International Journal of Advances in Medicine
Madala P et al. Int J Adv Med. 2017 Apr;4(2):357-361
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: http://dx.doi.org/10.18203/2349-3933.ijam20170913

Original Research Article

Outcome of patients with OPC poisoning who require mechanical ventilation: a statistical analysis

Puja Madala[1]*, Aravind[1], Mohini Singh[2]

[1]Department of General Medicine Sri Lakshmi Narayana institute of Medical Sciences, Puducherry, India
[2]Department of General Medicine, Sri Ramachendra Medical College and Research Institute, Chennai, India

Received: 15 February 2017
Accepted: 21 February 2017

***Correspondence:**
Dr. Puja Madala,
E-mail: bravikiran86@gmail.com

ABSTRACT

Background: Poisoning constitutes about 60% of deliberate self-harm in rural Asia. OPCs account for 80% of pesticide poisoning. Ravi et al reported the incidence of organophosphorous poisoning as around 1.26 lakhs in India. Patients will be required ventilator support for management in most of cases and hence study is being done to find the association of factors in patients with prolonged ventilator support.
Methods: Statistical analysis was carried out for 50 patients after categorizing each variable like age, sex, type of compound, quantity, serum pseudo cholinesterase levels, respiratory failure, intermediate syndrome and other clinical signs.
Results: Out of 50 patients 74% of patients required more than 10 days of ventilation and methyl parathion was the frequent compound associated with prolonged ventilation and 60% of patients who required 4-8 days of atropinisation and also patients who had low pseudocholinesterase levels at the onset had required prolonged ventilation.
Conclusions: The results show that outcome of patients with OPC poisoning is associated with type of compound, period of atropinisation, quantity, pseudocholinesterase levels. So immediate treatment is most important to improve mortality in OPC poisoning.

Keywords: Atropin, Organophosphorous poisoning, Parathion, Poisoning

INTRODUCTION

In this modern era of Industrialization, humans are continuously exposed to varied number of environmental pollutants. Of which, pesticides like OPC forms a major significant group posing a potential threat.

In this 21st century where everything is fast paced, humans are subjected to various stresses and suicidal indent behaviour is alarmingly very high. Because of their easy access, availability and cheaper cost, OPCs form a major group of poisoning. Poisoning constitutes about 60% of deliberate self-harm in rural Asia.[1] OPCs account for 80% of pesticide poisoning. Ravi et al in 2007 reported the incidence of OPC poisoning as around 1.26 lakhs in India.

OPC poisoning has high inpatient mortality and many patients have cardio respiratory arrests after admission and patients will be required ventilator support for management in most of cases hence the present study is undertaken to identify the factors associated with prolonged ventilatory support in organophosphorous compound poisoning, which help in predicting the factor causing prolonged ventilatory support and to identify the factors associated with death after consumption of OPC

poisoning need for ventilator support and thus helping to reduce the mortality by timely institution of ventilator support.

METHODS

This is prospective observational study, fifty patients admitted in our hospital with OPC poisoning selected for clinical study as per inclusion/exclusion criteria are subjected to detailed clinical examination after obtaining informed consent.

Type of compound, quantity, day of onset of Intermediate syndrome, type 2 respiratory failure, period of atropinisation, pupil size, GCS were recorded in detail.

Routine blood investigations like serum electrolytes, renal functional tests were done. Serum cholinesterase levels were measured both at the onset and during recovery. Patients were followed up till the end of study.

Aim of the study was to identify the factors associated with prolonged ventilator support in OPC poisoning and to identify the factors associated with death after consumption of OPC poisoning.

Inclusion criteria

- History of OPC poisoning (ingestion/inhalational)
- Presence of characteristic signs and symptoms of OPC poisoning.

Exclusion criteria

- Poisoning with other compounds along with organophosphates like kerosene, sedatives
- History of any chronic liver disease or pancreatic disease
- Pregnant women.

Prolonged ventilation was correlated with: type of compound, quantity, intermediate syndrome, Type 2 respiratory failure, serum cholinesterase levels, period of atropinisation and electrolytes.

Statistical analysis was carried out for 50 patients after categorizing each variable like age, sex, type of compound, quantity, serum pseudo cholinesterase levels, respiratory failure, intermediate syndrome and other clinical signs. Data were analysed using SPSS 16.0 Version software. The values are presented as mean and standard deviation.

The statistical significance was indicated by unpaired sample Mann - Whitney U test and Chi - Square test.

RESULTS

Maximum percentage (48%) of cases occurred in the age group between 31-35 years. 88% were found to be male, 12% were female. But there is no association of sex and ventilator support and was statistically insignificant. 64% of cases were from agricultural sector while remaining 36% were non-skilled workers.

