



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 8, Issue, 8, pp. 19457-19460, August, 2017

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

ANALYTICAL STUDY OF ECG CHANGES OF ORGANO-PHOSPHOROUS POISONING

Vijaya Kumar G¹., Prabhakar Rao R² and Srikanth P^{*3}

¹SRMC, Nandyal, S. Srinivas, Professor & HOD, FIMS, Cudappah

²SRMC, Nandyal, Feroz Khan, Junior Resident, SRMC, Nandyal

³PSIMS, Vijayawada

DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0808.0697>

ARTICLE INFO

Article History:

Received 06th April, 2017

Received in revised form 14th
June, 2017

Accepted 23rd July, 2017

Published online 28th August, 2017

Key Words:

Pesticides, Organo- Phosphorous Poisoning,
Electrocardiogram, Respiratory Failure,
Qtc Interval

ABSTRACT

Our country being agricultural one, farmers use pesticides commonly but without following precautions during spraying and thus become victims of poisoning exposure. Not only farmers but other population is also at risk of chronic poisoning from pesticides as result of ingestion of vegetables which contain significant amount of these compounds. AIM OF STUDY:- To study importance of electrocardiographic changes in Organo -phosphorous poisoning and to analyze their relationship as predictors of final outcome. MATERIALS & METHODS: In our multi-centered study of 80 cases in detail electrocardiographical changes of acute organo-phosphorous poisoning admitted to Shantiram medical college and general Hospital, Nandyal, Pinnamenenisiddhardha institute of medical sciences Vijayawada, and Fathima Institute of Medical Sciences, Kadapa during July 2016 to February 2017 CONCLUSIONS: In our study, the following electrocardiographical abnormal QTc prolongation which was commonest ECG abnormality. QTc prolongation has prognostic value in predicting respiratory failure and final outcome, other ECG changes did not show any significant prognostic value. In conclusion a complete Electrocardiogram of O.P poisoning at emergency department/ casualty is important and has definite prognostic value.

Copyright © Vijaya Kumar G *et al*, 2017, this is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

In India Agriculture is main occupation of majority of people in rural areas. As the organo - phosphorous pesticides contributed their own share with increasing use of these pesticides in agriculture and public health programs, that made easy availability in market and sale without any restriction are freely available to all. In public health they are used to control vector borne disease, thus large number of people engaged in spraying the chemicals are at risk developing toxic effect of chemicals accidentally. Cardiac complication that often accompany poisoning with these compounds may be serious and fatal. They should be evaluated for the prognostic prediction of the outcome.

MATERIAL AND METHODS

All the cases with alleged organophosphorus poisoning are taken for study. Patient with history of Hypertension, coronary artery disease and drugs use causing ECG abnormalities were excluded from study. ECG obtained at time of admission before giving atropine and PAM, during hospital stay and at time of discharge.

The analysis of ECG were done and the variations observed and tabulated. The result of outcome of patients was interpreted and correlated with ECG abnormalities.

OBSERVATIONS AND RESULTS

80 Cases of organophosphate poisoning were analysed ECG at time of admission, during hospital stay and at time of discharge.

- 76 cases were suicidal poisoning and 4 cases were accidental poisoning.
- Age incidence -common in young adult of either sex peak incidence in between 20-30 years and male: female ratio is 1.2:1.
- Poisoning was more common in uneducated married rural population with agricultural background with low socioeconomic status.
- QTc prolongation has prognostic value in predicting respiratory failure and final outcome, other ECG changes did not show any significant prognostic value.

*Corresponding author: Srikanth P
PSIMS, Vijayawada

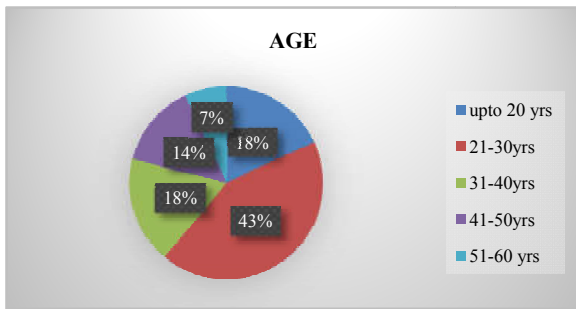


Table 1 Analysis of Cases According Age & Sex

Table 2 Analysis of Cases According Sex

Sex	No. of cases	Percentage
MALE	44	55%
FEMALE	36	45%

AGE	Male	Female	Percentage
Upto 20 yrs	06	09	18%
21- 30yrs	18	16	43%
31-40 yrs	09	05	18%
41- 50 yrs	06	08	14%
51-60 yrs	06	00	7%

