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# ASSESSMENT OF SEVERITY OF ORGANO PHOSPHATE POISONING AT A TERTIARY CARE HOSPITAL, SOUTH INDIA

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## ABSTRACT

The Purpose of the study was to assess the severity of OP (Organo Phosphate) poisoning cases in the ED (Emergency Department), A prospective-observational study on OP poisoning cases was done in the Emergency Department (ED) for the period of 6 months. All the OP poisoning cases were included in the study. The patient informed consent was taken, and data were collected by using standard Case Report Forms. The assessment for the severity and clinical prognosis was done using standard scales (GCS, APACHE II and PSS). In Severity categorization we found 77% of patients were in Mild condition, 14%in Moderate, 7% in severe and 1% fatality seen.Out of 90 cases 89 cases were recovered. The usefulness of few poisoning severity scoring system for predicting the severity, which in turn can be used to predict the outcome of poisoning. Implementation of practicing APACHE II & PSS Scales in the study hospital, may be useful to identify the severity at an early stage, would help in prompt and appropriate poisoning treatment, and prevent the prolonged hospitalization & better patient outcome.

**KEYWORDS:** Organophosphorus, OP poisoning, Severity, Antidote.

## INTRODUCTION

For predicting outcome in OP poisoning various systems were developed. International Program on Chemical Safety developed The International Program on Chemical Safety (IPCS)/EC/EAPCCT Poison Severity Score (IPCS PSS), a scoring system producing a

qualitative evaluation of the morbidity caused by different forms of OP Poisoning was created by the European Community, and the European Association of Poisons Centers and Clinical Toxicologists. [1]

Glasgow coma scale (GCS), the acute physiology and chronic health evaluation (APACHE II) and the Poisoning Severity Score (PSS) were always found to be helpful in estimating severity and clinical prognosis of OP poisoning which has been applied to patients. [2-5] The clinical characteristics, severity, treatment and outcome assessment were found in various studies so as to assist decision makers in knowing the type and therapy so that the patient self-harm and death rate could be reduced. To assess the usefulness of the GCS, APACHE II, Predicted Mortality Rate and to predict death in patients poisoned measures has to be taken. [6-9] With better medical management and through restrictions on the most toxic pesticides mortality rates could be reduced.[10]Further studies are needed.[10-11]

## MATERIALS & METHODS

A prospective-observational study was done for 6 months. OP poisoning cases in Emergency Department including casualty and ICU are included in the study. All other poisoning, other than OP cases, were excluded from the study. Human ethical clearance was obtained for carrying out the research work from Ethical Committee of the study Hospital.

Study was to find out the severity of OP poisoning cases in the study hospital. Informed Consent (ICU) was taken from the study population before commencing the study. The victims, who had undergone exposure to OP Poisoning, irrespective of age, gender are recorded using standard Case Report Form (CRF).

The state of consciousness and mental status (extent of mental injury) at the time of admission were assessed using the Glassgow Coma Scales (GCS). The Glasgow coma score was assigned, based on three responses, i.e. best eye response, best verbal response, and best motor response. The lowest possible GCS score (the sum) is three (deep coma or death), while the highest score is 15 (fully awake person).The severity of the poisoning was assessed using and Poison Severity Scale (PSS).

The prognosis was estimated using acute physiological and chronic health evaluation scale APACHE II scale. The prognosis and predicted mortality rate was estimated using acute physiological and chronic health evaluation scale.The APACHE II score was calculated from

12 routine physiological and laboratory measurements made during the first 24 h. The score for each parameter is assigned from 0 to 4, with 0 being normal and four being the most abnormal. The sum of these values were added to a mark adjusting for patient age and a mark adjusting for chronic health problems (severe organ insufficiency or immuno-compromised patients), to arrive at the APACHE II score. The resulting point score was interpreted in relation to the illness of the patient. The measurement was made during the first 24 h following admission to the emergency ward and resulted in an integer point score between 0 and 71.

The GCS and PSS also estimated within 24 h from the time of admission. GSS and PSS scoring were done alternative days, to know the improvement of severity conditions. The assessment was done, for all the cases, with the assistance of Nurses and clinicians at the study site.

