

CLINICAL PROFILE OF PATIENTS PRESENTED WITH ORGANOPHOSPHORUS POISONING

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ABSTRACT

Objective: The purpose of this study was to determine the demographics, clinical profile and outcome of patients admitted with organophosphate poisoning at a tertiary care center. **Methods:** It is a descriptive study. We enrolled 100 patients of age >14 years of either gender, with the history organophosphate (OP) intake or who showed either signs of muscarinic or nicotinic involvement. We excluded those patients in which organophosphorous poisoning was doubtful and Patients suffering from other systemic illness like diabetes mellitus, hypertension, ischemic heart disease, which could affect morbidity and mortality rate. All patients were given standard treatment for Organophosphate poisoning, i.e. Maintaining Airway, Breathing and Circulation, gastric lavage, administration of atropine at a dose of 2 mg every 10 minutes till reversal of muscarinic symptoms and administering a stat dose of pralidoxime. **Results:** We enrolled 100 patients those met our inclusion criteria. The mean average age was 31±5.7 years. Out of 100 cases, male to female ratio was 1:1.5 i.e. 40% male and 60% female. We found that 67% patients were in 14-35 years of age group. There were only 5 cases above age of 50 years. The youngest patient was 14 years old while the oldest was 59 years old. Incidence of poisoning decreases with higher educational level. Majority of the cases belonged to lower socioeconomic status i.e. 59 patients followed by middle socioeconomic status i.e. 36 patients. Incidence of pesticide poisoning was more common in married population i.e. 70. Suicidal cases were highest in number 75% followed by accidental cases and homicidal cases. In 72% of cases ingestion was mode of exposure. Nausea/Vomiting were the most common symptom observed in 100 patients (100%). Other common symptoms were excessive salivation (60%), abdominal pain (20%), respiratory difficulty (36%), altered sensorium 42% and 2% patients had convulsion. Most common physical finding was meiosis in 90 of total patients i.e. in 90%. Other common physical signs were fasciculation (63%), bradycardia (60%), neck muscle weakness (16%) and oro-nasal frothing (15%). In present study, few patients developed complications. Respiratory failure was the most common complication found in 20 patients i.e. in 20% of the total patients, 9 patient had aspiration pneumonia, 16 patients had circulatory collapse and 1 patient had septic shock. Out of total 100 patients 55 patients (55%) died, 31 patients got cured and 14 got LAMA. **Conclusion:** The mortality rate due to organophosphate poisoning was very high at our tertiary care center due delayed presentation, late treatment and of medical facilities. Pesticides are the major chemical agents, which pose a health threat particularly to young people, depressed individuals and farm workers. So this serious condition needs rapid diagnosis, early and effective treatment. The importance of first aid cannot be overlooked because patients who received first aid at the primary center survived better than those without first aid and have less complication and severity of poisoning.

KEYWORDS: Organophosphorus poisoning; Tertiary hospital; Intensive care.

INTRODUCTION

Organophosphates are used worldwide as insecticide and pesticide. Organophosphates group of chemical compounds with similarities in structure and biological effects on human beings.^[1] Organophosphates are usually esters and amides derivatives of phosphoric acid. They are chemical agents used widely throughout the world, especially in agriculture, in glaucoma as a therapeutic agent and also a nerve agent in war fares.^[2] It

is estimated that there are over 3 million cases of Organophosphate poisoning per year worldwide.^[3] Organophosphates are the most common mode of poisoning in Asia, being both wide spread and resulting in high mortality rate.^[3] Majority of these occur in developing and agricultural countries, Intentional and unintentional pesticide poisoning has been acknowledged as a serious problem in many agricultural communities of low- and middle-income countries, including Pakistan,

India, Sri Lanka, and Viet Nam.^[4-5] OP is a standout amongst the most significant reasons for harming in Pakistan. The exact prevalence of organophosphate poisoning is unknown in Pakistan as many cases are not notified due to religious, social or cultural reasons.^[6-7] In our neighboring countries India and Sri Lanka, pesticides and organophosphates (OP) account for more than 50% of the poisoning cases seen in hospitals.^[7] The estimated mortality rates with OPP in neighboring countries Iran and India are around 7-12%. Local figures are few and variable with mortality rates from OPP ranging from 0.05% to about 9%.^[8] The main mode of administration of Organophosphate compounds are the alimentary system and the Skin. They can readily be absorbed in vapor form from the lungs especially the nerve agents. After absorption, OP compounds accumulate rapidly in fat, liver, kidneys and salivary glands. Organophosphate compounds generally are lipophilic and therefore cross the blood / brain barrier in most cases. OP compounds inhibit Acetylcholine esterase (AChE) which hydrolyses Acetylcholine (ACh), a neurotransmitter. The inhibition of cholinesterase activity leads to the accumulation of ACh at synapses, causing overstimulation and altered transmission of neuronal signals in Central and Peripheral Nervous Systems. This overstimulation of ACh receptor sites leads to a variety of physiologic and metabolic derangements.

