Acta Scientific Neurology (ISSN: 2582-1121)

Volume 4 Issue 12 December 2021

Clinical Case Report

Head Tremor in a Patient with Organophosphorus Poisoning

Sarath Aleti[1]*, Kamalesh Chakravarty[2], Alex Rebello[1] and Sahil Mehta[3]

[1]Senior Resident, Department of Neurology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

[2]Assistant Professor, Department of Neurology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

[3]Additional Professor, Department of Neurology, Post Graduate Institute of Medical Education and Research, Chandigarh, India

***Corresponding Author:** Sarath Aleti, Senior Resident, Department of Neurology, Post Graduate Institute of Medical Education and Research, Chandigarh, India.

Received: September 27, 2021

Published: November 15, 2021

Abstract

Objectives: Organophosphorus poisoning (OPP) may rarely present with delayed neurological manifestation like Parkinsonism or coma. Neck tremor in OPP has not been reported in literature till date.

Methods: Patient presented to Emergency and was admitted in ICU and evaluated. Informed consent from patient and ethical clearance from institute has been obtained

Results: A 42 year old gentleman presented with diarrhea, sialorrhea, rhinorrhea, drowsiness and breathlessness after ingestion of organophosphorus (OP) compound for suicidal intent. He improved with decontamination, mechanical ventilation and atropine infusion. His atropine infusion was stopped. On 6th day of illness (video 1), he developed encephalopathy and a jerky movement of the neck in form of flexion and extension of the neck. His CEMRI Brain and spine and CSF were normal. EEG showed diffuse slowing. His cholinesterase levels done on day 13 were low. A possibility of OPP induced delayed encephalopathy and extra-pyramidal syndrome was considered. He was restarted on atropine infusion and he improved (video 1).

Discussion: Dystonia and tremor in neck is uncommon in OPP. A meticulous examination would prevent mistreating these patients as seizure. Pseudocholinesterase level needs to be checked to diagnose delayed manifestation of OPP. Restarting atropine infusion is the treatment.

Keywords: Head Tremor; Organophosphorus Poisoning; CNS Manifestations in Organophosphorus Poisoning; Extrapyramidal Symptoms; Encephalopathy

Introduction

Organophosphorus (OP) is a commonly used agricultural pesticide and organophosphorus poisoning (OPP) is one of the most common mode suicides in India. The clinical manifestations of OPP are primarily due to uninhibited cholinergic activity. The cholinergic symptoms are nausea, vomiting, diarrhea, cough with expectoration, shortness of breath, excessive sweating and bradycardia [1]. Most common reported neurological manifestation in acute OP poisoning is intermediate syndrome. Chronic and long standing exposure can manifest as a delayed polyneuropathy [2]. Some atypical manifestations of central nervous system (CNS) involvement has been described [2,3]. We describe a patient of OPP with extrapyramidal manifestation of head tremor and late onset encephalopathy.

Patient information

A 42 year old gentleman presented to our emergency department with diarrhea, cough with expectoration, excessive salivation,

rhinorrhea, drowsiness and breathlessness for 3 hour duration. He had a history ingestion of organophosphorus compound. His examination revealed hypoxia (spO_2 = 75%) and tachypnea. He was intubated and intermittent positive pressure ventilation (IPPV) was started. Gastric lavage and skin decontamination was done. He received atropine (2.4mg) followed by atropine infusion at 1mg/hour. His respiration and his sensorium improved and started obeying commands. On 2nd day of illness he developed weakness of all four limbs (power = 0/5).

Clinical findings

On examination he had hypotonia and areflexia. A possibility of intermediate syndrome was considered. He was started on CMV mode of ventilation as his arterial blood gas also revealed hypercapnea. His atropine infusion was stopped. On 5th day of illness he became unresponsive. On 6th day of illness (video 1; segment 1), he also developed a jerky movement of the neck in form of flexion and extension of the neck. These tremors were aggravated when the head is kept in specific posture i.e. head turn towards left side. It would disappear with tactile stimulation (video 1; segment 2). We considered a possibility of dystonic neck tremors which would improve with sensory trick (tactile stimulation). He also developed resting tremors of both upper limbs and rigidity in all four limbs. His DTR were 3+ with flexor response on plantar reflex. He underwent tracheostomy.

Video 1

Segment 1-Head tremor developed by the patient on 6th day of OPP.

Segment 2: Head tremor reproduced with a specific posture and diminished with tactile stimulation.

