discovered by Schrader during II world war. Organophosphorous compounds (O.P.) are widely used for agriculture, vector control and domestic purpose. Since then it is used as the fact that, in developing countries these products are easily available and could lead to intentional, accidental and occupational exposure. As per literature, about 3 million exposures occur annually worldwide. As per WHO estimate O.P. poisoning is a cause of more than 2.2 lakhs death, annualy. Countries like Srilanka and India have higher rates of exposure and mortality.[1,2]

Pattern of poisoning in a given area, depends upon the availability of poisonous substances, occupation prevalent in the society, religious and cultural influences. Ingestion is the most common route of poisoning accounting for more than 90% of cases. In India organo phosphorous use is widespread as most population is mainly rural, with farming as a major occupation. Acute poisoning is a medical emergency. It is important to know the nature, severity and outcome of acute poisoning cases in order to take up appropriate planning, prevention and management techniques. Patients exhibit muscarinic and nicotinic symptoms depending upon the severity of compound. Muscarinic symptoms such as nausea, vomiting, diarrhea, sweating, salivation, urination, stool in continence, lacrimation, miosis and bradycardia and nicotinic signs such as muscular weakness, fasciculation, paralysis, convulsions and coma are found.

O.P. compounds lead to acute and chronic complications. Acute complications include acute respiratory failure,

acute respiratory distress syndrome, type I and II respiratory paralysis, intermediate syndrome, sudden cardiac death, aspiration pneumonia. Chronic complication include anxiety, depression, polyneuropathy paralysis and coma. Poisoning in these cases is often serious and requires treatment in intensive care unit, as they present with life threatening complications and may result in mortality. It may also affect respiration which may endanger the individual's life.[2]

Mortality rate depends upon the amount and type of compound, condition of the patient on arrival at hospital, delay in diagnosis and treatment and respiratory management. There was always correlation with the type of compounds, pre-hospitalisation period, type of management and they are useful for preventing the mortality rate in developing countries such as India.

Treatment includes early resuscitation, oxygen, airway protection, I.V. fluids, muscarinic antagonists such as atropine and acetyl choline esterase activator such as PAM. Gastric lavage could have a role but should only be under taken once the patient is in stable condition. Patient must be carefully observed after stabilization for changes in atropine needs or worsening respiratory function because of IMS and recurrent cholinergic features occurring with fat soluble organophosphorous compounds.

The objective of the present research was to study the clinical aspect of O.P. poisoning, in detail with clinical out com, recovery and mortality.

METHODS

A total of 344 patients with poisoning admitted in this hospital for treatment was examined clinically after getting informed consent.

The present study was conducted from January 2015 to December 2015 in Patliputra Medical College Hospital, Dhanbad, Jharkhand, India with patients of acute organophosphorous poisoning. A total of 344 cases were analysed. The data was collected from acute O.P. poisoning cases admitted through emergency or OPD in a detailed proforma, as per history given by patient / relatives / attendants with particular emphasis being given to age, sex, socioeconomic status, rural / urban background, time of O.P. ingestion, symptoms, motive of poisoning, type of compound, interval time from ingestion to hospitalization and final outcome.

Selection criteria

The study comprised 344 cases of acute O.P. compound poisoning which were admitted in Patliputra Medical College Hospital, Dhanbad, Jharkhand. Authors included all patients of O.P. poisoning, those who came with history and clinical features of O.P. poisoning, irrespective of their vital status during our study period.

The diagnosis of O.P. compound was based on definite history of O.P. ingestion examination of container, typical clinical features, clinical examination findings, characteristic odour of stomach wash or vomitus and atropine tolerance.

RESULTS

A total of 344 case of only O.P. poisoning compound were studied in detail, during the period between January 2015 to December 2015 at Patliputra Medical College Hospital, Dhanbad. The following were our observations.

The maximum number of cases were in the age group of between 21 - 30 years where we found 67 cases of males and 57 cases of females followed by age group of 13 - 20 year in which 48 cases were male and 42 case were female. The least no of case wherein the age group 71 - 80 years where we found only two male patient and no female patient in this group (Table 1).

Table 1: Combined age and sex wise distribution.

