

## Mortality in patients presenting with organophosphorus poisoning at Liaquat University of Medical and Health Sciences

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### ABSTRACT

**Objective:** Organophosphorus (OP) poisoning leads to high morbidity and mortality. The objective of this study was to evaluate the mortality due to Organophosphorus poisoning.

**Methodology:** This descriptive and analytical study was conducted at a Medical Unit-1 and Intensive Care Unit of Liaquat University Hospital (LUH) Hyderabad/Jamshoro from October 2009 to Feb 2011. All patients with suspicion of OP poisoning were admitted. Their history and clinical features were recorded. The diagnostic criteria of the study were history from parents about ingestion of organophosphorus poison and clinical signs like excessive bradycardia, salivation, meiosis and wheezing. The exclusion criteria were absence of meiosis and patients who expired in emergency department before reaching in intensive care unit or medical wards. The data was analyzed with SPSS version 11.

**Results:** During the period of study 100 patients were studied with the diagnosis of OP poisoning divided into grades according to severity. Their age ranged 18-58 years with mean age of  $37.5 \pm 9.5$  years and median age was 43 years. Males were 78 (78%) and females were 22 (22%) with M/F ratio of 7.8/2.2. 20 (20%) patients were of mild severity, 40 (40%) were of moderate severity, and 40 (40%) were of severe grade. The most common route of OP exposure was ingestion 79 (79%), followed by inhalation and dermal absorption 21 (21%). The clinical features as hyper salivation, meiosis, wheezing and depressed mental status were present in all (100%) of the patients followed by lacrimation 90 (90%), bradycardia 58 (58%), hypotension 76 (76%), chest crepitations 80 (80%), vomiting 69 (69%), abdominal cramps 40 (80%). Respiratory failure was seen in 42 (42%), sepsis in 5 (5%), seizures in 9 (9%), Pulmonary edema in 19 (19%) and ARDS in 10 (10%) patients. Forty (40%) patients were given mechanical ventilation with inotropic support. Average duration of hospital stay was 4.5 days  $\pm$ SD 2.5 (range 3-22) days. Out of 100 patients 82 (82%) survived and the mortality was 18 (18%). Cause of death was mainly due to respiratory failure.

**Conclusion:** Mortality due to Organophosphate poisoning is extremely high in our part of the world. Recognition of clinical features will make easy and early diagnosis.

**KEY WORDS:** Organophosphorus Poisoning, Mortality.

Pak J Med Sci October - December 2011 Vol. 27 No. 5 1022-1024

### How to cite this article:

Shaikh MA. Mortality in patients presenting with organophosphorus poisoning at Liaquat University of Medical and Health Sciences. Pak J Med Sci 2011;27(5):1022-1024

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\* Received for Publication: April 13, 2011

\* Accepted: September 20, 2011

### INTRODUCTION

Organophosphorus (OP) pesticides are the most important cause of severe toxicity and death from acute poisoning worldwide. Although the incidence of severe acute organophosphorus pesticide poisoning is much less in developed countries, many patients with acute low dose unintentional or occupational exposures present to health facilities.<sup>1</sup> Organophosphorus compounds are a diverse group

of chemicals used in the domestic, industrial, and agricultural settings. Examples include insecticides (Malathion, etc) herbicides and nerve gases (sarin, tabun, vx).<sup>2</sup>

In Asian countries like Pakistan, India and Srilanka, suicidal and accidental poisoning by OP compounds is one of the leading causes of death in young people.<sup>3</sup> World Health Organization has estimated that one million serious accidental and two million suicidal poisonings occur worldwide every year, of which nearly 200,000 peoples die from pesticide poisoning mainly in the developing countries.<sup>4</sup>

Because of high mortality due to OP poisoning this study was conducted. The objective of this study was to evaluate mortality due to Organophosphorus poisoning which is not an uncommon, rapidly progressive, and potentially fatal clinical entity.

## METHODOLOGY

This descriptive and analytical study was conducted at a Medical Unit-1 and Intensive Care Unit of Liaquat University Hospital (LUH) Hyderabad/Jamshoro from October 2009 to Feb 2011. All patients who presented with suspicion of OP poisoning were admitted. The proforma was filled by asking questions from patients and attendants with details of family and socioeconomic background and work environment. Mode of presentation and clinical findings was recorded.

The diagnostic criteria of the study were history from parents about ingestion of organophosphorus poison and clinical signs like excessive bradycardia,

salivation, meiosis and wheezing. The exclusion criteria were absence of meiosis and patients who expired in emergency department before reaching intensive care unit or medical wards. The data was analyzed with SPSS version 11.

## RESULTS

During the period of study 100 patients were studied with the diagnosis of OP poisoning divided into grades according to severity. Their age ranged 18-58 years with mean age of  $37.5 \pm 9.5$  years and median age was 43 years. Males were 78 (78%) and females were 22 (22%) with M/F ratio of 7.8/2.2. Out of 100 patients 20 (20%) were of mild severity, 40 (40%) were of moderate severity, and 40 (40%) were of severe grade. The most common route of OP exposure was ingestion 79 (79%), followed by inhalation and dermal absorption 21 (21%).