Segment 3: Head tremor and encephalopathy improved after restarting atropine. Patient started responding to verbal commands.

Segment 4: Patient completely improved after 1 month of discharge with residual bilateral foot drop.

Timeline

Figure a

Diagnostic assessment

His metabolic profile showed hypernatremia (sodium = 159 meq/l). His CEMRI Brain and spine was normal. His CSF showed 8 cells with protein of 34 mg/dl and sugar of 87 mg/dl. His EEG did not reveal epileptiform activity. A possibility of hypernatremia induced metabolic encephalopathy was considered. His sodium levels were corrected with free water. His sodium levels became 141 meq/L over 3 days. But his sensorium did not improve ruling out the possibility of metabolic encephalopathy. A possibility of hypoxic ischemic damage was also considered. His CEMRI Brain and spine was normal ruling out a ischemic damage. His CSF showed 8 cells with protein of 34 mg/dl and sugar of 87 mg/dl. His EEG did not reveal epileptiform activity. His cholinesterase levels done on day 13 were 2582U/L (Reference range : 5100-11700U/L). In view of low cholinesterase levels, a possibility of OPP induced encephalopathy and extra-pyramidal syndrome was considered.

Therapeutic intervention

He was again started on atropine infusion at 1 mg/hr for 7 days.

Follow-up and outcomes

His sensorium improved (video 1; segment 3) the next day and he was weaned off from the ventilator on day 16. He gradually regained power in all his limbs and rigidity, head tremors also improved. He was discharged on Day 20 with a mRS 4 and was advised physiotherapy. One month later, he had a mRS of 2 and his extrapyramidal symptoms completely resolved (video 1; segment

4). Examination revealed bilateral foot drop. NCS done showed bilateral peroneal neuropathy. His CEMRI Brain done after 2 months did not reveal any abnormality.

Discussion

Patients of OPP may have delayed manifestations rarely as in the index case. Delayed encephalopathy is defined as a GCS of 3 after 72 hours of ingestion in a patient whose GCS was 15 initially [3]. Early onset coma in acute OPP poisoning is multifactorial and can be attributed to neurologic, cardiac and respiratory effects of OP. However, late onset encephalopathy or coma may be attributed to toxicokinetic properties of the OP compounds. Lipophilic OPs can have rapid distribution to fat tissues and subsequent redistribution leading to delayed manifestations [2].

Extrapyramidal symptoms may present during 24-96 hours after consumption of OPP. OPP induced extrapyramidal symptoms include Parkinsonism, tremors, dystonia and rigidity [4]. The pathophysiology of extrapyramidal side effects in OPP could be a glutaminergic stimulation of subthalamic nucleus leading to stimulation of the indirect pathway (Table 1). Inhibition of central acetylcholinesterase (AChE) activity in striatum, globus pallidus, mesencephalic and pontine reticular formation could be a possible mechanism in patients of OPP presenting with both extrapyramidal symptoms and encephalopathy [4]. Basal ganglia are more vulnerable to toxin, vascular insult as well as metabolic abnormalities because it is rich in mitochondria, neurotransmitters and vascular supply in comparison to other parts of brain. Amantadine has been reported to be beneficial in ameliorating parkinsonism symptoms due to its anti NMDA activity [5]. The immediate improvement in encephalopathy and extra-pyramidal symptoms after starting atropine infusion suggests inhibition of central cholinergic effects as a mechanism behind improvement [6-8].

Syndrome	Time of presentation	Receptor	Symptoms
Delayed cholinergic syndrome	48 hrs	Peripheral muscranic receptors	Bradycardia, hypersalivation and miosis
Intermediate syndrome	24-96 hrs	Peripheral nicotinic receptors	Areflexic quadriparesis and respiratory failure
Delayed Encephalopathy	4-6 days	Central receptors	Coma
Delayed Extrapyramidal manifestation	5-15 days	Central receptors	Tremor, dystonia, rigidity and parkinsonism

Table 1: Timeline of various delayed manifestations of Organophosphorous poisoning and the receptors responsible for the manifestations.