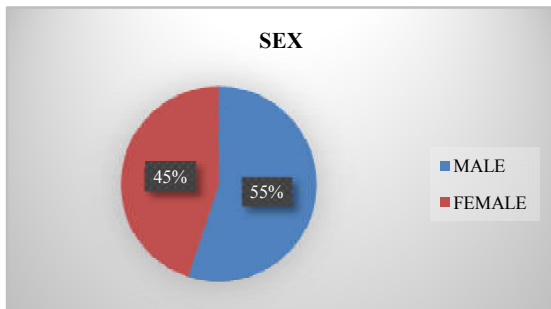


Table 2

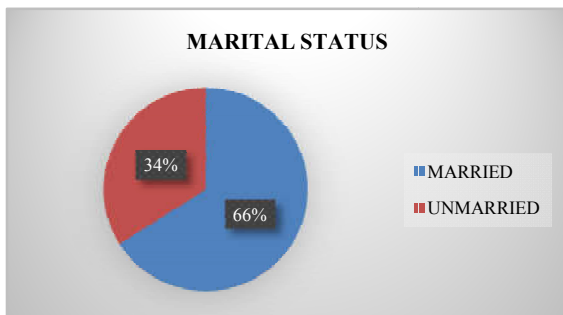


Table 3 Marital status of cases studied

Marital Status	No. of Cases	Percentage
Married	53	66%
Unmarried	27	34%

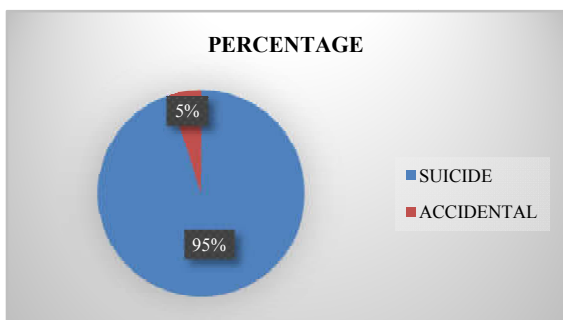


Table 4 Analysis of Motive behind the poisoning

Table 5 Occupation of the cases studied

Motive/ mode	No. of cases	Percentage
Suicidal	76	95%
Accidental	4	5%

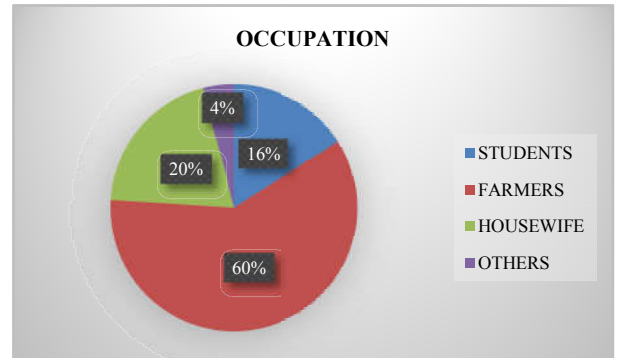


Table 6 Education status of the cases studied

Occupation	No. of cases	Percentage
Student	13	16%
Farmer/agriculture	48	60%
Housewife	16	20%
Others	3	4%

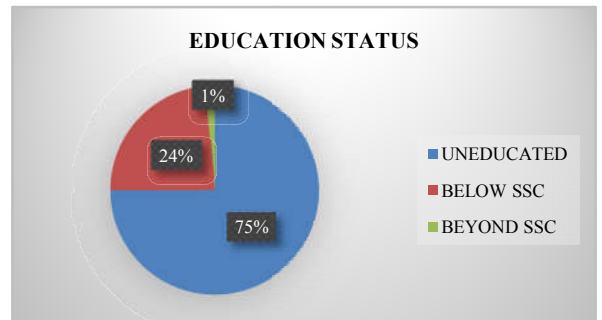
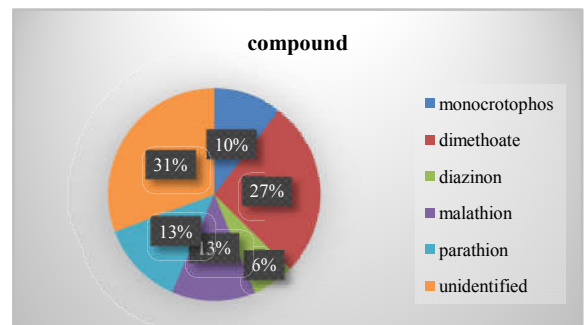


