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STUDY OF ACID AND BASE AND ELECTROLYTE IMBALANCE AND LACTIC ACIDOSIS IN PATIENTS OF ORGANOPHOSPHATE POISONING (ACUTE).

Internal Medicine

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ABSTRACT

Introduction: Acute poisoning manifests as cholinergic crisis with myasthenia like syndrome, glandular secretions, peripheral neuropathies, altered sensorium. Acid-base and electrolyte abnormalities from various causes frequently develop. It could cause a central respiratory depression or central apnoea. Such patients with respiratory failure are kept under observation and regular Arterial Blood Gas (ABG) reports are strictly monitored to evaluate acid base disturbances and improve alveolar ventilation. WHO estimates that one million serious unintentional poisonings occur every year and an additional two million people are hospitalized for suicide attempts with pesticides. Self-poisoning with pesticides is a global suicide burden and often require Intensive Care Unit (ICU) care, causing about 200,000 deaths each year, more in the developing nations Including China, India, Sri Lanka, and Vietnam. In Sri Lanka, about 10,000 to 20,000 hospital admissions for organophosphorus poisoning occur each year of which at least 10% die. Compared to other chemical poisonings, pesticide poisoning is more fatal. At presentation of the patients, severity can be assessed by simple tests and outcome can be predicted which would aid to sketch a treatment plan and prepare to tackle any complications; thus to be able to save more lives and prognosticate better and be quick to prevent complications or least solve them efficiently. This study focuses on simpler tools, i.e., routine blood investigations, ABG at the time of presentation, before giving PAM or Atropinisation; and assess various simple Acid-Base and Electrolyte Disorders with their severity and corelate with organ damage to predict the outcome of the patients with OP Poisoning and prepare better to improvise through treatment.

Objective:

1. To study the prevalence of various Acid Base disorders with acute OP poisoning.
2. To study the prevalence and severity of electrolytes imbalance (Sodium (Na), Potassium (K), Chloride (Cl), Calcium (Ca) in patients of acute OP poisoning).
3. To assess the prevalence and severity of Lactic Acidosis in patients of acute OP poisoning.
4. To correlate survival and duration of hospital stay and severity of organ injury using SOFA score with various electrolytes, Acid base imbalance and lactic acidosis in patients with acute OP poisoning

Materials And Methods: The study is done in a tertiary care centre with 200 cases of organophosphate consumption above 16 years of age evaluated on the basis of history, examination and investigations. Routine Blood Investigations and ABG were able to give the status of the Acid-Base disorders, electrolytes imbalance; the SOFA score will be calculated at presentation. This will help us assess the prevalence of various disorders and their severity in acute OP poisoning. Organ damage can be evaluated from SOFA score. These Day1/ initial investigations will be used to correlate them with the survival and duration of hospital stay of the patients. Day 1 is taken obviously because that is the objective; and that is the state in which the patient has presented to us where we wish to use these parameters to predict the severity of poisoning to correlate with outcome; subsequent treatment for the betterment of the patient will alter the various parameters towards normal if discharged. By logistic analysis, the SOFA score will be correlated with the aimed objectives. The statistical analysis have been done by various test such as Student T test, Chi square test, ANOVA, and correlation and regression and so on. Data have been charted in simplified forms in table and charts and tried to be compared with outcome, Discharged and Death. **Results:** The event is more common in younger females where respiratory failure is the most common cause of death. Respiratory alkalosis is the most common acid base disorder followed by R. acidosis and acidosis being more fatal. However, fatality is maximum in cases of metabolic acidosis making it an alarming finding. Moderate to severe Hypokalaemia, severe hyponatremia served as poor prognostic markers. Hyperchloremia is associated with deaths though literature to support this is scarce. Lactic Acidosis is a poor prognostic marker. The result also solidifies SOFA score and ABG as an initial prognostic markers for use in explaining the prognosis and assessing the severity of the event and its course. The positive predictive value when combined (SOFA score and ABG) is more than SOFA score and ABG (pH) alone. Thus, combined ability to predict outcome seems to be better marker.

