ORIGINAL RESEARCH PAPER

General Medicine

SERUM AMYLASE LEVEL AT ADMISSION AS PROGNOSTIC MARKER IN PATIENTS OF ORGANOPHOSPHOROUS COMPOUND POISIONING

KEY WORDS:

Dr Shrikant Choudhary* Resident Dept. of general medicine, JLN Medical college and hospital, Ajmer, Rajasthan *Corresponding Author

Dr Vishnukant sharma Resident Dept. of general medicine, JLN Medical college and hospital, Ajmer, Rajasthan

Dr Sanjiv Maheshwari Senior Professor Dept. of general medicine, JLN Medical college and hospital, Ajmer, Rajasthan

ABSTRACT

INTRODUCTION: Acute organophosphate poisoning is one of the commonest poisoning in India. Due to high mortality there is requirement of certain parameters which can predict mortality and morbidity. Previously various case reports showed correlation between serum amylase level and various parameters in OPC poisoning.

AIMS AND OBJECTIVES: To study the clinical profile, severity & outcome in OPC poisoning patients and to correlate serum amylase level with various parameters.

METHODOLOGY: This is cross sectional study carried out in JLN Medical College and hospital, Ajmer during year 2016-2017.

RESULTS: High serum amylase level is statically significantly correlated with pupil size (0.935), fasciculation (<0.0001), respiratory failure (<0.0001), WHO seriousness grading (0.001), duration of hospital stay (0.047), ventilator requirement (<0.0001) and mortality (<0.0001).

INTRODUCTION:

Acute organophosphate poisoning is one of the commonest poisoning and has reached epidemic proportion in most parts of the world especially in developing countries, where the toxicity of poison and its medical management is lacking and leads to its high fatality rate.(1) There are nearly 3 million poisonings per year resulting in two hundred thousand deaths. (2) In the past, a high mortality was reported but in recent years, with intensive care, mortality has considerably declined. (3) Early recognition and prompt ventilator support may improve the survival rate. So our aim is to discuss the clinical features and management of organophosphorous poisoning with emphasis on optimization and monitoring of usage of OP compounds. Case reports on clinical significance of hyperamylasemia and acute pancreatitis following acute organophosphorous compound ingestion has been reported now and then, but there are no large-scale studies with reference to clinical significance of hyperamylasemia in a serial manner. Pancreatitis due to OP is caused by increased pressure within the pancreatic duct as a result of increased exocrine secretion of pancreatic fluid. (4-7)

AIMS AND OBJECTIVES:

To study the clinical profile of Organophosphorous compound poisoning patients and to estimate serum amylase levels at the time of admission in patients of organophosphorous compound poisoning and to correlate with their clinical severity and outcome.

MATERIAL AND METHODS:

This was a cross sectional study carried out in 100 patients who were presented with organophosphorous poisoning at J.L.N Medical College and Hospital, Ajmer during period 2016-2017.

Patients who had a definite history (by patient himself/ close relative / eye witness/ producing empty container) of consumption/ exposure of organophosphorous compounds along with clinical profile (smell of organophosphorous compounds/ respiratory signs/ constricted pupils/ any other signs and symptoms suggestive of organophosphorous compounds poisoning) were included after detailed clinical examination & inclusion/exclusion criterias.

All selected patients undergone estimation of serum amylase by 2-CHLORO-4-NITROPHENYL-ALPHA-D-MALTOTRIOSIDE (CNPG3) KINETIC LIQUID METHOD.

Exclusion criteria:

- Patients with indication of exposure to entirely different poison other than OP poisons or mixed with any other poison.
- Patients who have consumed poison along with alcohol or chronic alcoholics.
- Patient having history/clinical features suggestive of acute/chronic pancreatitis.
- Patients with history suggestive of gall stone disease, parotid gland disease, lipid disorders, hyperparathyroidism, renal or hepatic disease.
- History of intake of drugs likely to produce pancreatitis. i.e. azathioprine, mercaptopurine, thiazides, frusemide, pentamidine

RESULTS:

The mean age of patient in study is 32.75 ± 11.27 years. Maximum cases (52%) belong to age group 25-40 years, followed by age group < 25 years (27%) & age >40 years (21%). Of 100 patients 73 were males & 27 were females. Among study population mode of poisoning in 30 was suicidal & accidental in 70 patients.

