E-ISSN: 2707-4455

P-ISSN: 2707-4447

www.forensicpaper.com/

IJFM 2019; 1(1): 07-09

Received: 07-11-2019

Accepted: 10-12-2019

Dr. Roshan Perera

Department of Forensic
Medicine, Institute of Forensic
Medicine & Toxicology,
Colombo, Sri Lanka

Evaluation of cases of organophosphorous poisoning in population

Dr. Roshan Perera

DOI: <https://doi.org/10.33545/27074447.2019.v1.i1a.3>

Abstract

Background: Organophosphorus pesticide self-poisoning is a major clinical and public-health problem across much of rural Asia. The present study was conducted to assess the organophosphorous poisoning in population.

Materials & methods: The present study was conducted in department of forensic medicine. It comprised of 138 cases of organophosphorous poisoning of both genders. Parameters such as manner of poisoning, occupation and clinical findings were recorded.

Results: Out of 138 patients of OP poisoning, males were 78 and females were 60. Age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients. The difference was significant (P<0.01). 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen. Common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), diarrhea (34%), abdominal pain (46%), drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%).

Conclusion: Organophosphate (OP) compounds lead to serious complication when consumed accidentally, homicidal or suicidal.

Keywords: Organophosphorous, poisoning, tachycardia

Introduction

Organophosphorus pesticide self-poisoning is a major clinical and public-health problem across much of rural Asia. Of the estimated 500000 deaths from self-harm in the region each year, about 60% are due to pesticide poisoning. Many studies estimate that organophosphorous pesticides are responsible for around two-thirds of these deaths-a total of 200 000 a year. Deaths from unintentional organophosphorus poisoning are less common than those from intentional poisoning and seem to be more common in regions where highly toxic organophosphorus pesticides are available ^[1].

Human deaths following poisoning are a matter of great concern. It has high mortality and morbidity. It is a global matter occurring all over the world involving people of all age groups, both sex, from all economic and ethnic groups. The reason for poisoning can be accidental or intentional. It results into approximately 7 lacs death annually. About 345,000 occur from unintentional poisoning, and more than 370,000 from suicidal causes ^[2, 3].

WHO in year 2012 reported that more than 90% of fatal poisoning cases are seen in middle and low income countries i.e. the developing countries in general and agricultural countries in particular ^[4]. Acute organophosphorus poisoning occurs after dermal, respiratory, or oral exposure to either low volatility pesticides such as chlorpyrifos, dimethoate or high volatility nerve agents like sarin and tabun. Inhibition of acetylcholinesterase at synapses results in accumulation of acetylcholine and over activation of acetylcholine receptors at the neuromuscular junction and in the autonomic and central nervous systems ^[5]. The present study was conducted to assess the organophosphorous poisoning in population.

Materials & methods

The present study was conducted in department of forensic medicine. It comprised of 138 cases of organophosphorous poisoning of both genders. A proforma was made and information such as name, age, gender, education status etc. was recorded. Parameters such as Manner of poisoning, occupation and clinical findings were recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Corresponding Author:

Dr. Roshan Perera

Department of Forensic
Medicine, Institute of Forensic
Medicine & Toxicology,
Colombo, Sri Lanka

Results

Table 1: Distribution of patients

Total-138		
Gender	Male	Female
Number	78	60

Table 1 shows that out of 138 patients of OP poisoning, males were 78 and females were 60.

Graph 1: Distribution of patients

Table 2: Age wise distribution of patients

Age group (years)	Number	P value
0-10	13	0.01
11-20	38	
21-30	45	
31-40	28	
40-50	10	
>50	4	

Table 2, graph 2 shows that age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients. The difference was significant (P=0.01).

Graph 2: Age wise distribution

Graph 3: Occupation of patients

Graph 3 shows that 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen.

Graph 4: Clinical findings

Graph 4 shows common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), and diarrhea (34%), abdominal pain (46%), and drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%).

Graph 5: Manner of poisoning

Graph V shows that manner of poisoning was accidental in 82%, suicidal in 13% and homocidal in 5%.

Discussion

Organophosphate (OP) compounds are a diverse group of chemicals used in both domestic and industrial settings. Pesticide poisoning from occupational, accidental and intentional exposure is a major developing world health problem. Millions of people are exposed to danger by hazardous occupational practices and unsafe storage [6].

OP compounds inhibit acetylcholinesterase at neuromuscular junction, in autonomic and central nervous system resulting in accumulation of acetylcholine (ACh) and over stimulation of ACh receptors resulting in acute cholinergic crisis which is characterized by bradycardia, bronchorrhoea, miosis, sweating, salivation, lacrimation, defecation, urination and hypotension [7]. In addition, there occurs muscle weakness and fasciculations. The CNS involvement results in alteration in sensorium and seizures. Following resolution of cholinergic crisis, some patients may develop intermediate syndrome i.e. cranial nerve

palsies, proximal muscle weakness, respiratory muscle weakness^[8]. The present study was conducted to assess the organophosphorous poisoning in adult population.

