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Original Article

Rational drug use in organophosphorous poisoning implicates prevention of suicidal mortality

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ABSTRACT

Suicidal poisoning by Organophosphorous compounds remains the potential public health concern imposing a significant morbidity and mortality throughout the India. A retrospective study was conducted in Maharishi Markandeshwar institute of medical sciences and research, Maharishi Markandeshwar deemed to be university, Mullana, Ambala, Haryana, India, to analyze the antidotes administered viz Pralidoxime (an oxime) and Atropine in patients diagnosed with Organophosphorous poisoning. The demographic data of 181 Organophosphorous poisoning clinical cases documented 100 % suicidal tendency of patients, 70.17 % in age of 15-24 years, and 72.93 % were females and 84.53 % from rural background. Meiosis, excessive salivation, vomiting, nausea, sweating (82.20 %), disorientation, disturbances in consciousness levels, blurring of vision (7.93 %) were the peculiar symptoms and signs of clinical presentation of these documented patients. Before pharmacotherapy all patients were subjected for stomach was which leads to improvement of 17.12 % of patients, while other 82.88 % of patients were administered pharmacotherapy consisting of Pralidoxime and Atropine. The positive outcomes as documented by pupillary size after atropine as antidote were 83.33 % and 80.66 % for heart rate. This present concluded that vast majority of patients diagnosed with Organophosphorous poisoning can be managed by alone administration of atropine as an antidote which is available as an cost effective drug bas compared to Pralidoxime which is expensive as compared to atropine. Thus cost effectiveness and suicidal death prevention can be significantly reduced by rational drug use of antidotes administered for Organophosphorous poisoning.

Keywords: Organophosphorous poisoning, Atropine, Pralidoxime, suicidal death

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INTRODUCTION

The rapid industrialization, massive use of pesticides in agriculture sector and introduction of newer range of drugs for pharmacotherapy has increased the incidence of poisoning cases. In developed world the poisoning deaths are attributed to paracetamol, household detergents, cleansing surfactants and reagents, carbon monoxide and other cosmetically used products , but contrary in India as agriculture is the main stay of occupation, agrochemical related fertilizers, insecticides are used to much greater extent and poisoning by these agents are of thereof choice.[1,2] According to various studies organophosphate forms the most common substantial poison consumed for suicidal poisoning. Poisoning contributes to the fourth most common cause of significant mortality in India. [3] Organophosphorous poisoning results from consumption or thereto exposure to hazardous deleterious Organophosphorous compounds. These Organophosphorous compounds are group of chemical compounds used in industrial, domestic and agricultural sectors. Organophosphorous compounds are commonly used household insecticides and are extensively used in horticulture and agriculture sector. They are used worldwide and massively used in India too. [4, 5, 6]

For easy availability and access to household Organophosphorous compounds are one of the major products amounting to suicidal poisoning and thus causing significant morbidity and mortality, especially in India. [4-9]. The suicidal tendency among rural Indian population is very much common. In Haryana, a native state of India Organophosphorous compounds poisoning is a major massacre killer. [7, 8, 9]

The reduction of psychological stress may at time result in decrease in incidence and prevalence of suicidal death tendency. In spite of primary prevention and primary intervention in developing world, it is difficult to tackle this menace. Thus it is well understood to tract clinical cases of Organophosphorous poisoning in tertiary care hospitals to reduce the morbidity and subsequent mortality posed by Organophosphorous compounds. Although complete removal of Organophosphorous compounds from home which are widely and readily available at moments of stress may favor reduction in suicidal death rates. [9]

The core pharmacotherapy of Organophosphorous poisoning constitutes of Atropine, a central and peripheral muscarinic receptor antagonist and another antidote called as Pralidoxime (cholinesterase reactivation) [10, 11, 12]. According to well documented literature to improve prognosis immediate use of antidote is recommended in every established case of Organophosphorous poisoning. Till now very very few studies have been done to visualize the present situation of Organophosphorous poisoning and its pharmacotherapy module, thus this present retrospective study is conducted to see the rational drug usage of available antidotes and rate of suicidal death prevention.

***Aims and objectives*:**

1) To analyze the possible causal relationship of demographic profile of patients of Organophosphorous poisoning and type of Organophosphorous compounds ingested and subsequent prognosis after pharmacotherapy with subsequent antidotes administered.
2) To analyze the rational drug usage of Atropine and Pralidoxime for patients of Organophosphorous poisoning.