Conclusion:

- GCS score is an easy and reliable prognostic and severity assessment parameter in acute OP poisoning.
- Overall, Respiratory alkalosis was the most frequent Acid Base Disorder occurring in OP Poisoning patients (33.5%).
- Overall, maximum number of casualties, Mortality rate, was that of Respiratory Alkalosis (47.06 %). Metabolic Acidosis was associated with highest case fatality rate amongst acid base disorders (9 deaths in total 20 cases).
- Moderate to severe Hypokalemia, severe hyponatremia served as poor prognostic markers in Acute OP poisoning. Also, we observed Hyperchloremia associated with deaths though literature to support this is scarce.
- Lactic Acidosis was associated with poor outcome and is poor prognostic marker.
- SOFA score and SOFA score with ABG, can be used significantly as prognostic markers with Acute OP poisoning and assess its severity.

KEYWORDS

WHO (World Health Organization), OP (organophosphorus), ABG (Arterial Blood Gas), Electrolyte, SOFA score (Sequential organ failure assessment)

INTRODUCTION

Organophosphate (OP) poisoning is a medical emergency. They act in central and peripheral nervous system mainly in neuromuscular junction that results in dysfunction. OP agents could cause a central respiratory depression or central apnoea.[1]

Early clinical features (the acute cholinergic crisis) reflect involvement of the parasympathetic system and include bronchorrhea, bronchospasm, miosis, salivation, defecation, urination, and hypotension. Features indicating involvement of the neuromuscular junction (muscle weakness and fasciculations) and central nervous

system (seizures, coma, and respiratory failure) are common at this stage. Respiratory failure may also occur many hours later, either separated in time from the cholinergic crisis (intermediate syndrome [2]) or merged into the acute cholinergic crisis. [3] The pathophysiology of this late respiratory failure seems to involve downregulation of nicotinic acetylcholine receptors. [2] [3] Intermediate syndrome is particularly important since people who are apparently well can progress rapidly to respiratory arrest.

Arterial Blood Gas (ABG) analysis represents the ultimate test in clinical practice for the evaluation of severity and causes of lung gas exchange abnormalities using arterial oxygen tension (PaO_2) and arterial carbon dioxide tension ($PaCO_2$) and also Acid- base disturbances using pH, $PaCO_2$and serum bicarbonate (HCO_3). Arterial blood gas analysis is the sampling of blood from an artery for the determination of oxygen (O_2), carbon dioxide (Co_2) and acid content.[4]

Reliable prognostic factors have been identified for predicting the outcomes of OP poisoning, including the poisoning severity score, the Glasgow Coma Scale (GCS), the Acute Physiology and Chronic Health Evaluation II (APACHE II) score, C-reactive protein (CRP) levels, and electrocardiogram (ECG) recordings.

This study, however, focuses on simpler tools, that is., routine blood investigations, ABG at the time of presentation in an acute OP poisoning patient before giving PAM or Atropinisation; and assess various simple Acid-Base and Electrolyte Disorders with their severity and corelate with organ damage to predict the outcome of the patients with OP Poisoning.

MATERIALAND METHOD

This study will be carried out on patients admitted in PG Dept. of Medicine and Emergency , SNMC Agra, from September 2019 to March 2022. Approval of institutional ethical committee will be taken to conduct the above study. Informed consent will be taken from all the patients included in the study.

METHOD:

In this study the aim is to have 200 cases of organophosphate consumption above 16 years of age. Diagnosis will be on the basis of history and examination and investigations.

Investigations To Be Done:

- Routine Investigation (CBC, KFT, LFT, S. ELECTROLYTE, URINE ROUTINE AND MICROSCOPY)
- Arterial Blood Gas (ABG) Analysis.
- Electrocardiogram (ECG).

Inclusion Criteria:

- OP Poisoning patient, 16yrs and above.
- Acute poisoning duration less than 24 hours.

Exclusion Criteria:

- Patient not giving consent.
- No past H/O hypertension/diabetes/ischemic heart disease/ Chronic Kidney Disease
- (CKD)/Chronic Liver Disease(CLD).
- No H/o consumption of any other poison along with Organophosphate poisoning.