The clinical features as hyper salivation, meiosis, wheezing and depressed mental status were present in all (100%) of the patients followed by lacrimation 90 (90%), bradycardia 58 (58%), hypotension 76 (76%), chest crepitations 80 (80%), vomiting 69 (69%), abdominal cramps 40 (80%), diarrhea 48 (48%), Fasciculations 42 (42%), cyanosis 32 (32%), ST changes 30 (30%), and prolonged QTc 20 (20%). Muscle tone was increased in 20 (20%), decreased in 48 (48%), reflexes were depressed in 60 (60%) and exaggerated in 15 (15%) patients. Respiratory failure was seen in 42 (42%), sepsis in 5 (5%), seizures in 9 (9%), Pulmonary edema in 19 (19%) and ARDS in 10 (10%) patients. 40 (40%) patients were given mechanical ventilation with inotropic support (Table-I). Average duration of hospital stay was 4.5 days  $\pm$ SD 2.5 (range 3-22) days. Out of 100 patients 82 (82%) survived and 18 (18%) died. Cause of death was mainly due to respiratory failure.

## DISCUSSION

Organophosphorus pesticides are used extensively throughout the world in agriculture and in pest control as well as for community health purposes. OP suicidal and accidental poisoning is an important clinical problem in rural areas of the developing world. Accidental poisoning kills far fewer people but is an apparent problem in places where highly toxic OPs are available. Neurologic dysfunction is the best documented health effect of OP exposure.

High-level exposure has both acute and long-term neurologic signs and symptoms. Acute OP pesticide exposure can involve in wide range of both central and peripheral neurologic symptoms.

Table-I: Clinical Manifestations of OP poisoning (n 100).

Clinical Feature	No of Patients	Percentage
Meiosis, Blurred vision, Salivation	100	100%
Bradycardia	58	58%
Nausea, Vomiting,	69	69%
Lacrimation	90	90%
Abdominal pain	80	80%
Diarrhoea	48	48%
Diaphoresis	60	60%
Wheezing	100	100%
Muscle Fasciculations,	42	42%
Paralysis Muscle weakness		
Hypertension, Tachycardia	20	20%
Unconsciousness, Confusion	100	100%
Toxic psychosis, Seizures	34	34%
Fatigue, Respiratory	42	42%
Depression		
Dysarthria, Ataxia, Anxiety	25	25%

Among all the neurologic self-reported symptoms, headache, watering in eyes, and burning sensation in eye/face were the most important clinical manifestations attributed to chronic OP pesticide exposure.<sup>5</sup> In this study out of 100 patients 82 (82%) survived and 18 (18%) died. Cause of death was mainly due to respiratory failure. Most patients presented with hypotension, bradycardia, meiosis, decreased respiratory rate and hypothermia. OP is one of the leading causes of premature deaths.

Reports of OP poisoning from Saudi Arabia<sup>6</sup> and other countries<sup>7,8</sup> are the evidence of this widespread problem. Severe suicidal poisoning is a major clinical problem in the Asians. Some hospitals admit 500-1000 patients every year with mortality over 20%<sup>9</sup> while in this study the mortality is 18%. In the third world countries like Pakistan OP poisoning is the major cause of morbidity and mortality and accounts for a large proportion of patients admitted to intensive care units.<sup>10</sup> Majority of cases in this study are males (78%). Sixty five percent are of young age group 18-28 years, which was also revealed by another study<sup>11</sup> which found that death due to OP poisoning was predominant in young males (90.38%) compared to females (9.16%).<sup>12</sup>

In a study at Civil Hospital Karachi also reported male majority (61.53%) with ingestion of OP with suicidal attempt. Organophosphorus compounds may cause late-onset distal polyneuropathy occurring two or more weeks after the acute exposure.<sup>13</sup> In a study from Multan following results were obtained: Out of 578 poisoned patients, 370 were pesticides victims (73% males and 27% females). Suicidal, occupational and accidental incidences were 53%, 23% and 24% respectively and 54 deaths occurred.<sup>14</sup> In another study meiosis, depressed mental status, brochospasm and excessive salivation were present in all the patients. Eighteen patients received mechanical ventilation of which 10 died, 8 survived with mortality rate above 50 % of ventilated patients.<sup>15</sup> In another study it was recognized that 14/26 patients required ventilatory support.<sup>16</sup>

In this study, 40% patients required ventilatory support and 18% died. It has been recognized that after about one week recovery from acute organophosphorus pesticide poisoning some patients suddenly deteriorate with re-emergence of acute organophosphate poisoning symptoms, or pulmonary edema or sudden death, a phenomenon known as rebound. Organophosphorus compounds have become increasingly popular for agricultural, industrial and home use and represent a significant potential health risk. Prompt recognition and

aggressive treatment of acute intoxication are essential in order to minimize the morbidity and mortality from these potentially lethal compounds.<sup>17</sup>

## CONCLUSION

Mortality due to Organophosphate poisoning is extremely high in our set up. Recognition of clinical features carefully will make easy and early diagnosis.

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