

Original article

Clinical profile of organophosphorus poisoning in a tertiary care hospital

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ABSTRACT:

Introduction: Organophosphorus compounds are associated with significant morbidity and mortality in developing countries, predominantly affecting the working age group (21-30 years). Present study was planned to study the clinical profile of organophosphorus poisoning admitted to the Karnataka Institute of Medical Sciences, Hubli.

Materials and methods: Patients admitted to Karanataka Institute of Medical Sciences, Hubli, between the December 2011 and November 2012, with history of organophosphorus poisoning were studied, with preformed proforma.

Observations and results: Out of 320 patients included in the study, majority were male (58.75%), between the age group of 21-30 years. Most common cause was suicidal (97.5%), commonly affecting farmers (30%), illiterates (42.5%) and from rural area (70%). Most patients were of grade II severity (45%); higher grade associated with higher duration of hospital stay and death. Most common finding pupillary constriction (76.25%), followed by excessive secretions (57.5%). Mortality rate in our study was 21.25%. Dimethoate was the most common poison (18.75%). Monocrotophos poisoning and dicholorovas poisoning was associated with higher mortality of 100% and 66.63% respectively.

Conclusion: Organophosphorus poisoning has become a common mode of suicide in the rural setting, among the farmers and the illiterates. The ease of availability of the poison and the poor health care facility has caused a higher mortality rate. Selective ban on poison compound with high mortality rate and availability of proper health care facility is a need of the hour.

INTRODUCTION

Organophosphorous compounds are principally used as pesticides, and their exposure is highly prevalent in developing countries. Toxic effects of organophosphorus compound are associated with significant morbidity and mortality making it a major global clinical problem. Their ease of access and socio-cultural factors play important role in the choice of organophosphorus compound as a self-poison. The incidence is higher in young,

economically active group with a case fatality ratio of 4-30%.^{1,2,3}

The importance of pesticides in India can be understood from the fact that agriculture is a major component of the Indian economy. It contributes 22% of the nation's GDP and is the livelihood of nearly 70% the country's workforce.

In India, use of insecticides, accounted for 67% of the total pesticide consumption in 2006. The potential adverse impact on human health from exposure to pesticides is likely to

be higher in countries like India due to easy availability of highly hazardous products and low risk awareness. Overexposure to pesticides can occur before spraying because of easy access for children, lack of adequate labeling and during mixing, spraying and after spraying operations. Spray operators and bystanders can be affected. Suicidal poisonings are common as pesticides are cheap and easily available in market.⁴

After an exposure to an organophosphorus agent the clinical syndrome progresses through three well defined phases: Initial cholinergic phase, intermediate syndrome and delayed polyneuropathy phase. Severity of organophosphorus poisoning is classified according to Modified Dreisbach Clinical Criteria.

MATERIALS AND METHODS

Organophosphorus poisoning cases presenting to Karnataka Institute of Medical Sciences, Hubli, between the period of December 2011 and November 2012 were included in the study. A total of 320 cases with organophosphorus compound poisoning were admitted to the hospital during the study period. Patients with history of exposure to an

entirely different poison or mixture of organophosphorus and other poison were excluded from the study.

Admissions were always through the emergency department where initial decontamination procedures were carried out. These included skin decontamination by removal of all clothing, washing skin and hair with soap and water, and gastrointestinal decontamination by gastric lavage, and activated charcoal. The diagnosis of organophosphorus poisoning was based on the history, clinical features and response to atropine. All cases were treated with repeated doses of intravenous atropine and oximes when indicated. Data analysis was done with the help of computer using SPSS 17.0 SOFTWARE.

OBSERVATIONS AND RESULTS

Out of 320cases studied, 58.75% (188 cases) were males, and 41.25% (132cases) were females. Incidence of organophosphorus poisoning was more in males when compared to females in our study. The age group most commonly affected was between 21-30 years (45%), in both the sexes.

TABLE 1: AGE AND SEX DISTRIBUTION

AGE GROUPS IN YEARS	SEX		TOTAL
	FEMALES	MALES	
<20	52	4	56
21-30	64	80	144
31-40	8	44	52
>40	8	60	68
Total	132	188	320

TABLE 2: DISTRIBUTION ACCORDING TO REASON FOR POISONING

REASON	NO. OF CASES	PERCENTAGE
ACCIDENTAL	8	2.5
SUICIDAL	312	97.5
HOMICIDAL	0	0
Total	320	100.0

In our study the main reason for majority of poison consumption was intentional, and only 2.5% had accidental exposure. Majority of the cases were seen in farmers (30%), illiterate people (42.5%), and from rural background

(70%). Oral consumption was the most common route of poisoning (97.5%). The cutaneous exposure was seen in 2.5% and was accidental.