All the cases included in the study, were analyzed for the reason for Poisoning; appropriateness of gastric lavage, selection and rational use of antidotes by the investigators, using Micromedex database. The data including demographic information (age, sex), toxic substances involved, type of poisoning, clinical symptoms, laboratory tests and patient outcome were evaluated.

## RESULT & DISCUSSION

A total 90 cases were observed in the study period of 6 months and the following evaluations were made from the observed data. Of the 90 cases assessed for the severity, 69 patients (77%) were in mild in severity,13 patients (14%) were moderate, 6 patients (7%) were in severe condition &in one patient (1%) it was fetal as per standard scales GCS, APACHE II, PSS scales.

In GCS (Mild-Normal) severity level,in 1$^{st}$ assessment (29%) and in 2$^{nd}$ assessment 49 patients (71%) were improved from Mild –Normal level as shown in Table 1**.**

**Table 1: Glassgow Coma Scale (N=69), Level of Conciousness.**

| Severity Level | 1$^{st}$Assessment (No. of victims) | Percentage (%) (1$^{st}$Assessment) | Percentage (%) (2$^{nd}$ Assessment) |
|---|---|---|---|
| **Mild-Normal** | 69 | 29 | 71 |

Table 2 shows GCS (Moderate-Mild) severity level in which in 1st assessment 3 patients (23%) & in 2nd assessment 10 patients (77%) were improved from Moderate-Mild condition.

**Table 2: Glassgow Coma Scale (N=13).**

| Severity Level | 1st Assessment (No. of victims) | Percentage (%) (1st Assessment) | Percentage (%) ( 2nd Assessment) |
|---|---|---|---|
| **Moderate-Mild** | 13 | 23 | 77 |

In another GCS (severe-Moderate) severity level, in 1st assessment 2 patients(33%) & in 2nd assessment 4 patients (67%) were improved from severe to moderate condition as shown in Table 3**.**

**Table 3: Glassgow Coma Scale (N=6).**

| Severity Level | 1st Assessment (No. of victims) | Percentage (%) (1st Assessment) | Percentage (%) (2nd Assessment) |
|---|---|---|---|
| **Severe-Moderate** | 6 | 33.3 | 66.7 |

Table 4 shows APACHE II Score Assessment.Patients Physiological characteristics were assessed & found to be improving from 1st assessment to 2nd assessment. More severe the disease higher will be the score.

**Table 4: APACHE II SCORE (N=90), PHYSIOLOGICAL ASSESSMENT**

| Scores* | 1st Assessment (No.ofvictims) | Percentage (%) (1st Assessment) | 2nd Assessment (No.of victims) | Percentage (%) (2nd Assessment) |
|---|---|---|---|---|
| **0-4** | 54 | 60 | 68 | 75.5 |
| **5-9** | 16 | 17 | 9 | 10 |
| **10-14** | 5 | 5.8 | 2 | 2.2 |
| **15-19** | 8 | 8.9 | 5 | 5.5 |
| **20-24** | 2 | 2.4 | 4 | 4.5 |
| **25-29** | 3 | 3.5 | 1 | 1.1 |
| **30-34** | 1 | 1.2 | 0 | 0 |
| **>34** | 1 | 1.2 | - | - |

*****More severe the disease higher will be the scores

Effect of demography and manner of exposure on Poisoning Severity Score is shown in Table 5. Among a total of 12815 IP admissions, OP Poisoning cases accounted for 90 admissions including 57 (63%) (0.9±0.1) females & 33 (37%) (1.5± 0.1) males Majority of poisoning occurred among the age group of 16-25yrs (N=45) (0.8±0.1), Exposures were either Interpersonal Conflict (N=60) (1.5±0.3), accidental (N=25) (1.6±0.13) by nature.Majority of patients resorting to self harm were females than males**.**