Type Of Study: Cross-sectional

Sample Size:

A total of 200 patients satisfying the inclusion and exclusion criteria will be taken. The patients were admitted and investigated for Routine Blood Investigations and ABG. They are able to give the status of the Acid- Base disorders, electrolytes imbalance; the SOFA score will be calculated at presentation. This will help us assess the prevalence of various disorders and their severity in acute OP poisoning. Organ damage can be evaluated from SOFA score. These Day1/ initial investigations will be used to correlate them with the survival and duration of hospital stay of the patients. Day 1 is taken obviously because that is the state with the patient has presented to us with and we want to use these parameters to predict the severity of poisoning to correlate with outcome; subsequent treatment for the betterment of the patient with alter the various parameters towards normal if discharged. By logistic analysis, the SOFA score will be correlated with the aimed objectives.

OBSERVATIONS

1. Sofa And Outcome

Table 1.1

SOFA	Discharge		Death	
	No.	%	No.	%
≤6	125	75.30	7	20.59
7-9	30	18.07	4	11.76
10-12	4	2.41	14	41.18
13-15	5	3.01	7	20.59
>15	2	1.20	2	5.88
	166	100.00	34	100.00

Chi-square value=78.20
p-value=<0.0001

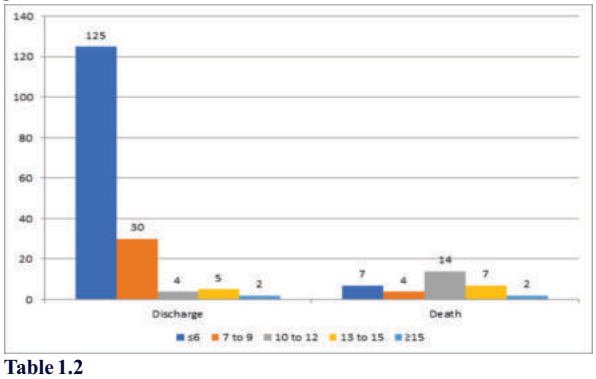
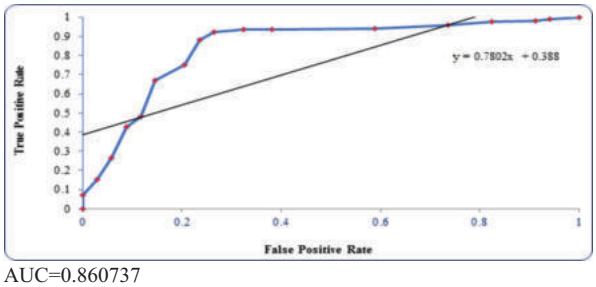


Table 1.2

Statistic	Value	95% CI
Sensitivity	93.98%	89.20% to 97.07%
Specificity	41.18%	24.65% to 59.30%
Positive Likelihood Ratio	1.60	1.20 to 2.12
Negative Likelihood Ratio	0.15	0.07 to 0.30
Disease prevalence	83.00%	77.06% to 87.93%
Positive Predictive Value	88.64%	85.45% to 91.20%
Negative Predictive Value	58.33%	40.46% to 74.26%
Accuracy	85.00%	79.28% to 89.65%

ROC



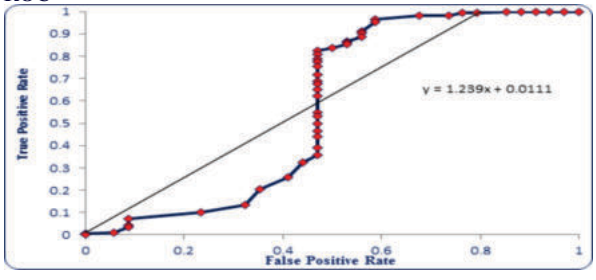
AUC=0.860737

2. ABG (pH) And Outcome

Table 2

Statistic	Value	95% CI
Sensitivity	100.00%	97.80% to 100.00%
Specificity	14.71%	4.95% to 31.06%
Positive Likelihood Ratio	1.17	1.02 to 1.35
Negative Likelihood Ratio	0.00	
Disease prevalence	83.00%	77.06% to 87.93%
Positive Predictive Value	85.13%	83.27% to 86.81%
Negative Predictive Value	100.00%	
Accuracy	85.50%	79.84% to 90.07%

