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Evaluation Of Serum Potassium Levels As A Prognostic Marker In Acute Organophosphorus Poisoning In Tertiary Care Centre

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ABSTRACT
BACKGROUND – Hypokalemia is observed most commonly in severe profound organophosphorus poisoning patients. This study is undertaken to evaluate hypokalemia as a prognostic marker in acute organophosphorus poisoning .
AIM: To evaluate the serum potassium levels as a prognostic marker in acute organophosphorus poisoning patients in tertiary care centre.
Material and Method: This is a cross sectional study. 30 patients presenting to the emergency department with alleged history of op poisoning and features of respiratory failure requiring ventilatory support and who fulfilled the following inclusion and exclusion criteria are included in the study . Prior approval from ethics committee is obtained. Before initiation of actual study consent from responsible attendant or informant is taken after explaining the possible prognosis.
Results: 63.3 percent people showed hypokalemia in op poisoning. Hypokalemia patients showed convulsions, respiratory distress and need for intubation than normokalemic patients
Conclusion: From the study conducted it was found that hypokalemia increases both morbidity and mortality in organophosphorus poisoning significantly. Hence hypokalemia can be used as a reliable and cost effective marker of mortality and morbidity in organophosphorus poisoning. Early hospitalization and correction of hypokalemia can be life saving in OPC poisoning.
KEYWORDS – *Hypokalemia, respiratory distress, ventilatory support, serum electrolytes, cholinesterase.*

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I. INTRODUCTION

Organophosphate (OP) compounds are the most common agents consumed for poisoning in India. OP compounds act by inhibiting acetyl cholinesterase at muscarinic and nicotinic receptors. Hence, erythrocyte cholinesterase and plasma cholinesterase (PChE) reduce in OP poisoning.One of the contributing factors for severity of OP poisoning is electrolyte imbalances. In acute OP poisoning, the most frequent cause of mortality is respiratory arrest and acidosis as the result of respiratory muscle paralysis . Hypokalemia is also a frequent finding OP poisoning. Associated hypokalemia reinforces the Muscle weakness. Hence, hypokalemia can be considered as an important factor for intensifying the poisoning.

II. MATERIALS AND METHODS

Study Design: Cross sectional study.
Study Setting: Patients who presented to emergency department in Maharajah's Institute Of Medical Sciences , Nellimarla and consent was taken from cases before commencing the study.
Sample size: 30 cases .
Study Period: JANUARY 2023 TO JUNE 2023.
SUBJECT AND SELECTION CRITERIA : A complete clinical examination of subjects was done. Then blood sample was drawn and following investigation were sent. 1. Haemogram 2.Serum electrolytes 3.Serum cholinesterase levels 4.Arterial blood gas analysis. Repeat and additional investigations as required by patient's status were ordered. Serum cholinesterase levels were measured by kinetic /DGKC calorimetric method. The lab reference range used in present study :5100-11700 IU /litre.
STATISTICAL ANALYSIS : All the collected data is entered in Microsoft excel sheet and then transferred to statistical package of school sciences for analysis . Data are presented with median,mean,and standard deviation for continuous variables and frequency and percentage for categorical variables and analysed using chi square

test. One way ANIVA test is used to compare means of hypokalemia and different clinical features .p value <0.05 was taken as level of significance.

INCLUSION CRITERIA : Patients who had allegedly consumed organophosphate poison and admitted to hospital within 24 hours of ingestion, irrespective of age and gender.

EXCLUSION CRITERIA : 1.Patients with history of dual insecticide or multiple poisoning with other drugs such as opioids,diazepam,barbiturate etc. 2. Patients with respiratory illness like bronchial asthma,cold.cardiac illnesses,Neuro muscular disorders like myasthenia gravis etc. 3. All conditions causing hypokalemia – alkalosis,diuretic,beta agonist use,high aldosterone level,insulin overdose,laxative abuse, corticosteroids.

III. RESULT

Incidence of hypokalemia was 63.3 percent.

Phorate compound was the most common op compound being consumed i.e, 70 percent.

Convulsions was observed in 26.3 percent of hypokalemia patients as compared to 9.1 of normokalemic patients and difference was statistically insignificant

Respiratory distress was observed in 52.6 percent of hypokalemia patients compared to 27.3 percent of normokalemic patients and the difference was statistically insignificant.

Ventilator requirement was observed in 47.4 Percent of hypokalemia OPC poisoning cases as compared to 9.1percent of normokalemic patients.

APACHE score was significantly higher in hypokalemia OPC poisoning cases.

Table no 5 Requirement of ventilator vs Hypokalemia

			Hypokalemia		
			No	Yes	Total
Requirement of ventilator	No	Count	10	10	20
		%	90.9%	52.6%	66.7%
	Yes	Count	1	9	10
		%	9.1%	47.4%	33.3%
Total		Count	11	19	30
		%	100.0%	100.0%	100.0%

P value -0.03

Table no 7 Mortality vs Hypokalemia

			Hypokalemia		
			No	Yes	Total
Death	No	Count	11	13	24
		%	100.0%	68.4%	80.0%
	Yes	Count	0	6	6
		%	0.0%	31.6%	20.0%

Death was observed in 31.6 percent of hypokalemia OPC poisoning cases as compared to 0 percent of normokalemic OPC poisoning cases.

Hospital stay for more than 10 days was observed in 31.6 percent OPC poisoning cases compared to 18.2 percent of normokalemic OPC poisoning cases which was statistically insignificant.

IV. DISCUSSION

- **In** this study there is male preponderance compared to females
- Phorate is the most common op compound used for deliberate self harm followed by dichlorphos and parathion.

- In acute cases of OP poisoning, due to strong nicotinic actions, respiratory distress, muscle weakness and paralysis sets in. In such stressful conditions, hypokalemia can be established as an add-on to the clinical burden and/or these signs and symptoms can be aggravated in the presence of associated hypokalemia.
- Hypokalemia manifests with lassitude, mucular weakness, and loss of deep tendon reflexes, paralysis, and death (which is usually due to cardiac arrhythmias and respiratory distress)
- Hypokalemia is observed most commonly in severe profound foot grade of op poisoning.
- The patients in the present study developed grievous signs and symptoms sequentially as the [K+] reduced
- Death and ventilator requirement are observed in hypokalemic op poisoning cases compared to normokalemic patients and the data is statistically significant.

V. CONCLUSION

The ease of access to OPCs in developing countries like India has made this compound the main tool for suicidal poisoning. Present study was conducted keeping in mind the paucity of studies for OPC-Poisoning and the relation of electrolyte derangements with it. From the study conducted, it was found that Hypokalemia increases both morbidity and mortality in organophosphorus compound poisoning significantly. Hence Hypokalemia can be used as a reliable and a cost effective marker of morbidity and mortality in organophosphorus compound poisoning. Early hospitalization and correction of hypokalemia can be life saving in OPC-Poisoning.

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