**Table 5: Effect of Demography and Manner of Exposure on Poisoning Severity Score.**

| Grade | Poisoning Severity Score(PSS) (mean±SD) | Grade 0 | Grade 1 | Grade 2 | Grade 3 | Grade 4 |
|---|---|---|---|---|---|---|
| Gender **Male N=33** | **1.5±0.1** | 3 | 15 | 12 | 3 | 0 |
| **Female N=57** | **0.9±0.1** | 20 | 25 | 8 | 3 | 1 |
| **Age** | | | | | | |
| **<15yrs N=13** | **0.2±.01** | 10 | 3 | 0 | 0 | 0 |
| **16-25yrs N=45** | **0.8±0.1** | 20 | 15 | 10 | 0 | 0 |
| **26-35yrs N=23** | **2.4±0.6** | 12 | 10 | 1 | 0 | 0 |
| **36-45yrs N=5** | **1±0.2** | 0 | 5 | 0 | 0 | 0 |
| **>45yrs N=7** | **1.6±0.3** | 0 | 3 | 4 | 0 | 0 |
| **Manner of exposure** | | | | | | |
| **Interpersonal conflict N=60** | **1.5±0.3** | 3 | 22 | 35 | 0 | 0 |
| **Love Tragedy N=1** | **0** | 1 | 0 | 0 | 0 | 0 |
| **Financial Crisis N=4** | **1.5±0.02** | 0 | 2 | 2 | 0 | 0 |
| **To Threaten N=0** | **0** | - | - | - | - | - |
| **Accidental N=25** | **1.6±0.13** | 5 | 10 | 15 | 0 | 0 |
| **Occupational N=0** | **0** | - | - | - | - | - |

Fig 1 shows outcome of victims, in which 89 patients (99%) were recovered & 1 patient (1%) was dead. This study is supported by study done by Rivera JA et al from Jan 1986-Jan 1990 which shows zero mortality rates. [12]

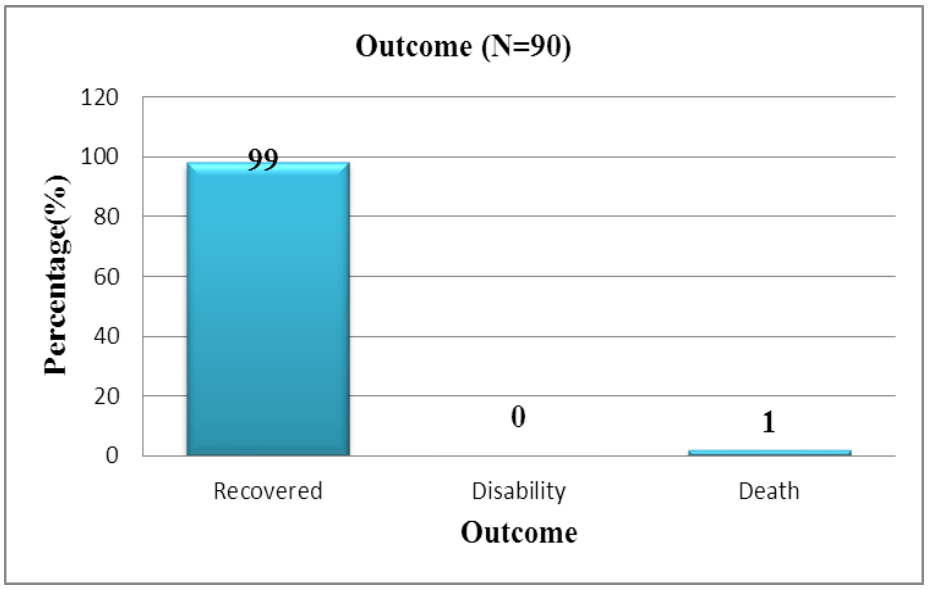


**Fig 1: Outcome of Victims.**

The assessment of level of consciousness, Physiological Assessment & severity was done by using three validated scales (GCS, APACHEII, PSS). We concluded that after 2nd assessment victims condition was improved as compared to 1st assessment.

## CONCLUSIONS

In the conclusion, The usefulness of few poisoning severity scoring system for predicting the severity, which in turn can be used to predict the outcome of poisoning. Implementation of practicing APACHE II & PSS Scales in the study hospital, may be useful to identify the severity at an early stage, would help in prompt and appropriate poisoning treatment, and prevent the prolonged hospitalization & better patient outcome. The study findings were reported to the various physicians and interns who manage the poisoning cases in the ED. This may alter their practice pattern and continually improve the quality of patient care.

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