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General Medicine

STUDY ON SERUM AMYLASE LEVELS IN ACUTE ORGANOPHOSPHORUS POISONING.

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KEYWORDS :

INTRODUCTION

Over one hundred thousand people in India die each year as a direct result of suicide or attempted suicide, as reported by the National Crime Records Bureau India (1). The vast majority of suicide victims were between the ages of 14 and 34, and organophosphorus compounds (OPCs) were the most frequently employed agent(2).

It was hypothesised that increased duct pressure and exocrine pancreatic secretion were at the root of the pancreatic changes seen in people who had consumed OP. Many diseases, such as those affecting the salivary glands, can cause an increase in serum amylase levels. Considering that hypersalivation can generate high serum amylase that consists only of a salivary pattern, it is reasonable to assume that this is what happened in the cases of OP poisoning, when hypersalivation was detected. The OP substance may be to blame for this as it is the over stimulation of the pancreas' cholinergic system that leads to the onset of acute pancreatitis (3).

In situations with limited healthcare options, the serum amylase level may serve as a reliable indicator of the severity of acute OP poisoning.

AIMS AND OBJECTIVES

1. To estimate the serum amylase levels in patients with acute OP poisoning.
2. To evaluate its concentration in relation to a control group.
3. Evaluate the correlation between serum amylase and cholinesterase levels and clinical severity in individuals with OPC poisoning.

MATERIALS AND METHODS

The present study is a cross-sectional prospective study conducted in the Department of General Medicine in Maharajah's Institute of Medical Sciences, Nellimarla, AP for a period of 10 months i.e., from June 2022 to March 2023. All the patients presenting with Organophosphorus (OP) poisoning were included in the study. Patients with exposure to entirely different poison other than OP, with double poisoning, patients consuming OP poison with alcohol, patients who are chronic alcoholics, with gall stone disease, with history of parotid gland disease, with lipid disorders, with history of renal or hepatic disease, pregnant and lactating women, patients with history of abdominal trauma or Endoscopic Retrograde Cholangiopancreatography (ERCP), history of drug intake likely to produce pancreatitis like Azathioprine, 6-Mercaptopurine, Thiazides, Frusemide, Pentamidine, Steroids, valproate and Sulphonamides were excluded from the study.

A total of 145 patients were admitted in the hospital in the study period and 60 patients were included in the study who fulfil the inclusion criteria. Clinical and demographic data was collected and noted in predesigned proforma. Poison Particulars- Severity grade, Symptoms after consumption, Immediate steps taken after OP exposure and Biochemical evaluation which includes Serum Amylase, serum cholinesterase, Blood glucose, urea, creatinine and Liver function tests were done in all the patients.

Each individual had two samples taken from their venous blood, one at the time of admission (Sample I) and the other 24 hours later (Sample II). For around 15 minutes, the samples were centrifuged at 3000 rpm. Serum from the supernatant was extracted and frozen. The CNP-G3 technique was used to quantify serum amylase with the use of a kit made by ERBA diagnostics. Up to 80 U/L is considered normal. At our lab, serum cholinesterase is assessed using an auto-analyser and the novel DGKC technique. Our lab provides the following typical ranges: Females: 3930-10800 U/L, Males: 4620-11500 U/L.

RESULTS

The mean age of the study population was 32.5 ∓ 5.6 years. Most of the patients belonged to the age group 21-30 (35%), followed by 31-40 (28%). Out of the 60 patients, 42 were males and 18 were females. Most common reason for poisoning was due to familial and financial problems. Most of the cases 42 (80%) are in rural areas and the rest 20% are from urban areas. Most common agent of poisoning was Dimethoate (40%), followed by Monochrotophos (30%) and Quinolphos (16.66%).

Secretions (70%) and pin-point pupils (60.2%) were the most prevalent signs of poisoning, whereas hypotension (6.5%) and convulsions (5.5%) were the least frequent. Mortality rate was 15%.

	Cases (Mean)	Controls (Mean)
Serum Amylase	153.6 ∓ 86.5	47.2 ∓ 15.2

The difference between cases and controls in terms of Serum amylase is statistically significant at p-value <0.0001.