ROC

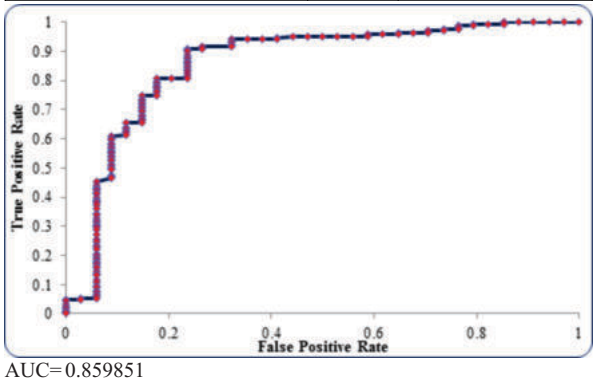


AUC=0.582388

3. Sofa Score + ABG (pH) And Outcome

Table 3

Statistic	Value	95% CI
Sensitivity	95.78%	91.50% to 98.29%
Specificity	41.18%	24.65% to 59.30%
Positive Likelihood Ratio	1.63	1.23 to 2.16
Negative Likelihood Ratio	0.10	0.04 to 0.23
Disease prevalence (*)	83.00%	77.06% to 87.93%
Positive Predictive Value (*)	88.83%	85.69% to 91.34%
Negative Predictive Value (*)	66.67%	46.61% to 82.08%
Accuracy (*)	86.50%	80.97% to 90.91%



AUC= 0.859851

4. Electrolytes With Outcome

Table 4

Outcome	No.	Na+		K+		Ca+2		Cl		Lactate	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Discharge	166	135.25	10.22	3.98	0.80	1.01	0.17	98.80	5.86	1.83	1.94
Death	34	124.66	9.06	3.12	0.94	0.99	0.25	104.74	7.67	3.54	1.77
t-value		-5.606		-5.538		-0.572		5.091		4.749	
p-value		<0.0001		<0.0001		0.568		<0.0001		<0.0001	

5. Lactate

Table 5

Lactate –level	Discharge		Death	
	No.	%	No.	%
Normal (0.5-1)	54	32.53	6	17.65
Moderate lactic acidosis (2-4)	105	63.25	11	32.35
Severe lactic acidosis (>4)	7	4.22	17	50.00
	166	100.00	34	100.00

Chi-square value=56.02
p-value=<0.0001

RESULT

Table 1 illustrates a very essential relation of this study, SOFA score with Outcome. Various levels of SOFA score have been taken and compared with the two outcomes.

The categorical groups with outcomes show statistically significant difference in the two groups. Also, in table 1.2, as can be seen, the positive predictive value of SOFA score is 88.64% implying that the ability of SOFA score to correctly predict outcome of total is 88.64%. The accuracy is 85%. This solidifies the idea of using SOFA score as an initial prognostic marker in order to aid in explaining the prognosis and assessing the severity of the event that has occurred.

Table 2 shows the relation of ABG (pH) with outcome and trying to use ABG as a predictor in outcome in OP poisoning. Its Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Accuracy are 100.00%,14.71%,85.13%, 100.00%, 85.50%, respectively, is similar to SOFA with outcome. Thus, it is safe to use ABG at admission as a significant prognostic marker to predict outcome of the event.

Table 3 shows ability of combined SOFA score and ABG (pH) to predict outcome in OP poisoning. Its Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Accuracy are 95.78%, 41.18%, 88.83%, 66.67%, 86.50%; the AUC=0.859851. The positive predictive value when combined is more than SOFA score and ABG (pH) alone. Thus, combined ability to predict outcome seems to be better marker. Accuracy is also 86.50%. Thus, by far with the available data in our study, we can deduce that at admission, various routine investigations done with ease could be used to predict outcome grossly.

However, it remains to say that the course of event/disease, its treatment and response to treatment can drive the course to any direction; and further follow up requires daily investigations to assess the progression.

