

## CASE REPORT

# Organophosphorus Compound Induced 'intermediate syndrome'

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### Abstract

**Background:** Organophosphate compound (OPC) poisoning with suicidal intent is common in Indian ICUs. These compounds are the organic derivatives of phosphorous containing acids and their effect on neuromuscular junction and autonomic synapses is clinically important. Organophosphate poisoning can present as acute cholinergic syndrome, intermediate syndrome and delayed neuropathy.

**Case Presentation:** Intermediate syndrome secondary to organophosphate poisoning is a serious health problem leading to increased morbidity and mortality. The incidence of problem varies and ranges from 8%-84% of OPC poisoning cases. After initial recovery from cholinergic crisis, some patients have resurgence of respiratory muscle paralysis requiring continued ventilatory support. This is termed intermediate syndrome (IMS). The factors accounting for this difference is the nature of organophosphate compound, severity of poisoning and inadequate oxime therapy. The recognition of this syndrome is important as if this entity is overlooked it can have disastrous effects.

**Discussion:** Our patient had developed respiratory muscle weakness as evidenced by inadequate respiratory efforts, drop in oxygen saturation, retention of CO<sub>2</sub> and need for ventilatory support. There was no evidence of weakness in ocular, neck, bulbar muscles but he had weakness in all 4 limbs more pronounced in proximal muscles.

**Conclusion:** We presented this case of OPC poisoning with intermediate syndrome, which remained for a prolonged time and required mechanical ventilation for 16 days. This case highlights how the timely intervention can save the patient's life.

**Keywords:** Intermediate syndrome; OP Poisoning

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### INTRODUCTION

Organophosphate compound (OPC) poisoning with suicidal intent is common in Indian ICUs. OP insecticides are the commonest insecticides responsible for poisoning in India accounting for almost 75% of all poisonings and 50% of poisoning related deaths in the last 25 years (1). It is estimated that worldwide OP poison consumption with suicidal intent causes approximately 200,000 deaths annually with mortality rate ranging from 10-20%. Majority of the these deaths occur in the Asia-Pacific region (2).

OPCs are the organic derivatives of phosphorous containing acids and their effect on neuromuscular junction and autonomic synapses is clinically important (3). OPCs are irreversible inhibitors of the enzyme acetyl cholinesterase, causing accumulation of acetylcholine at synapses with resultant over stimulation of neurotransmission.

The clinical features are due to excess acetylcholine at the muscarinic and nicotinic receptors, which leads to initial stimulation and eventual exhaustion of cholinergic synapses. The cholinergic effects depend on the balance between muscarinic and nicotinic receptors and are best described by mnemonic DUMBELS – diarrhoea, urination, miosis,

bronchospasm, emesis, lacrimation, and salivation (4). After exposure, these agents cause acute and sub acute manifestations depending on the type and severity of the agents like Acute Cholinergic Manifestations, Intermediate Syndrome with Nicotinic features and Delayed Central Nervous System Complications (5). We report here a case of OPC poisoning in which the patient developed IMS on the 6<sup>th</sup> day of poisoning and required ventilatory support for almost 16 days but he recovered completely and was discharged on the 23<sup>rd</sup> day.

### CASE PRESENTATION

A 35-year-old labourer was brought by his relatives in a stuporous state. His brother gave history of excessive alcohol consumption by patient the night before and was found in an altered level of consciousness in the morning. There was no h/o fever or headache but he had 4 episodes of vomiting at night, which was attributed to alcohol consumption. Next day morning, he was found in an altered level of consciousness and hence brought to hospital.

On examination he was stuporous, PR was 78/min, BP was 100/70 mm of Hg, and RR 26/min. He revealed no pallor, cyanosis, icterus or clubbing. He had pinpoint pupils and

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generalized fasciculation. His RS examination revealed bilateral crepts at bases and widespread throat conducted sounds s/o increased bronchial secretions. Considering his clinical picture, he was suspected to have OPC poisoning. Reduced pseudo cholinesterase levels further gave strength to our diagnosis of OP poisoning. He was given thorough gastric lavage. Surprisingly, his gastric secretions did not have a typical smell. He was given injection PAM 1 gm 8 hourly that was continued for 48 hours. He was simultaneously started on atropine infusion initially 6 mg/hour and thereafter titrated according to heart rate and pupillary size. As he was not maintaining saturation, he was intubated and ventilator support was started. In the span of 72 hours, he improved and started on T piece ventilation and atropine could be tapered up to 0.6 mg 4 hourly boluses. Extubation was planned on the next day morning. However, in the morning he developed reduced respiratory efforts. Although there was weakness in all 4 extremities, it was more pronounced in proximal muscles. ABG revealed CO<sub>2</sub> retention. He was again put on ventilatory support. He was suspected to have 'Intermediate syndrome (IMS)'. His atropine dose was again increased and higher doses were required for the desired response. He needed ventilatory support for 16 days thereafter his weakness improved gradually and was weaned off the ventilator and atropine in the next 4 days. The patient was kept in the ward for 4 days and discharged thereafter with complete recovery.

## DISCUSSION

The intermediate syndrome (IMS) following OPC insecticide poisoning was first described in the mid-1980s. The syndrome described comprised characteristic signs and symptoms occurring after apparent recovery from the acute cholinergic syndrome. As the syndrome occurs after the acute cholinergic syndrome but before organophosphate-induced delayed polyneuropathy, the syndrome is called 'intermediate syndrome' (5).

The incidence of Intermediate syndrome following OPC poisoning reported in the literature is variable and ranges from 7.7% to as high as 84% (6). Jaywardane P et al found the incidence to be 7.8% in a study conducted in Sri Lanka (7). Various factors account for this difference, including the nature of OP compound, severity of poisoning, inadequate Oxime therapy, etc (6).

The syndrome occurring after the acute cholinergic crisis is usually over 12-96 hours after exposure and reflects a prolonged action of acetylcholine on the nicotinic receptors. It usually manifests as acute muscle paralysis especially involving neck flexors, proximal muscles, cranial nerve palsy and respiratory muscles and therefore requires ventilator support (8). Although this syndrome has been described for decades, due to diverse clinical picture, it often remains

undiagnosed, at least until the occurrence of significant respiratory weakness (9).

The risk of mortality is due to the associated respiratory depression. The sensory functions characteristically remain normal and full recovery is evident in 4-18 days (9). Our patient had developed respiratory muscle weakness as evidenced by inadequate respiratory efforts, drop in oxygen saturation, retention of CO<sub>2</sub> and need for ventilatory support. There was no evidence of weakness in ocular, neck, bulbar muscles but he had weakness in all 4 limbs more pronounced in proximal muscles.

## CONCLUSION

IMS is an important complication of OP poisoning which is often overlooked. It should be recognized and treated adequately. There should not be any delay in intubation and mechanical ventilation. Atropine has to be continued depending upon the clinical response. Mechanical ventilation might have to be continued for a long time depending upon the clinical response of the patients. Any patient of OPC poisoning should be screened for weakness before being shifted in the ward and they should not be discharged from hospital in hurry.

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