

Study of organophosphate poisoning in north Indian patients

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Abstract

Organophosphate poisoning occurs most commonly as a suicide attempt in farming areas of the developing world and less commonly by accident. The study has planned in North Indian Hospital. The 40 patients detected with the Organophosphate poisoning were enrolled in to the study.

The maximum patients found in the selected study groups are from the rural area. From the total 40 patients 30 patients are from the rural area and 10 patients are from the urban area. From the total patients 18 are male and 22 were females. There are about 22 patients who were poison detected within 6 hour of intake. 10 patients were detected in 6-12 hours and 8 patients were known after 12 hours. There are about 21 patients whose intake quantity of poison is not known. There are about 25 patients who had intention of the suicide for the intake of poison was detected.

It is more frequent observation that younger generations are more victims of organophosphate poisoning. Hence the law needs to be strengthening on easily availability of organophosphate. The educating the people about serious concerns of the organophosphate are also important.

Keywords: organophosphate, poisoning, north India

Introduction

Organophosphate poisoning is poisoning due to organophosphates (OPs). Organophosphates are used as insecticides, medications, and nerve agents. Symptoms include increased saliva and tear production, diarrhea, vomiting, small pupils, sweating, muscle tremors, and confusion. While onset of symptoms is often within minutes to hours, some symptoms can take weeks to appear ^[1]. Symptoms can last for days to weeks ^[2].

Organophosphate poisoning occurs most commonly as a suicide attempt in farming areas of the developing world and less commonly by accident. ^[2] Exposure can be from drinking, breathing in the vapors, or skin exposure. ^[3] The underlying mechanism involves the inhibition of acetyl cholinesterase (AChE), leading to the buildup of acetylcholine (ACh) in the body. Diagnosis is typically based on the symptoms and can be confirmed by measuring butyrylcholinesterase activity in the blood. Carbamate poisoning can present similarly ^[2].

Prevention includes banning very toxic types of organophosphates ^[2]. Among those who work with pesticides the use of protective clothing and showering before going home is also useful ^[6]. In those who have organophosphate poisoning the primary treatments are atropine, oximes such as pralidoxime, and diazepam ^[2, 3]. General measures such as oxygen and intravenous fluids are also recommended. Attempts to decontaminate the stomach, with activated charcoal or other means, has not been shown to be useful. While there is a theoretical risk of health care workers taking care of a poisoned person becoming poisoned themselves, the degree of risk appears to be very small ^[2].

OPs are one of the most common causes of poisoning worldwide ^[2]. There are nearly 3 million poisonings per year resulting in two hundred thousand deaths ^[2, 4]. Around 15% of people who are poisoned die as a result ^[2]. Organophosphate poisoning has been reported at least since 1962 ^[5].

A number of measurements exist to assess exposure and early biological effects for organophosphate poisoning. Measurements of OP metabolites in both the blood and urine can be used to determine if a person has been exposed to organophosphates. Specifically in the blood, metabolites of cholinesterases, such as butyryl cholinesterase (BuChE) activity in plasma, neuropathy target esterase (NTE) in lymphocytes, and of acetyl cholinesterase (AChE) activity in red blood cells ^[6]. Due to both AChE and BuChE being the main targets of organophosphates, their measurement is widely used as an indication of an exposure to an OP. The main restriction on this type of diagnosis is that depending on the OP the degree to which either AChE or BuChE are inhibited differs; therefore, measure of metabolites in blood and urine do not specify for a certain OP ^[6]. However, for fast initial screening, determining AChE and BuChE activity in the blood are the most widely used procedures for confirming a diagnosis of OP poisoning ^[26]. The most widely used portable testing device is the Test-mate ChE field test ^[7] which can be used to determine levels of Red Blood Cells (RBC), AChE and plasma (pseudo) cholinesterase (PChE) in the blood in about four minutes. This test has been shown to be just as effective as a regular laboratory test and because of this, the portable ChE field test is frequently used by people who work with pesticides on a daily basis ^[8].

Methodology

The study has planned in North Indian Hospital. The 40 patients detected with the Organophosphate poisoning were enrolled in to the study. The age group of the patients are from 20-60 years. The emergency patients visited to a tertiary care hospital in North India were considered in the study. All the patients are informed consents. The entire patient's clinical histories were collected. The approval of the institutional ethical committee is taken for the planned study.

Results & Discussion

The data from the 30 enrolled patients were included in the study.

Table 1: Age & Locality of the Patients:

Age	Rural	Urban	Total
20-30	3	1	4
31-40	7	3	10
41-50	12	4	16
51-60	8	2	10
Total	30	10	40

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Table 2: Sex Distribution

Age	Patients
Male	18
Female	22
Total	40

Table 3: Duration of Poisoning

Duration of Poisoning	Patients
Less than 6 hour	22
6 -12 hour	10
More than 12 hour	8

Table 4: Quantity of Poison

Quantity of Poison	Patients
Less than 10 gm	8
More than 10 gm	11
Unpredictable	21
Total	40

Table 5: Purpose of Poisoning

Purpose of Poisoning	Patients
Suicidal	25
Accidental	15
Total	40

Organophosphate Poisoning is common in India, as ours is an agriculturally based society and as the OP compounds are easily available at a cheap rate. Organophosphates are the commonest class of pesticides, which have been implicated in cases of poisoning [10, 11].

The previous study reports that Organophosphate Poisoning is common in younger age group, which is similar to that in other studies [12, 14].

The present study had more number of OP cases from the rural areas as compared to urban areas. Because these compounds are used as pesticides, they are easily available in the rural areas.

It observed that the incidence of suicide is high, affecting more females [15].

Conclusion

It is more frequent observation that younger generations are more victims of organophosphate poisoning. Hence the law needs to be strengthening on easily availability of organophosphate. The educating the people about serious concerns of the organophosphate are also important.

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