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Original Research Article

Clinical profile of patients presenting with inhalational organophosphorus poisoning in central India: a retrospective study

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ABSTRACT

Background: World Health Organisation (WHO) report through International Programme on Chemical Safety (IPCS), poisoning is a significant global public health problem. According to WHO data, in 2012 an estimated 193,460 people died worldwide from unintentional poisoning. Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many countries, including India, Limited literature available on clinical profile of organophosphorus poisoning cases, with this background present study was attempted. Objective of the study was to know the clinical presentation of OP poisoning cases admitted in tertiary care hospital.
Methods: A retrospective record based observational study was conducted.
Results: A total of 535 patients presented in the emergency department with the clinical features of OP poisoning. Mean age of the persons presenting in the emergency was 33.3±10.1 years. Nausea and vomiting is the most commoner symptom reported by 60.7% of patients followed by giddinesss (41.3%), loose motion (28.2%) and secretions (9.5%). Signs like abnormal pupil size, fasciculations and inability to neck holding were common with 23.55% 19.3% and 21.1% respectively. Statistical significance was found between Serum acetylcholine esterase level and outcome of patients ($p<0.01$). 96.1% received treatment less than half an hours. 18 patients required ventilator and among these 13 were died.
Conclusions: Majority of the patients were of young age with males outnumbering females. Nausea and vomiting was the most common symptom reported by the patients while abnormal pupil size was the most common sign observed at the emergency department.

Keywords: Clinical profile, Farmers, Inhalational, Organophosphorus poisoning, Outcome

INTRODUCTION

WHO report through the International Programme on Chemical Safety (IPCS), poisoning is a significant global public health problem. According to WHO data, in 2012 an estimated 193,460 people died worldwide from unintentional poisoning. In the same year, unintentional poisoning caused the loss of over 10.7 million years of healthy life (disability adjusted life years, DALYs).[1,2] Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many countries, including India, China, Sri Lanka, and Vietnam.[3] With organophosphorus compounds (OP) is a global problem. According to various studies organophosphorus compound forms the commonest poisoning substance in Asia.[4-7] According to data available from National Poison Information Centre India, suicidal poisoning with house-

hold agents (OP, carbamates, pyrethrinoids, etc.) is the most common modality of poisoning.[8] Patients die mostly from respiratory failure and lung injury, although there is variability in the clinical symptoms and signs depending on nature of compounds, amount consumed, severity, time gap between exposure and presentation in the hospital.[9] Yavatmal district in Maharashtra, is pre-dominantly cotton growing area. In the year of 2017, unfortunate series of deaths and poisonings took place among farming community due to pesticide exposures. It is very intensive in Yavatmal and in nearby districts. Due to limited availability of facilities and resources in developing countries all OP poisoning patients are not managed in intensive care units. Hence it is important to know the clinical features and other factors that indicate the severity of poisoning and criteria to speculate the need for ventilator support which should be identified in the initial examination so that maximum patients should be benefitted from the available resources and there is limited literature available on clinical profile of OP poisoning cases, with this background present study was attempted to know the clinical presentation of OP poisoning cases admitted in tertiary care hospital.

METHODS

Study was conducted in tertiary care hospital in Maharashtra, India with aims and objective were, to study the clinical profile of OP poisoning patients and to study the outcome in OP poisoning patients.

A retrospective record based observational study was conducted to address the study objectives. All inpatient were included in study. Patients not admitted were excluded. The case papers of all patients were kept safely at hospital medical section. In medical record section both scan copies and hard copies of all admitted due to inhalation OP poisoning in the year 2017 were revived. Details of case summary and investigation done since the day of admission was properly assured. Information of age, sex, clinical features, investigation and outcome of the patients were recorded in pre-structured proforma. Ethics: The study was approved by institutional ethical committee.

Statistical analysis

Data was collected and entered in excel sheet in computer. Data analysis was done by using descriptive and inferential statistical methods: frequency, percentage, means, standard deviation. A chi-square test used for qualitative data, p-value less than 0.05 was considered to be statistically significant.

RESULTS

A total of 535 patients presented in the emergency department and was admitted in ward of the institute during the study period of January 2017 to December 2017 with the clinical features of OP poisoning.

Table 1: Distribution of patients according to age and sex (n=535).

