



## Original Article

# Organophosphorus Poisoning-Still a Challenging Proposition

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### Abstract

Organophosphorus poisoning is one of the most common suicidal agents in our country. OP compounds are easily available as it is widely used pesticide. There is no hard restriction on its sale. This cross sectional study was conducted at 250 bedded Pabna District General Hospital between March 2007 to April 2008. A total of 127 patients were studied. Out of which 67 were female and 60 were male. Comorbid conditions like Hepatic, Renal and Cardiac illnesses were excluded from the study. The age of the patients varied from 15-40 years. The conventional method of treatment were given like gastric lavage, oxygen inhalation, IV fluid, oropharyngeal suction etc. Apart from that patients were divided into two groups. Group- A & Group-B. Group – A patients were treated with Inj. Pralidoxim and Inj. Atropine while Group-B were treated with Inj. Atropine alone. Group-A patients revealed recovery rate quicker than Group-B with the improvement of general condition, pupil dilate earlier, pulse attended tachycardia, muscle twitching and fasciculation came to normal in Group A earlier than Group B. Lacrimation and salivation also attained closer to normal in Group B than Group A. The female patients numbered more than the males.

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### Introduction

Among the suicidal agents Organophosphorus poisoning is the leading cause of mortality in developing countries. ( 1, 3, 4). Insecticides and pesticides are found selling in open market with no tight restriction from any lawful authority. Widespread illiteracy, social frustration and emotional lability among youngsters and adolescents leads to OP compound ingestion for trivial anger, mental agony and bereavement.

OP compounds are widely used as pesticide in agriculture for eradication of vectors of malaria and fileria. Victims of OP poisoning are brought to emergency of the Hospital by the relatives in a furious mood to get a quick relief from symptoms.

About 16% mortality was recorded in our study (1,3,5) which corroborates with the data available.

OP's inactivate Acetylcholinesterase (AChE) by phosphorylation leading to accumulation of acetylcholine (ACh) at cholinergic synapses. Recovery follows the reappearance of active (AChE) following synthesis or spontaneous hydrolysis of phosphorylated (AChE).The phosphorylated AChE may lose a chemical group so that its inactivation becomes irreversible known as `Aging`.

Sequential triphasic illness follows OP intoxication:

- Acute cholinergic phase

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- Intermediate syndrome(IMS)
- Organophosphate induced delayed polyneuropathy (OPIP)

### Acute cholinergic syndrome

May occur within minutes of exposure usually within an hour. The pathognomonic features of muscarinic effect are miosis, bronchorrhea, bronchospasm, salivation, lacrimation, fasciculation, abdominal pain, bradycardia, central depression of the respiratory centre, copious secretion, bronchoconstriction and muscles paralysis contributes to respiratory failure.

### Nicotinic effect:

Muscle fasciculation, hyperreflexia, flaccid muscle weakness with reduced tendon reflex.

### CNS effect :

Headache, dizziness, confusion, drowsiness, coma, fit, CNS depression.

### Materials and methods

The present study carried out in Medicine Ward of 250 bedded General Hospital Pabna.

A total of 127 patients were studied who were admitted in to the Hospital during the period from March 2007 to April 2008 of whom 60 (47%) were male and 67 (52%) were female.

The age of the patients varied from 25-40 years. The patients were divided into two groups.

Group A and Group B

Group A consisted of 30 male and 32 female.

Group B consisted of 30 male and 35 female.

Only the fresh cases were taken into study. Comorbid conditions like acute liver disease, gross malnutrition, diabetes mellitus were excluded from the study.

**Group A:** patients were treated with inj. PAM (Pralidoxime) + inj. Atropine.

**Group B:** patients were treated only with inj. Atropine.

Other supportive treatments like injectable antibiotic, inj. Omeprazole, IV fluids were given according to the individual need of the patient.

All the patients were kept nothing by mouth.

All the patients were subjected to stomach wash during admission.

**Group A:** Inj. PAM (Pralidoxim) 2 amp. Dissolved in 5% DA 500 cc IV stat slowly.

Inj. Atropine 3 amp (1.8 mg) IV stat followed by 1 amp IV every 2 hourly until pupil dilated .