Table 4 relates electrolytes disturbances with OP poisoning outcome showing moderate to severe Hypokalemia, severe hyponatremia as poor prognostic markers in Acute OP poisoning. Also, Hyperchloremia has been associated with deaths though literature to support this is scarce.

DISCUSSION

Organophosphate poisoning has still been a burden in the developing nations, mostly observed in the younger age group, as also observed in this study. Similar observations were also noted in many studies. Recent example is a study by ***2021 Goswami et al*** **and** *by* ***S Subikshavarthni , R Selvan.***

In our study, we have more female preponderance than males. ***Ananta Bhakta et al,*** in their study have also suggested more female cases in OP poisoning patients. However, some studies have also shown males more in the study.

As a serious problem, OP Poisoning hampers the productivity of a nation as a whole, being more common in the younger age group and even having grave outcomes. The mortality associated is though lesser, however the morbidity is still significant. The severity of the insult determines the outcome. Statistically and as per data analysis, there has been significant association with various parameters predicting the outcome of OP poisoning.

Acid-base and electrolyte imbalance from various causes occur in patient with acute OP poisoning [5–7]. A number of synergistic mechanisms have the potential to contribute to reduce ventilation post Organophosphate exposure. Acutely, peripheral acetylcholine at the neuromuscular junction (NMJ) induces fasciculation/twitching and weakness of voluntary muscle groups, including those involved in breathing.

Organophosphorus agents could also cause a central respiratory depression or central apnoea.[1] Such organophosphate poisoned patients who have developed respiratory failure are kept under observation and regular Arterial Blood Gas (ABG) reports are strictly monitored to assess acid base disturbances in order to improve alveolar ventilation.

In our study, we have observed that out of total sample, maximum or most common Acid Base disorder has been *Respiratory Alkalosis.* ***Anjali Pergulwar, H N Khan, A M Siddiqui, A R Shinde, S B Khannade,*** had similar observation in their study. ***S Subikshavarthni , R Selvan,*** also in their study in defining ABG as a prognostic tool in Organophosphate poisoning had maximum patients of Respiratory Alkalosis. In our study, this was followed by Respiratory Acidosis, Metabolic Acidosis and Metabolic Alkalosis.

Also, while seeing the outcome of the patients, in the group of discharged patients, the acid base disorder most commonly observed was Respiratory Alkalosis. Out of total Respiratory Alkalosis patients (67) 76.12% got discharged, and 23.88% expired.

Similarly, Respiratory Acidosis, out of 34 total patients, 73.53% got discharged, 26.47% expired;

In Metabolic Alkalosis, out of 18 patients all got discharged, no deaths and, out of 20 Metabolic Acidosis patients in total of 200, 55% got discharged and 45% expired indicating that though occurring less frequently than other simple Acid Base disorders, Metabolic Acidosis

is serious and bad prognostic marker in OP poisoning patients evidently when percentage or proportion of mortality was compared being, 23.88%, 26.47%, 0%, 45% in Respiratory alkalosis, Respiratory Acidosis, Metabolic Alkalosis and Metabolic Acidosis respectively.

Regarding Electrolyte imbalance, the mean Sodium (Na) level in discharged patients were 135.25 and in expired patients was 124.66.

- Mean Potassium (K) in discharged patients was 3.98 and in expired patients was 3.12.
- Mean Calcium (Ca) in discharged patients was 1.01 and in dead patients was 0.99.
- Mean Chloride level was 98.80 in discharged patients, while in dead was 104.74.
- Mean lactate level was 1.83 and in expired patients was 3.54.

Dr Karthik M.R et al did a study regarding electrolyte imbalance in OP poisoning patients.

Sodium imbalance was seen in majority of patients, 144 patients. 124 patients had Hyponatremia, severe in 38 patients. Hypernatremia was found in 20 patients.

Of 34 total deaths 30 had hyponatremia. In our observations, we have been able to deduce that there is profound hyponatremia in severe cases of OP poisoning, however, to support this notion the data is scarce over the internet. However study done by ***Dr Karthik M.R et al*** has not shown Sodium imbalance to be significant.

