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Research Article

**PSEUDOCHELINESTERASE LEVEL AS A DIAGNOSTIC  
TOOL IN SUSPECTED ORGANOPHOSPHORUS POISONING**<sup>1</sup> Dr. Abdul Haque Khan, <sup>1</sup> Dr. Tariq Zaffar Shaikh, <sup>2</sup> Dr. Hamid Raza, <sup>3</sup> Dr. Love Kumar,  
<sup>4</sup> Dr. Hamid Nawaz Ali Memon and <sup>3</sup> Dr. Fiza Laghari<sup>1</sup> Department Medicine Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro<sup>2</sup> Assistant Professor of Anesthesiology, Department of Anesthesia & Intensive Care Unit,  
Liaquat University of Medical and Health Sciences (LUMHS) Jamshoro<sup>3</sup> Liaquat University Hospital Hyderabad / Jamshoro<sup>4</sup> General Practitioner Zulekha Hospital Dubai United Arab Emirates**ABSTRACT:****OBJECTIVE:** To determine the serum pseudocholinesterase level as a diagnostic tool in patients with suspected organophosphorus poisoning (OP).**PATIENTS AND METHODS:** Twenty five patients of suspected organophosphorus compound of age  $\geq 18$  years, either gender were randomly selected while excluding the patients who had taken other compound as poisoning substance and patients with prior hepatic and renal dysfunction. The detail clinical history was taken and specific clinical examination was performed. The serum level of enzyme pseudocholinesterase was estimated on daily basis for three days while the data was compiled and manipulate in SPSS 17.**RESULTS:** Out of 25, eighteen (72%) were males and seven (28%) were females having mean  $\pm$  SD for age was  $32.98 \pm 8.95$ . Most of the patients were admitted within 6 hours of intoxication. Eight (32%) patients has mild, seven (28%) has moderate and ten (40%) has severe OP poisoning. The common features identified were nausea and vomiting 18 (72%), diarrhea and abdominal cramps 15 (60%), miosis 12 (48%) and difficulty in breathing 14 (56%). The patients who survived and improved had gradual raising values of enzyme levels and the patients who died did not show subsequent increase in enzyme level.**CONCLUSION:** Serum pseudocholinesterase activity is the reliable and best tool during early stages of poisoning with value above 4200 U/L has the indication of survival and subsequent increase in level also the indicator of best prognosis while the low enzymatic level during early stage of poisoning revealed increased mortality.**KEYWORDS:** Pseudocholinesterase, enzyme, organophosphorus**Corresponding author:****Dr. Abdul Haque Khan,**

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**INTRODUCTION:**

In Pakistan, the acute poisoning is important cause of morbidity and mortality while in medical emergency 15% of hospitalizations are due to intoxications and organophosphorus poisoning (OP) contributes around 50% [1,2]. Organophosphorus poisoning compounds is the emerging substance in the field of chemistry and apart from its usage as agricultural insecticides, pesticides, they are frequently abused for suicidal mean due to its low cost, early action and easy availability and accessibility [3]. The products have been imported in Pakistan since years but very little knew about their nature as a virulent poison [4]. The exposure to organophosphorus compounds in form of nerve agents and pesticides poses an ever increasing military and civilian threat. In developing countries the pesticide poisoning has more mortality than infectious disorders. Organophosphate insecticides account common cause of poisoning in young teen agers and adults as suicidal purpose while the accidental poisoning also occurs during spraying in the field [5]. The compound act by irreversibly inhibiting the enzyme cholinesterase resulting in accumulation of acetylcholine at synapses and myoneural junction and leads to cholinergic over activity [6]. The most common cause of death is respiratory failure and arrhythmias while the earlier recognition and timely ventilatory support may improve the mortality rate. Thus this study was compiled to study the serum level of pseudocholinesterase as a diagnostic tool in individuals with suspected organophosphorus poisoning.

**PATIENTS AND METHODS:**

This cross sectional study was conducted at tertiary care hospital and 25 individuals of suspected organophosphorus poisoning were recruited and enrolled in the study as the patient  $\geq 18$  year of age,

either gender with suspected OP while the exclusion criteria were patients who had consumed other drugs, hepatic and renal failure patients. The detailed history was taken as per the proforma and a complete physical examination was performed soon after hospitalization. The diagnosed based on clinical history or evidence of exposure to organophosphorus compound within 24 hours along with clinical features as miosis, fasciculations, excessive salivation and lacrimation, abdominal pain and diarrhea and tachypnoea, improvement of symptoms after administration of atropine and evidence of odour smell of gastric aspirates. The severity if categorized as mild, moderate and severe while soon after hospitalization the serum levels of pseudocholinesterase will be estimated for three days along with other routine tests as blood complete picture, random blood sugar, serum urea and creatinine, urine detail report and chest radiograph. The normal values of serum pseudocholinesterase range from 4150 to 7200 U/L while all the data was collected on pre-structured proforma and analyzed in SPSS version 17 whereas the frequencies, percentages and mean  $\pm$  SD was calculated.

