



To Assess The Severity of Organophosphorus Compound Poisoning Clinically By Using Peradeniya Score.

KEYWORDS

Peradeniya Organophosphorus scale, ventilatory support, mortality

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ABSTRACT *Introduction: Respiratory failure is the commonest fatal complication of OP compound poisoning. Our aim was to assess the severity of organophosphorus compound poisoning clinically by using Peradeniya score (POP) to plan management & assess outcome.*

Methods: This was an prospective observational study conducted on 118 patients at PESIMR hospital, a tertiary care center at Kuppam, Andhra Pradesh.

Results: Based on POP score, the need for ventilator support was noted in 26.9% of patients, 30% of patients with moderate poisoning and 46.1% of patients with severe poisoning. Mean dose of atropine required was high in patients with severe grade (631.78mg) when compared to patients with mild & moderate grade 440.18mg & 580.17mg respectively. Overall mortality was 11% and it was (30.8%) in severe grade (p value < 0.05).

Conclusion: Patients in severe grade (22.1%) of POP scale needed ventilatory support (46.1%) & the mortality (30.8%) and amount of atropine (631.8mg) was higher when compared to the patients with mild to moderate grade. POP score is useful in care plan & assessment of prognosis in OP poisoning patients.

Introduction

Organophosphorus compound poisoning is the most common medico toxic emergency in India where the majority live on agriculture. Although poisoning can result from occupational exposure or accidental ingestion, in most cases there is suicidal intent. It is therefore important that the clinical features and other factors which indicate the severity of poisoning and the criteria to predict the need of ventilatory support be identified at the initial examination. Red blood cells (RBC) cholinesterase level is a sensitive indicator, but its estimation is difficult and is usually not available. Serum cholinesterase level, which can be routinely estimated locally, is depressed after OP poisoning¹.

Peradeniya OP poisoning scale is a poisoning severity score that has not been studied much in Indian scenario. The Peradeniya Organophosphorus Poisoning (POP) scale assesses the severity of the poisoning based on the symptoms at presentation and is simple to use. In a study by Senayeke et al, patients with a high score on the POP scale had a high rate of morbidity and mortality.²

Our objectives were to find out the prognostic significance of Peradeniya OP poisoning scale in predicting the severity of OP poisoning in terms of need for mechanical ventilation, total dose of atropine needed and outcome.

Materials and Methods:

Study design:

An observational prospective study

Inclusion criteria:

A history of exposure to organophosphorus compound within previous 24 hours as indicated by patient or relatives or the referring doctor, with characteristic clinical manifestations of organophosphorus compound poison and physical evidence of the poison consumed & age > 18 years.

Exclusion criteria:

Patients with concomitant illness or conditions that are likely to alter the respiratory effort due to organophosphorus compound poisoning, consumed other substances along with organophosphorus compound, treated elsewhere for the poisoning & age < 18 years.

The ethical committee approval was obtained to carry out the study in the hospital. Consent of the patient and or guardian was taken.

Patients of OP poisoning admitted in PES medical college hospital were studied. Patient data was collected as per proforma. Qualifying patients were subjected for a detailed history, clinical examination and relevant biochemical investigations. A thorough clinical examination was carried out with particular reference to vital parameters, pupil size, assessment of central nervous system, respiratory system, cardiovascular system as per proforma, during initial presentation and the cases were followed up in the intensive care unit. Peradeniya op poisoning scale (table 1) was applied to all study subjects and the severity of op poisoning was graded as mild, moderate, severe at the time of admission.

Peradeniya op poisoning scale is shown in table 1

The patients were treated with pralidoxime and intravenous (IV) atropine, bolus and drip, maintaining the optimum level of atropinization & ventilatory support as needed. Complete recovery or death was used as the end point. The total amount of atropine & duration of hospital stay was also noted in each patient.

