

A STUDY ON SERUM AMYLASE LEVELS IN ACUTE ORGANOPHOSPHOROUS POISONING

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Abstract

Background: Poisoning by organophosphorous Pesticides (OP) has reached epidemic proportions in most parts of the world, particularly in developing agrarian countries, where the toxicity of available poisons and paucity of appropriate medical facilities ensure a high fatality rate. To estimate serum Amylase levels in acute organophosphorus compound poisoning. To find out its relationship with clinical severity and outcome. **Materials and Methods:** Patients with organophosphorus compound poisoning admitted to the hospital during the study period, 100 was included in the study at Mahatma Gandhi Memorial Hospital Warangal, Telananga March 2018 to October 2019 for a period of 20 months. **Result:** Organophosphates and Carbamates are frequently used pesticides which can produce life-threatening intoxication. All these compounds act by irreversible inactivation of acetylcholinesterase (ACh). **Conclusion:** Of the 100 patients in our study 33 patients (33%) had normal serum amylase level; 67 patients (67%) had elevated serum amylase level which is very significant.

INTRODUCTION

Poisoning by organophosphorous Pesticides (OP) has reached epidemic proportions in most parts of the world, particularly in developing agrarian countries, where the toxicity of available poisons and paucity of appropriate medical facilities ensure a high fatality rate. Their access and social-cultural factors plays important factor in choice of OP as a self-poison and the incidence is more in young age group with a common fatality ratio of 20%.^[1,2] According to WHO, worldwide estimates of pesticide poisoning number 3 million each year among them 2 million hospitalized from suicide attempts and 2,20,000 deaths, the majority of which are actually intentional.

Poisoning due to occupational exposure, accounted for about one fifth of the incidents, with a fatality ratio of less than 1%. More than 90% of the non-occupational incidents were suicidal, with a fatality rate more than 10% and the majority of the subjects are young males. Accidental exposures accounted for 8-10% of the incidents and homicidal use (less than 1%) were other forms of poisoning. The reported overall mortality following OP insecticide poisoning varies from 4-30% in different countries and institutions.^[4] In India, OP compounds cause

more self-poisoning deaths in southern and central India. In Northern India, aluminium phosphide causes most deaths with a fatality ratio over 90%. Other Pesticides used for self-poisoning include carbamates, Organochlorines and pyrethroids.^[5] Organophosphorous compounds are principally used as pesticides, and their exposure is highly prevalent in developing countries. Toxic effects of OPs are associated with significant morbidity and mortality and are a major global clinical problem. Occupational, suicidal (or) homicidal exposure to OPs produces a characteristic but treatable syndrome in humans thus, early recognition and timely intervention of toxicity from these compounds are of great importance, to emergency physicians and patients. Case reports on acute pancreatitis following acute organophosphorus compound ingestion has been reported now and then, but regular studies with reference to Pancreatitis is not available in a serial manner. Hence an attempt was made to study Pancreatic involvement through biochemical means.^[6]

Aim of the Study

1. To estimate serum Amylase levels in acute organophosphorus compound poisoning.
2. To find out its relationship with

- a) clinical severity
- b) outcome

MATERIALS AND METHODS

Patients presenting with Organophosphorous poisoning were the study at Mahatma Gandhi Memorial Hospital, Warangal, Study duration March 2018 to October 2019 for a period of 20 months. Materials: Patients with organophosphorus compound poisoning admitted to the hospital during the study period, 100 were included in the study. 100 healthy (age and sex matched) individuals were kept as control.

Study Criteria

Inclusion Criteria

100 patients with a history of exposure to OP poison were the study subjects.

Exclusion Criteria

- Patients with indication of exposure to a entirely different poison other than OP poison.
- Patients with mixed poisoning
- Patients who have consumed poison along with alcohol
- Patients with history suggestive of gall stone disease
- Patients with known history of lipid disorders

History suggestive of parotid gland disease

- Patients with history of lipid disorders
- History suggestive of parotid gland disease
- Patients with history of renal or hepatic disease
- History of renal or hepatic disease
- History of intake of drugs likely to produce pancreatitis Azathioprine, 6-Mercaptopurine, Frusemide and Pentamidine.

