

ACUTE ORGANOPHOSPHATE POISONING: PATTERN, MANAGEMENT AND OUTCOMES

***Himal Paudel Chhetri, G. M. Khan, Amrita Acharya, Sabita Maharjan, Madina Manandhar, Rojina Manandhar, Sabyata Gautam**

Department of Pharmacy, Kathmandu University, Dhulikhel, Kavre, Nepal

Summary

Poisoning refers to the development of harmful effects following exposure to chemicals, drugs, or other xenobiotics. Suicide by acute poisoning is one of the leading causes of death. Acute poisoning is a common and urgent medical problem in all developed and developing countries. The objective of the study was to determine the pattern of organophosphate poisoning in the emergency department of Kathmandu University teaching hospital, Nepal and to compare the effectiveness of poisoning treatment between atropine and pralidoxime (PAM) together and atropine alone. This was a retrospective study and the patients admitted from 2003 to 2006 A.D in the emergency department of the hospital were taken into consideration. The total numbers of cases admitted were 59, of which 35 were females and 24 males. Seasonal variations in poisoning were observed with more cases in the summer and the peak hospital admission time from 7 pm to 1 am. The circumstances of poisoning were intentional in 91.50% and accidental in 8.50% cases. The mean hospital stay for poisoning was 8.15 ± 4.12 days. Almost 18.64% developed complications among which aspiration pneumonia and respiratory failure accounted in 1.69% and 16.94% respectively. Also, a comparison was done on the basis of number of days patient stayed in the hospital with and without use of PAM. The results obtained showed that there were not any differences among the patients receiving atropine and PAM, and atropine alone. The use of broad spectrum antibiotics like ampicillin and cefotaxime were predominant in the treatment. The mean cost of the treatment was Nepalese Rupees (NRs.) 2277.01 ± 1568.65 which covered the cost on drugs and hospitalization. Out of the 59 cases, 53 patients recovered, only one of them died and the outcome of the 5 cases were not known.

Key words: Organophosphate poisoning, retrospective study, xenobiotics, broad spectrum antibiotics

***Corresponding author**

Himal Paudel Chhetri

Lecturer, Department of Pharmacy, Kathmandu University

GPO Box: 6250, Kathmandu, Nepal

Email: himalchhetri@ku.edu.np

Introduction

Poisoning refers to the development of harmful effects following exposure to chemicals, drugs, or other xenobiotics. Poisoning is one of the major causes of hospitalization through emergency and is a major public health problem in the country (1). In the fiscal year 1999-2000, the nationwide suicidal death due to poisoning was reported to be 31% (2). Everyday around the world, roughly 700 people die from poisonings and for every person that dies, several thousand more are affected by poisoning. According to world health organization (WHO) more than three million poisoning cases with a quarter million deaths occur worldwide annually, of which, 99% fatal poisonings occur in developing countries, particularly among agricultural workers (3).

Use of poison is the main method of attempted suicide (1). Insecticides are the major source of poisoning. The most common insecticide poisoning is the organophosphate poisoning. In our country, most of the insecticide poisonings is intentional in nature. The most common insecticides used for suicidal attempt are organophosphorous compounds followed by zinc phosphide and aluminium phosphide. Familial conflict, failed love affair, failure in examination and business, financial problems are usually the common causes of suicidal poisoning. Accidental and occupational over exposure to pesticides occurs mainly among agriculture workers, farmers and their family members (4).

Organophosphate (OP) group of poisons produce their toxic effect by inhibiting the activity of the enzyme acetyl cholinesterase (5). This results in the build up of acetylcholine in the neuromuscular junction and results in a cholinergic crisis. Organophosphates are absorbed across the lung, mucous membrane (including gut), skin and symptoms may appear within a few minutes to up to 12 hours. Drugs used for treatment are: atropine, pralidoxime (PAM), diazepam, dopamine and other for symptomatic treatment. Atropine, an anticholinergic compound is the mainstay of the treatment.