In present study, out of 138 patients of OP poisoning, males were 78 and females were 60 age group 0-10 years had 13 patients, 11-20 years had 38 patients, age group 21-30 years had 45 patients, age group 31-40 years had 28 patients 40-50 years had 10 and >50 years had 4 patients.

Subhash *et al*^[9] found that a total of 47 patients of OP poisoning, 22 (46.8%) cases were male and 25(53.2%) were female. The maximum number of patients was between the age of 20-40 (33-70.2%). Married patients outnumbered the unmarried (35/74.5% vs 12/25.5%). The most common motive for poisoning was suicidal, 41 cases (87.2%). Metacid (methyl-parathion) was the most commonly used OP compounds in 32 (68%) patients. Interpersonal marital relationship seemed to be the commonest predisposing factor, 23 cases (48.9%). The commonest time of presentation was between 6 pm-12 midnight. 7(57.4%) cases presented within 2 hours of ingestion of the poison. Serum cholinesterase level measured after full atropinisation was >50% of normal level in 17 cases (36.2%). 10 cases (21.3%) required respiratory support. Intermediate syndrome (IMS) was observed in 3 cases. Overall mortality occurred in 3 cases (6.4%).

We found that 42% were farmers, 27% were labourer, 20% were housewives, 6% were students and 5% were businessmen. Common symptoms were nausea/ vomiting (62%), excessive secretions (50%), muscular weakness (40%), diarrhea (34%), abdominal pain (46%), drowsiness (12%), crackles (68%), tachycardia (24%), bradycardia (17%) and hypotension (8%). The manner of poisoning was accidental in 82%, suicidal in 13% and homicidal in 5%.

Mild poisoning is defined as depression in cholinesterase activity to 20-50% of normal. Moderate poisoning occurs when activity is 10-20% of normal. Severe poisoning occurs at less than 10% of cholinesterase enzyme activity. Small short-term exposures can depress cholinesterase activity to very low levels with minimal symptoms. Levels do not always correlate with clinical illness. The level of cholinesterase activity is relative and is based on population estimates. Neonates and infants have baseline levels that are lower than those in adults.¹⁰ However, most patients do not know their baseline level, the diagnosis can be confirmed by observing a progressive increase in the cholinesterase value until the values plateau over time.

Conclusion

Organophosphate (OP) compounds lead to serious complication when consumed accidentally, homicidal or suicidal.

References

1. Srivastava A, Peshin SS. An epidemiological study of poisoning cases reported to the National Poisons Information centre, All India Institute of Medical Sciences, New Delhi. *Hum Exp Toxicol*. 2005; 24:279-85.
2. Edwin J George, Jayaraj K, John J, Manjaly, Raghunath M. Clinical profile and outcome of organophosphate poisoning cases in a tertiary care hospital in central Kerala. *Int J of Recent Trends in Sci and Tech*. 2015; 14:338-343.
3. Tall A, Ly AB, Nabeth P, Sall AA, Sarr FD, Faye J, *et al*. Epidemiological investigation of death cases by pesticide poisoning. *J Agric Biotechnol Sustainable Develop*. 2010; 2:51-5.
4. Indranil Banerjee, SK Tripathi, A Sinha Roy¹ *N Am J Med Sci*. 2012; 4:147-150.
5. Gupta B *et al*. Organophosphorus poisoning facts and myths. *Medicine update*, 1999, 1345-1348.
6. Goel A, Joseph S, Gupta TK. Organophosphate poisoning predicting the need for ventilator support. *JAPI*. 1998; 46:786-90.
7. Vinay BS, Gurudatta S, Pawar, Inamadaa PI. Profile of poisoning cases in district and medical college hospitals of north Karnataka. *Indian journal of forensic medicine and toxicology*. 2008; 2:7-12.
8. Vivek A, Chiddarwar, Vandana V, Chiddarwar, Jinendra M, Jain, Santosh Kumar *et al*. Study of clinical profile of household and agricultural Insecticide poisoning patients with reference to serum Cholinesterase levels. *Int J Pharm Bio Sci*. 2013; 4:781-788.
9. Subhash Chandra Joshi, Chandra Prakash, Arun Joshi, Godawari Joshi. Profile of Organophosphorus Poisoning At Tertiary Care Hospital in Uttarakhand. *J Indian Acad*
10. *Forensic Med*. 2013; 35:346-8.
11. Ather NA, Ara J, Khan EA, Sattar RA, Durrani R. Acute organophosphate insecticide poisoning. *J Surg Pak*. 2008; 13:71-4.