

Clinicoepidemiological Profile of Organophosphorus Poisoning in a Tertiary Care Center

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ABSTRACT

Introduction: Organophosphorus compounds are widely used as insecticides. Organophosphorus poisoning has a significant morbidity and mortality and is a common occurrence due to their easy accessibility. Study aimed to assess clinicoepidemiological profile of organophosphorus poisoning.

Material and methods: Our study was a hospital based prospective study conducted over a period of two years involving all the patients of organophosphorus (OP) poisoning, admitted in the medical emergency of the hospital. These patients were evaluated for demographic and clinical profile and followed till the time of discharge or death.

Results: 102 cases of OP poisoning were admitted, majority belonged to the age group of 15-25 years (54.9%) and were of rural origin (84.3%). Females (67.64%) outnumbered males. 97 cases had taken it with suicidal intent. Miosis was the most consistent clinical feature (93.13%). 64 patients (62.7%) needed admission in ICU. Respiratory failure was the most common complication. Mortality rate of 14.7% was observed.

Conclusion: OP compounds are ingested mostly with suicidal intent due to their easy availability mostly by young and productive population. Initial management and resuscitation in periphery is invaluable.

Keywords: Organophosphorus Compounds, Poisoning

INTRODUCTION

Organophosphorous (OP) compounds are widely used as insecticides.¹ Their poisoning, both intentional and accidental, is a major global problem with a case fatality rate of 4-30%. According to World Health Organization (WHO), globally more than three million cases of acute poisoning occur annually with 2,20,000 deaths.² In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and poisoning with such products is more common.³ It is of great concern in developing world as it affects the most productive age group of the society.^{4,5} Pattern of poisoning in a region depends on various factors which include availability and access to the poison, socioeconomic status of individual, cultural and religious influence.⁶ OP compounds can be absorbed through oral route, inhalation or subcutaneous route. The rapidity of action of depends upon the route of administration, quantity of dose, the rate of absorption and type of compound.^{4,5} Toxicity of OP compounds is the result of excessive cholinergic stimulation through inhibition of acetylcholinesterase. The rapid accumulation of acetylcholine in the synaptic junctions of CNS and peripheral tissues results in a cholinergic crisis, characterised by range

of muscarinic, nicotinic and central effects.⁷ Death usually occurs due to cardiovascular and respiratory failure due to paralysis of respiratory muscles and obstruction caused by bronchospasm and bronchial secretions.⁸ Early recognition, timely resuscitation and protocolized treatment have proven to decrease morbidity and mortality. Various studies have been conducted regarding management of OP poisoning but limited data is available regarding epidemiological profile of these patients in our setup. This study was conducted with the intention of exploring clinicoepidemiological features of patients of organophosphorus poisoning.

MATERIAL AND METHODS

Our study was a hospital based prospective study conducted over a period of two years in a tertiary care facility. This Study was conducted in Emergency medicine department, Intensive care unit and other inpatient areas of Sheri-Kashmir Institute of Medical Sciences. Following approval by institutional ethical committee all the patients of organophosphorus (OP) poisoning who were admitted in the hospital during the study period were included. Patients with history of mixed poisoning were excluded from the study. Diagnosis was made on the basis of clinical history and examination, Findings of clinical examination like miosis, salivation, lacrimation, anxiety/restlessness, bronchospasm, altered sensorium, hypotension and convulsions were noted. Routine monitoring of heart rate, blood pressure, pupillary size and reaction, respiratory rate, SpO₂ was done. Demographic profile of the patients such as age, sex, profession, marital status, route of poisoning, manner of poisoning, were recorded. The patients were treated according to standard protocol. Patients were decontaminated which included stomach wash, body wash and removal of contaminated clothes. All the patients received atropine and pralidoxime as per standard protocol.

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Patients were followed during their stay in hospital. Patients were followed till the time of discharge or death. Any complication during hospital stay like respiratory failure, circulatory failure, sepsis etc were noted. Likely cause of mortality was also recorded.

STATISTICAL ANALYSIS

Data collected was analyzed using SPSS version 20. The variables of interest were tabulated in terms of frequency and percentage. A two- tailed P- value less than 0.05 was considered to be statistically significant.

RESULTS

In the present study, 102 cases of OP poisoning were admitted in the medical emergency. Majority (54.9%) of the patients belonged to the age group of 15-25 years.

