Original Article

Hyperamylasemia with Organophosphate Poisoning

Incidence of Hyperamylasemia Leading to Respiratory Failure in Patients of Organophosphate Poisoning

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ABSTRACT

Objective: To determine the frequency of Hyperamylasemia leading to respiratory failure in patients of organophosphate poisoning.

Study Design: Observational / descriptive study.

Place and Duration of Study: This study was conducted at the Department of Medicine Dow University of Health Sciences, Karachi from June 2014 to June 2015.

Materials and Methods: A total of 168 patients of Organophosphate poisoning fulfilling the inclusion criteria were included in the study. Blood was drawn after aseptic measures by a trained phlebotomist for Serum Amylase level and Arterial blood gases. Value more than 101U/L was taken as hyperamylasemia. PaO_2 less than 60mmHg or PCO_2 greater than 55mg was labeled as respiratory failure. All information was noted on proforma.

Results: There were 59% were male and 41% were female. Frequency of hyperamylasemia in patients of organophosphate poisoning was 44%. Frequency of respiratory failure in hyperamylasemia in patients was observed in 68%. Respiratory failure was significantly high in male than female (70% vs. 30%; p=0.019).

Conclusion: Hyperamylasemia is more frequently seen in organophosphate poisoning. In patients with respiratory failure the mortality is very high; therefore we recommended early diagnosis, careful monitoring and appropriate management of complications in reducing the mortality rate.

Key Words: Organophosphate, Respiratory failure, Hyperamylasemia

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INTRODUCTION

Organophosphate compounds are diverse group of chemicals widely used in domestic and industrial settings, as insecticides, herbicides & fungicide[1-4]. However these compounds pose major health risks and hazards in the form of organophosphate poisoning. The problems associated with these compounds are not only affecting the developing world but are also common in the developed world [1].

The following facts and figures about organophosphate poisoning stand out[1] it accounts for approximately 3 million poisoning cases around the globe[2] it is the cause of around 200,000 deaths every year [3] majority of such cases are largely populated in the Asian-Pacific region[4]

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It is projected that nearly 90 percent of such poisoning cases are suicidal with fatality rate of greater than 10 percent[5] 8 to 10 percent are accidental while less than 1 percent are estimated as homicide cases[6,7].

The widespread use of organophosphates as a household and agricultural pesticide without regulation, is probably the most important reason for organophosphate poisoning. This reflects the necessity of early diagnosis, treatment and the implementation of advanced supportive care in ICU[8,9,10].

Elevated amylase levels or Hyperamylasemia is frequently seen in organophosphate poisoning due to cholinergic stimulation of pancreas[4]. Studies conducted by Singh et al and Lee et al reported 37 patients out of 79 and 44 patients out of 121 with hyperamylasemia in patients with organophosphate poisoning respectively[11,12].

Furthermore, respiratory failure is one of the serious complications associated with such poisoning.[13]

MATERIALS AND METHODS

This study was carried out at the Department of Medicine Dow University of Health Sciences, Karachi from June 2014 to June 2015.

Sample Selection:

Inclusion criteria:

• Age ≥ 15yrs to ≤ 45yrs of both genders

• Diagnosed case of organophosphate poisoning presenting in 24hours of ingestion

Exclusion criteria:
• History of ingestion of any other material along with organophosphate poisoning
• Subjects with H/O of alcohol addiction
• Patients with acute abdomen
• Who had gone thru ERCP in previous 24hrs
• Concomitant respiratory illness

Data Collection Procedure: Data was collected on a pretest self administered Performa after taking permission from ethical committee of the hospital. Blood was drawn after aseptic measures by a trained phlebotomist for Serum Amylase level and Arterial blood gases.

Data Analysis Procedure: Data was analyzed with the help of SPSS program version 18. Frequency and percentages were calculated for gender, hyperamylasemia and respiratory failure. Stratification was done with regards to age, gender, duration of ingestion.

RESULTS

One sixty eight diagnosed case of organophosphate poisoning presenting in 24hours of ingestion were included in this study. Age distribution of the patients is presented in figure 1. The average age of the patients was 36.87±7.54 years (table 1).
Out of 168 cases, 99(59%) were male and 69(41%) were female. Duration of ingestion of the most of the cases were 6 to 12 hours as presented in figure 2.
Frequency of hyperamylasemia in patients of organophosphate poisoning was 44%. Frequency of hyperamylasemia was not significant among the groups (table 2). Similarly rate of hyperamylasemia was not significant between gender and in patients with <6 hours and 6 to 12 hours duration of ingestion as presented in table 3 and 4.
Frequency of respiratory failure in hyperamylasemia in patients of organophosphate poisoning was observed in 68% (50/74). Frequency of respiratory failure was not significant in age groups while respiratory failure was significantly high in male than female (70% vs. 30%; p=0.019) as shown in table 8. Frequency of respiratory failure in hyperamylasemia was also not significant with <6 hours and 6 to 12 hours duration of ingestion patients as presented in Table 5.