Table 7 Type of OP compound consumed

Education	No. of Cases	Percentage
Uneducated	56	70%
Below SSC	18	22%
Beyond SSC	6	8%



Type	No. of cases	percentage
Monocrotophos	24	30
Dimethoate	16	21
Diazinon	4	5
Malathion	8	10
Parathion	8	10
Unidentified	20	24

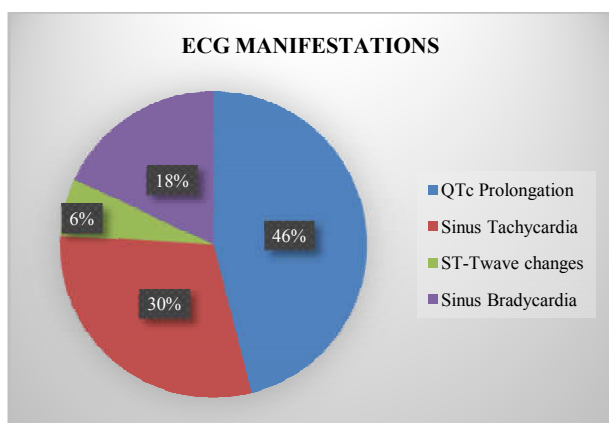


Table 8 ECG manifestations in our study

ECG Manifestations	No. of Cases	Percentage	Mathur A et al	AM saadeh et al	Mookherjee et al
QTc prolongation	37	46%	35%	67%	46%
Sinus tachycardia	24	30%	93%	35%	40%
ST-T wave changes	5	6%	91%	41%	49%
Sinus bradycardia	14	18%	4%	28%	-

DISCUSSION

Incidence of poisoning is maximum during agricultural activity between July 2016 to February 2017, but cases tend to occur in any season because of suicidal poisoning is more than accidental. Organo-phosphorous poisoning is encountered in different age groups. In our study the peak incidence seen in age of 21-30 years in both sex. Sex incidence: In our study 44 cases male and 36 cases of female that male: female =1.2:1. Mode of poisoning: In our study most of cases are ingestion except 4 cases due to accidental while spraying and exposure due to lack of preventive measures while spraying. Motive for poisoning: Motive was suicide in most of cases except 4 accidental poisoning. None of patients in present study have past psychiatric illness. Education: In our study 70% are uneducated, 22% are belong to below SSC, 8% are beyond SSC, most of them are uneducated patient due lack awareness. Marital status: In suicidal poisoning incidence high in married population (66%), may due to marital disharmony. The mechanism by which organophosphates induce cardiotoxicity is still uncertain, both sympathetic and parasympathetic over activity have been shown to cause myocardial damage. Cardiotoxicity associated with organo-phosphorous and carbamate poisoning by more than one mechanism. They are hypoxemia, acidosis, electrolyte derangement and direct toxicity effect of compound on myocardium. Some investigators have described a polymorphic ventricular tachycardia of the torsade de pointes type attributed to a prolongation of the Q-Tc interval in majority of our patients (28%). Hypertension and sinus tachycardia, which may be seen in organophosphate poisoning are nicotine effect, while hypotension and sinus bradycardia are cholinergic manifestation¹.

Arrhythmias were detected in 54%. Patients. Similar observations were reported by Kiss and Fazekas *et al*⁶ in 80% and Saadeh AM *et al*² in 67% of the patients. But we observed only 36% QTc interval prolongation was the most common ECG abnormality seen in 28% of our patients. Ludomirsky

*et al*³ reported QTc interval prolongation as the most common ECG change in acute organophosphorus poisoning.

However, in our study there was no significant relation between QTc interval prolongation and Severity of poisoning. Mortality among these patients with Prolonged QTc was 50%, was statistically significant when compared with the mortality of 2.78% in those with Normal QT interval. So this study correlates QTc prolongation with increased incidence of complications and increased mortality. QTc interval prolongation indicates poor prognosis. Similar correlations between QTc interval prolongation and severity and mortality were established by Chuang F R *et al*⁷.

Some investigators have described a polymorphic ventricular tachycardia of ‘torsades de pointes’ type, attributed to QTc interval prolongation associated with OP compound poisoning. In spite of presence of QTc interval prolongation in many of our patients (28%) only 29% had sinus tachycardia. This is comparable to study of Luzhnikov *et al*⁵, Kiss and Fazekas *et al*⁶, Ludomirsky *et al*³. The mechanism underlying this ventricular tachycardia is believed to be a persistent imbalance between the sympathetic and parasympathetic influences on the heart.

