



## RANDOM BLOOD SUGAR (RBS) LEVEL AT ADMISSION AS A PROGNOSTIC MARKER IN PATIENTS OF ORGANOPHOSPHOROUS COMPOUNDS POISONING

### General Medicine

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### ABSTRACT

**Introduction:** Organophosphate poisoning being most common poisoning in Indian scenario, requires a watchful and emergency diagnosis and management. It requires certain parameters which can help a clinician. Various parameters were studied but here we studied random blood sugar level at presentation as prognostic indicator.

**Aims and objective:** To study the clinical presentation, severity & outcome in OPC poisoning patients and to correlate random blood sugar level with various parameters.

**Methodology:** This is cross sectional study conducted in JLN Medical College and hospital, Ajmer during year 2016-2017 including 100 patients.

**Results:** Random blood sugar level at the time of presentation was statistically significantly correlated with fasciculation (<0.0001), respiratory failure (<0.0001), WHO seriousness grade (0.001), duration of hospital stay (0.0047), ventilator requirement (<0.0001) and outcome (0.0001).

**Conclusion:** India as a developing country has many OPC poisoning patient deaths every year. As a prognostic marker RBS can be used as a simple, easily available & cheap method to assess severity and prognosis.

### KEYWORDS

#### 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. Random blood sugar level is one of the factors which influences the severity of organophosphorous compound poisoning. The results of various studies in critically ill patients have shown that stress-induced hyperglycaemia is a strong predictor of increased mortality and adverse clinical outcome. (4-6)

The rising mortality despite adequate poisoning management forces us to investigate for other possible contributory factors. The glycemic status is one such variable that affects the outcome in critical illness.

#### AIMS AND OBJECTIVES:

To study the clinical profile of Organophosphorous compound poisoning patients and to estimate random blood sugar level 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 criteria.

#### Exclusion criteria :

- Patients with indication of exposure to a poison other than OP poisons, mixed with other poison or alcohol.

- Patients who have history of diabetes mellitus.
- Patients who were treated elsewhere.
- Patient have HbA<sub>1C</sub> >6

Blood sugar was measured by GLUCOSE OXIDASE-PEROXIDASE METHOD with semi auto analyser (STATFAX 2000).

#### 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 random blood glucose level at the time of admission to various parameters:

Various parameters were compared on the basis of random blood sugar levels. There was no statistically significant correlation between RBS level and pupil size.

RBS 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**)

#### Random blood sugar level & clinical seriousness/outcome:

Statistically significant correlation was found between RBS level and duration of hospital stay, ventilator requirement & outcome. (p values 0.047, <0.0001 & 0.0001 respectively). Hospital stay of patients with higher RBS level was statically significantly higher than patients with normal RBS level (p=0.047). 44.59% patients among patients with RBS level <150 mg/dl stayed in hospital for >7 days, while 85.71% patients stayed >7 days among patients with RBS level ≥150 mg/dl. (**Table 3**)

Likewise 4 (5.1%) patients of 77, needed ventilator support among patients with RBS level <150mg/dl, while 16 (69.56%) patients of 23 with RBS level ≥150mg/dl, needed ventilator support. (p<0.0001) (**Table 3**)

Mortality is higher among patients with higher RBS level. 3 (3.8%) patients expired among patients with RBS level <150mg/dl, while 9 (39.13%) patients expired among patients with RBS level  $\geq$ 150mg/dl. ( $p=0.0001$ ) (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  $32.75 \pm 11.27$  years which is comparable to study by MK Mahapatra et. al. who also observed mean age of  $27.2 \pm 10.4$  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 comparison 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)[7] which shows respiratory failure in 21% cases and 79% were without respiratory failure.

In this study mean RBS level in patient with constricted pupil is  $120.19 \pm 38.60$  and in patient with NS NR pupil is  $119.18 \pm 38.46$ . This difference was statistically non significant. ( $p=0.935$ ).

Mean RBS level in patient with fasciculation is  $146.09 \pm 43.96$  and in patient without fasciculation is  $102 \pm 19.29$ . This difference was statistically significant ( $p < 0.0001$ ).

Mean RBS level in patient with respiratory failure is  $160.75 \pm 38.30$  and in patient without respiratory failure is  $100.04 \pm 16.28$ . This statistically significant difference is found in patients with respiratory failure patient in comparison to without respiratory failure patients. The RBS level increases in respiratory failure cases ( $p < 0.0001$ ). This is comparable to Namita Mohanty et al [8] study which shows out of 42 patients with hyperglycemia 30% patients had complications. The most common complications encountered was respiratory failure (60%) followed by ARDS (33%) and aspiration pneumonitis (27%).

Mean RBS level was significantly higher in patients with higher WHO seriousness grading ( $P < 0.001$ ), which is comparable with study of S. Panda et al (2014) [9] shows that mean RBS level in patient with Grade I is  $103.9 \pm 20.96$ , in Grade II is  $117 \pm 33.8$  and in Grade III is  $164.64 \pm 30.16$  ( $p < 0.05$ )

Increase in duration of hospital stay ( $>7$ days) and requirement of ventilator support, which are indicator of disease severity, are also correlated with RBS level ( $P=0.0047$  &  $<0.0001$  respectively). This is comparable with Pankaj Saha et al [7] study which shows 22% cases required ventilator and 78% cases not required ventilator.

This study shows that 12 cases (12%) out of 100 cases expired due to poisoning. Out of 12 cases, 9 cases (75%) have RBS level  $\geq$ 150 mg/dl, while 3 cases (25%) have RBS level <150mg/dl. Mortality in patients with RBS level  $\geq$ 150mg/dl is statistically significantly higher than patients with RBS level <150mg/dl. ( $p = 0.0001$ ). This is comparable to study by S. Panda et al [9] who observed high incidence of mortality in patients with raised amylase level. This comparable to study by Surjeet Singh et al [10] at Rohtak observed 12.3% mortality in OPC poisoning cases.

#### CONCLUSION:

Raised random blood sugar 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 blood sugar level. So random blood sugar level (RBS) at the time of admission can be used as a prognostic marker or indicator of seriousness of disease in patients of OPC poisoning.

**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	83
	• Alert	17
	• Drowsy	
12	Pupil	11
	• Normal	89
	• Constricted	
13	Bradycardia	17
14	Tachycardia	8
15	Respiratory failure	33

**Table 2: Correlation of random blood sugar level with different parameters**

Parameters (no. of cases)	Random blood sugar	P value
Pupil size	$120.19 \pm 38.60$	0.935
• Constricted(89)	$119.18 \pm 38.42$	
• NS NR(11)		
Fasciculation	$146.09 \pm 43.96$	$<0.0001$
• Present(41)	$102 \pm 19.29$	
• Absent (59)		
Respiratory failure	$160.75 \pm 38.30$	$<0.0001$
• Present(33)	$100.04 \pm 16.28$	
• Absent(67)		
WHO seriousness grading	$99.81 \pm 16.28$	0.001
• Grade 1(37)	$112.86 \pm 30.10$	
• Grade 2(43)	$173.10 \pm 36.03$	
• Grade 3(20)		

**Table 3: Random blood sugar level & seriousness/outcome**

Parameters	No. of patients with RBS <150 mg/dl	No. of patients with RBS $\geq$ 150 mg/dl	P value
Hospital stay	41	2	0.0047
• <7 days	33	12	
• >7 days			
Ventilator	4	16	$<0.0001$
• Required	73	7	
• Not required			
Outcome	3	9	0.0001
• Expired	74	14	
• Discharged			

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