Peradeniya op poisoning scale

Sl.no	Parameter	Score
1	Miosis -	
	Pupils > 2mm	0
	Pupils = 2mm	1
2	Fasciculations -	
	Present but not generalized or continuous	0
	Generalized and continuous with central spasms	2
3	Respiration -	
	Respiratory rate < 20/min	0
	Respiratory rate > 20/min	1
4	Bradycardia -	
	Pulse rate > 60/min	0
	Pulse rate < 40-60/min	1
5	Level of consciousness -	
	Conscious and rational	0
	Inspired, responds to verbal commands	1
Total	Inspired, no response to verbal commands (if convulsion present add 1)	2
		11

POP score	Severity
0-3	Mild
3-7	Moderate
8-11	Severe

Table 1: Peradeniya op poisoning scale

Statistical analysis:

Variables which follow normal distribution were summarised by mean and standard deviation and on contrary, median with interquartile ranges were presented. Categorical variables were analysed using Fischer exact test method and for continuous variables which were done by kruskall wallis test.

Results

A total of one hundred eighteen consecutive patients of OP poisoning who attended the emergency and who fulfilled the inclusion & exclusion criteria mentioned were enrolled in the study. Among them, 62.7% were males. The age of the patients ranged from 18 years and above with 63%(67) of them between 18 to 30 years.

Farmers and students were the most common group of patients in our study (29.2% and 21.6% respectively), followed by house wives(20.8%), labourers (13.2%), and others(15.2%).

The symptoms and signs at presentation are shown in table2 &3.

Symptoms	No.	Percentage (%)
Nausea	110	93
Vomiting	106	89.8
Increased Salivation	46	38.9
Increased Sweating	36	30.5
Breathlessness	29	24.5
Bronchorrea	26	22.03
Headache	10	8.4
Diarrhea	8	6.7
Increased Lacrimation	7	5

Table 2: Symptomatology of patient

Signs	No.	Percentage (%)
Miosis	116	98.3
Tachycardia	64	54.2
Bradycardia	36	30.5
Neck muscle weakness	36	30.5
Altered consciousness	26	22
Fasciculations	23	19.4
Tachypnea (RR> 20)	22	18.6

Table 3: Signs noted

There were 54 (45.7%) cases with mild POP score, while

38 (32.2%) cases showed moderate POP score. Only 26 (22.1%) patients had score above 7 with Severe POP score.

The values of different parameters in the three grades of poisoning as per the POP scale are shown in Table 4.

POP scale	Ventilation support		Mortality(%)		Total
	Yes	No	Death	Recovered	
Mild (< 4)	8(14.8)	46(85.2)	3(5.5)	51(94.5)	54(45.7)
Moderate (4-7)	11 (30)	27(70)	2(5.2)	36(94.8)	38(32.2)
Severe (>7)	12(46.1)	14(53.9)	8(30.7)	18(69.3)	26(22.1)
Total	31(26.9)	87(73.1)	13(11.0)	105(89)	118(100)
CHI-SQUARE TEST	P=0.011(<0.05)		P=0.001(<0.05)		

Table 4: Ventilatory support and mortality in the three grades of poisoning as per the POP scale

Only 14.8% of patients with mild grade of poisoning according to POP scale required ventilator support, where as most of patients with moderate (30%) and severe poisoning (46.1%) according to POP score required ventilator support(p value -0.011).The study revealed association between POP score and the outcome. Those with mild and moderate POP scores showed significant chances of survival as compared to those with severe POP scores(p value -0.001).Among survivors(105),POP score was correlated with dose of atropine and hospital stay as shown in table 5.