Objectives

The objectives of the study were to determine the pattern of organophosphate poisoning management in the emergency department of Kathmandu University Teaching Hospital (KUTH), Dhulikhel, Nepal and to compare the effectiveness of atropine and PAM together and atropine alone during poisoning treatment.

Materials and Method

This was a retrospective study and it was done in the emergency department of KUTH, Dhulikhel, Kavre, Nepal. This study was approved by the ethical committee of the University and the ethical number

provided was 08/07. A total of 59 patients admitted during the period of 2003 to 2006 A.D. in the hospital for organophosphate poisoning were taken into consideration. Poisoning by chemicals other than organophosphate was not included in this study. The monitoring parameters used during the study were: gender and age of the patients, months of admission, agents used for the management, time of arrival in hospital, nature of poisoning, outcomes of the management, total cost of the treatment and the comparison on the basis of number of days patient stayed in the hospital with and without use of PAM. Data was collected from the patient medication record and were analyzed.

Results and Discussion

Of the total admitted cases of OP poisoning females outnumbered the males (Table 1) and almost one-third of the patients were young adults of productive age 20-30 years followed by 10-20 years. The age of the patient varied from 10-70 years (Figure 1). Different studies have revealed similar findings and the reason behind this may be increased stress of unemployment, poverty, conflicting relationships and love affairs among the young adults. Self poisoning seems to be the preferred method of dealing with the stressful life situations especially in cases of young adults (6).

Table 1. Gender wise distribution of cases

Gender	Number of cases	Percentage
Female	35	59.33
Male	24	40.67
Total	59	100

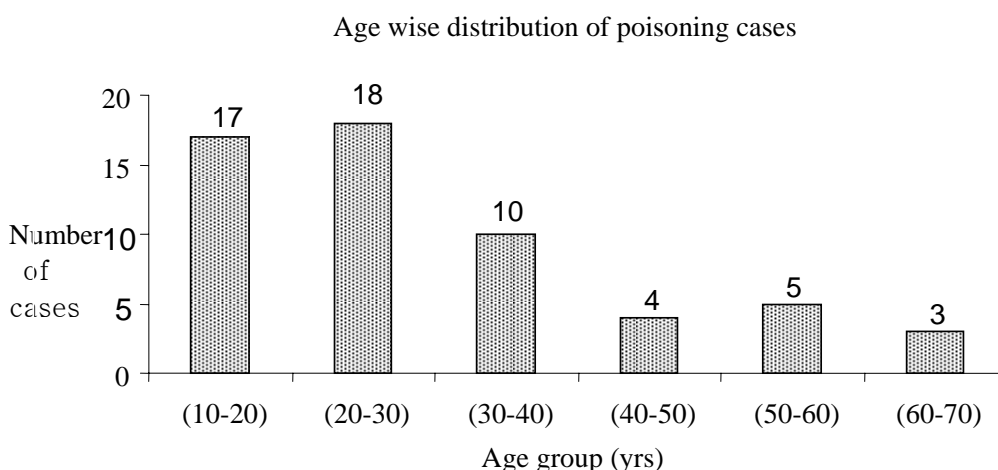


Figure 1: Age wise distribution of cases

The admitted cases were high during the summer seasons. An altogether of 17 cases was admitted in the months of June, July and August with the highest incidences of cases occurring in the month of October

(Figure 2). Similar seasonal variation in poisoning was also noted by Prasad and Karki (7) and Subedi (8). This may be due to the increased work and labor pressure, increased use and availability of pesticides during the respective months.

