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A clinico-epidemiological profile of organophosphorous compound poisoning, a retrospective study in a tertiary hospital, in Puducherry

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Abstract:

Background and Objectives: *Organophosphorous compound [OPC] poisoning is an acute medical emergency , more commonly encountered in India and other developing countries. Due to its easy availability and usage as a pesticide in agricultural fields , OPC poisoning is seen more among farmers. The present study aims to describe the clinico-epidemiological profile and outcome of patients of OPC poisoning reported to a tertiary care hospital , Puducherry.*

Materials and Methods: *This retrospective study evaluated the case records of patients above 12 years with OPC poisoning admitted to our hospital over last 3 year and data regarding age, gender, socioeconomic status, type of Organophosphorous compound , severity of clinical presentation, incidence of paralysis, treatment modalities, complications, duration of hospitalization and mortality were entered into a pre-defined proforma. The data was analyzed using SSPS software.*

Results: *A total of 80 patients were included in the study. Mean age was 29.78 years and more common among young males belonging to lower socioeconomic status population. Around 75% of patients were farmers or labourers. Most common reason for consumption of OPC was quarrel with parents/spouse [43.5%]. Monocrotophos [30%] was the most common compound encountered. About 75% patients received first aid within an hour. Around 45% had severe and 37.5% had moderate manifestations. All patients in the study received decontamination measures, atropine and Pralidoxime. Around 42.5% patients developed paralysis and all required mechanical ventilation. Mean duration of ventilation and hospitalization were 9 days [standard deviation of 7 days]. Mortality was around 6% in the present study.*

Conclusion: *The present study describes substantial information regarding the epidemiology, clinical profile and outcome of acute OPC poisoning in a tertiary care teaching hospital. Its relatively small sample size and the retrospective record-based nature are the major limitations of the present study. There is a further need for prospective studies to study in detail the clinico-epidemiological profile and treatment modalities to predict the outcome of OPC poisoning.*

I. Introduction

Organophosphorous poisoning is one of the most common poisonings with suicidal intention in India and other developing countries as it is easily available with no special safeguards . It is more commonly misused among farmers for suicidal purposes due to its usage as a pesticide in agricultural fields. It occurs following oral ingestion , respiratory or dermal exposure. Mortality mainly is due to delay in hospitalization and neurological complications leading to respiratory failure. Organophosphorous poisoning inhibits acetyl cholinesterase at the neuromuscular junction in both autonomic and central nervous system resulting in accumulation of acetylcholine [Ach] and over stimulation of Ach receptors resulting in three distinct phases which are acute cholinergic crisis, intermediate syndrome [IMS] and delayed polyneuropathy [OPIDN]. This research was undertaken retrospectively to study the clinical and epidemiological profile with special reference to outcome of Organophosphorous compound poisoning.

II. Aims and objectives

In the present study, our aim is to describe the epidemiological factors and clinical profile and outcome of the patients presenting with organophosphorous compound poisoning to a tertiary hospital in Puducherry.

III. Materials and methods

All the case records of patients above 12 years of age admitted to Pondicherry Institute of Medical Sciences, Puducherry during the last 3 years with organophosphorous poisoning were included in our study. Patients who have consumed other pesticides were excluded from the study. A detailed information regarding

the clinical history, physical examination and relevant investigations, which were carried out in all patients at the time of admission and during their course of hospitalization, was entered into a Proforma. Institutional ethical committee clearance was obtained. Patients were categorized into mild, moderate and severe poisoning based on the clinical features[1]. The outcome measures assessed were development of intermediate syndrome , number of days on ventilator, number of days of hospitalization and development of complications like pneumonia, urinary infection, delayed neurotoxicity and mortality. Analysis of results was done by using SPSS-10 software.

IV. Results and discussion

There were 80 case reports of patients of organophosphorous compound poisoning during the study period. The mean age was 29.78 years. 46% of patients were in the age group of 15-25 and another 20% were in the age group of 26-30 with an overall 66% of patients were younger below 30 years as mentioned in table.no.1, indicating high risk of suicidal attempt among younger individuals. Only 20% of patients were women among the study population. Similar results were obtained in a study conducted at University hospital of Tunisia[4] .

