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Original Research Paper

General Medicine

TOXICITY DUE TO CHRONIC ORGANOPHOSPHATE COMPOUND EXPOSURE

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ABSTRACT Organophosphorus (OP) compounds have irreversible anticholinesterase activity and are commonly used as insecticides and pesticides OP poisoning is a global health problem due to occupational, accidental, or intentional exposure (to commit suicide), especially in developing nations, and poses a threat to human health. Although chronic occupational OP exposure has been reported among farmers, we report a school going young girl who developed toxicity due to chronic exposure. A complete patient history and a high index of suspicion are required in recognizing an organophosphate poisoning.

KEYWORDS : Cholinergic toxidrome, chronic organophosphate exposure, fasciculation, intermediate syndrome.

INTRODUCTION

Organophosphorus compounds are usually esters, amides or thiol derivatives of phosphonic acid. OP Poisoning is one of the serious public health problems worldwide with health and economic burden. It ranks 45th among the cause in total death in the world. The highest incidence of organophosphorous poisoning has been reported from exposure of household agents (44.1%), followed by drugs (18.8%) and agricultural pesticides (12.8%). Organophosphate (OP) poisoning is one of the most common causes of emergencies due to poisoning in developing nations like India.[5,6] These compounds are absorbed from the oral, respiratory, and transdermal pathways and expose people to poisoning. These have been extensively used with little protection by the public and the individuals are thus exposed. Due to the chronic exposure of vulnerable groups to organophosphate compounds, including pregnant women, the fetus and young children, there is a significant potential for the widespread adverse events. Thus, there is some evidence that chronic exposure may have adverse effects on health and we report 18 years old female who developed cholinergic and intermediate syndrome due to chronic occupational exposure to OP Compound.

Case Report

18 years old female came with complaints of six to eight episodes of loose stools since afternoon for which she was taken to a private clinic. She was then referred to our hospital at around 9:00 pm in a state of drowsiness responding to oral commands. So, clinical diagnosis of acute gastroenteritis was made and hydrated with IV fluids. On examination she had excessive salivation, BP was 110/70, PR 70/mt, bilateral pin point pupil and bilateral crepitations. On a suspicion of cholinergic toxidrome, a thorough history was provoked. Her parents denied any history of poisoning and also revealed she had similar episode of loose stools 2 months prior which recovered spontaneously. On further detailing it came to evident that patient is chronically exposed to ant killer powder (1.5 % chlorpyriphos) for the past three years for their occupation purpose which they used to spray thrice weekly outside her residence and also she used to complaint that she was having discomfort in the form of feeling insecticide smell while swallowing saliva intermittently for the past 2 years. So possible diagnosis of chronic organophosphorous compound exposure was made and treated with atropine.

After 2 hours of presentation patient developed fasciculation, and her GCS was 6/15 so patient was intubated. Her serum cholinesterase level was low. On day 3 cholinergic symptoms improved, her sensorium also improved, patient was extubated and shifted to step down ICU care for observation. On day 5 patients had tachycardia but symptomatically better. On day 6 she was tachypnoeic with persistent tachycardia. On examination single breath count was less than 3, neck muscle power was poor, BP 110/80, SpO_2 98% in room air. So probable diagnosis of chronic organophosphorous compound exposure with intermediate syndrome was made. Patient was electively intubated in view of impending respiratory failure. On day 8 her neck holding improved and she clinically improved with stable hemodynamic parameters. Patient was extubated and kept under observation. On day 10 she symptomatically improved and was able to do her routine activities. Her serial serum cholinesterase level was improved. Following that patient was discharged. On further followup after one week in OPD patient recovered completely.

DISCUSSION

OP poisoning is one of the most common poisoning seen in Emergency wards in developing countries, requiring intensive monitoring and prioritised intervention. Presentation may be diverse with symptoms and signs in the form of muscarinic, nicotinic and central nervous system symptoms. SLUDGE (salivation, lacrimation, urination, defecation, gastric cramps and emesis) symptoms are the common symptoms of OP poisoning. The diagnosis of OP poisoning is mainly clinical, based on nicotinic and muscarinic signs and symptoms.[7] These are characterized by a triphasic response involving an acute cholinergic phase, an intermediate phase and a disabling but non-lethal delayed polyneuropathy. The delayed polyneuropathy may occur in the absence of the cholinergic or intermediate syndrome. Initial phase and intermediate phase are associated with high mortality and morbidity.[4]

Chronic toxicity due to OPCs may be because of the rate of regeneration of AChE and the rate at which pesticide metabolites are hydrolysed and getting eliminated from the body. This 'fast' or 'slow' enzymatic hydrolysis activity seems to be determined by gene polymorphisms of hydrolases such as paraoxonase.[1] However, in some situations where there is chronic exposure to OPC, there seems to be poor correlation between evidence of toxicity and the degree of AChE inhibition.[2] The reason may be that the toxicity in these

situations is mediated more by other mechanisms, such as oxidative stress through OPC-induced generation of free oxygen radicals leading to lipid peroxidation.[3]

CONCLUSION

In case of typical symptoms such as those described for our patient, there should be a high suspicion of organophosphate exposure even when the patient or his/her family is not aware of it and detailed history may be helpful. OP poisoning is associated with mortality rate of 3-25%.[8] Our patient had a serious complication of intermediate syndrome. Thus, timely and appropriate management of patients can prevent significant mortality and morbidity.

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