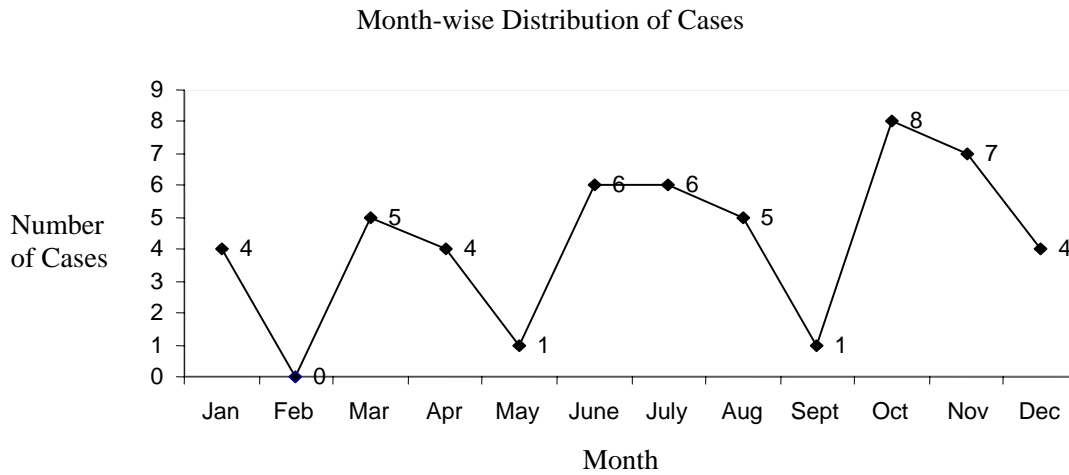


Figure 2: Month wise distribution of poisoning

Among the OP compounds Nuvan and Methyl parathion were the most commonly used poisons. They are responsible for 15 (25.42%) and 13 (22.03%) cases respectively.

In the present study conducted the time for the arrival of the patient to the hospital and time of intake of the poison was found to be at peak from 7 pm to 1am (Figure 3).

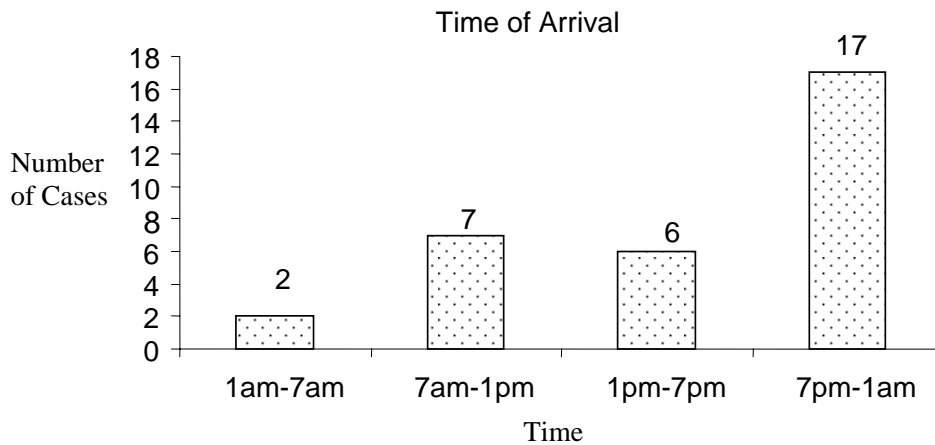


Figure 3: Time of Arrival

The motives of the poisoning were suicidal in 55 (93.22%) cases while 4 (6.78%) cases were accidental (Figure 4).