Table.no.1. Distribution of patients by Epidemiological factors

Epidemiological factors	Number	Percentage
Age in years		
15-20	22	27.5
21-25	15	18.8
26-30	16	20
31-60	26	32.5
More than 60	1	1.3
Gender		
Female	16	20
Male	64	80
Socioeconomic status		
Upper	1	1.25
Upper middle	2	2.5
Lower middle	14	17.5
Upper lower	45	56.25
Lower lower	18	22.5
Region		
Urban	5	6.25
Rural	75	93.75
Occupation		
Farmers	50	62.5
Laborers	10	12.5
Students	8	10
Unemployed	6	7.5
Housewives	4	5
Officers	2	2.5
Reason		
Quarrel with spouse	20	25
Quarrel with parents	15	18.75
Failure in exams	10	12.5
Failed relationships	12	15
Unemployment	7	8.75
Financial	7	8.75
Psychotic	6	7.5
Unknown	3	3.75

Upper lower class constituted more than 50% of cases and only around 4% belonged to upper two socioeconomic classes [upper and upper middle as per modified kuppusamy's socioeconomic classification] as mentioned in table.no.1. Only 6% of the patients were from urban areas , indicating organophosphorous compound poisoning is an overwhelming problem of rural poor. 75% of patients were farmers or laborers and importantly 10% were students. Similar results were obtained in a study conducted among 376 patients in Srilankan hospital by Eddleston et al[5]. Quarrel with relatives [parents / spouse] was the most important reason accounting for nearly half of the patients [43.5%] and the second important cause being scholastic and relationship failure [27.5%] as in table.no.1, which is comparable to a study conducted by Murat sungur et al among 47 patients in Turkey[6] .

Monocrotophos and chlorpyriphos were the commonest compounds [30% and 12.5% respectively] as listed in table.no.2. In a study conducted among 376 patients in Srilankan hospital by Senanayake et al[7] , the commonest compound encountered was chlorpyriphos. 65% of them consumed less than 50ml whereas 35 % of them consumed >50ml.

Table . 2. Distribution based on type of the compound ingested

Type of the compound	Number	Percentage
Monocrotophos	24	30
Chlorpyriphos	10	12.5
Quinolophos	7	8.8
Triazophos	6	7.5
Profenophos	4	5
Ethion	5	6.3
Dimethoate	4	5
Carbofuran	9	11.3
Methylparathion	3	3.8
Demecron	3	3.8
Others	5	6.3
Total	80	100

Majority [75%] of the patients received first aid within an hour. Breathlessness [94%] and sweating [94%] were the most common symptoms. Vomiting [63%], urinary incontinence [45%] , were other common symptoms as tabulated in table.no.3. Importantly 2 patients [2.5%] experienced seizures. The most common signs were sweating [94%], bradycardia [88%], pin point pupil seen in 50% of patients. Sialorrhoea [38%] and bronchorrhoea [23 %] were the other common signs as listed in table.no.4. Around 43 % patients developed paralysis.

Table .3. Symptoms of patients

Symptoms	Number	Percentage
Breathlessness	75	93.75%
Sweating	75	93.75%
Vomiting	50	62.5%
Loose stools	15	18.75%
Abdominal pain	15	18.75%
Fits	2	2.5%
Urinary incontinence	36	45%
Difficulty in swallowing	5	6.25%
Blurring of vision	5	6.25%

Table .4. clinical signs of patients

Signs	Number	Percentage
Pinpoint pupils	40	50%
Sweating	75	93.75%
Salivation	30	37.5%
Lacrimation	15	18.75%
Rhinorrhoea	10	12.5%
Warmth	10	12.5%
Delirium	10	12.5%
Fasciculation	10	12.5%
Hypertension	10	12.5%
Bronchorrhoea	18	22.5%
Bronchospasm	15	18.75%
Comatose	15	18.75%
Opthalmoplegia	15	18.75%
Flacidparalysis	25	31.25%
Hypotension	7	8.75%
Tachycardia	10	12.5%
Bradycardia	70	87.5%
Extrapyramidal signs	1	1.25%

In our study, based on clinical manifestations at presentation, patients were categorized into mild, moderate, severe and fatal groups. It was found that only a small proportion 17.5% of patients had mild manifestations and over 37.5% of patients had moderate and 45% had severe manifestations as in table.no.5. None of the patients with mild to moderate manifestations developed paralysis, whereas over 90% of patients with severe manifestations developed paralysis and required ventilator.

