

# INTERMEDIATE SYNDROME IN ORGANOPHOSPHOROUS POISONING

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## ABSTRACT

One hundred and fifty three cases of Organophosphorous poisoning cases presented to Kasturba Hospital, Manipal, India during a 2 year period ( 2001- 2002), out of which 45 cases (29.4%) had features of Intermediate Syndrome. Largest number of victims were in the age group of 21-30 years (37.7%). Males predominated (71.1%). Methyl Parathion was the commonest compound (57.7%). Respiratory muscle weakness was the most common manifestation seen (84.4%) . Mortality was 22.3%.

**Key Words:** Insecticide, Intermediate Syndrome, Organophosphorous, Poisoning

## INTRODUCTION

Organophosphorous insecticides are used extensively in horticulture and agriculture. Because of its easy availability organophosphorous poisoning is a significant cause of morbidity and mortality in developing countries including India.

In organophosphorous poisoning, three well defined clinical phases are seen:

1. Initial acute cholinergic crisis characterised by muscarinic manifestations.
2. Intermediate syndrome
3. Delayed neuropathy

This research lays emphasise on the intermediate syndrome.

The term 'intermediate syndrome' was first coined by Senanayake from Srilanka in 19871 but intermediate syndrome was first described by Wadia<sup>2</sup> as type II paralysis in 1974.

It was called as intermediate because it appears after the acute cholinergic phase but before the expected onset of delayed neuropathy. The cardinal features of this syndrome are cranial nerve palsies, weakness of neck flexors, proximal muscle weakness and respiratory muscle paralysis which usually develops between 24 to 96 hours of ingestion of the poison<sup>3</sup>.

Organophosphorous compounds produce significant pesticide related illness and deaths in developing countries like India. There is, thus, a need to determine exact extent of the problem and to develop appropriate strategies to manage these cases with available resources in these countries.

The present study was undertaken to find the incidence of intermediate syndrome in cases of organophosphorous poisoning in this part of the world so as to develop data for this region.

## MATERIALS AND METHODS

The present study was undertaken at Kasturba hospital, Manipal, which is a tertiary care teaching hospital situated in coastal karnataka, South India. The cases were studied retrospectively for a period of two years (2001-2002). The necessary information regarding age, sex, nature of the compound, features, outcome, time taken for recovery etc were obtained from the hospital files from the Medical Records department of Kasturba hospital, Manipal. The data obtained was tabulated and analysed.

## RESULTS

During the two year period (2001-2002), one hundred and fifty three cases of

organophosphorous poisoning were admitted in Kasturba Hospital, Manipal, out of which 45 cases developed the features of intermediate syndrome which formed the material for the present study. Incidence of intermediate syndrome was 29.4%. 21-30 years was the commonest age group affected (Table I). 32 victims(71.1%) were males and remaining 13 victims (28.9%) were females. Methyl parathion was the most common compound(Table II). Respiratory muscle weakness was commonly seen(Table III). Ten patients died (Table IV). Time taken to recover from the manifestations was 3-12 days.

**Table 1**  
**Age distribution of the victims**

Age(years)	No.of cases	Percentage
11-20	7	15.5
21-30	17	37.7
31-40	13	28.9
41-50	4	8.9
51-60	3	6.7
61-70	1	2.2

**Table 2**  
**Organophosphorus compound causing intermediate syndrome**

Compound	No of cases	Percentage
Methyl parathion	26	57.7
Monocrotophos	3	6.7
Phosphamidon	1	2.2
Quinalphos	1	2.2
Dimethoate	2	4.4
Unknown	122	6.6

**Table 3**  
**Manifestations**

Features	No of cases	Percentage
Respiratory muscle weakness	38	4.4
Neck muscle weakness	14	31.1
Proximal muscle weakness	12	26.6
Cranial nerve palsy	7	15.5

**Table 4**  
**Outcome of the cases**

Outcome	No of cases	Percentage
Survived	35	77.7
Dead	10	22.3

## DISCUSSION

The present series attempts to analyse the manifestations of intermediate syndrome in cases of organophosphorous poisoning.

There are several postulations regarding the mechanism of intermediate syndrome. Wadia[2] had suggested that persistence of nicotinic effects due to lack of early use of oximes may be responsible for the paralysis.

Gadoth and Fischer[4]attributed the late onset paralysis to the release of organophosphates from the adipose tissue, acting on the nicotinic receptors.

Senanayake[1] felt that the neuromuscular junctional dysfunction is the predominant factor in the pathogenesis of intermediate syndrome.

The incidence of intermediate syndrome in the present study was 29.4%. It varied from 5.4% to 47% in various other reported works[5-8]. 21-30 years was the commonest age group to be affected. This finding is in concurrence with the findings of other workers[1,5]. The occurrence of intermediate syndrome was more in males. Similar findings were observed in Srilanka[1] and Bangalore[5].

Methyl parathion was the commonest compound implicated in causing intermediate syndrome. Similar finding was observed in Bangalore[5]. Fenthion was the compound commonly involved in one of the study[1].

Respiratory muscle weakness was the most common manifestation seen in our study. Cranial nerve palsy was commonly seen in the work reported from Srilanka1 and the involvement of proximal muscles predominated in other studies[2,5].

Since this is a retrospective research, the clinical manifestations could not be co-related with the quantity of the poison consumed, because of paucity of the relevant information.

A mortality of 22.3% was observed which is comparable with the data available from Vellore6.

Other studies mention it to vary from 10.5% to 41.6%[1,2,5].

Time taken for recovery from the manifestations varied from 3-12 days. It took 72 hours for complete recovery in one of the study[2.]

In our series neck muscle weakness was the first manifestation to recover followed by cranial nerve palsies and proximal muscle weakness. Respiratory muscle weakness was the one which recovered last.

The high incidence of intermediate syndrome in organophosphorous poisoning in the present study emphasises the need for careful monitoring of these patients. Mortality from respiratory paralysis can be prevented by early recognition of the syndrome and prompt ventilatory support. The muscles of respiration are the last to recover and this fact should be borne in mind while weaning the patient from the ventilator.

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