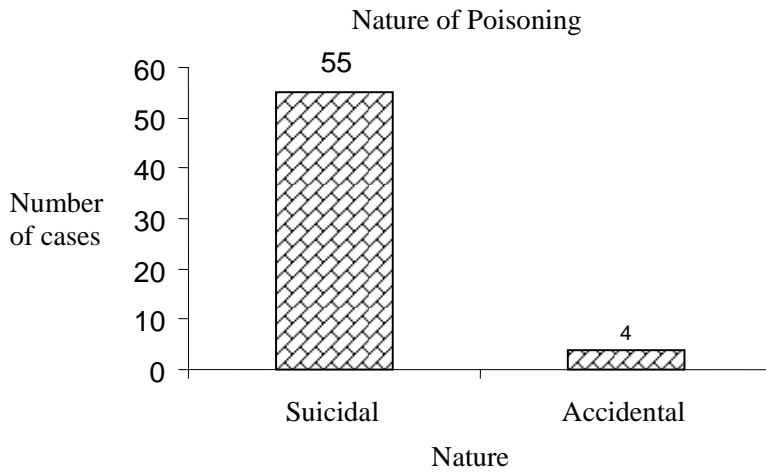


Figure 4: Nature of poisoning

The mean hospital stay varied depending on the type and route of poisoning. The hospital stay of the admitted patients with the poisoning ranged from a minimum of 1 day to maximum of 25 days. The mean hospital stay days were 8.15 ± 4.12 days. The complications observed in the cases were aspiration pneumonia and respiratory failure, which accounted for 1.69% and 16.94% respectively. The muscarinic manifestations were the most common presenting features in the patients with the poisoning cases. This includes miosis (100%) followed by salivation, urinary inconsistency (32.20%) each. Other nicotinic manifestations included fasciculation and increased heart rate, which were (1.69%) and (10.16%) respectively. Out of the 59 cases, 53 (89.83%) patients recovered, only one (1.69%) of them died and the outcome of the 5 (8.47%) cases were not known.

Also, analysis was conducted on the use of antibiotics in the treatment of the poisoning. From this study it was found that the use of broad-spectrum antibiotics like ampicillin, cefotaxime and norfloxacin were among the highest (Figure 5). Anti-ulcerative drugs like ranitidine were used almost in all of the cases while antacids and omeprazole were used in minority. The anti-convulsive drugs like diazepam were also found to be frequently used; use of midazolam and alprazolam were in the minorities. Analgesics like paracetamol tablets as well as suppositories were used in the majority of the cases.

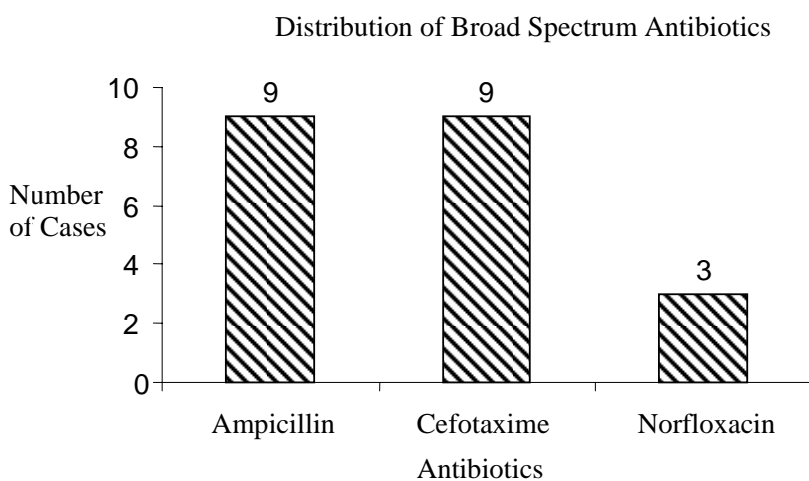


Figure 5: Distribution of antibiotics

The number of poisoning incidences was found to be in the increasing order from the year 2003 to 2006 A.D., which were 8, 10, 22 and 19 cases respectively.

The mean cost of OP poisoning for an individual patient is NRs. 2277.01±1568.65. Out of which the cost of drug accounted NRs. 1056.01±950.65 and number of days stay in hospital accounted for NRs.1221±618. The effectiveness of PAM when given along with atropine was compared with the effectiveness of atropine when given alone. In this study out of 59 cases, 25 were treated with atropine and PAM, while 29 were treated with atropine alone. The comparison was done on the basis of number of days patient stayed in the hospital with and without use of PAM. The result obtained showed that there were no any differences among the patient receiving atropine and PAM together and atropine alone. The mean day the patient stayed in the hospital receiving atropine and PAM together and atropine alone were 8.72 and 8.2 days respectively.

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