Research Journal of Biological Sciences 3 (7): 775-778, 2008
ISSN: 1815-8846

Analysis of Organophosphosphates Intoxicated Cases Treated at Khorramabad and Sari, Iran

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Abstract: To study the socio-demographic pattern and mode of presentation of organophosphorous intoxication, this study conducted at the department of internal Medicine in shohada ashayer hospital of khorramabad and Imam Khomeini hospital of sari, Iran. In this descriptive study, 286 cases of organophosphorous compound poisoning, admitted through the emergency department, were evaluated. In all the cases, a previously established clinical and therapeutic protocol was applied and the outcome was recorded. One-hundred sixty (54.54%) patients were male and 130 were (45.45%) female with the mean age of 25.04 years. Two hundred and twenty two (77.62%) cases were attempted suicides and 64 cases (22.37%) were due to accidental events. Mean age was 22.1 years in the 222 suicidal cases (77.62%) and 156 (70.27%) of them were less than 24 years. Among the suicide attempts, 126 (56.75%) were female patients. One-hundred fifty seven of cases were illiterate and 47.55% of the patients were in the lower middle socioeconomic status. The patients' mean arrival time to the hospital after poisoning was 2.1±6.01 h. Exposure routes were gastrointestinal in 222 patients (77.62%), respiratory in 16 patients (5.59 %), dermal in 20 patients (6.99%) and both dermal and respiratory in 28 (9.79%). Death of 20 (6.99%) patients related to either the ingestion of higher doses or delay in approaching the hospital for emergency management. Causes of poisoning (suicide vs. non-suicide) and time interval between poisoning to arrival at hospital were major determinants of lethality. These findings call for a shift in emphasis in educating the masses towards first-aid care for intoxication.

Key words: Organophosphorous compound, poisoning, suicide, intoxication

INTRODUCTION

Organophosphorous compound poisoning from occupational, accidental and intentional exposure is a global problem, especially in developing countries (Sheu *et al*., 1998). Its toxicity is based on inhibition of acetyl cholinesterase, culminating in accumulation of acetyl-choline at the synapses (Muhammad and Shamim, 2003). Initially, majority of patients presents with florid cholinergic symptomatology (Khurana and Prabhakar, 2000). Severe intoxication can lead to bronchorrhea, respiratory depression, fasciculations and altered sensorium (Yelmos *et al*., 1992). Quantifying acetylcholine can help in the diagnosis (Muhammad and Shamim, 2003).

Irrational frequent sprays in high concentration pose risk to farmers (Vander Hoek *et al*., 1998). Interestingly recognition of toxicity is resulting in paradoxical rise of such cases. Most of the villagers have stocks of these compounds at houses, readily available for deliberate self-poisoning (Eddleston, 2000). Suicidal intake of pesticides is a huge burden on health services and causing extremely higher case fatality rate than accidental oisoning (Hettiarachchi and Kodithuwakku, 1989; Ingianna *et al*., 1983; Abdollahi *et al*., 1997).

In this study, we investigated the sociodemographic pattern of organophosphorous intoxication and tried to establish the determinants, which are responsible for such cases.

MATERIALS AND METHODS

This is a descriptive study of 286 patients of organophosphorous compound poisoning presenting at shohada ashayer hospital of khorramabad, lorestan, Iran and Imam Khomeini hospital, sari, Iran. Cases were admitted through emergency department and diagnosed based on history of ingestion/exposure of the compound. Attendants of the patients were asked to bring the bottle through which the patient took the poison. Some of them were already carrying the container with them. While,

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diagnosing these cases, clinical signs suggestive of muscarinic involvement like excessive salivation, sweating, miosis and typical odour of the compound in breath and clothes were also taken into account. Finally, improvement with intravenous atropine was thought to confirm the diagnosis. Other agrochemicals, parquat or drugs poisonings were not entertained in the study.

Data collected includes age, gender, education, employment and marital status, address, socioeconomic levels, time, dose and route of exposure of the toxic agents, frequency of different clinical features, treatment before admission, duration of hospitalization and complications. Gastric lavage was done in all patients and atropine 2 mg intravenously was given in repeated boluses until complete atropinization was achieved. Subsequently atropine was administered according to the patient's clinical situation. A small number of the patients had to be put on circulatory and respiratory support.