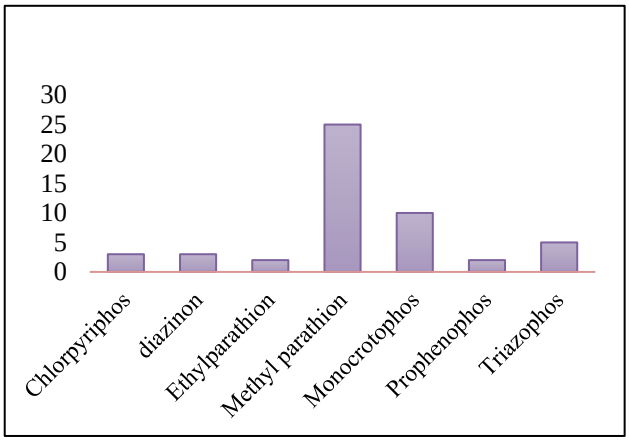

Figure 1: Compound.

In our study group, methylparathion (n = 25 cases) was the frequent compound associated with prolonged ventilatory support (Figure 1). But the association between type of compound is statistically significant (p = 0.0498).

Majorly 42 cases (84%) accounted in ingestion as the route of exposure whereas 8cases had inhalational exposure (16%).

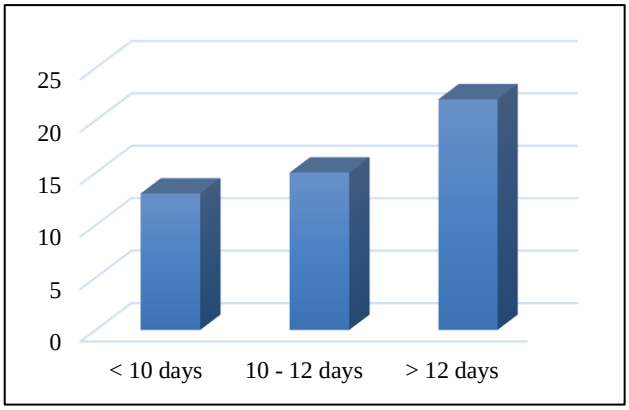

Figure 2: Number of days on ventilator.

Most of the patients required more than 10 days (74%) of ventilator support. Prolonged ventilation defined as who are on ventilatory support for more than 10 days (Figure 2).

In our study total 30 patients required 4-8 days of atropinisation (60%), the association between period of atropinisation and ventilator support was statistically significant (p = 0.00) (Figure 3).

There was statistical significance between quantity of consumption (>120 ml) and ventilator support (p = 0.00).

One patient who consumed 150 ml died on 3rd day. There were total 8 cases of respiratory failure (16%) and 3 deaths. The association between type 2 respiratory failure and ventilator support was statistically insignificant (p = 0.876). Even these 8cases had prolonged ventilator support.

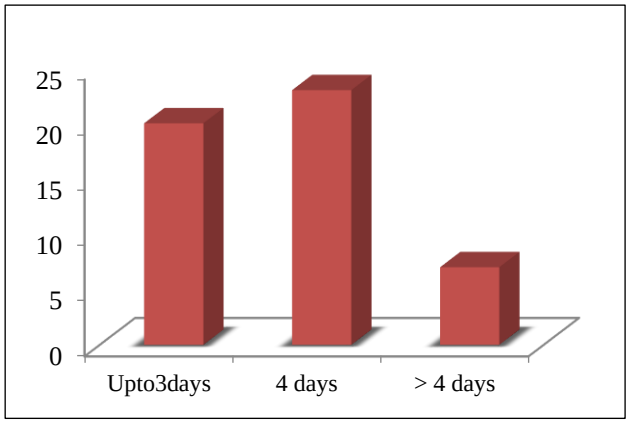

Figure 3: Period of atropinisation.

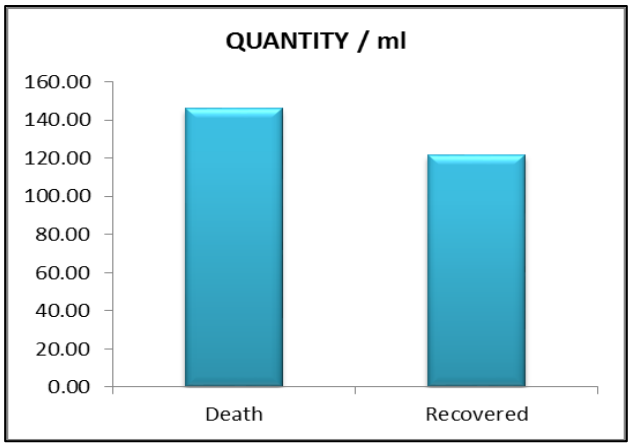

Figure 4: Quantity and the outcome.