Table .6. Distribution of patients by severity of presentation

Severity of presentation	Number	Percentage
Mild	14	17.5
Moderate	30	37.5
Severe	36	45
Total	80	100

Patients were treated with standard measures like gastric lavage, skin decontamination, atropine and Pralidoxime as listed in table.no.6.

Table .6. Various treatment modalities

Treatment	Number of patients	Percentage
Gastric lavage	80	100%
Skin decontamination	80	100%
Atropine	80	100%
Pralidoxime	80	100%
Glycopyrolate	30	37.5%
Ventilator support	34	42.5%
Activated charcoal	5	6.25%

Overall 34 patients [42.5%] in the study developed paralysis and all the patients required intubation and ventilation as in table no.6. In a study conducted among 376 patients in Srilankan hospital by Eddleston et al[5] , around 24 % developed paralysis and required ventilator. About 60 % required intubation and mechanical ventilation within first 6 hours and 21 % were intubated after 24hours as mentioned in table.no.7. In a study conducted among 376 patients in Srilankan hospital by Senanayake et al[7] , the time to intubation varied from 15 hours to 6 days. Of those who required ventilation, about 50 % of patients required ventilation for less than a week. Close to 20 % of them required ventilation more than 2 weeks as in table.no.7. Mean duration of

ventilation was 9 days [standard deviation was 7 days]. In a study conducted among 376 patients in Srilankan hospital by Eddleston et al[2] , the duration of ventilation varied from 3 to 15 days.

Of the total 80 case records of patients in our study as listed in table.no.7, 2/3 rd were discharged within a week and only 1/8 th stayed beyond 2 weeks. Mean [SD] duration of hospitalization was 9 days [7days]. Five [6%] of our patients died. Pneumonia was the most common complication being seen in 16 patients [20%]. Other complications noted were thrombophlebitis [3 patients] and urinary tract infection [2 patients]. In a study conducted by Murat sungur et al among 47 patients in Turkey[6], respiratory failure and pneumonia were the most common complications.

Table.no.7. Distribution of patients by Outcome measures

Outcome	Number	Percentage
Incidence of paralysis		
Present	34	42.5
Absent	46	57.5
Type of paralysis		
Type I	6	17.6
Type II	10	29.4
Both type I and type II	18	52.9
Time to intubation		
Less than 6 hours	20	58.8
7-12 hours	4	11.8
13-24 hours	3	8.8
More than 24 hours	7	20.6
Duration of intubation		
Less than 1 week	18	52.9
1-2 weeks	10	29.4
More than 2 weeks	6	17.6
Duration of hospitalization		
Less than 1 week	54	67.5
1-2 weeks	16	20
More than 2 weeks	10	12.5
Mortality		
Alive	75	93.8
Expired	5	6.3
Complications		
Pneumonia	16	20
Urinary tract infections	2	2.5
Thrombophlebitis	3	3.8

V. Conclusion

Organophosphorous compound poisoning is a common and life threatening poisoning encountered among rural people belonging to lower socioeconomic strata. It is more prevalent among young males [especially farmers] with suicidal intention. Misunderstanding with parents / spouse is the most important reason for consumption of poison. Monocrotophos and chlorpyriphos were common compounds encountered in our study. Majority of the patients received first-aid within an hour. Over 80% of patients had moderate and severe manifestations. Nearly all patients with severe manifestations developed paralysis and required ventilation, while none among those with mild to moderate manifestations developed paralysis. Mortality in our study was 6% and 20% patients developed pneumonia. Early recognition and immediate first-aid and appropriate treatment with atropine and pralidoxime can save lives. The retrospective record-based nature and relatively small sample size are the limitations of our study.

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