



Case Report

Accidental death due to intentionally usage of organophosphate: Report of two cases

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Abstract

The use of organophosphates (OP) in agriculture as insecticides is widespread all over the world. Except for this purpose, it is known that OP have been using against pediculosis capitis in human. We report unusual causes of organophosphate poisoning. A 7 years old child and her mother were admitted to the emergency unit due to poisoning after exposure from emulsion of OP that was used for the treatment of head lice. The daughter who was poisoned by the way of inhalation and direct contact brought to the emergency unit with cardiac arrest. Child was revived with cardio-pulmonary resuscitation, but died at the eighteen days of the treatment in intensive care unit. The mother was bradycardic when she admitted to the emergency unit. After the primary treatment, the mother was taken to the intensive care unit. The mother was discharged after the medical treatment in the intensive care unit for 6 days. The hairs of patients were cut, clothes were removed and bodies were washed in order to avoid recontamination. This is important also for avoiding from contamination of surrounding healthcare personnel. Misuses of OP toxicities are not rare and it may be life threatening. Some of accidental poisonings are intentionally misuse for a purpose of treatment. It should be written on each box that OP should not be used for other purposes like treatment of head lice.

Keywords: Organophosphate, accidental death, misuse, lice

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Introduction

Organophosphates (OPs) poisoning are common worldwide, 3 million cases per year occurring and 300000 cases result in death [1, 2]. Action mechanism of OPs occurs due to suppressing acetylcholinesterase activity in nervous system. By this action neuromuscular junction, autonomic nervous system and secretory glands are influenced in insects via acetylcholine. As same in insects, toxic effects are seen in humans [1,3]. OP poisoning are commonly seen, most of them accidental events [4-6]. However, poisonings occurred by conscious usage are rarely encountered. In this case report, we present a 7 years old girl and her mother which are intoxicated by OP that was used consciously but a wrong purpose. The girl was died cause of toxic effects of OP but the mother survived by treatment.

Cases

Daughter

In one of two cases, a 7 years old girl was washed with emulsion that contains OP by her mother in bathroom with reason of hair pediculosis. Afterwards when the mother was washing herself hair with the same solution, respiratory distress and the change in consciousness began in child. Family called an ambulance for take the child to emergency department (ER). During ride to ER cardiopulmonary arrest occurred and cardiopulmonary resuscitation (CPR) was performed. CPR was continued at ER. According to information given by relatives, smell of the child and insecticide bottle brought by her mother; the case was diagnosed as OP intoxication. The hair of daughter was cut, clothes were removed and her body was washed in order to avoid recontamination [7]. The mother said that she was using that solution as a shampoo for treating hair pediculosis. Miotic eyes, depressed respiration, excessive salivation and tearing were identified by examination. OP antidote pralidoxime (PAM) was added her treatment because these signs can occur with inhibition of plasma pseudocholinesterase [1,8,9]. Treatment protocol of OP intoxication is atropine for muscarinic signs and PAM for reactivation of enzyme. The patient was taken to intensive care unit (ICU) immediately after her cardiac rhythm started. According to performed Brain CT, brain edema was suspected and mannitol was added to her treatment regime. Antibiotherapy was started upon lung infection at ICU. Symptoms of renal failure like increased uric acid level and hyponatremia and hepatic failure was observed. At 14th day of acceptance to

pediatric ICU; results of apnea test, cranial doppler and EEG was well-matched with brain death. Committee formed by pediatric neurologist, neurosurgeon, anesthesiologist and pediatric cardiologist agreed on that brain death has occurred. The patient survived for 16 days with supportive therapy at ICU and died at 16th day of hospitalization.

Mother

The second case was a 28 years old mother washed her hair with solution of OP after washing her daughter's hair with the same solution. While washing their hair with that shampoo as a treatment for pediculosis, mother and her daughter got worse and brought to ER by ambulance. When brought to ER, the mother was conscious and had nausea and vomiting. She was time and place oriented and well cooperated. Her pupils were miotic [1,8,9]. The bottle of solution that she used was brought by her. OP intoxication was diagnosed and upon monitorization the patient was bradycardic, atropin and antidote PAM was given. She was taken to ICU for observation closely. Beside the PAM treatment, symptomatic treatment for bradycardia, vomiting and headache was given. After observation for 6 days at ICU the patient was stabilized and discharged from hospital. She was blaming herself about this situation that is why; psychiatric clinical control was suggested to her for psychiatric support.

Discussion

OPs acts by blocking acetylcholinesterase enzyme. Acetylcholinesterases are divided into two as true cholinesterase and pseudocholinesterase. True cholinesterases are found in red blood cells, while pseudocholinesterases (plasma cholinesterase) are found in serum, liver, heart, pancreas and brain [1]. Cholinesterase hydrolyses inactive components of acetylcholine into choline and acetic acid. By inhibiting cholinesterase, amount of acetylcholine does increase at neuromuscular junctions and synapses. This increase causes over stimulation on the acetylcholine receptor. Firstly, acetylcholine over stimulation causes extensive synaptic paralyzes at central nerve system, autonomic ganglions, parasympathetic and some sympathetic nerve endings and somatic nerves [1,10]. By proceeding of this situation "cholinergic crisis" begins and because of that central and peripheric clinical signs start to occur. Actual symptoms are related to stimulation of nicotinic and muscarinic receptors.

Pharmacologic intervention is needed because of irreversibility of bonds between OPs and cholinesterases, so production of new cholinesterases take a long time [1]. For this reason, immediate antagonistic intervention is very important.

In addition to patient's specific properties (age, skin development, skin lesions, developmental level of nervous system), kind of active agent, amount of exposure, kind of exposure, time of exposure, time interval to starting emergency treatment are important for occurrence of clinical symptoms [7,11]. Clinical findings can occur within a few minutes when one is exposed high dose of OP.

OP intoxications are generally seen with similar frequency in all countries over the world. Intoxications can occur by accidental exposure at home, at agricultural areas, while production and transportation of OPs, working in buggy fields and eating contaminated foods without cleaning. Consciously taken OPs in adults are usually for suicide but accidental in children. One kind of OP was used in terrorist attack in metro of Tokyo, 1995 [3]. OPs can create a toxic effect by inhalation, direct dermal contact and orally taken contaminated foods. As a difference in our case there is a high dosed-multiple ways of exposure by direct contact, taking via inhalation and probably orally taking bathroom water. Clinical signs occur rapidly by inhalation than by dermal contact which effects lately.

Conclusion

We investigated these cases because of owing medical and forensic issues. Intoxication via direct contact occurs less frequently, that is why we presented these cases. Intoxication of OPs occurred by exceptional utilization for hair pediculosis like these cases rarely seen, for that reason we approved to present these cases in order to pay attention for this kind of intoxication. Willemijn van Heel and Said Hachimi-Idrissi [4] presented the survived case of intoxication occurred by shampoo containing OP. Their case has survived from intoxication however one of our cases has died and this makes our case dramatic.

OP intoxications are commonly seen and can cause serious diseases and even death. We believe that doing a comprehensive informational works and utilization of these kind chemicals by well trained experts would be safe in order to decrease this type of intoxication and cases of death. On each medicine box should be remarkably written that "not to contact to

body and not to use except for purpose". Usage and storage instructions should also be written clearly and detailed. It is important to inform people about this kind of intoxication. It is believed that easy accessibility to health services will reduce intoxication cases, because there are a lot of medicine that is effective and safety proved by experiments for hair pediculosis.

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