Patient distribution according to signs and symptoms at the time of admission: detailed symptomatology is given in table 1.

Correlation of serum amylase at the time of admission to various parameters:

Various parameters were compared on the basis of serum amylase levels. There was no statistically significant correlation between serum amylase level and pupil size.

Serum amylase level was higher in patients with fasciculation, respiratory failure and higher WHO seriousness grading as compared to patients without fasciculation, respiratory failure or with lesser WHO seriousness grading respectively. And this correlation was statistically significant. (P values <0.0001, <0.0001 & <0.001 respectively) (Table 2)

Serum amylase level & clinical seriousness/outcome:

Statistically significant correlation was found between serum amylase level and duration of hospital stay, ventilator requirement & outcome. (p values 0.03, <0.0001 & 0.00012 respectively) . Hospital stay of patients with higher serum amylase level was statically significantly higher than patients with normal amylase level (p=0.03). 54.17% patients among patients with normal serum amylase level stayed in hospital for >7 days, while 75% patients stayed >7 days among patients with higher amylase level. (Table 3)

Likewise 6 (7.79%) patients of 77, needed ventilator support among patients with normal serum amylase level, while 14 (60.86%) patients of 23 with higher amylase level, needed ventilator support.(p<0.0001) (Table 3)

Mortality is higher among patients with high amylase level than patients with normal amylase level. 4 (5.19%) patients expired among patients with normal amylase level while 8 (34.78%) patients expired among patients with higher amylase level. (p=0.00012) (Table 3)

DISCUSSION:

In India OPC poisoning is a significant cause of morbidity and mortality. It is commonest poisoning with nearly half of admission to the hospital emergency with poisoning.

The mean age of patient in this study is 32.75 ± 11.27 years which is comparable to study by MK Mahapatra et. al. [8] who also observed mean age of 27.2 ± 10.4 years. Most common age group is 25-40 years who were exposed to poisoning. This age group is most vulnerable to poisoning because of increasing familial and social responsibility with economic hardship and achieve life style having stressful situation and not coping with them leading to suicidal attempts. This study shows that out of 100 cases of poisoning 30% cases were suicidal and 70% cases were accidental in comparision to another study by Surjeet Singh et al which shows suicidal cases 40% while accidental cases 60%. Out of 100 cases, respiratory failure present in 33% cases and 67% cases without respiratory failure which is comparable with study of Kumar Pankaj Saha et al (2016)[9] which shows respiratory failure in 21% cases and 79% were without respiratory failure.

In this study mean amylase level in patient with constricted pupil is 128.55 ± 108.46 and in patient with NS NR pupil is 138.36±103.45. This difference was statistically non significant. (p = 0.7767).

Mean amylase level in patient with fasciculation is 188.17 ± 146.44 and in patient without fasciculation is 88.94 ± 28.53. This difference was statistically significant (p <0.0001), which is comparable with study of Dr. Kumar Pankaj Shah et al [10] which shows mean amylase level in patient with fasciculation is 355.2 ± 105.8 and in patient without fasciculation is 176.5 ± 145.1 (p < 0.001).

Mean amylase level in patient with respiratory failure is 214.66 ± 152.36 and in patient without respiratory failure is 87.74 ± 25.86. This statistically significant difference is found in patients with respiratory failure patient in comparison towithout respiratory failure patients. The S. Amylase level increases in respiratory failure cases (p < 0.0001).

Mean serum amylase level was significantly higher in patients with higher WHO seriousness grading (P<o.oo1), which is comparable with study of T.N. Dubey et al (p<0.0001) [10] and S. Panda et al (2014) (p<0.05) [11].

Increase in duration of hospital stay (>7days) and requirement of ventilator support, which are indicator of disease severity, are also correlated with serum amylase level (P=0.03 & <0.0001 respectively). This is comparable with Subhash L Patil et al (2014) study [12]. This study shows that 12 cases (12%) out of 100 cases expired due to poisoning. Out of 12 cases, 8 cases (66.67%) have increased amylase level while 4 cases (33.33%) have normal amylase level. Mortality in abnormal amylase level patients is statistically extremely higher than normal amylase level patients. (p = 0.000127). This is comparable to study by S. Panda et al [11] who observed high incidence of mortality in patients with raised amylase level.