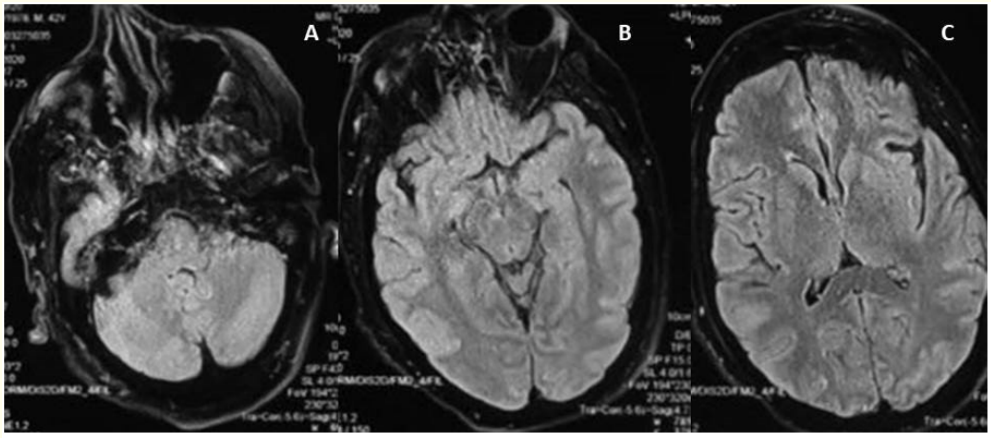

Figure 1: A,B and C showing Normal FLAIR MRI of brain during hospital admission.

Figure 2: Showing T2 and contrast MRI of brain showing normal study after 2 months follow up.

Conclusion

Neurological manifestations of OPP are rare. Dystonia or tremor usually involves limbs/trunk in OPP. But neck dystonia or tremor has not been reported in OPP. Such patients should be worked up extensively to rule out other causes like metabolic, infections and hypoxic ischemic damage. Even though patients improve initially with atropine, they can develop delayed neurological symptoms due to OPP as in index case. Performing a pseudocholinestrase level in such patients would help in diagnosis and management of such patients. Restarting the atropine infusion is the treatment. Clinician should remember this entity in treating patients with OPP as it is reversible.

Patient's Perspective

Patient was overwhelmed and satisfied with the treatment and outcome. He feels thankful for surviving from a bad state.

Informed Consent

Detailed written consent was taken from the patient for reproducing his videos and clinical details. We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines.

Acknowledgement

I would like to thank the junior residents Dr Divya C Ragate, Dr Gowtham T and Dr Ashish who played a crucial role in this case.

Author Contribution

- Dr Sarath Aleti- 1A. Conception, 1B. Organization, 1C. Execution, 3A. Writing of the first draft, 3B. Review and Critique
- Dr Kamalesh Chakravarty- 1A. Conception, 1B. Organization, 3B. Review and Critique
- Dr Sahil Mehta- 1B. Organization 3B. Review and Critique
- Dr Alex Rebello- 1B. Organization 1C. Execution 3B Review and Critique.

Conflicts of Interest

None.

Ethical Compliance Statement

Ethical clearance obtained from PGIMER ethical committee.

Bibliography

1. Peter JV., *et al*. "Clinical features of organophosphate poisoning: A review of different classification systems and approaches". *Indian Journal of Critical Care Medicine* 18.11 (2014): 735-745.
2. Singh S and Sharma N. "Neurological syndromes following organophosphate poisoning". *Neurology India* 48.4 (2000): 308-313.
3. Peter JV., *et al*. "Delayed-onset encephalopathy and coma in acute organophosphate poisoning in humans". *Neurotoxicology* 29.2 (2008): 335-342.
4. Senanayake N and Sanmuganathan PS. "Extrapyramidal manifestations complicating organophosphorus insecticide poisoning". *Human and Experimental Toxicology* 14.7 (1995): 600-604.
5. Müller-Vahl KR., *et al*. "Transient severe parkinsonism after acute organophosphate poisoning". *Journal of Neurology, Neurosurgery, and Psychiatry* 66 (1999): 253-254.
6. Reji KK., *et al*. "Extrapyramidal effects of acute organophosphate poisoning". *Clinical Toxicology (Phila)* 54.3 (2016): 259-265.
7. Moody SB and Terp DK. "Dystonic Reaction Possibly Induced by Cholinesterase Inhibitor Insecticides". *Drug Intelligence* 22.4 (1988): 311-312.
8. Hsieh BH., *et al*. "Acetylcholinesterase inhibition and the extrapyramidal syndrome: a review of the neurotoxicity of organophosphate". *Neurotoxicology* 22.4 (2001): 423-427.

Volume 4 Issue 12 December 2021