This phenomenon of QTc interval is unrelated to the serum electrolyte abnormalities. Serum electrolytes were normal in most of the patients of Kiss and Fazekas *et al*⁶, and in all patients of Ludomirsky *et al*³. In our 28 patients with QTc interval prolongation, serum electrolytes (sodium, calcium and potassium) were found normal.

ST-T changes in 18%, sinus tachycardia in 29% and sinus bradycardia in 21% of the patients. Many investigators reported the occurrence of non specific ST-T changes in acute OP poisoning. The possible mechanisms include the parasympathetic over activity and coronary spasm in addition to hypoxemia.

In the present study among the patients with ST-T changes (22%), we observed ST depression in 10%, T wave inversion in 6% and T wave flattening in 6%. No patient had ST segment elevation. These results were comparable with the studies of P Karki *et al*⁴ and Sadeh A M *et al*².

The classic teaching has impressed upon the importance of sinus bradycardia for diagnosis, although recent studies have shown tachycardia to be more frequent in acute OP poisoning, probably resulting from preganglionic nicotinic receptor stimulation followed by release of adrenaline and noradrenaline from adrenal gland leading to predominance of adrenergic effect on heart. Respiratory failure (mechanical and pulmonary edema) with hypoxia may be a contributory factor to tachycardia.

In our study sinus tachycardia present in 29% of patients was more frequent than sinus bradycardia seen in 21% of patients. These observations were similar to those of Saadeh AM *et al*² who reported sinus tachycardia in 35% and sinus bradycardia in 28% of patients; A Mathur *et al*⁹ who reported sinus tachycardia in 93.33% and sinus bradycardia in 4%; and P Karki *et al*⁴ who reported sinus tachycardia in 40.5% and sinus bradycardia in 18.9%. Similarly, many other studies have shown that sinus tachycardia is commoner than sinus bradycardia in acute OP poisoning. Conduction disturbances

were detected in 4% patients in current study which were in the form of prolongation of PR interval. Comparable findings were reported by AMathur *et al*⁹ and Saadeh A M *et al*². Three of the patients in the present study had cardiac arrhythmias. All patients who expired had ECG changes except two patients. Kiss and Fazekas *et al*⁶ reported the occurrence of ECG changes including cardiac arrhythmias within 1-20 days of exposure.

Bibliography

1. Subhash vijaykumar, Mdfaredullah, E.Ashokkumar, K.Mohan Rao, Cardiovascular Toxicology June 2011, Volume 11, Issue 2, pp 113-117 Date: 20 Feb2011.
2. Saadeh A M, Farsakh N A, Al-Ali M K. Cardiac manifestations of acute Carbamate and organophosphate poisoning. *Heart* 1997; 77: 461-4.
3. Ludomirsky A, Klein H, Sarelli P, Becker B, Hoffman S, Taitelman U *et al*. Q-T prolongation and polymorphous (torsades de pointes) ventricular arrhythmias associated with organophosphorus insecticide poisoning. *Am J Cardiol* 1982; 49: 1654-8.
4. Karki P, Ansari J A, Bhandary S, Koirala S. Cardiac and Singapore Med J Electrocardiographical manifestations of acute organophosphate poisoning. *Singapore Med J* 2004; 45:385-89.
5. Luziknov E. A., Savina A. S., Shepelev V.M., on the pathogenesis of cardiac rhythm and conductivity disorder in case of acute insecticide poisoning. *Kardiologica* 1975; 15:126-129.
6. Kiss J, Fazekas T. Arrhythmia in Organophosphate poisoning. *Acta cardiol* 1979; 34: 323-330.
7. Chuang F.R., Jang S.N. *et al*. QT prolongation indicates poor prognosis in patients with organophosphate poisoning. *American Journal of Emergency Medicine* 1996; 14: 451-453.
8. Manojith Mookherjee. Cardiotoxicity profile in organophosphate and carbamate poisoning. *Indian Heart Journal* 1999; 51: 662.
9. Mathur A., Swaroop A., Agarwal A. ECG changes in acute organophosphorus compound and aluminium phosphide poisoning. *The Indian Practitioner* 1999; 52: 248-252.

How to cite this article:

Vijaya Kumar G *et al*. 2017, Analytical Study of ECG Changes of Organo-Phosphorous Poisoning. *Int J Recent Sci Res.* 8(8), pp. 19457-19460. DOI: <http://dx.doi.org/10.24327/ijrsr.2017.0808.0697>