Potassium levels disturbances were seen in 101 patients. 97 had Hypokalaemia, vastly being mild hypokalemia. Out of 34 deaths 29 had hypokalemia. Severe hypokalemia was seen in 8 patients out of which no one survived. This makes Hypokalemia of severe grade a very poor prognostic marker for mortality in OP poisoning. **Evaluation of Serum Potassium Levels as Prognostic Marker in Acute Organophosphorus Poisoning in a Tertiary Care Centre, by *Dr Vandana Dandekar, Dr Ashiti Jain, Dr Aakash Barad, Dr Jaishree Ghanekar*** *also suggested hypokalemia as alarming sign in the patients of OP poisoning. Along with fasciculations, hypokalemia can aid in paralysis of Respiratory system.* ***D. R. M. M. Prasad*** in his study also suggested that severe grade hypokalemia could be used as a bad prognostic marker for assessing OP poisoning. *Fatality was noted when the mean serum [K+] reduced to 2.90 ± 0.06 mmol/L. For these conditions, the correlation of the clinical effects and serum [K+] was significant (P < 0.001).* This observation is similar to our study's results, further concreting the idea of Serum K+ levels being used as prognostic marker in OP poisoning cases. ***Dr Karthik M.R et al*** study is also indicative of the same observation making Potassium evaluation very necessary. Probable mechanisms by which OP compounds produces hypokalemia are excessive vomiting, diarrhoea, ganglionic stimulation related sympathetic overactivity and hypomagnesemia [8].

Hypokalemia, acute renal failure transient elevation of liver enzymes can occur in OP poisoning [9].

In our observations, majority of cases have Chloride levels within normal limit. However, severe cases, or expired cases, even Chloride was observed to be deranged. ***Dr Karthik M.R et al*** study has given us that Chloride level have also seen imbalance though not very significant with the prognosis and outcome. In our study too, Chloride levels of 113 patients of total were normal. 53 had hypochloremia levels with 4 deaths, and 34 have hyperchloremia with 19 deaths. However significant, to just label chloride levels or independently associate it with mortality is difficult as it's a multifactorial analysis and hyperchloremia could be because of severe dehydration. Thus, its needs to be assessed more in future studies so more data can be collected to concrete this relationship.

Calcium levels in 134 patients is sub-normal; 57 in normal; and 9 had hypercalcemia. There was no significant relation with outcome.

Lactic acidosis was seen in 140 patients of total. Severe lactic acidosis seen in 24 patients of which 17 eventually expired showing a significant relation with outcome and also implying that this is an important prognostic marker in OP poisoning patients. However, it remains to say that outcome is multifactorial. Raised serum lactate levels generally shows impaired tissue perfusion and is due to increased adenosine triphosphate(ATP) production through anaerobic metabolism and decreased clearance by the liver, kidneys, and skeletal muscle [10,11]. Elevated serum lactate may develop due to Organophosphate induced impaired ventilation and/or circulation. Whether OP raises lactate levels by itself is yet to be investigated; elevated lactate levels are also found in metformin and toxic alcohol poisoning [10]. Therefore, whether the raised lactate is a directly related to OP and, if so, what level of serum lactate increase results from this direct effect needs to be looked into in further future studies

According to ***Lionte et al. (2016)***, lactate and Glasgow Coma Scale (GCS) can be used to predict morbidity and mortality post systemic poisons exposure. ***Tang et al. (2016)*** reported that 6 hour post-admission high blood lactate levels, low blood pH, and low lactate clearance rates were independent prognostic factors identified for Organophosphate poisoning. This also keep up with ***Maignan et al. (2014),*** as per whom, some indicators such as toxicological history, GCS, QT interval, and serum lactate level, proved to be useful to distinguish between low and high acuity poisoned patients with deliberate drug poisoning, in order to avoid excessive morbidity after a retrospective analysis.

Yuan et al. Medicine (2018) 97 had lactate as a predictor of mortality along with SOFA score and APACHE 2.

In severe cases of OP poisoning, rhabdomyolysis, characterized by severe necrotizing myopathy, can affect skeletal musculature, including pharyngeal, laryngeal, and respiratory muscles, and also cardiac muscle.