The clinical signs regarding organophosphorous may be characterized as "Acute cholinergic crisis" i.e. muscle weakness, muscle fasciculation, cramps, twitching, lacrimation, salivation, diarrhea, diaphoresis, blurred vision and most of the patient need ventilatory support due to weakness of respiratory muscles and bronchospasm.^[9] Another manifestation "Intermediate syndrome" which usually starts 24 – 46 hours after acute syndrome; characterized by respiratory paresis, weakness, depressed tendon reflexes and transient extra pyramidal syndrome, cranial nerve palsies, muscle weakness; may last up to 18 days.^[9-10] Organophosphorus induced delayed neuropathy, which is a symmetric distal neuropathy usually, occurs after weeks of exposure. The organophosphorous poisoning is a very serious condition that needs rapid treatment. A comprehensive knowledge about the nature, magnitude, morbidity and mortality of a particular poison is necessary not only for its prompt diagnosis and treatment, but also to make necessary precautions to avoid such incidents. Present study comprises cases of acute pesticide poisoning admitted in intensive care unit of government tertiary care hospital. In this study we determine the clinical presentation and outcome of organophosphorous poisoning.

PATIENTS AND METHODS

It is a descriptive study. We enrolled 100 patients of age >14 years of either gender, with the history organophosphate (OP) intake or who showed either signs of muscarinic or nicotinic involvement. We excluded those patients in which organophosphorous poisoning

was doubtful and Patients suffering from other systemic illness like diabetes mellitus, hypertension, ischemic heart disease, which could affect morbidity and mortality rate. All patients were given standard treatment for Organophosphate poisoning, i.e. Maintaining Airway, Breathing and Circulation, gastric lavage, administration of atropine at a dose of 2 mg every 10 minutes till reversal of muscarinic symptoms and administering a stat dose of pralidoxime.

RESULTS

We enrolled 100 patients those met our inclusion criteria. The mean average age was 31±5.7 years. Out of 100 cases, male to female ratio was 1:1.5 i.e. 40% male and 60% female. We found that 67% patients were in 14-35 years of age group. There were only 5 cases above age of 50 years. The youngest patient was 14 years old while the oldest was 59 years old. Incidence of poisoning decreases with higher educational level. Majority of the cases belonged to lower socioeconomic status i.e. 59 patients followed by middle socioeconomic status i.e. 36 patients. Incidence of pesticide poisoning was more common in married population i.e. 70. Suicidal cases were highest in number 75% followed by accidental cases and homicidal cases. In 72% of cases ingestion was mode of exposure. Nausea/Vomiting were the most common symptom observed in 100 patients (100%). Other common symptoms were excessive salivation (60%), abdominal pain (20%), respiratory difficulty (36%), altered sensorium 42% and 2% patients had convulsion. Most common physical finding was meiosis in 90 of total patients i.e. in 90%. Other common physical signs were fasciculation (63%), bradycardia (60%), neck muscle weakness (16%) and oro-nasal frothing (15%). In present study, few patients developed complications. Respiratory failure was the most common complication found in 20 patients i.e. in 20% of the total patients, 9 patient had aspiration pneumonia, 16 patients had circulatory collapse and 1 patient had septic shock. Out of total 100 patients 55 patients (55%) died, 31 patients got cured and 14 got LAMA.

Table 1: Demographic details of patient.

Gender	Number of patients	Percentages
Male	40	40%
Female	60	60%
Age Groups		
14-25 years	28	28%
26-35 years	39	39%
36-45 years	23	23%
46-60 years	10	10%
Marital status		
Married	70	70%
Unmarried	30	30%
Socioeconomic status		
High class	5	5%
Middle class	36	36%
Low class	59	59%

Table 2: Mode of OP poisoning.

Suicidal	75	75%
Accidental	22	22%
Homicidal	3	3%

Table 3: Mode of Exposure.

Ingestion	72	72%
Dermal plus inhalation	14	14%
Inhalation alone	9	9%
Dermal alone	5	5%

Table 4: Signs and Symptoms of OP poisoning.

Sign/Symptoms		
Nausea	100	100%
Vomiting	100	100%
Perspiration	70	70%
Stool incontinence	60	60%
Salivation	60	60%
Altered sensorium	42	42%
Convulsion	2	2%
Respiratory difficulty	36	36%
Muscle twitching/flickering	60	60%
Cranial palsies	12	12%
Bradycardia	60	60%
Meiosis	90	90%
Anxiety / restlessness	80	80%

Table 5: Complication wise distribution.

