Organophosphate Intoxication Due to Suicidal Intent

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Abstract

Organic phosphorus (OP) intoxication comprises a significant portion of intoxication due to agricultural chemicals. This type of intoxication occurs by oral intake, inhalation or skin contact accidentally during use or due to suicidal intent. It is most commonly observed in males from 15-45 years. OP reversibly inhibits the acetylcholinesterase (AChE) enzyme in the synapses. Symptoms and findings appear 1-2 hours after exposure generally linked to the balance between the nicotinic and muscarinic receptors. Treatment comprises general support treatment, decontamination, prevention of absorption and administration of antidote. In this study we present a case with organophosphate intake by the oral route with suicidal intent. We discuss the precautions necessary for OP intoxication and the clinical monitoring and treatment of this patient in intensive care.

Introduction

Organophosphates are one of the chemical materials (organophosphates, carbamates, organic chloride, pyrethrins) commonly used as insecticides in industry, agriculture and homes. Diazinon, ortenna, malathion, parathion and chlorpyrifos are the most commonly used chemicals in the organophosphate group. Acetyl choline is a neurotransmitter found in parasympathetic and sympathetic ganglia, postganglion parasympathetic nerve endings, neuromuscular junctions and sweat glands and is destroyed by acetylcholinesterase and butyrylcholinesterase. OPs bind to phosphate radicals with covalent bonds in the active region of the acetylcholinesterase enzyme found in the central nervous system and erythrocytes and butyrylcholinesterase enzyme in plasma, irreversibly inhibiting these enzymes [1]. The result is that nicotinic and muscarinic cholinergic receptors in the neuromuscular junctions of the central and autonomic nervous system are overstimulated by the effect of acetyl choline accumulating at cholinergic junctions and a clinical tableau occurs. The severity of the tableau varies depending on the amount and type of the agent, exposure route, rate of absorption, destruction rate and previous patient history of exposure to cholinesterase inhibitors. OPs are rapidly absorbed by gastrointestinal, lung, skin and mucous membranes and the conjunctiva. Clinical complaints generally occur 1-2 hours after exposure with nicotinic, muscarinic and central nervous system (CNS) findings and cardiopulmonary symptoms. Diagnosis is made based on history, related symptoms and reduced cholinesterase levels. Treatment is ensured by airway reliability, strong respiratory support, symptomatic support, decontamination, prevention of absorption and administration of antidote. In this article we describe the treatment and monitoring of a case developing clinical symptoms 1-2 hours after oral organophosphate intake with suicidal intent in intensive care.

Case

A 43-year old male patient weighing 70 kg was brought to the emergency services by ambulance due to sudden loss of consciousness. Pupils were myotic, there were increased oral secretions and the patient had wheezing respiration and complete loss of consciousness. The patient had an intense smell resembling garlic. Vital signs were blood pressure: 90/60 mmHg, pulse: 52/min, respiration rate: 20/min and fever 37 °C. The patient was intubated and airway support ensured. Based on clinical findings and findings, organophosphate intoxication was considered as leading diagnosis. The patient was a bus driver with no additional diseases, had no history with insecticides or agriculture so intake of chemical material with suicidal intent was considered a possibility. His stomach was washed with gastric lavage and 1 mg/kg active carbon was administered. The patient’s clothes were...
Discussion

Organophosphates are compounds used to kill insects in many areas of life, like agriculture, animal husbandry, homes and workplaces. Organophosphate intoxication occurs at similar rates in nearly all countries in the world. Intoxication generally is seen due to accidents in homes, agriculture and industry (those working in production and transportation of this material) and in those working in the insect area. It is most commonly used with suicidal intent. Systemic absorption of organophosphates occurs through inhalation, transdermal, transconjunctival and gastrointestinal routes. Depending on the organophosphate compound, intoxication may be severe or mild. Organophosphate compounds like methamidophos and methyl parathion are easy to access for suicide attempts, mistakenly used in agriculture or insecticides in the recent past according to his material taken, amount, previous health situation, time since poisoning and route of exposure without loss of time. In those with symptoms, intoxication should be considered. Specific treatment of atropine and pralidoxime should be administered in the shortest time. Decontamination should be performed depending on route of exposure without loss of time. In those with symptoms of systemic intoxication, mechanical ventilation support should be provided.

Conclusion

Organophosphate compounds are commonly used in many areas, are easily accessed for suicide attempts, mistakenly used in pediatric and psychiatric disorder cases with exposure in farmers. A high rate of exposure to these compounds is more toxic. The mechanism of effect is though inhibition of the cholinesterase enzyme in the nervous system. In patients in the risk group taken the material, amount, previous health situation, time since being found or transported, respiratory support, intubation and separation from the ventilator and incidence is mean 3-25% [7, 11]. Our case was a severe intoxication case, who had mortal progression in spite of administered treatment.
References

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