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General Medicine

A STUDY OF SERUM PSEUDOCHOLINESTERASE LEVELS ON ADMISSION AS A PROGNOSTIC INDICATOR OF SEVERITY AND DURATION OF HOSPITAL STAY IN ORGANOPHOSPHOROUS POISONING IN TERTIARY CARE CENTRE, KAKINADA

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ABSTRACT **Introduction:** In most parts of the world, acute poisoning from organophosphorus pesticides (OP) has reached pandemic proportions, with a frequent fatality ratio of 20%, their ease of access and socio-cultural variables have a significant impact on the decision to use OP as a self-poison. **Results:** In the current scenario, clinical manifestations such as miosis, secretions, changed neurological state, muscle fasciculations, bradycardia, and a characteristic pesticide odour are used to determine the severity and the basis of treatment. **Conclusion:** Monitoring the degree of inhibition in cholinesterase levels may aid in the early detection and treatment of OP poisoning and to adjust the dose regimen based on the clinical condition of the patients.

KEYWORDS : serum pseudocholinesterase, organophosphorus poisoning

INTRODUCTION

According to WHO, 3 million people are poisoned by pesticides each year, with 2 million hospitalized due to suicide attempts and 2,20,000 fatalities, the vast majority of which are purposeful26. Poisoning from occupational exposure accounted for approximately one-fifth of the events, with a death rate of less than 1%. More than 90% of the non-occupational occurrences were suicidal, with a death incidence of more than 10%, and the individuals were mostly young boys 18 years old. Other kinds of poisoning included accidental exposure (8-10% of occurrences) and homicidal use (less than 1%). In different nations and institutions, total mortality from OP pesticide poisoning ranges from 4-30%18. Monitoring the degree of inhibition in cholinesterase levels may aid in the early detection and treatment of OP poisoning and to adjust the dose regimen based on the clinical condition of the patients. This study was carried out with an objective to determine the association if any between pseudocholinesterase profile and severity of OP poisoning and to assess the duration of hospital stay depending on Serum Pseudocholinesterase levels.

MATERIALS AND METHODS

A prospective cross-sectional study was done during January 2021-December 2021 in Government General Hospital, Kakinada with a sample of 100. Inclusion criteria of male or female with age 18 years to 60 years of age with a history of exposure to OP poison admitted to GGH, Kakinada were the study subjects. Patients who met the inclusion criteria were chosen for the research. On the 1st, 2nd, 3rd, 5th, and 7th days following hospitalization, 3 ml of venous blood was taken in simple sample vials from each individual. For 15 minutes, the samples were centrifuged at 3000 rpm. The serum supernatant was separated and frozen. About 0.01ml of blood sample was used for the ChE estimate, while the rest was used to assess protein and antioxidant status.

INDEPENDENT T TEST was used to analyze the significance of the continuous variables among groups.

RESULTS

Out of 100 subjects of the study 68(68%) were males and 32 (32%) were females. Mean age (SD) 36.62 (13.2) Years with range 16-80 Years. 54% are rural and 46% are urban. Agricultural laborers have the highest rate of consumption (34%) followed by farmers (26%). Familial problems 64(64%) were identified to be the most common reason for poisoning whereas for 18 (18%), the reason was financial. The majority of the patients (43) consumed the poison with soft drinks and 32 patients consumed the poison with Alcohol.

Table 1: presenting symptoms to hospital

Clinical symptoms	Frequency	Percentage
Miosis (pinpoint pupil)	46	46%
Depressed mental status	34	34%
Increased secretions	82	82%
Fasciculations	50	50%
Tachycardia	6	6%
Bradycardia	38	38%
Convulsions	6	6%

The time gap between consumption of poison and admission into the hospital is Mean age (SD) 3.8 (1.52) hours with range 1-6 hours. Presenting symptoms shown in table 1. 30% of them were having mild toxicity while 24% were moderately and 46% are severely toxic. 24% of them are in hyperglycemic state. 42% were developed respiratory depression. Relation between severity of poisoning and their respiratory depression and hospital stay was shown in table 2.

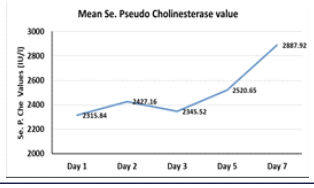
Severity of poisoning	Mechanical ventilation (days)	ICU stay (days)	Hospital stay (days)
Mild	--	--	6.846±0.273
Moderate	4.33± 0.33	5± 0.577	8.058± 0.181
Severe	4.9± 0.623	5.894± 0.561	9.210± 0.624
Total	4.96± 0.4765	5.447± 0.569	7.97± 10.359

Of them 78% were survived while 22% were succumbed. Cause of death was respiratory failure in 20 (94.1%) of patients and Aspiration & Pneumonitis in 2 (5.9%) patients. Intermediate syndrome was described in table3.

Severity of poisoning	No. of cases	Mortality	Recovered
Mild	--	--	--
Moderate	2 (2%)	--	2 (2%)
Severe	6 (6%)	6 (6%)	--
Total	8 (8%)	6 (6%)	2 (2%)

Mean (SD) serum pseudocholinesterase level was 1668.74 (1664.97) with range from 95- 5670. Day wise levels were mentioned in fig 1.

DISCUSSION



The great majority of poisonings were caused by oral intake of liquids, and practically all patients had gastric lavage performed very away. The incidence was highest (56%) in the 21-40 age group (35.82 1.779), followed by (30%) in the 41-60 age group. These are consistent with the findings of Muhammet Guven et al23 and AM Saadeh et al27, where the mean ages were 24.1 and 23.95 respectively. Murat Sungar et al. study has (31.25%) 28 of patients with Hyperglycemia.

Mortality due to respiratory failure was high in 22 patients (22%)of the total 100 patients which were consistent with the reports (29.16%) by Murat Sungar et al28 and Indira et al. Shailesh et al27 discovered that the incidence of IMS was 18%. According to Leon. S et al, Avasthi and Singh, the incidence is 20-60% and 65.55%, respectively. of Banerjee BD et al40. Tanrisev et al39, MA Cherian et al10 Ulrich Holfman et al41, Amit Tyagi et al39, and others on the link between ChE levels and acute OP poisoning. Ravi BN et al. study showed that the serum Pseudocholinesterase values <4000U/L ($p<0.001$) were associated with complications in 91%($p<0.001$) and patients needed ventilator support. According to Goel et al., around 4% of patients with mild poisoning and 6% of patients with intermediate poisoning required ventilator support, whereas 62% of patients with severe poisoning required ventilator support. Sungur et al. report a 27.6% overall death rate, with a 50% mortality rate among those on ventilatory support. Indira et al. report an overall death rate of 28.4%, with the intermediate condition having a mortality rate of 40%. According to Banday et al., mortality was greater in patients who required ventilatory assistance for more than seven days ($p<0.05$) and reported the overall mortality is 33.3%. In our investigation, the average dosage of Pralidoxime was 3.920 0.206mg over 4.898± 0.314 days. The highest suggested dose for adults was 12 g/24 hours, and it was 2.14mg/kg/hr in research by Gretchen M. Tush et colleagues [48].

CONCLUSIONS

OP poisoning is frequent in developing countries like India and is a major hazard since it affects the most productive age group in society.

The value of swift diagnosis, using Serum Pseudocholinesterase levels and optimization of treatment with early and successful therapy should not be underestimated. The use of Serum Pseudocholinesterase levels in unknown poisons and treatment with atropine and pralidoxime in the patients who have low Pche values at admission decreased the mortality and morbidity in patients who consumed the unknown compound.

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