RESULTS

Table 1: Age Distribution of Cases and Controls Among Study Population.

Age groups in years	Cases		Controls	
	Number	%	Number	%
UPTO 20	13	13.0%	15	30.0%
21 TO 30	40	40.0%	40	40.0%
31 TO 40	36	36.0%	35	20.0%
41 ABOVE	11	11.0%	10	10.0%
Total	100	100.0%	100	100.0%
Mean	MEAN 29.4		MEAN 32.3	

p value 0.97677812, non-Significant

Table 2: Gender distribution among cases and controls

Gender	Cases		Controls	
	Number	%	Number	%
Male	63	63.00%	70	70.00%
Female	37	37.00%	30	30.00%
Total	100	100.00%	100	100.00%

P value- 0.2942661, NOT SIGNIFICANT

Table 3: relationship of agents of poisoning with outcome among cases

AGENTS	OUTCOME			
	Alive		Dead	
	Number	%	Number	%
Chloropyrifos	15	15.0%	0	.0%
Bug killer liquid	10	10.0%	0	.0%
Dichlorofos	3	3.0%	0	.0%
Fenthion	5	5.0%	0	.0%
Methyl parathion	2	2.0%	2	2.0%
Monocrotophos	44	44.0%	9	9.0%
Quinolphos	10	10.0%	0	.0%
Total	89	89.0%	11	11.0%

The Yates chi-square statistic is 5.983. The Yates p-value is .425.
The result is not significant at $p < .05$.

Table 4: Relationship of amylase levels and outcome

Amylase Levels	ALIVE	DEAD
	MEAN	MEAN
	119.0	209.8
Significance	0.0001 significant	0.0005 significant

DISCUSSION

Organophosphates and Carbamates are frequently used pesticides which can produce life-threatening

intoxication. All these compounds act by irreversible inactivation of acetylcholinesterase (ACh).

The clinical symptoms range from the classic cholinergic syndrome to flaccid paralysis and intractable seizures. About 99% of fatal poisoning occurs in developing countries, particularly among farm workers.

Despite an increased incidence of organophosphorous insecticide poisoning, the exact micro molecular changes that take place remain elusive. Till date, atropine and oxime continue to occupy the prime position in the specific management of OP poisoning.

With the ease of availability, it is not surprising that the use of OP compounds in suicide attempts has mushroomed from a disturbing early trend to being one of the commonest modes of suicidal poisoning which accounted for 100% in our study. This rate was consistent with the findings of Mahadi Balali Mood et al (94.3%) whereas it was reported to be 67% by AM Saadeh et al.

The vast majority of poisonings followed oral ingestion of liquid form and almost for all the patients gastric lavage was immediately done

The most common reason for consumption in our study was found to be the familial stress (66%) followed by financial stress (25%).

Monocrotophos accounted for about 53% of intoxication.

CONCLUSION

- Of the 100 patients in our study 33 patients (33%) had normal serum amylase level ; 67patients (67%) had elevated serum amylase level which is very significant.
- The mean Amylase level in first 24 hours of OP poisoning was 145.05 U/L which is significantly higher than the control groups.

The bad bedside prognostic factors which correlated very well with serum Amylase levels in the order of increasing severity include

1. Convulsions (amylase 156 u/l)

2. Pupil constriction (208U/L)
3. Severe secretions (245 U/L)
4. CNS depression (259.9 U/L)
5. Fasciculations (273.1U/L)
6. Respiratory failure (292U/L)

Hence Serum amylase levels may be considered as a marker of Organophosphorous intoxication, since it enables the early recognition of severity and also helps to identify those at risk of developing the complications of Organophosphorous poisoning.

Our study also showed that there was a significant correlation between markedly elevated Amylase level and respiratory failure and therefore poor outcome.

A significant rise in Serum Amylase level also portends various complications that include convulsions, CNS depression, fasciculations and respiratory failure.

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