Variables		Number	Percentage
Age group in years	<20	30	6
	21 to 30	238	44
	31 to 40	153	29
	41 to 50	85	16
	51 to 60	23	4
	> 60	6	1
Sex	F	18	3.4
	M	517	96.6

Mean age of the patient presenting in the emergency with clinical features of OP poisoning was 33.3 years (±10.1) with range from 13 to 70 years. Majority, 391 patients were in the age group of 21-40 years, followed by 85 patients in 41-50 years age group, only 30 patients were below 20 years of age and only 29 are above 50 years of age. The males outnumbered females, males were 517 (96.6%) as compare to females 18 (3.4%) and Male: Female ratio of 28.41:1 was observed.

Table 2: Distribution of patients according to presenting symptoms (n=535).

Presenting symptoms	Number	Percentage
Nausea and vomiting	325	60.70
Giddiness	221	41.30
Loose motions	151	28.20
Secretion	51	9.50
Irritation of eyes	55	10.30
Weakness	42	7.90
Diplopia	9	1.70

Table 3: Distribution of patients according to presenting sign (n=535).

Presenting signs		Number	Percentage
Pupil size	Abnormal	126	23.50
	Normal	409	76.40
Fasciculation	Yes	103	19.30
	No	429	80.20
Neck holding	Yes	113	21.10
	No	422	78.90
Status on admission	Conscious and oriented	521	97.40
	Conscious and disoriented	9	1.70
	Unconscious	5	0.90
Co morbidities	Yes	12	2.20
	No	523	97.80

Nausea and vomiting were most common symptom reported by 60.7% of patients followed by giddiness (41.3%), loose motion (28.2%), and secretions (9.5%)

respectively. Other symptoms were irritation of eyes (10.3%), weakness (7.9%) and diplopia (1.7%).

Most common clinical sign observed was of abnormal pupil in 126 (23.5%) patients followed by fasciculations in 103 (19.3%) patients and inability to neck holding were present in 21.1% patients. There were 5 (0.9%) patient came unconscious at emergency department whereas 9 (1.7%) were conscious but disoriented. Remaining 521 (97.5%) patients were conscious and oriented at the time of admission. Co-morbidities were present in 12 (2.2%) patients. These co morbidities were of alcohol intoxication, fatty liver, hypertension, acute febrile illness etc.

Table 4: Distribution of patients according to serum choline-esterase level.

Sr. choline esterase level	Outcome			
		Died	Live	Total
> 3000 U/l (mild)	Frequency	2	191	193
	Percent	15.40	48.50	47.40
1500 to 3000 U/l (moderate)	Frequency	3	108	111
	Percent	23.10	27.40	27.30
< 1500 U/l (severe)	Frequency	8	95	103
	Percent	61.50	24.10	25.30
Total	Frequency	13	394	407
	Percent	100	100	100

Chi-Square value= 9.959; df=2; p-value=0.007

Table 5: Distribution of patients according to investigation done.

Parameters		Number	Percent
Random blood sugar level	Done	144	26.90
	Not done	391	73.10
Urea	Done	346	64.70
	Not done	189	35.30
Creatinin	Done	346	64.70
	Not done	189	35.30
Total Bilirubin	Done	333	62.20
	Not done	202	37.70
SGOT	Done	71	13.30
	Not done	464	86.70
SGPT	Done	71	13.30
	Not done	464	86.70
Cholin esterase level	Done	407	76.10
	Not done	128	23.90
Total		535	100

Out of 535 patients, 407 investigated for serum acetyl choline-esterase level.

Lowest and highest recorded serum acetyl choline-esterase level was 50 and 21898 U/L respectively. Patients were categorized according to serum cholinesterase level in to three groups into mild, moderate and severe category. When compared with serum acetyl cholinesterase level among patients who died and to those who lived, it was found to be statistically significant with p-value=0.007 (<0.01) which is moderately significant.

Out of 535 patient 144 are investigated for random blood sugar level and only 2 found to be have blood sugar more than 200, 342 patients had done blood urea and serum creatinine out of that 28 had raised blood urea level and 170 had raised serum creatinine level respectively.

