



“PROGNOSTIC SIGNIFICANCE OF SERUM CREATINE PHOSPHOKINASE LEVELS IN ORGANOPHOSPHOROUS POISONING : AN OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL “

General Medicine

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ABSTRACT

Background: organophosphorous poisoning is the major cause of mortality and morbidity in developing countries like india. It is the most commonly used insecticide in India and easily available. Erythrocyte cholinesterase and butyryl cholinesterase are markers for assessing the severity of OP poisoning, but they are costly and not available at all centers. This study was done to assess and find out the correlation of CPK levels with severity of OP poisoning **Aims & Objectives :** To assess serum creatine phosphokinase (CPK) level in OP poisoning To find out the correlation of serum creatine phosphokinase (CPK) level With the severity of OP poisoning **Materials And Methods:** A Hospital-based cross-sectional study was conducted in the Department of General Medicine, Santhiram medical college, and the general hospital for six months. A total of 100 cases with OP poisoning admitted to wards & ICU who satisfy the inclusion criteria were taken in to study. **Results:** Out of 100 patients 63 % were males and 37 % were females. Majority were in age group 19 -30 years. Methyl parathion was the most commonly used compound. Most of the cases presented with mild op poisoning. Serial measurement of serum CPK levels showed significant correlation with the severity of acute OP poisoning patients. **Conclusion:** High initial serum CPK levels is associated with severe degree of poisoning and is associated with complications and mortality. CPK may be considered as a prognostic marker of OPC intoxication since it enables the early recognition of severity and also helps to identify those at risk of developing the delayed complications of OPC poisoning

KEYWORDS

INTRODUCTION:

Organophosphorous compounds are the widely used insecticides all over the world . Among all the poisonings it is the commonest cause of mortality and morbidity in india . (OP) poisoning is an important global health problem especially in developing countries like india. Complications like respiratory failure , CNS depression and ventricular Arrhythmias should be anticipated and treated. If poisoning is recognized early and treated effectively, these Complications can be prevented

Estimation of erythrocyte cholinesterase (EChE) and butyrylcholinesterase (BChE) as an evidence of OP poisoning is costly, not regularly performed and shows wide inter-Individual variability.

Therefore, this study was designed to assess if serum creatinephosphokinase (CPK) can be used as a cheaper and easily available biomarker alternative of cholinesterase to stratify OP poisoning severity

MATERIALS AND METHODS:

A Hospital-based prospective observational study was conducted in the Department of General Medicine, Santhiram Medical College and General Hospital for six months after approval from the Hospital Ethics and Research Committee

Duration Of Study: From July 2023 to December 2023

Sample Size: 100 cases

METHODS OF DATA COLLECTION:

- OP poisoning cases admitted in medical wards and ICU of Santhiram medical college and general hospital, Nandyal, fulfilling the inclusion criteria, were taken for study after taking prior informed consent.
- Information is collected through a pre-structured proforma for each study subject.

An initial CPK value will be determined and follow up values will be taken on day 1, 4 & 7

Sampling Technique: Simple Random Sampling

Inclusion Criteria:

- Patients > 18 years
- Patients with history of exposure to OP poisoning within 6 hours

Exclusion Criteria:

- Patients with indication of exposure to an entirely different poison Other than OPC Poison.
- Patients with OP poisoning and mixed with any other poison
- Patients who have consumed poison along with alcohol
- Patients who are chronic alcoholics
- Patients with history suggestive of chronic liver disease
- History suggestive of myopathy
- Patients with history of malignancy and autoimmune disease
- Patients with history of renal disease
- History of intake of drugs like, -Eg: Statins, Fibrates, Dexamethasone

Data Analysis:. The data collected in the study was formulated into a master chart in Microsoft Office excel and statistical analysis was done with help of computer using Statistical software package SPSS V.17 for Windows. Using this software, frequencies, range, mean, standard deviation and Percentages were calculated. At a P-value of 0.05, statistical results were considered significant <0.05

RESULTS:

Table 1: - Age distribution in the case group

Age	No. of cases	Percentage
19 -30	37	37 %
31-40	21	21%
41-50	23	23%
51-60	16	16%
>60	3	3 %
Total	100	100.0 %