Acute respiratory failure	20	20%
Aspiration pneumonia	9	9%
Sudden cardiac arrest	16	16%

Table 6: Outcome/fate of patients with OP poisoning in our study.

Survived	31	31%
Expired	55	55%
LAMA	14	14%

DISCUSSION

World Health Organization estimated that more than 3.1 million cases of acute pesticide poisoning occur worldwide annually, the majority of them were being

caused by organophosphorous compounds used for agricultural purposes in developing countries.^[11] OP poisoning is the most significant poison in Asia, being both widespread and coupled with a high mortality

rate.^[12] In several areas, some pesticides have become the common method of suicide, gaining unpleasant reputation amongst both health-care personnel and community. In agricultural areas of Srilanka the agent responsible for 77% of the deaths was organophosphate.^[13] Self-poisoning with organophosphate is uncommon in urban areas. In agricultural countries like Pakistan, toxicity of pesticides as well as lack of medical services is taking its toll in the form of high case fatality rates.^[14] Few data are available on the organophosphorous compound poisons most commonly used in cotton producing Southern Punjab. So an attempt was made to carry out a study at Lahore to observe the sociodemographic and clinical features of organophosphorous intoxication. Out of total 100 cases, 75% cases were suicidal, 22% cases were accidental and 3% cases were homicidal. Study done by Agarwal et al reported that 67.4% of the cases had the intention of committing suicide, 16.8% of the cases were the result of occupational exposure, and 15.8% of the cases were from accidental poisoning.^[15] Khan FY et al reported that 87.3% patients were exposed accidentally in state of Qatar.^[16] This shows much higher incidence of accidental organophosphorous poisoning as compared to our study. In studies done by Gannur DG et al^[17], Nigam M et al^[9] and Kar SM et al^[5], observed highest incidence in young age group i.e. in 16-35 years. These results were similar to our study. This is the main working age group and exposed to organophosphorous compounds while working in farm could be the main reason of higher incidence of cases in this age group. Our study showed female predominance in OP poisoning which was contrary to studies done by Khan FY et al^[16] and Raja KS et al.^[18] Our study reported higher incidence of poisoning in illiterates than literates. Similar trend was noted in studies done by Nigam M et al^[10], Gupta BD et al^[12] and Muhammad IS et al^[14] which suggest illiteracy predispose to poisoning. Ingestion route was the most common mode of exposure found in 72 patients 72% followed by combined dermal + inhalation mode of exposure found in 14% patients then inhalational exposure found in 9% patients and dermal mode of exposure was rarest mode of exposure 5%. This is partially comparable to study done by khurram et al in Sindh.^[8]

Study done by Khan FY et al^[16] reported that most common symptoms were excessive salivation (100%), agitation (87.5%), altered sensorium (75%), abdominal pain (62.5%) and abdominal cramps (50%) which are very much similar to our study. In our study Nausea/Vomiting were the most common symptom observed in 100% patients. Study done by Gannur DG et al^[17] resulted Diarrhea in only 13.97% which is very much less than our study i.e. 60%. In present study, most common physical finding was Meiosis found in 90% patients. Other common increased bronchiolar secretions (39%), bradycardia (60%), altered sensorium (42%), neck muscle weakness (16%) and oro-nasal frothing

(10%). Similar trend was noted in studies done by Gannur DG et al^[17] and Muhammad IS et al.^[15]

In this study it also became evident that out of 55 patients who expired, most of them received no appropriate initial therapy before coming to the hospital and arrived late, also supported by study done by Suliman MI et al.^[18] Mortality rate was 55% very high as comparable to studies done by Numidasa UA et al and Pandyal BP.^[19] This high mortality rate was observed in our study which may be due to lack of ICU facilities, late arrival, not receiving any treatment at periphery before arrival to the hospital, poverty and illiteracy.

In this study, quantity of poison ingested and time interval between poisoning and arrival at hospital were directly linked to the death. 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 only three of them received antidote. These findings demand a swing in emphasis in community education towards first-aid management of poisoning cases.

CONCLUSION

The mortality rate due to organophosphate poisoning was very high at our tertiary care center due delayed presentation, late treatment and of medical facilities. Pesticides are the major chemical agents, which pose a health threat particularly to young people, depressed individuals and farm workers. So this serious condition needs rapid diagnosis, early and effective treatment. The importance of first aid cannot be overlooked because patients who received first aid at the primary center survived better than those without first aid and have less complication and severity of poisoning.

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