Apart from lactate, in our study GCS when observed, had noteworthy difference in the two groups of outcome thus making it a significant marker to predict the outcome. This is evident in the above mentioned studies. ***Bilgin et al.*** concluded that GCS system has superiority over the others as it was easy to perform, and did not require complex physiologic parameters and laboratory methods [12]. ***Cander et al.*** showed that GCS values were effective in predicting the outcomes. ***Lionte et al. (2016, Maignan et al. (2014)*** have also used GCS for predictor of severity and outcome of acute OP poisoning patients.

SOFA is a clinical assessment sore showing various organ functions and can be used for assessment of patient as he/she comes in the ER. While trying to relate SOFA Score with outcome, we observed that, there was significant difference when compared in the two groups. Thus, we could conclude that, SOFA score can be used as a prognostic marker in OP poisoning as well as to assess the severity of acute poisoning.

Mona Moussa, Soheir Mohamed, Maha Hilal, Marwa Elnabi, Nayel Zaki in their study *The Role of APACHE II, SOFA, Serum amylase and Lipase in Assessment of Severity and Outcome of Acute Organophosphorus Poisoning,* came up with similar results that SOFA score has significant role in assessing severity and predicting outcome in OP poisoning.

Ebrahimi et al 2018 in their study also illustrated the similar result in OP poisoning regarding the use of SOFA score more predictive than APACHE (Acute Physiology and Chronic Health Evaluation) 4 and PSS(poisoning severity score).

Coskun, et al. has similar observation regarding SOFA score in OP poisoning.

Kim YH, et al. concluded from their study that the SOFA score is more useful in predicting mortality, and easier and simpler than the APACHE II and SAPS (Simplified acute physiology score)II.

Yuan et al. Medicine (2018) 97:21, concluded that for its simplicity and objectivity SOFA score was a superior predictor of mortality

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SOFA score also directly reflects the organ damage and in our study also when reading the data about LFT,KFT we could conclude that multiorgan dysfunction directly predicted outcome of patients which is indeed a part of SOFA parameters. It could be concluded that SOFA score had a role in assessment of severity of acute organophosphorus poisoning and could be used as predictor of outcome. SOFA score is more useful in predicting mortality, and easier and simpler than other scores.

Our study recommends that predictors of outcome , GCS, S. Lactate ,

SOFA score should be assessed routinely and as early as possible to evaluate the severity, improve the course of management and deciding the pathway of care.

In our study we have evaluated parameters such as GCS, Lactate and SOFA score and compared each with two groups of outcome and even tried to establish a connection with mean duration of stay in hospital. We have also clubbed SOFA score with ABG while doing our data and seen its observations. Its Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value, Accuracy are 95.78%, 41.18%, 88.83%, 66.67%, 86.50%; the ROC, AUC=0.859851.

The values are better than SOFA score alone. Hence, it can be said on the basis of results, that SOFA score with ABG is a more reliable marker of severity and predictor of outcome in OP poisoning patients. There is scarcity of data regarding this. However, further studies with this agenda will surely concrete this finding.

CONCLUSION

We took 200 patients of acute OP poisoning and evaluated them for our study and reached to the conclusion that:

- GCS score is an easy and reliable prognostic and severity assessment parameter in acute OP poisoning.
- Overall, Respiratory alkalosis was the most frequent Acid Base Disorder occurring in OP Poisoning patients (33.5%).
- Overall, maximum number of casualties, Mortality rate, was that of Respiratory Alkalosis (47.06 %). Metabolic Acidosis was associated with highest case fatality rate amongst acid base disorders (9 deaths in total 20 cases). Lactic Acidosis was associated with poor outcome and is poor prognostic marker.
- Moderate to severe Hypokalemia, severe hyponatremia served as poor prognostic markers in Acute OP poisoning. Also, we observed Hyperchloremia is associated with deaths though literature to support this is scarce.
- SOFA score and SOFA score with ABG, can be used significantly as prognostic markers with Acute OP poisoning and assess its severity.

Through our observations we were able to deduce various results and strengthen them by statistical analysis. We were able to draw conclusions and put them forward with scientific reason.

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