POP Scale	Atropine requirement	Duration of hospital stay	Total(105)
	Mean+sd deviation	Mean+sd deviation	
Mild (< 4)	440.18+220.72	7.35+2.76	51
Moderate (4-7)	580.17+314.35	8.5+2.64	36
Severe (>7)	631.78+227.64	9.11+3.027	18
CHI-SQUARE TEST	P=0.043(<0.05)	P=0.016(<0.05)	

Table 5: showing association between POP score and quantity of atropine required and duration of hospital stay

P value was significant between the groups on ventilatory support (0.043) as well as duration of hospital stay (0.016). Mean dose of atropine required for patients with mild POP score was 440.18 mg whereas in severe group it was 631.78 mg. This association was statistically significant. Mean duration of hospital stay required for patients with mild POP score was 7.35 days whereas in severe group it was 9.11 days. This association was statistically significant.

Discussion:

In our study, majority of the patients were in the age group of 18-30 years (63%) followed by 25% of the patients in 31-40 years. Totally 91.7% of patients were within 40 years of age. This compares well with studies done by A Goel et al³, Reihman et al⁴, kavya S.T et al⁵.

Out of 118 patients, males (53.3%) & females (46.7%) formed the study subjects. The male to female ratio was 1.14:1. Male preponderance was also reported in studies conducted by Rajeev H et al⁶, A Goel et al⁵, Kavya S.T et al⁷.

In the present study, the commonest symptom was nausea (93%) followed by vomiting (89.8%). The commonest clinical sign observed was miosis (98.3%). Others were tachycardia (54.2%), bradycardia (30.5%), neck muscle weakness (30.5%), fasciculations (19.4%). These results are comparable to studies of Hasan et al⁷ who found pupillary manifestation as the most common sign (93%), Rehiman et al⁶ also found bradycardia and miosis as the most common and consistent clinical findings.

Respiratory failure requiring ventilator support was observed in 26.9% of patients in our study. This concurs with the findings of Shah Harsh D et al (30%), A Goel et al⁵ (34.95%).

POP scale was calculated for all patients on admission and 45.7% of patients had mild grade of poisoning and 32.2% had moderate grade of poisoning & 22.1% of patients in our study had severe grade of poisoning. In the severe grade, 46.1% (12/26) required ventilatory support which was higher as compared to mild (14.8%) & moderate group (30%). This is statistically significant in predicting the need of ventilatory support (p value < 0.0001). Kavya et al⁷ also found significant correlation between severe POP score and need for ventilatory support. Rehiman et al⁶ also found good correlation between POP score and the need for mechanical ventilation and total dose of atropine.

Among the survivors, the mean dose of atropine required for patients with mild grade of POP scale was 440.18 mg and for patients with severe grade of POP scale was 631.78 mg (p value = 0.005). A study conducted by Rehiman et al⁶ showed that the total amount of atropine needed to treat the patients was increased with severity of POP scale. Mean Duration of hospital stay in mild group was 7.35 days in moderate group was 8.5 days and in the severe group was 9.11 days. Our study had a mortality of 11% which compares well with Rehiman et al⁶ (14%), Das. B.W. et al⁸ (13.3%), Arup Kumar Kundu et al⁹ (13.3%).

In the mild grade of poisoning, 94.5% of patients survived and 8 out of 26 patients (22.1%) who expired had severe grade according to POP score (p value < 0.05). Similar findings were observed by Kavya et al⁷ who found that POP score directly correlated with death outcome (p value < 0.001).

Conclusion:

In the study, majority of the patients were in younger age group. There was male preponderance (M:F::1.14:1) amongst the patients and the majority of patients were agriculturists. Route of intake of poison was oral in the majority. In those who had severe grade of poisoning (POP score > 7) mortality was highest (36.8%) in contrast to mild grade (5.5%). Thus, grade of poisoning estimated by POP score can predict the mortality. POP score showed significant correlation in predicting the need for ventilatory support. Lower grade of poisoning according to POP scores had better outcome (94.5%) whereas higher grade of poisoning had poorer outcome (69.3%).

Among the survivors, POP scores showed significant correlation between the amount of atropine, duration of hospital

stay and severity. Thus POP scores can be reliably used to assess the prognosis and mortality of patients of OP poisoning.

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(Endnotes)

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