TABLE 3: MODE OF CONSUMPTION

MODE OF CONSUMPTION	NO. OF CASES	PERCENTAGE
ORAL	312	97.5
SKIN EXPOSURE	8	2.5
TOTAL	320	100.0

TABLE 4: DISTRIBUTION OF CASES ACCORDING TO OCCUPATION

OCCUPATION	NO. OF CASES	PERCENTAGE
BUSSINESSMAN	8	2.5
EMPLOYEE	8	2.5
FARMER	96	30
HOUSEWIFE	48	15
LABOURERS	64	20
STUDENTS	80	25
UNEMPLOYEE	16	5
TOTAL	320	100.0

TABLE 5: REGIONAL DISTRIBUTION

REGION	NO. OF CASES	PERCENT
RURAL	224	70
URBAN	96	30
TOTAL	320	100.0

TABLE6: DISTRIBUTION ACCORDING TO EDUCATIONAL STATUS

EDUCATIONAL STATUS	NO. OF CASES	PERCENTAGE
DEGREE	12	3.75
PUC	44	13.75
HIGH SCHOOL	80	25
PRIMARY SCHOOL	48	15
ILLITERATE	136	42.5
TOTAL	320	100

TABLE 7: DISTRIBUTION OF CASES ACCORDING TO SEVERITY OF POISONING

CLINICAL GRADES	NUMBER OF CASES	
	CASES	%
GRADE I	80	25
GRADE II	144	45
GRADE III	96	30

TABLE 8: DISTRIBUTION OF CONSUMED COMPOUNDS

COMPOUND	NO. OF CASES	PERCENTAGE
Chlorpyriphos	36	11.25
Diazinon	40	12.5
Dichlorvos	12	3.75
Dimecron	28	8.75
Dimethoate	60	18.75

Fenthion	4	1.25
Malathion	28	8.75
Metacid	32	10
Mevinphos	24	7.5
Monochrotophos	16	5
Paraoxan	32	10
Quinolphos	8	2.5
Total	320	100.0

Dimethoate was the most common cause of organophosphorus poisoning (18.75%), followed by Diazinon (12.5%), Chlorpyrifos (11.25%), Metacid and Monochrotophos (10% each). In our study the majority of cases 45% belonged to Grade II severity. In our study

maximum hospital stay was observed in 30 % of cases having more severe poisoning (grade III), followed by grade II and grade I severity. The mean duration of hospital stay being 6.3 days. The mortality was highest among cases with more severe type of poisoning.

TABLE 9: CORRELATION OF POISONING SEVERITY AND HOSPITAL STAY AND MORTALITY

CLINICAL GRADES	NUMBER OF CASES		HOSPITAL STAY DURATION	NUMBER OF DEATHS	
	CASES	%		CASES	%
GRADE I	80	25	4 DAYS	12	15
GRADE II	144	45	6DAYS	24	16.6
GRADE III	96	30	9 DAYS	32	33.3

TABLE 10: CORRELATION OF TIME OF ARRIVAL AND MORTALITY

TIME OF ARRIVAL	NUMBER OF CASES	NUMBER OF DEATHS
<3 hrs	80	12
3-6hrs	144	24
>6hrs	96	32

In our study group 45% were in clinical severity grade II, and 30% were in clinical severity grade III. It was observed that the severity of organophosphorus poisoning as well as mortality increased with the increased duration of arrival.

The most common symptom was pupillary constriction (76.25%), followed by excessive secretions (57.5%), fasciculation (42.5%),

depressed consciousness (36.25%), diaphoresis (31.25%), diarrhea (30%), abdominal pain (28.75%), fever (28.75%), and respiratory failure (26.25%). In our study majority of cases consumed dimethoate and 46.6% among them died. Maximum mortality rate 100% was seen among cases with monocrotophos poisoning followed by dichlorvas 66.63%.