Table 2: - Gender distribution

Gender	No. of cases	Percentage
Male	63	63.0 %
Female	37	37.0 %
Total	100	100.0 %

63% of cases were males

Table 3: Type of exposure

Type of exposure	No of cases	%
Accidental	6	6
Suicidal	94	94
Total	100	100

94% of cases were suicidal , only 6% were accidental

Table 4 :Agents responsible for op compound poisoning

Agents	No of cases	Percentage
Bug killer liquid	13	13
Chlorpyrifos	9	9
Dichlorophos	4	4
Fenthion	7	7
Monochrotophos	8	8
Methyl parathion	52	52
Quinolpos	7	7
Total	100	100

Methyl parathion was found to be the most common compound

Table 5: shows correlation between CPK and outcome of patient

CPK vs outcome	Survival	Death	Total	%
<390	78	0	78	78
391-600	1	5	6	6
>600	0	16	16	16
Total	79	21	100	100
P value	0.012			

Table 6: Comparison of the initial and final serum creatine phosphokinase Levels of studied patients

	Mild (390)		Moderate (390-600)		Severe (>600)	
CPK LEVEL(IU/L)	Mean	SD	Mean	SD	Mean	SD
INITIAL CPK	225.9	56.301	492.667	70.955	751.188	91.327
FINAL CPK	121.0	27.613	1076.333	554.485	1138.18	248.64
	<0.001 significant		0.028 significant		<0.001 significant	

DISCUSSION

Organophosphorus (OP) compounds are among the most commonly used pesticides in agriculture. Because of their wide use and easy accessibility, OP toxicity is important global health problem especially in many developing countries. In our study 67% of patients were males, 33 % were females. Majority of cases were in the age group 19 -30. Methyl parathion was the most commonly used compound. 94 % of cases in our study were suicidal. The present study showed that there was a high degree of correlation between the initial serum CPK levels and the severity of acute OP poisoning. Muscle fiber necrosis and consequently raised CPK levels occur in severely acute OP poisoned cases. So, cheaper, easily quantifiable and more available Biochemical markers in relation to OP poisoning like serum CPK can be used in Predicting as well as assessing the prognosis of patients with OP poisoning. The present work highlighted the importance of serial measurement of serum CPK levels, as it might be helpful in predicting as well as assessing the prognosis of patients with acute OP poisoning. The severity of OP poisoning in this study ranged from mild, moderate and severe. Most of cases were presented with mild OP toxicity; Serum CPK level remains the best biomarker for Detecting and monitoring skeletal muscle damage and diseases. However, the main disadvantage of serum CPK as a biomarker for acute OP Poisoning, its non-specificity. So, exclusion of other conditions and diseases that May cause its elevation in patients with acute OP poisoning is mandatory. In our study there is a direct correlation between The initial CPK levels and severity of poisoning. Hence the patient's prognosis is Bad when the initial CPK levels are high PK levels and the Severity of acute OP poisoning; Muscle fiber necrosis and consequently raised CPK levels occur in severely acute OP poisoned cases [30, 31]. So, cheaper, easily quantifiable and more available Biochemical markers in relation to OP poisoning like serum CPK can be used in Predicting as well as assessing the prognosis of patients with OP poisoning [14]. The severity of OP poisoning in this study ranged from mild, moderate and severe; The Present study found that the initial serum CPK level is comparable for Butyryl cholinesterase level And can be used as an alternative biomarker in diagnosis of acute OP poisoning. Provided that exclusion of any other diseases or conditions that may cause rise in CPK levels, Serum CPK level remains the best biomarker for detecting and monitoring skeletal muscle damage and diseases. Also authors Confirmed the elevation of serum CPK levels in acute OP poisoning, especially if the patient is severely poisoned, presumably due to muscle fiber necrosis. However, the main disadvantage of serum CPK as a biomarker for acute OP Poisoning, its non-specificity. So, exclusion of other conditions and diseases that may cause its elevation in patients with acute OP poisoning is mandatory. We evaluated 100 patients admitted following consumption of Organophosphorus

compounds in Santhiram General Hospital. In our study there is a direct correlation between the initial CPK levels and severity of poisoning. Hence the patients prognosis is bad when the initial CPK levels are high.

CONCLUSION:

Organophosphorus compounds are commonly used agents for suicidal purpose. This study found that Serum CPK levels can be used as an alternative biomarker in diagnosis or stratifying severity of acute OPC poisoning, as it is cheap and easily available in developing countries. Serial CPK levels in acute OP poisoning can predict the prognosis.