**RESULTS:**

During six month study period total 25 patients with suspected OP poisoning were explored and studied. The mean  $\pm$  SD for age of whole population was  $32.98 \pm 8.95$ . Out of 25, eighteen (72%) were males and seven (28%) were females. Most of the patients were admitted within 6 hours of intoxication. Eight (32%) patients has mild, seven (28%) has moderate and ten (40%) has severe OP poisoning. The common features identified were nausea and vomiting 18 (72%), diarrhea and abdominal cramps 15 (60%), miosis 12 (48%) and difficulty in breathing 14 (56%). The results are presented in Table 1 and 2.

**TABLE 1: THE DEMOGRAPHICAL PROFILE OF THE STUDY POPULATION**

<b>Parameter</b>	<b>Frequency (N=25)</b>	<b>Percentage (%)</b>
<b>AGE (yrs)</b>		
18-20	04	25
21-29	06	27.7
30-39	08	30.5
40-49	04	13.8
50+	03	2.7
<b>GENDER</b>		
Male	18	72
Female	07	28
<b>DURATION OF POISONING (hrs)</b>		
≤6	13	52
>6	12	48
<b>SEVERITY OF POISONING</b>		
Mild	07	28
Moderate	10	40
Severe	08	32
<b>RESIDENCE</b>		
Urban	05	20
Rural	20	80
<b>OCCUPATION</b>		
Farmer	08	32
Labour	03	12
Student	06	24
Businessman	03	12
House wife	05	20

**TABLE 2: PSEUDOCHOLINESTERASE LEVEL IN PATIENTS WITH SUSPECTED ORGANOPHOSPHORUS POISONING**

PSEUDOCHOLINESTERASE LEVEL IU/L	Survived n (%)	Died n (%)	Total
<4000	07 (28%)	02 (8%)	09 (36%)
4000-5000	09 (36%)	01 (4%)	10 (40%)
>5000	05 (20%)	01 (4%)	06 (24%)

**DISCUSSION:**

Organophosphorus compound poisoning is the major health trouble in developing countries either accidental exposure or suicidal usage. Because a high proportion of Pakistani population involved in agriculture as farmer as a result the incidence of suicidal OP poisoning is increasing as its easily availability and accessibility in stressful situations i.e. self poisoning [7]. Various agents are used for suicidal purposes in developing countries and organophosphate (OP) and carbamate occupies significant place [8]. In this study maximum incidence of OP poisoning was among 30-39 year age group 8 (30.5%) with male predominance 18 (72%) and can be comparable to former studies [9,10]. In present study the majority of patients has low enzymatic activity and can be inferred that low pseudocholinesterase activity can be taken as good diagnostic tool for OP poisoning and is consistent with the previous studies [11,12]. In current series it has been found that patients with high enzymatic activity on first day have a better prognosis as far as recovery is concerned than with lower enzymatic population and similar findings were observed for day remaining two days. Thus it can be seen that initial measurement of pseudocholinesterase activity can be used to predict the prognosis of patients with OP poisoning. The study by Banday TH, et al and Manu MS, et al observed that pseudocholinesterase activity below normal level was associated with bad prognosis and further states that serum pseudocholinesterase is more sensitive than acetylcholinesterase as far as diagnosis and prognosis is concerned [13, 14]. The patients who died has decline in their enzymatic activity on subsequent days and is the indicator of poor prognosis to take early effective management steps to save the patients from life threatening complications and mortality associated with OP poisoning, the finding is consistent with the study by Guven M, et al [15]. Thus, it can be concluded that daily estimation of increase in serum pseudocholinesterase level can predict better outcome.

**CONCLUSION:**

The determination of serum pseudocholinesterase activity during early stage form a reliable diagnostic strategy and the patients who has gradual increasing in enzymatic activity in subsequent days has better prognosis and early recovery whereas the patients with low enzymatic activity and decline its level on subsequent days has worst outcome. Therefore the enzymatic activity is directly proportional to better prognosis in patients with OP poisoning while the low enzymatic level is the indication of increase in mortality.

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