333 farmers had investigated for serum bilirubin out of that 58 had raised bilirubin level similarly 71 had investigated for SGOP and SGPT out of that 18 and 4 had raised level of SGOP and SGPT respectively. Serum choline esterase level of 407 patients, the lowest and highest recorded serum acetyl choline esterase level was 50 and 21898 U/l respectively.

Table 6: Distribution of patients according to time duration between admission and investigation, treatment given, ventilator required or not and outcomes of the patients.

Time required		Frequency	Percent
Duration between admission and biochemical tests	Same day	371	91.20
	2nd day	31	7.60
	More than 2 days	5	1.20
	Total	407	100
Duration between admission and treatment	<30 min	514	96.10
	>30 min	21	3.90
Ventilator required	Yes	18	3.40
	No	517	96.60
Outcome	Live	522	97.6
	Died	13	2.40
Total		535	100

Serum acetylcholinesterase level and other biochemical test were done in 91.2% patients on the day of admission while remaining 36 patients were investigated on second day and onward. Out of 535 patients 514 (96.1%) were received treatment less than half an hours. Only 18 patients required ventilator support out of 535 patients.

Among them, 13 died who were required ventilator support at variable period of time, ranging from immediate admission to up to 5th day and these patients were sent for post-mortem examination. Remaining 462 patients were discharged safely, 47 were DAMA (Discharge Against Medical Advice) and 11 were absconded.

DISCUSSION

Yavatmal is considered as tribal district of Maharashtra, lies in the eastern part of the state and belongs to Vidarbha region. The district has 17 Tehsils with 2155 villages. According to 2011 Census, the district has a total population of 27,72,348 accounting for 2.5 percent of the total population of the State.[10] In present retrospective study, 391 (73%) of poisoning cases were in the age group 21-40 years, which was similar with studies conducted in Tamilnadu by Edwin et al, Dayanand et al, Padmanaba et al and Subhash et al.[11-15] The mean age of patient were mean±SD. 33.3±10.1 in present study. Study conducted by Thunga et al and Marahatta et al mean age of the patients was in 4th decade which lies between 31 to 35 years age-group.[16-17] Male victims were commonly observed during study duration 517 (96.6%) than female 18 (3.4%), which were similar with the findings of Patel et al, Gannur et al.[18,19] Whereas study in Nepal by Chataut et al and by Banerjee et al the females were more as compare to males with male to female ratio was 1:1.4, 1:1.38 respectively.[9,20] The higher male: female ratio of 28.4:1 in this study was due to most of the males are professional insecticide sprayers, only few females are involved in this profession. Nausea and vomiting was the most common symptom (60.7%) which coincide with study findings conducted by Banerjee et al, Patel et al and Selveraj et al whereas study in Manipal by Thunga et al.[9,11,16,18] Sweating and secretions was the most common symptoms. Abnormal pupil was the most common presenting sign 126 (23.5%) which was similar with the other study Banerjee et al, Thunga et al, Selveraj et al, out of 535, 407 patients investigated for choline esterase level, statistical significance difference was found when compared sr. choline esterase level with the outcome of patients, these finding coincide with the study findings by Shah et al and Akshaya et al.[8,11,16,21,22] Present study reported 13 (2.4%) patients died, which was lesser as compared to study by Banerjee et al (5.78%), Patel et al (5.2%) and Selveraj et al (12%).[9,11,18] All the 13 died patients require ventilation for their life support. Among 13 died patients 7 (53.8%) patients died within 48 hours of admission and rest of 6 (46.2%) died after 48 hours of admission. Out of 322 patients se who were survived only 44 (8.4%) patients stayed less than 48 hours in hospital. The findings were similar with the studies in Goswamy et al.[23]

CONCLUSION

As agricultural industries are growing, OP is widely used as insecticides. The present study showed that majority of the patients were of young age with males outnumbering females. Nausea and vomiting was the most common symptom reported by the patients while abnormal pupil size was the most common sign observed at the emergency department. For diagnosis, we require detailed history and clinical examination, with the support of laboratory investigations such as acetylcholinesterase level. Maximum incidence of poisoning was seen in younger age group less than 30 years of age. Present study concluded that there was a significant difference between the outcome of patients and degree of derangement of serum cholinesterase level. Injections Atropine and PAM are very useful to treat in case of organophosphorus poisoning.

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