Patients admitted with intentional intake and suicide attempt were referred for psychiatric assessment. All patients and their attendants were given telephone number to obtain follow-up interview.

RESULTS

The major characteristics of 286 patients along with mode and means of exposure of poisoning is given in Table 1. The youngest patient was 14 years of age and the oldest was 52. Correlation between socioeconomic class and educating level in the study population is presented in Table 2.

The precipitating factors for the use of poisoning in 222 suicidal cases included marital friction in 64 (28.8%), strained social relation in 54 (24.3%), financial stress in 32 (14.4%), unemployment in 30 (13.5%), failure in love affair in 30 (13.5%), failure in exams in 4 (1.8%) and chronic illness in 4 (1.8%) (Table 3).

Table 1: Characteristics of 286 patients with organophosphorous poisoning

Characteristic	Number of patients%
Gender	
Male	156 (55.76%)
Female	130 (44.24%)
Male/female ratio	1.26
Age (years)	
14	10 (3.84%)
15-24	146 (50.0%)
25-34	70 (2.47%)
35-44	42 (14.68%)
45-5	18 (5.76%)
Mean age	25.05
Mode of poisoning	
Suicidal attempt	222 (76.9%)
Accidental	64 (23.1%)
Routes of exposure	
Ingestion	222 (78.0%)
Inhalation	16 (5.6%)
Topical	20 (6.4%)
Inhalation+Topical	28 (10.0%)

Most frequently used organphosphorus compound was Methamedophos and melathion. Out of 222 suicidal cases, 204 (91%) used < 30 mL of the poison and

Table 2: Correlation between socioeconomic class and educating level in the study population

	Education level			
Number of patients	Illiterate	Primary	Secondary	Graduate
157	+			
98		+		
28			+	
3				+

Table 3: The precipitating factors for the use of poisoning in 222 suicidal cases

Ess situation	Number of patients
Marital friction	64 (28.8%)
Strained social relation	54 (24.3%)
Finantional stress	32 (14.4%)
Unemployment	30 (13.5%)
Failure in love affair	30 (13.3%)
Failure in exam	4 (1.8%)
Chronic illness	4 (1.85)

Table 4: Amount taken in self-harm cases of organphosphorus compound poisoning (222 cases)

	Number of patient		Number of death	
Quantity in cc	Total	(%)	Total	(%)
Less than 30cc	202	90.90	6	5.4
More than 30cc	20	9	14	6.3
Total	222	100	20	9

Table 5: Time interval between poisoning and arrival at hospital in all cases of organphosphorus poisoning

Duration	Number of patients	Number of death
Less than 1 h	4 (23%)	0 (0%)
1-2 h	140 (48.95%)	2 (0.69%)
2-3 h	24 (8.39%)	2 (0.69%)
3-4 h	36 (12.58%)	0 (0%)
4-5 h	10 (3.49%)	8 (2.79%)
More than 6 h	12 (4.61)	8 (2.79)
Total	286 (100%)	20 (6.99

Table 6: Presenting symptoms and complications in 286 patients with organphosphorus poisoning

Presenting symptoms/complications	Number of patients (%)
Muscarinic manifestations	
Nausea	236 (82.0%)
Vomiting	280 (98.0%)
Excessive salivation	208 (73.0%)
Miosis	200 (70.0%)
Blurred vision	168 (59.0%)
CNS manifestations	
Giddiness	260 (91.0%)
Headache	252 (88.0%)
Disturbances of consciousness	142 (50.0%)
Muscular twitching	6 (2.0%)
Cardiovascular manifestations	
Elevated BP	20 (14.0%)
Tachycardia	72 (25.0%)
Bradycardia	12 (5.5%)
Odour from clothes and mouth	216 (76%)
Complications	
Respiratory	10 (3.5%)
Circulatory collapse	2 (0.7%)
Convulsion	4 (1.4%)
Delayed motor polyneuropathy	2 (0.7%)

6 patients (2.7%) died, while 20 patients (9%) consumed >30 mL and 14 patients (6.3%) died (Table 4).