**Group B:** Inj. Atropine 3 amp (1.8 mg) IV stat followed by 1 amp. IV 2 hourly until pupil dilated.

The size of pupil and pulse rate was taken as parameter of improvement.

The size of pupil and pulse rate was recorded hourly.

However, 18 patients (14%) died (group A 8 group B 10) during the 24 hours of admission into Hospital despite measures taken accordingly (6,8,10).

### Results

A total of 127 patients with OP poisoning were studied. Age of the patients were between 15-40 years. Study group consisted of 60 males and 67 females. The patients were divided into two groups.

**Group A:** Subjects were treated with inj. Pralidoxim and inj. Atropine simultaneously. While Group B subjects were treated with injection Atropine alone.

Results reported that Group A patients showed quick recovery i.e. size of pupil dilated more rapidly while the pulse rate did not show any significant difference between the two Groups.

Muscle fasciculation in Group A patients normalized more rapidly than Group B.

Bronchopulmonary secretion and salivation rapidly came to normal within 36 hours in Group A, while it took over 48 hours in Group B.

In both the groups patients become well alert and felt better within 48 hours.

**Table 1:** Size of pupil and pulse rate change in relation to time (Group A).

Time in hour	Size of pupil	Pulse per minute
02	Pin point	64± 2
04	Pin point	70±2
06	Moderately dilated	78±3
08	Moderately dilated	90±4
12	Dilated	96±2
24	Widely dilated	110±3

**Table 2:** Size of pupil and rate change in relation to time (Group B).

Time in hour	Size of pupil	Pulse per minute
02	Pin point	64±3
04	Pin point	72±2
06	Constricted	80±4
08	Constricted	92±3
12	Moderately dilated	110±2
24	Dilated	120±4

However 18 patients died despite taking necessary measures available at a District level Hospital where ventilatory life support was not available. The patients were brought to hospital after a considerable time have been elapsed due to long distance they had to travel. Hence use of inj. Pralidoxim along with the inj. Atropine clearly gave better result than treatment with inj. Atropine alone.

## Discussion

OP poisoning is one of the popular ways of committing suicide followed by ingestion of hypnotics and hanging. OP's are easily available and the method is known to people of all ages since long. OP poisoning cases are treated conventionally with gastric lavage, withdrawal of soiled clothing's, washing out of salivary secretions by keeping the patient prone position with clearance of secretions by sucker machine. Oxygen inhalation is needed to combat hypoxia. The OP compound inhibits the enzyme acetylcholinesterase as a result accumulation of Acetylcholine takes place.

Acetylcholine exerts muscarinic, nicotinic and central actions at nerve endings. Thus causing the

characteristic symptoms like miosis, salivation, bronchospasm, lacrimation and bradycardia. Nicotinic effect like muscle fasciculation, hyperreflexia, flaccid muscle weakness. Central depression of respiratory center, bronchoconstriction and muscle paralysis may contribute to respiratory failure.

Atropine is an anticholinergic drug used to prevent inactivity of cholinesterase and it acts at the level of muscarinic receptors. Pralidoxim acts on the same enzyme in turn it blocks the action of nicotinic receptor level.

A total of 127 patients were taken into study of whom 60(47%) were male while 67 (52%) were female. The age ranges from 15-40.

The patients were divided into two groups - Group A and Group B.

**Group A:** Patients were treated with inj. Atropine and inj. Pralidoxim while Group B patients were treated only with inj. Atropine. Comparative study were carried out between the two groups with parameters of size of the pupil and rate of dilatation of it and with increased pulse rate.

In group A the pupil dilated more quickly than group B.

The pulse rate was directly proportional to the Atropinization.

The pulse rate exceeded 110/ min in Group A while in Group B it was 120/min which did not show statistical significant difference between the two groups. (9,10,12).

Muscle twitching and fasciculation showed rapid normalization in Group A than group B. Patients treated with Pralidoxim recovered earlier than the patients treated with Inj. Atropine alone. Females fell victim of OP poisoning more than the males.

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