Most of the patients in our study at presentation had pupil size of 2 mm and there is no statistical association between pupil size and ventilator support (p = 0.987). There was total of 8 cases of intermediate syndrome (within 5 and 9 days) and there was no statistical significance between intermediate syndrome and ventilator support (p = 0.875). Pseudocholinesterase levels measured at the onset had statistical significance (p = 0.005), and there is association with ventilator support. In our study total of 9 patients had low levels at the onset (18%).

There were total of 10 deaths (20%) and different factors associated were type 2 respiratory failure, period of atropinization, pupil size, low serum pseudocholinesterase levels at the onset, quantity of compound. In our study group methylparathion (n 25 cases) was the frequent compound associated with the prolonged ventilation. Other OPC compounds in our study group were following: chlorpyriphos (n = 3), diazinon (n = 3), ethylparathion (n = 2) monocrothophos (n = 10), propophenophos (n = 2), triazophos (n = 5).

DISCUSSION

Our study was conducted in factors associated with prolonged ventilator support in OPC poisoning. Outcome analysis was done in comparing the factors like type of compound, quantity consumed, duration of intermediate syndrome, respiratory failure serum cholinesterase levels, period of atropinisation.

Age and gender distribution

Maximum percentage (48%) of cases occurred in the age group 31-35 years. Similarly, in one retrospective study (n=45) conducted in Mangalore, Karnataka, India was reported majority in age group 21-40 years.

There appears to be gender predilection for poisoning but the association of sex or age with the outcome had no statistical significance. As early as 1987, Senanayake observed male predominance in his study.

Quantum of exposure

Significantly there is prolongation of ventilator support in patients who consumed greater than 120ml are 37 patients were found to have prolonged ventilation and among them 1 patient had death who consumed greater than 250ml. The association between quantity and prolonged ventilation is statistically significant (p = 0.00). So patients who consumed more than 150ml need vigilant monitoring and aggressive treatment since admission till recovery.

Type of compound

In our study group methylparathion (n = 25cases) was the frequent compound associated with the prolonged ventilation. Other OP compounds in our study group were following: chlorpyriphos (n = 3), diazinon (n = 3), ethylparathion (n = 2), monocrothophos (n = 10), propophenophos (n = 2), triazophos (n = 5).

Medical toxicology methyl parathion is the most poisonous compound.[3] Onset and duration of intermediate syndrome: In our study group, onset of intermediate syndrome ranges from 5 to 9 days following exposure. On day 5, three cases and on day 9, five cases developed intermediate syndrome.

In majority of cases onset is at 9th day after exposure. Death occurred in patients more than 9 days (3 deaths). Association between intermediate syndrome and ventilator support is statistically insignificant (p = 0.875).

So early recognition of IMS and appropriate treatment with high dose of PAM and ventilator support would cut

short the duration of IMS. Insrilankan study onset of IMS was on day 1-4 following exposure and recovery evident in 4-18 days.

In a study by Shaileesh et al, and Wadia et al, found that proximal muscle weakness as most common clinical presentation in IMS and 16 patients had respiratory failure and required mechanical ventilator and which was statistically significant (p = 0.001).[4,5]

Type 2 respiratory failure

In our study 8 patients had type 2 respiratory failure and among them 3deaths were observed. Correlation between respiratory failure and ventilator support is statistically insignificant (p = 0.876).

There was study conducted as "respiratory failure in OPC poisoning" by Noshad et al found that OPC poisoning is a serious and lethal condition and needs early diagnosis and appropriate treatment of complications in reducing the mortality rate.[6]

Period of atropinization

Prolonged ventilator support is associated with period of atropinization. In our study the correlation is statistically significant (p = 0.00). Patients who required more than 4 days of atropinization had prolonged ventilator support. Atropinization end points used in the study were also used by Basu A et al.[7] Incremental dose of atropine administration is used for standard care.

Pseudocholinesterase levels

In our study both at the onset and during recovery acetylcholinesterase levels were measured. Patients who had low pseudocholinesterase levels at the onset required prolonged ventilator support and is statistically significant (p = 0.005). Pseudocholinesterase levels measured during recovery had no significance. At the time of recovery the increase in value indicates good prognosis.

In a "study of clinical and biochemical parameters in predicting the need for ventilator support in OPC poisoning" by Rajeev H et al found that patients having low serum cholinesterase levels had prolonged ventilator stay and also for assessing the severity of poisoning.[8]

Number of days of ventilator

Period of ventilation is extended to greater than 10 days. Three groups were noted, 13 patients have less than 10 days,15 patients are between 10-12 days, 22 patients were more than 12 days.