Table 5 indicates the patient arrival time to hospital after the poisoning. The time ranged from 45 min to 15 h with a median of 1-2 h. The longer time gap between the use of poison and the arrival in hospital determined the increased deaths. Before arrival at hospital only 38 patients received some medical aid at the periphery which included gastric lavage and intravenous line. Only 8 patient received atropine injection by the local physician.

Ten patients (6.9%) died and all of them belonged to the suicidal group. The deaths were related to larger amounts of the poison consumed and the delayed arrival in the hospital. Presenting symptoms and complications in 286 patients is in Table 6.

DISCUSSION

Organophosphorous compounds account for two million suicide attempts and one million accidental poisoning each year worldwide (Jayaratnam, 1990). These are the most significant poisons in Asia. In several areas, some pesticides have become the trendiest method of suicide (Eddleston *et al*., 1998). In agricultural areas of Srilanka the agent responsible for 77% of the deaths was pesticides (Karalliedde and Senanayake, 1988). Self-poisoning with pesticides is uncommon in urban areas.

In this study, most of the victims of poisoning were in the age group of 15-24 years. In a study at Ahmedabad, India, patients' age ranged from 11-60 years with maximum number of cases between the ages of 21-30 years (Agarwal, 1993). In another small study at Jan Bozy Provincial Hospital in Lublin, age range was 13-85 years and most of the patients belonged to 51-60 years age group (Gnyp and Lewandowska, 1997). In Kamenczak study the highest number of poisonings was noted in age group 30-39 years (Kamenczak *et al*., 1997). The youngest age group affected in khorramabad and sari is worrisome (Casey and Vale, 1994).

Overall male to female ratio was 1.2:1 in our study. According to Sahin the attempted suicide proportion was 46.4% in men and 75.4% in women (Sahin, 2003). Van der Hoek *et al*. (1998) reports that suicidal intake of organo phosphates is more prevalent among males as compared to females in Srilanka.

More than half of the patients were married (54.54%) but married females were found to be more prone to self-harm as compared to married males. Majority of the enrollments happened during the month of August reflecting the easy availability of the organophosphorous compound. In Diyarbakir, Turkey, most plants intoxication cases occurred during the summer season (93 of 170 patients) on a monthly basis, admissions during April, May and July were most common (Guloglu and Kara, 2005).

Maximum patients belonged to lower middle class and only 34 patients were having qualifications up to secondary school level or above. Eleven cases were having previous history of suicide in the past and 21% patients were having previous history of psychiatric illness. In cases of Kara, most of them had a primary education level (66.7%) and a lower socioeconomic status (58.3%) (Kara *et al*., 2002). In this study, quantity of poison ingested and time interval between poisoning and arrival at hospital were directly linked to the death. Twenty cases took more than 30 mL of the liquid and seven of them died.

Among the symptomatology vomiting, giddiness and headache were more frequent. Three patients were having fasciculations at presentation. The frequency of these symptoms is almost similar to what reported in previous studies (Rivera and Rivera, 1990; Nalin, 1973; Eungprabhanth, 1975; Ozyurt, 1997).

Inhibition of acetyl cholinesterase enzyme activity in blood was not determined due to non-availability of the test at our center.

The time interval between poisoning and treatment is very crucial in the prognosis of such cases. Medical personnel involved with primary care should be accustomed to deal with such problems and provide their patients with the necessary management. One third of the patients were given some sort of therapy before shifting to our center and. These findings demand a swing in emphasis in community education towards first-aid management of poisoning cases. Medical authorities should be steered to supply proper resuscitative equipment and guarantee a regular delivery of drugs to all primary health care centers. Firm rules and regulations concerning the trade, delivery and storage of such chemicals should be followed in order to reduce the incidence of poisoning and resulting mortality.

CONCLUSION

The death in poisoning cases depended on a variety of factors like the organophosphorous substance and quantity taken, the duration between poisoning and hospitalization. Illiteracy, poverty and female gender are among the major inciting agent for suicidal impulsive behavior. Probability of improvement was high when the patient was taken to hospital as soon as possible. Confinement of unsafe pesticides away from houses will reduce the accessibility for impulsive act. Hopefully, non-chemical methods of pest control will put a stop to acute organophos- phorous compound poisoning.

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