TABLE 11: OP COMPOUND POISONING AND MORTALITY

COMPOUND	NO.OF CASES	NO.OF DEATH	PERCENT
Chlorpyriphos	36	12	33.3
Diazinon	40	4	10
Dichlorvos	12	8	66.63
Dimecron	28	0	0
Dimethoate	60	28	46.66
Fenthion	4	0	0
Malathion	28	0	0
Metacid	32	0	0
Mevinphos	24	0	0
Monochrotophos	16	16	100
Paraoxan	32	0	0
Quinolphos	8	0	0
Total	320	68	21.25

DISCUSSION

Organophosphates and carbamates frequently used pesticides can result in serious morbidity and mortality with over 50,000 organophosphorous compounds have been synthesized since the first one by Clermont in 1857. The clinical symptoms range from the classic cholinergic syndrome to flaccid paralysis and intractable seizures, with mortality ranging from 10 to 22%. About 99% of fatal poisonings occur in developing countries, particularly among farm workers.

Present study included 320 cases in the age group of 18 to 70 years. Majority (45%) were in the age group of 21-30 years (mean age being

25.07 yrs). These are consistent with the findings of Guven Met al⁵ where in a similar study the mean ages were 24.1 and 33.95 years in the age group of 21-30 years and 31-40 years respectively. Dassanayake T et al⁶ of Srilanka documented that 91% of their cases were under the age of 30 years. In our study incidence of organophosphorus poisoning was higher in males (58.75%) when compared to females. These findings are consistent with studies conducted by Murat S et al¹ (25 males, 51% and 23 females, 46%).

With the ease of availability, it is not surprising that the use of organophosphorus compounds in suicide attempts have increased

as the commonest mode of suicidal poisoning. This was also observed in our study. 97.5% were suicidal. It was also reported to be 67% by AM Saadehet al⁷. Murat S et al¹ reported 68% cases to be suicidal.

In our study, dimethoate poisoning was seen in 18.75% and followed by diazinon poisoning (12.5%) and chlorpyrifos (11.25%). In the study conducted by Murat S et al¹ dichlorvos accounted for 51.1% of cases, Ethyl parathion in 10.6% of cases and Fenthionin 8.5% of cases. In study by Dassanayake T et al⁶ dimethoate was the most common organophosphorus compound consumed in Sri Lanka. Selection of specific compound could

be because of the wide variations in the cost and ease of local availability of compound according to crops grown in that area, or local industries producing such compound.

In our study majority of cases 70% hailed from rural areas compared to 30% from urban areas. These findings were consistent with study conducted by Otto K Ret al⁸ who observed higher incidence of poisoning in the rural areas (70.8%) than in towns. Dalalet al⁹ reported a similar higher incidence (70.5%) in rural areas. Low educational status, low socioeconomic status and poor living conditions in rural areas could be possible reason.

TABLE 12: COMPARISON OF COMMON CLINICAL FEATURES WITH OTHER STUDIES FROM INDIA

Symptoms	Present study	Singh S et al ¹⁰	Kamath et al ¹¹	Gupta et al ¹²	Vishwanath et al ¹³	Doshi et al ¹⁴	Thunga G et al ¹⁵
Excessive secretions	57.5%	95%	12%	28%	1.8%	28%	69%
Abdomen Pain	28.75%	-	40%	-	5.9%	52%	-
Diarrhea	30%	55%	4%	55%	1.2%	12%	-
Altered sensorium	36.25%	60%	32%	60%	4.7%	8%	28%
Seizures	3.75%	-	-	-	-	-	1%
Miosis	76.25%	-	-	-	-	-	78%

In our study, severity of poisoning was classified by using Modified Dreisbach Criteria. Out of 80 cases, most of the cases were in the Grade II group of clinical severity 47.2%, followed by 27.77% in Grade III group and 25% in Grade I group. Arup KK et.al¹⁶ reported, mild grade in 15 cases (14%), moderate in 55 cases (50.9%), and severe grade in 32 cases (29.6%). It was observed in our study that the severity of poisoning had proportionate relation with outcome, greater the severity poorer the outcome. The death rate increases with Grade I severity was 15%, Grade II was 16.6% and Grade III was 33.33%. These findings were consistent with the study conducted by Arup KK et.al.¹⁶

The causes of death and mortality rate (21.25%) of our study group are in accordance with study conducted by Murat S et al¹ where

the mortality rate was 21.6% and respiratory failure in 55%.

CONCLUSION

1. Organophosphorous poisoning is most prevalent in the age group of 21-30 years.
2. Incidence is more common in males.
3. The incidence is higher among illiterates.
4. The most common intention was suicidal.
5. Organophosphorous poisoning is more common among agricultural laborers and unskilled workers.
6. The common route of exposure is ingestion of poison.
7. The higher the clinical grade of poisoning at initial presentation, more is the incidence of respiratory failure and need for ventilator support.

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