CONCLUSION:

Raised amylase level was significantly associated with fasciculation, more days of ICU stay, respiratory failure, ventilator support, seriousness and poor prognosis. High incidence of mortality was significantly associated with raised amylase level. So serum amylase level at the time of admission can be used as a prognostic marker or indicator of seriousness of disease in patients of OPC poisoning.

Acknowledgment: None

Table 1: Signs and symptoms distribution of study population

S.No.	Sign & Symptoms	No. of cases
1	Fasciculation	41
2	Vomiting	46
3	Tachypnea	37
4	Pain abdomen	39
5	Ghabrahat	44
6	Crepts	33
7	Nausea	40
8	Frothing from mouth	23
9	Vertigo	22
10	Burning throat	3
11	Level of consciousness • Alert • Drowsy	83 17
12	Pupil • Normal • Constricted	11 89
13	Bradycardia	17
14	Tachycardia	8
15	Respiratory failure	33

Table 2: Correlation of serum amylase level with different parameters

Parameters (no. of cases)	Serum amylase level(IU/L)	P value
Pupil size • Constricted(89) • NS NR(11)	128.55±108.46 138.36±103.45	0.776
Fasciculation • Present(41) • Absent (59)	188.17±146.44 88.94±28.53	<0.0001
Respiratory failure • Present(33) • Absent(67)	214.66±152.36 87.74±25.86	<0.0001
WHO seriousness grading • Grade 1(37) • Grade 2(43) • Grade 3(20)	84.10±12.11 110.79±74.42 254.35±162.59	<0.001

Table 3: Serum amylase level & seriousness/outcome

Parameters	No. of patients with normal amylase level	No. of patients with higher amylase level	P value
Hospital stay • <7 days • >7 days	39 33	4 12	0.03
Ventilator • Required • Not required	6 71	14 9	<0.0001
Outcome • Expired • Discharged	4 73	8 15	0.00012

References:

1. Eddleston, Michael; Buckley, Nick A; Eyer, Peter; Dawson, Andrew H (February 2008). "Management of acute organophosphorus pesticide poisoning". The Lancet. 371 (9612): 597–607. doi:10.1016/S0140-6736(07)61202-1
2. Berg, Sheri; Bittner, Edward A. (2013). The MGH Review of Critical Care Medicine. Lippincott Williams & Wilkins. p. 298.
3. Public health. Pesticide poisoning in developing world – a minimumpesticide list. Lancet Oct 2002; 360: 1163-67.
4. Dressel TD, Goodale RL, Jr, Arneson MA, Borner JW. Pancreatitis as a complication of anticholinesterase insecticide intoxication. Ann Surg. 1979;189(2):199–204. doi: 10.1097/00000658-197902000-00011.
5. Dagli AJ, Shaikh WA. Pancreatic involvement in malathion–anticholinesterase insecticide intoxication. A study of 75 cases. Br J Clin Pract. 1983;37(7–8):270–2

6. Weizman Z, Sofer S. Acute pancreatitis in children with anticholinesterase insecticide intoxication. Pediatrics. 1992;90(2 Pt 1):204–6.
7. Sahin I, Onbasi K, Sahin H, Karakaya C, Ustun Y, Noyan T. The prevalence of pancreatitis in organophosphate poisonings. Hum Exp Toxicol. 2002;21(4):175–7. doi: 10.1191/0960327102ht234cr.
8. Goswamy R., Chaudary A., Mahashur A. A study of respiratory failure in organophosphate and carbamate poisoning. Heart Lung 1994;23(6):466-72
9. Siwach SB, Gupta A. The profile of acute poisoning in Haryana. JAPI 1995; 43: 756-759.
10. Dr Kumar Pankaj Shah et al. A Study on Serum Amylase Level And Prevalence of Acute Pancreatitis in Organophosphate Poisoning. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). Volume 15, Issue 9 Ver. VI (September). 2016), PP 71-98
11. T. N. Dubey et al. Correlation of Severity of Organophoshorus Poisoning as Assessed by Peradeniya Organophosphorus Poisoning Scale with Serum Amylase and CPK Level. International Journal of Contemporary Medical Research. Volume 3 | Issue 9 | September 2016 | ICV: 50.43
12. Goel et al. Organophosphorus poisoning. Predicting need for ventilator support. JAPI 1998, 46(9): 786-90.