Serum amylase levels at the time of admission higher than the values after 24- hours of admission and the data is statistically significant at p-value < 0.0001.

	Serum Amylase at Admission (Mean)	Serum Amylase after 24-hours of admission (Mean)
Serum Amylase	153.6 ∓ 86.5	127.82 ∓ 55.2

DISCUSSION

Most of the patients with OP poisoning in the present study belonged to the age group 21-30 (35%), followed by 31-40 (28%). In a study by Gangadharappa et al. (4), 20-30 years was the most common age group with OP poisoning. In Raveendra and Mohan study, most of the patients (84.9%) belonged to age between 15-45 years (5). Most of the subjects were young males in a study by Elango and Indumathi (6). All the above studies correlated with the present study in age distribution.

Out of the 60 patients, 42 were males and 18 were females in the present study. this correlated with Paul et al study (7) with 65.3% being males, with Gangadharappa et al study and with Elango and Indumathi study where males were more common. In a study by Ahmed et al (3), 60% were females with M:F ratio – 1:1.5, which is in contrast to the present study. The most common reason for the poisoning was financial and family problems in the present study. In Ahmed et al study, most of the patients consumed the poison as an act of suicide. In a study by Raveendra and Mohan all their subjects committed suicide with 86% of them consuming the poison for the first time (5).

Most of the cases 42 (80%) are in rural areas and the rest 20% are from urban areas. In A study on current trends of poisoning by Khosya and

Meena (8), poisonings were more common in rural areas with 74%. In a study by Batra et al (9), 83% of the rural population was involved in all poisoning deaths. This could be due to easy availability of the pesticides to the rural population as many were involved in farming practices.

Most common agent of OP poisoning was Dimethoate (40%), followed by Monochrotophos (30%) and Quinolphos (16.66%) in the present study. the most common agent was Dimethoate (73%) in Raveendra and Mohan study followed by Dichlorvos and there is no significant correlation with the nature or type of the compound with serum amylase levels (5).

In the present study, the most prevalent feature observed was excessive salivation (70%). This correlated with Ahmed et al study. Increased nasal and oral secretions was the most common feature in Raveendra and Mohan study, observed in 81% of the subjects. Convulsions were the least common presenting features in the above studies including the present study. Pinpoint pupils were observed in 60% of the study population in the present study. Similar findings were observed in Ahmed et al study. The mortality rate was 15% in the present study.

The mean serum amylase values were significantly elevated in poisoning cases compared to controls. Serum amylase levels at the time of admission were higher than the values after 24- hours of admission and the data is statistically significant at p-value < 0.0001. These findings correlated well with other studies published in the literature. In salame and Wani study (10), the serum amylase levels were high during admission and significantly dropped after treatment. The serum amylase levels were high in severely poisoned subjects and correlated well with bad prognostic signs. Ahmed et al study (3), observed increased serum amylase levels in 31% , increased serum lipase levels in 10% and acute pancreatitis in 2.2% of their study population.

Raveendra and Mohan in their study observed rise of serum amylase levels on admission, predominantly in intubated patients and significantly associated with death. There were no deaths among patients with normal amylase levels, concluding that the serum amylase levels can be used as predictors of ventilator assistance and mortality. Elango and Indumathi (6), observed in their study that their findings provide credence to the idea that exposure to OP pesticides constitutes a medical emergency requiring prompt medical attention. In the first 24 hours after OP poisoning, the mean Amylase level was 154 U/L, which is considerably greater than the levels seen in the control groups.

CONCLUSION:

Serum amylase was shown to have a statistically significant relationship with the severity of OP poisoning. Given its accessibility, low cost, and high accuracy as a biochemical marker, serum amylase is a useful tool. Amylase can be utilised as a surrogate marker for prognosis and outcome prediction since elevated levels on admission are associated with a worse prognosis and an increased risk of mortality. A high serum amylase level may be used to assess the severity of acute OP poisoning in areas with limited medical supplies.

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