Age Group in years	Frequency	Percentage
<15	2	1.96%
15-25	56	54.9%
26-35	36	35.3%
36-45	7	6.86%
>45	1	0.98%
Total	102	100.0%

Table-1: Showing Age wise Distribution of Organophosphorus Poisoning Cases

Occupation	Frequency	Percentage
House wife	38	37.25%
Student	32	31.37%
Farmer	14	13.72%
Business	12	11.76%
Govt.Employee	2	1.96%

Table-2: Showing Frequency and Percentage Distribution of Occupations of Organophosphorus Poisoning Cases

Manner of Poisoning	Frequency	Percentage
Suicidal	97	95.1%
Accidental	2	1.96%
Occupational	3	2.94%
Homicidal	0	0.0%
Total	102	100.0%

Table-3: Showing Frequency and Percentage Distribution as per Manner of Poisoning

Clinical feature	Number	Frequency
Miosis	95	93.13%
Lacrimation/salivation	92	90.2%
Anxiety, restlessness	81	79.4%
Bronchospasm	78	76.4%
Bradycardia	60	58.8%
Urinary/faecal incontinence	59	57.8%
Loss of consciousness/altered sensorium	37	36.27%
Hypotension	21	20.58%
Convulsions	3	2.94%

Table-4: Showing Clinical Features of the Organophosphorus Poisoning Cases

Complication	Frequency	Percentage
Sepsis	4	3.92%
Circulatory failure	7	6.86%
Convulsions	8	7.84%
Multisystem failure	8	7.84%
Electrolyte disturbances	17	16.66%
Respiratory failure	21	20.58%
None	37	36.27%
Total	102	100.0%

Table-5: Showing Frequency and Percentage of Complications During the Course

Cause of death	Frequency	Percentage
Multisystem/multiorgan failure	8	53.34%
Respiratory failure	5	33.33%
Circulatory failure	2	13.3%
Total	15	100.0%

Table-6: Showing the Cause of Death in Organophosphorus Poisoning Cases

[Table-1] Total number of male patients were 33 (32.35%) with mean age of 24.64 years compared to females who constituted a total of 69 cases(67.64%) with a mean age of 26.02years. 86 (84.3%) cases were from rural areas while as only 16(15.7%) were from the urban areas. 50.9% (52) of the patients were married. Housewives were the largest group (37.25%) followed by students and farmers.[Table-2] A total of 99 cases (97.05%) had ingested the poison and rest of the three had inhaled the poisonous fumes while spraying. 97 cases had taken it with suicidal intent.[Table-3] Miosis was the most consistent clinical feature present in 93.13% of the cases followed by lacrimation/ salivation present in about 90.2% of the cases. The other features of cholinergic over activity like bronchospasm (76.4%) and urinary and faecal incontinence (57.8%) were also present in significant number of cases.[Table-4] A total of 76 patients were referred from the peripheral hospitals out of which 56 (73.68%) had received gastric lavage while as 20 cases (26.32%) had not received any gastric lavage before being referred. Hospital stay was less than 7days in 71 cases (69.6%) and more than that in rest of the cases. 64 patients (62.7%) needed admission in ICU, out of which 62 required mechanical ventilation. Out of 62 cases, 8 were ventilated for more than 3days and 4 needed tracheostomy. Respiratory failure was the most common complication during the course of hospital stay (20.58%) followed by electrolyte imbalance seen in 16.66% of cases.[Table-5] 15 cases expired yielding a mortality of 14.7%, all of whom were admitted in ICU. 8 died of multi system failure, 5 due to respiratory failure and 2 due to circulatory failure.[Table-6]

DISCUSSION

Our study completed over a period of two years involved 102 patients. Majority of the patients were young with a mean age of 26.18years. This was similar to studies conducted by padmanbha,⁸ mishra⁹ and Pal et al.¹⁰ This age group is most active physically, mentally and socially making them more

prone to stress in the form of family problems, unemployment, failure in examinations and improper knowledge regarding pesticides. We also observed a female predominance, which was similar to studies done by Shadnia¹¹ and Hassan et al.¹² This can be explained by the fact that females are more vulnerable to stress due to social, cultural and economic factors and take drastic step more frequently. However Hubdekari¹³ et al found a male predominance. Majority of the patients were from rural areas, which can be explained by the fact that in the rural areas the OP compounds are easily available due to their utility in farming practices. Raddi,¹⁴ Padmanbha,⁸ and Mishra,⁹ et al also made a similar observation. In our study 37.25% cases were housewives, 31.37% were students, followed by farmers (13.72%). This was similar to studies by Rehiman¹⁵ et al and Hassan¹² et al but in a study by Radi¹⁴ et al predominant occupation was farm related. This variation can be explained by lack of financial risks involved in farming practices in our region. Most of the cases had ingested the compound with suicidal intent, similar to other studies. Choice of OP compounds for suicide is mainly due to their known toxicity and cheap and easy over the counter availability. The route was oral as it is the easiest route. Studies by Raddi¹⁴, Hubdekari,¹³ kozaci¹⁶ et al also noted similar results. The most frequent clinical sign noted in our study was miosis (93.12%), followed by increased salivation (90.2%). The acute complication noted were hypotension and convulsions. 62.74% of the patients were admitted in the ICU and 60.78% required mechanical ventilation. All the patients who expired were admitted in the ICU and were on mechanical ventilation. None of the non-ventilated patients expired. Multiorgan failure was the cause of death in 8 cases, 5 cases died due to respiratory failure while as two expired due to circulatory failure. The reason for high mortality in our study as compared to others was due to late arrival, not receiving any treatment and lack intensive care at periphery. Kang¹⁷, Gundaz,¹⁸ Ahmed¹⁹ et al observed a mortality of 19%, 13.9% and 18% respectively.