Age up to (years)	Male	Female	Total no. of patients
13 - 20	48	42	90
21 - 30	67	57	124
31 - 40	30	27	57
41 - 50	25	16	41
51 - 60	14	9	23
61 - 70	6	1	7
71 - 80	2	-	2
Total	192	152	344

Muscarinic symptoms like vomiting and perspiration were present in 337 case (98%) followed by stool / urinary incontinence, which were present in 241 cases (70%) and salivation in 224 cases (65%). Altered sensorium was present in only 120 cases (35%) while convulsion was present in only 3 patients (0.87%). There was respiratory difficulty present in 138 patients (40%). Nicotinic symptoms were present in 224 cases (65%) (Table 2).

Table 2: Symptomatology wise distribution.

Symptoms	No. of cases %
Muscarinic	In isolation or in combination
Nausea	337 (98%)
Vomiting	
Perspiration	337 (98%)
Stool / Urine in continence	241 (70%)
Salivation	224 (65%)
Altered sensorium	120 (35%)
Convulsion	3 (0.87%)
Respiratory difficulty	138 (40%)
Nicotinic	
Twitching / flickering	224 (65%)

Clinical signs, like bradycardia was found in 62 cases (18%) and tachycardia was present in 41 cases (12%) while normal pulse rate was in, 241 cases (70%). Other clinical signs like Miosis was found in 254 case (74%) only. In patient in whom there was bradycardia and absent miosis, 6 case died while in patient in whom tachycardia was present, only 4 cases died (Table 3).

Table 3: Clinical signs wise distribution.

Pulse	No. of cases	Mortality
Brady cardia <60/min	62 (18%)	6 (9.67%)
Tachycardia >100/min	41 (12%)	4 (0.97%)
Normal <60 to 100/min	241 (70%)	51 (21.16%)
Miosis present	254 (74%)	55 (21.4%)
Miosis absent	90 (26%)	6 (6.6%)

Correlation of clinical sign with mortality was done and it was seen that maximum mortality was in patient in whom there was initial (21.4%) miosis present and in whom the pulse rate was within normal range in 51 cases (21%). (Table 3).

Table 4: Complication wise distribution is relation to mortality.

	No. of cases	Mortality
Type - 1 respiratory paralysis	189 (55%)	28 (14%)
Aspiration pneumonias	1	1 (100%)
A.R.D.S.	2	2 (100%)
Type - 2 paralysis	34	30 (88%)
Intermediate syndrome	4	3 (75%)

Patients were also evaluated for complications. There were 189 cases in type - I, respiratory failure (55%), aspiration pneumonia in 1 case and ARDS was found in 2 patients while type II, respiratory failure was found in 34 cases and intermediate syndrome in 4 patients only (Table 4).

In type - I, respiratory failure, mortality was in 28 case (14%) while in aspiration pneumonia and ARDS 100% mortality was noted. In patients with type - II, respiratory failure, 30 patients died out of 34 (88%), in patient with intermediate syndrome mortality was 75% (3 out of 4) (Table 4).

Patient hospital stay was also studied it was found that out of 344 cases, 61 cases expired while 74 cases absconded / gone to other centers for the treatment. Out of 61 cases, who expired, 47 cases died within 24 Hrs. additional, 7 cases died in next 24 hours, 4 cases died in next 24 hours from admission. While 1 case died on 5th day and one patient on 11th day (Table 5).

Table 5: Outcome and hospital stay wise distribution.

Out Come	Total	Duration of hospital stay (in days)					
		1st	2nd	3rd	4th	5th	6th
Survived / discharged	211 (61%)	-	-	-	-	-	211
Expired	61 (17%)	47	7	7	-	1	-
Absconded/ LAMA	74 (21.5%)	40	30	4	-	-	-

DISCUSSION

Organophosphorous poisoning is common in rural areas of Jharkhand, India, as our societies are agriculture based and organophosphorous compounds are cheap and easily available.

In present study majority of victims were in age group of 21 - 30 years similar to the study conducted by Karki P et al, as this age group was active and prone to day to day stress in the life.[3] The majority of the patients were of low socioeconomic class, of rural back ground, poor and low educational status. Mode of administration of organophosphorous compound was through ingestion with a suicidal intent. In present study no. of male cases outnumbered females which reflect poor stress tolerance in males as compared to females. This finding was consistent with Sahin et al, whereas findings of Banerjee I et al, are different that females outnumbered males.[4,5]