Table No.1: Descriptive Statistics of Patients

Variables	Mean ± SD	95%CI	Max-Min	Range
Age (Years)	36.87± 7.54	35.52 to 38.21	45-15	30
Duration of Ingestion (hours)	7.68± 2.46	6.12 to 8.74	12-1	11

Table No.2: Hyperamylasemia in Patients of Organophosphate Poisoning with Respect to Age Groups

Age Groups	Hyperamylasemia		P-Values
	Yes n=74	No n=94	
15-20 yrs	10(13.5%)	25(26.6%)	0.144
21-30 yrs	22(29.7%)	23(24.5%)	
31-40 yrs	30(40.5%)	28(29.8%)	
40-45 yrs	12(16.2%)	18(19.1%)	

Chi-Square= 5.146

Table No.3: Hyperamylasemia in patients with respect to gender (n=168)

Gender	Hyperamylasemia		P-Values
	Yes n=74	No n=94	
Male	45(60.8%)	54(57.4%)	0.66
Female	29(39.2%)	40(42.6%)	

Chi-Square= 0.194

Table No.4: Hyperamylasemia in patients with respect to duration of ingestion (n=168)

Duration of Ingestion	Hyperamylasemia		P-Values
	Yes n=74	No n=94	
< 6 hours	23(31.1%)	40(42.6%)	0.127
6 to 12 hours	51(69.9%)	54(57.4%)	

Chi-Square= 2.325

Table No.5: Respiratory failure in hyperamylasemia in patients of organophosphate poisoning with respect to duration of ingestion (n= 74)

Duration of Ingestion	Hyperamylasemia		P-Values
	Yes - n=50	No - n=24	
< 6 hours	15(30%)	8(33.3%)	0.77
6 to 12 hrs	35(70%)	16(66.7%)	

Chi-Square= 0.084

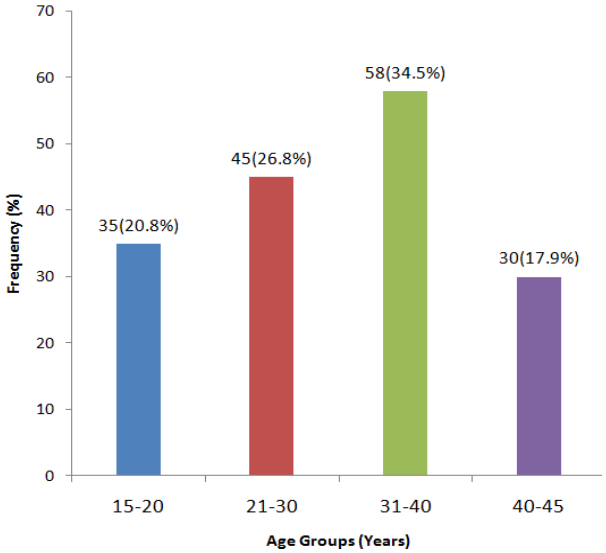

Figure No.1: Bar graphing showing age distribution of the patients n=168

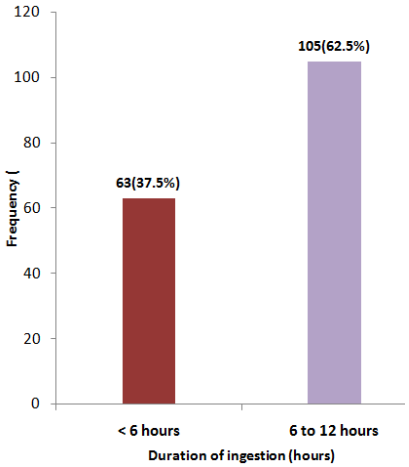

Figure No.2: Duration of ingestion of the patients n=168

DISCUSSION

In Pakistan, the prevalence of depression is high and suicidal tendencies are increasing[14]. Insecticide intake as a suicidal attempt has been seen very often in our society and in other developing countries as it is readily available in every home[8,15,16].

Ingestion of Organophosphates for suicidal purposes is a major problem, especially in developing countries. Ops (organophosphates) not only affect Acetylchlinesterase but also may alter the liver, kidney, pancreas and the other organ functions[17].

In our study Frequency of hyperamylasemia in patients of organophosphate poisoning was 44% (74/168). Martin Rubi et al [18] have reported only three patients with pancreatitis in a total number of 506 cases of organophosphate intoxication. The finding of hyperamylasemia was closely related to clinical severity and presence of shock. This makes a percentage of 5.66%. Sahinand others[19,20] have reported acute pancreatitis in 6 patients among 47 making a percentage of 12.7%.

Dagli and Shaikh[21] reported transient elevated amylase in 47 of 75 patients with malathion poisoning and three of their patients had hyperglycemia. Different scoring systems have been used to grade severity of poisoning[22,23]

In present study frequency of respiratory failure in hyperamylasemia in patients of organophosphate poisoning was observed in 68%. Frequency of respiratory failure was not significant in age groups while respiratory failure was significantly high in male than female (70% vs. 30%; p0.019). InEddleston at al study [24] ninety of 376 patients (24%) required intubation, 52 (58%) within 2 hrs of admission while unconscious with cholinergic features. Twenty-nine (32%) were well on admission but then required intubation after 24 hrs while conscious and without cholinergic features.

Harputluoglu and Edllestonhave reported to acute pancreatitis on admission after an attempted suicide by the ingestion of excessive organophosphate in human. In these reports, leukocyte count and serum amylase levels were very high measured when compared to reference range [24,25]

CONCLUSION

Organophosphate compounds poisoning is a serious and lethal condition and needs early diagnosis and appropriate treatment. Hyper amylasemia is more frequently seen in organophosphate poisoning. In patients with respiratory failure the mortality is very high; therefore we recommended early diagnosis, careful monitoring and appropriate management of complications in reducing the mortality rate.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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