In a "study of OPC cases requiring mechanical ventilation" by Aziza et al conducted in 120 patients found that patients had required 12 days of mechanical ventilation and the factors associated were type 2respiratory failure, low serum cholinesterase levels.[9]

Gcs

In our study all the patients were presented in unconscious state and got intubated and none of the patients had fasiculations.

In a "study of clinical and biochemical parameters in predicting the need for ventilatory support in OPC poisoning" by Rajeev H et al graded the severity of poisoning based on GCS and fasiculations.[8]

In this study, they noticed the patients who had low GCS at presentation were more vulnerable and required prolonged ventilator support and there is a statistical significance.

Electrolytes

In our study there was no electrolytes abnormalities observed in the patients. In a "Study of clinical profile of OPC in reference to electrolyte derangements" by karalliedde L et al conducted study in 100 patients found hypokalemia and hyponatremia but statistically not significant.[10]

Death

In our study total deaths were 10 (20%). Deaths found mostly in patients who had intermediate syndrome, who consumed more than 200ml, low pseudocholinesterase levels, prolonged period of atropinization, type 2 respiratory failure.

In a "study of survival pattern in patients with acute OPC poisoning on mechanical ventilation." Ahmed SM et al found that mortality from OPC poisoning is directly proportionate to the severity of poisoning, delay in starting PAM, and found that, there was positive correlation between lag time of starting of PAM with duration of mechanical ventilation.[11,12]

CONCLUSION

My study concludes 20 - 40 years age majority affected and males are commonly affected. Methyl parathion was the frequent compound associated with the complications and is statistically in significant. Quantum of exposure > 150 ml had statistically significant value and associated with outcome. Period of atropinization who received from 4- 8 days had statistical significance which is associated with prolonged ventilation. Low pseudocholinesterase levels at the onset had statistical significance. Respiratory failure and intermediate syndrome were associated with prolonged ventilatory support but there was no statistical significance. Period of prolonged ventilation in our study was 10 - 14 days

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

REFERENCES

1. Eddleston M, Rezvi MH, Hawton K. Deliberate self harm in Sri Lanka: an overlooked tragedy in the developing world. BMJ. 1998:317(7151);133-5.
2. Senanayake N, Karalliede L. Neurotoxic effects of organophosphorous insecticides. N Engl J Med. 1987;316:761-3.
3. Taylor, Francis. Environmental health perspectives. Journal Toxicology Environmental Health. 1994;102:1.
4. Shailesh KK, Pais P, Vengamma, Muthane U. Clinical and electrophysiological study ofintermediate syndrome in patients with organ-ophosphorous poisoning. JAPI.1994;42(6):451-3.
5. Wadia RS, Sadagopan C, Amin RB, Sardesai HV. Neurological manifestations of organophosphorous insecticide poisoning. J Neurol Neurosurg Psychiatry. 1974;37(7): 841-7.
6. Noshad H, Ansarin K, Ardalan MR, Ghaffari AR, Safa J, Nezami N. Respiratory failure in organophosphate insecticide poisoning. Saudi Medical Journal. 2007;28(3):405-7.
7. Basu A, Das AK, Chandrashekar S. Organophosphate poisoning - a clinical profile. J Assoc Physicians India. 1988:36:24.
8. Rajeev H, Arvind MN. Study of clinical and biochemical parameters in predicting the need for ventilator support in organophosphorus compound poisoning. J Evolution Med Dental Sci. 2013;2(49):9555-70.
9. Aziza MH, Sultan ST. Organo-phosphorus insecticide poisoning: management in surgical intensivecare unit. J Coll Physicians Surg Pak. 2005;15(2):100-2.
10. Karalliedde L, Senanayake N: Organo-phosphorus insecticide poisoning. Br J Anaesth. 1989;63:736-50.
11. Samuel J, Thomas K, Jeyaseelan L, Peter JV, Cherian AM. Incidence of intermediate syndin organophosphorus poisoning. Assoc Physicians India.1995;43:321-3.
12. Ahmed SM, Das B, Nadeem A, Samal RK. Survival pattern in patients with acute organophosphate poisoning on mechanical ventilation, a retrospective intensive care unit-based study in a tertiary care teaching hospital. Indian J Anaesth. 2014;58:11-7.

Cite this article as: Madala P, Aravind, Singh M. Outcome of patients with OPC poisoning who require mechanical ventilation: a statistical analysis. Int J Adv Med 2017;4:357-61.