CONCLUSION

We concluded that OP compounds are ingested with suicidal intent due to their easy availability by young population in rural areas, more commonly females. Miosis is the most common and consistent clinical feature and respiratory failure most common complication. A large number require intensive care in tertiary centres but initial management and resuscitation in periphery maybe invaluable.

REFERENCES

1. Afshari R, Majdzadeh R, Balali-Mood M. Pattern of acute poisonings in Mashhad, Iran 1993-2000. *J Toxicol Clin Toxicol* 2004;42:965-75.
2. World Health Organization. Guidelines for poison control Bulletin 1999; Geneva: World Health Organization.
3. Aaron R, Joseph A, Abraham S, Muliylil J, George K, Prasad J et al. Suicides in young people in Rural Southern India. *Lancet*, 2004; 363:1117-1118.
4. Eddlestron M, Szinicz L, Eyed p. Oximes in acute organophosphorus poisoning: a systemic review of

clinical trials. *QJ Med J*. 2002; 275-283.

5. Cherian MA, Roshini C, Visalakshi J. Biochemical and clinical profile after organophosphorus poisoning- A placebo- controlled trial using pralidoxime. *JAPI* May 2005; 53:427-430.
6. B. Maharani, N. Vijayakumari. Profile of Poisoning Cases in a Tertiary care Hospital, Tamil Nadu, India. *Journal of Applied Pharmaceutical Science*, January, 2013;3: 091-094
7. Jeyaratnam J. Acute pesticide poisoning: A major global health problem. *World Health Stat Q* 1990; 43:139-44.
8. Padmanabha T S et al. Study of Profile of Organophosphorus Poisoning Cases in a Tertiary Care Hospital, North Karnataka, Bidar, India. *Int J Pharm Bio Sci*, 2014; 5: 332 - 339.
9. Mishra A, Shukla SK, Yadav MK, Gupta AK. Epidemiological Study of Medicolegal Organophosphorus Poisoning in Central Region of Nepal. *J Forensic Res*, 2012;3:167.
10. Pal DK, Mondal T, Ghosh R. Evaluation of Organophosphorus Poisoning Cases in a Rural Block of West Bengal. *Journal of Dental and Medical Sciences*, Dec. 2015;14: 12:08-10.
11. Shadnia S, Okazi A, Akhlaghi N, Sasanian G, Abdullah M. Prognostic Value of Long QT Interval in Acute and Severe Organophosphate Poisoning. *Journal of Medical Toxicology*, Dec 2009;5:196-199.
12. Hassan NAM, Madboly AMG. Correlation between Serum Creatine Phosphokinase and Severity of Acute Organophosphorus Poisoning: A Prospective Clinical Study (2012-2013). *Journal of Environmental Science, Toxicology and Food Technology*, 2013;4: 18-29.
13. Hubdekari IA et al. Acute Poisoning with Organophosphorus Pesticide: Patients Admitted to a Hospital in Bijapur, Karnataka. *JKIMSU*, 2012;1:38-47.
14. Raddi D, Anikethana G. Liver Enzymes for Assessment of Severity of Organophosphorus Poisoning. *Int J Med Health Sci*. Jan 2015;4:60-63.
15. Rehiman S, Lohani SP, Bhattarai MD. Correlation of Serum Cholinesterase Level, Clinical Score at Presentation and Severity of Organophosphorus Poisoning, *J Nepal Med Assoc* 2008; 47: 47-52.
16. Kozaci Nalan et al. Factors Affecting the Prognosis in Acute Insecticide Intoxications Containing Organic Phosphorus. *JAEM* 2012; 11: p 93-97.
17. Kang EJ et al. Factors for Determining Survival in Acute Organophosphate Poisoning The Korean Journal of Internal Medicine. December 2009. Vol. 24, No. 4
18. Gündüz E, Dursun R, Icer M, Zengin Y, Güllü MN, Durgun HM, Gokalp O. Factors Affecting Mortality in Patients with Organophosphate Poison. *JPMA*, 2015; 65:967-972.
19. Ahmed KM, Sainath C, Ahmed P. A Cross Sectional Study of Estimation of Plasma Pseudo Cholinesterase and its Correlation to Mortality Among Organophosphorus Poisoning Patients. *Indian Journal of Basic and Applied Medical Research*; 2014;3:285-291.

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