Present study showed that muscarnic symptoms were found in upto 95% which is very close to Sahin et al, while study conducted by Emerson GM et al, showed only in 92% cases.[6] This study also showed that among muscarinic symptoms nausea and vomiting were present in most of the case which was present in only 88% cases in study conducted by Mishra et al.[7] Authors found that miosis was present it 74% cases which was consistent with findings of Sahin HA et al. The findings by Banerjee I et al, was 91%, in their series it was also noted that 14% cases had type I, respiratory failure which was present in 36% cases in the study of Sahin HA et al.[4,5]

The maximum mortality was in the patients with normal pulse rate. Faiz et al, showed that mortality is higher in patients with acute complications.[8]

This study shows that maximum complications and mortality were noted during the first 24 hrs. which is comparable with the study by Munidasa UA et al, and Sahin et al.[6,9] They suggested that maximum mortality was observed in the first 72 hrs. Davies et al, also of opinion that poor survival was noted in those patients, who came late to hospital, showing high GCS score on admission.[10] Maximum cases of survivors had hospital stay of more than 5 days. So, a week is sufficient to observe clinical course of O.P. poisoning.

In present study nearly, 61% cases survived which is comparable with the study by Gohel et al, in which 70% patients recovered.[11] In the present study 61 cases (17%) expired. Out of these 77% (47) cases died in first 24 hrs. Suggestive of acute cholinergic crisis and need for aggressive reversal of muscarinic symptoms. while 11% (7) each died on 2nd and 3rd day of admission pointing need for continuation of atropine use. While 1 patient died on 6th day of aspiration phenomena with a possible chance of early oral feeding in an unconscious patient.

Study by Kahajuria V et al, showed maximum no. of cases were in the age group of 25-49 years, while in present study the maximum no. of case were in the age group of 21-30 years, but patients with rural background and majority of male patients were similar in both studies.[12]

Number of male and female cases were similar in the study of Maqbool F et al, conducted in Rawalpindi, Pakistan. In their study pattern of poisoning was also different. majority took rat killer pills (88.7%) followed by anti-lice lotion and insecticide spray which is contrary to our study where almost all patients consumed pesticides by ingestion.[13]

In almost similar number of cases by Raddi D et al, in Hubli district of Karnataka, majority were males and in the age group of 21-30 years like present study. One other similar finding was pupillary constriction which was 76% in their study and 74% in present study. However, mortality rate was slightly higher in their study (21.25%) as against in present series of patients (17%).[14]

Present study was consistent with study by Edwin et al, in regard to more number of males cases as well as vomiting as a prominent presenting symptom.[15] Number of patients with altered sensorium was higher in his study, (38% drowsiness and 10% with loss of consciousness) as against 35% in our series. While mortality in present study was only 17% as against 26% in the study of George E et al.[15]

In the study of Budhattoki S et al, conducted in Dharan, Nepal in a paediatric population. which included poisoning due to organophosphorous, Hydrocarbon, mushroom and organochloride. In their study, children admitted below 5 years of age, 2/3 cases were accidental which was might be due to exploratory behaviours of the young children and mortality rate was also much lower (7.3%) probably due to over diagnosis or very minor exposer to O.P. agents was also diagnosed as poisoning.[16] Study conducted by Pandey S et al, in 100 patients of O.P. agents, ratio of male and female were 2:1 and maximum number of case were in the age group of 21 - 30 years in their series. Mortality was similar (15%) as in our study 17%.[17]

Study of Pal DK et al, done in a rural block of were Bengal in 114 cases, they revealed ratio of female male cases were 2:1 as against most of the studies including ours were no of male cases outnumbered females. They also showed number of cases with rural background was more like in the present study.[18]

Altered sensorium was present in 35% cases like study by Shah et al, (40%). Early stoppage of atropine is hazardous in course of O.P. poisoning.[2] So, it is better to continue atropine till patient is out of danger, adequate dose of atropine causes less mortality. Compared with under atropinisation and over atropinasation.

Acute life-threatening conditions in O.P. poisoning is ARDS, acute respiratory failure, sudden cardiac death and IMS. This study is comparable to study by Shah et al.[2]

CONCLUSION

The maximum no of cases was in the age group of 21 - 30 years. The maximum deaths were found in early period. Chances of survival was higher in patients who reached earlier in the hospital and received immediate treatment in intensive care unit. Organophosphorous poisoning the most common culprit agent for suicidal purpose, in rural, low socioeconomic, illiterate people.

The incidence is more common in males, maximum death was found in early period i.e. upto 72 hrs. Injection atropine and PAM are very useful to treat patients.

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