MATERIAL AND METHODS

An observational, retrospective study was conducted at department of forensic medicine in collaboration with department of pharmacology of Maharishi Markandeshwar institute of medical sciences and research, Mullana, Ambala, Haryana, India. The data was collected from hospital track records of patients diagnosed with Organophosphorous poisoning. The study plan was duly approved by institutional ethics committee before commencement of study.

The data was collected from MRD (medical record department) from 1st august 2017 to 31st February 2019 in a case record form. The collected data was designated for analyses in terms of demographic pattern, Organophosphorous compound ingested, pharmacotherapy and other supportive measures and drugs used; the subsequent signs of Atropinisation; and finally treatment outcomes were documented and tabulated. The data was compiled and subjected for data analyses by descriptive statistical methods by using SPSS version.

RESULTS

The data of 181 patients was collected during a span of 1 and half years. The demographic pattern (Table I) demonstrated that 100 % suicidal tendency predominance in females (72.93 %) with affected age group of 15-24 years(70.17%)and 84.53 %n cases were documented pertaining to rural patients background. When explored properly with documented records in case history files chlorpyriphos, phorate, malathion, parathion were most frequently used poisons.

Table I: Demographic analyses of Organophosphorous poisoning cases.

Parameter	Frequency (%)	Parameter	Frequency (%)
Age (years)		Sex	
15-24	127(70.17)	Male	49(27.07)
25-34	25(13.81)	Female	132(72.93)
35-44	18(9.94)	Marital status	
≥ 45	11(6.08)	No data	15(8.30)
Mode of poisoning		married	108(59.66)
suicidal	181(100)	Un-married	58(32.04)

The peculiar symptoms and signs of Organophosphorous poisoning were present in all cases viz. alteration in consciousness levels (7.93 %), hyper salivation, sweating and meiosis (82.20 %). Patients admitted in emergency department were chronic ones and needed intensive pharmacotherapy. Patients were treated according to set international protocols consisting of generalized supportive measures starting from maintenance of airway, breathing, circulation, drugs and also removal of clothes and decontamination of skin and orifices with absolute administration of requisite antidote therapy of 150 patients with 41.33 %: atropine and 34.66 % with Pralidoxime. Moreover approximately 24 % of patients in whom patient clinical condition was very much critical even after administration of antidotes and subsequent measures were referred to another tertiary care hospital at that time.

83.33 % patients improved after atropine therapy. Another set of patients required benzodiazepines (10 %), steroids therapy (12 %), Methylxanthines (18 %) along with antidote therapy.

DISCUSSION

In this present study patients were given generalized supportive measures by ensuring a maintenance of patency of airways, breathing and hemodynamic circulation. Further Atropine and Pralidoxime reserves the choice of antidote therapy in Organophosphorous poisoning.[4,12] Further a lot of debate has already been done in terms of most effective strategy of pharmacotherapy, as such atropine as the only drug was used in the past for the management of patients of Organophosphorous poisoning.[4,6,7,12,13,14]

The administration of Pralidoxime to 34.66 % of patients have not concluded any as such beneficial effect, also oximes are the class of expensive drugs and yields some major side effects. Thus atropine therapy alone is helpful for management of Organophosphorous poisoning and suicidal death prevention. The difference in prognosis depends upon the type of specific pesticides constituents. [5, 10] Patients developed respiratory depression after from cholinergic crisis load, while they were in conscious state as seen and documented by Glasgow coma scale. This was a most important cause of morbidity who were admitted and treated in this hospital in our study. [4, 6, 10]

CONCLUSION

Organophosphorous poisoning associated death prevention may be prevented by strict implementation of pesticide act which constitutes manufacture, transport, sale, distribution and use of pesticides under scrutinized guidelines; also 'poison information centre' must be effectively working in each and every district; emergency department must be equipped with necessary arrangements and antidotes to combat clinical poisoning suspects.

Appropriate management with effective pharmacotherapy constituted with administration of atropine alone as antidote, adjuvant pharmacotherapy with other drug categories: benzodiazepines, xanthenes and parenteral steroids must be implemented as and when required. The use of Pralidoxime must be restricted as such it is an expensive drug.

Thus cost effectiveness may be reduced and suicidal death could be prevented with rational drug use in patients of Organophosphorous poisoning.

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Footnotes:

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