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AN ATYPICAL PRESENTATION of ORGANOPHOSPHATE INTOXICATION: EXTRAPYRAMIDAL SIGNS

Bengü GÜLHAN AYDIN[1], Volkan HANCI[2], Bülent Serhan YURTLU[2],
Işıl Özkoçak TURAN[3]

ABSTRACT

Organophosphate intoxications may cause serious clinical results as the activation mechanism of organophosphates is via the inhibition of cholinesterase enzyme. Even if muscarinic and nicotinic symptoms are seen in the acute phase of intoxication, extrapyramidal symptoms are very rare. We aim to present an acute organophosphate intoxication case who was admitted to the emergency unit with extrapyramidal symptoms.

Key words: Organophosphate intoxication, Extrapyramidal symptoms

ORGANOFOSFAT İNTOKSİKASYONUNDA ATİPİK BİR PREZENTASYON: EKSTRAPİRAMİDAL BULGULAR

ÖZET

Organofosfatların etki mekanizması kolinesteraz enzim inhibisyonu yoluyla olduğundan organofosfat zehirlenmeleri ciddi klinik sonuçlara neden olabilir. Zehirlenmenin akut döneminde muskarinik ve nikotinik semptomlar görülse de ekstrapiramidal bulgulara nadiren rastlanır. Biz bu olgu sunumunda acil servise ekstrapiramidal semptomlarla başvuran bir akut organofosfat zehirlenmesi olgusunu sunmayı amaçladık.

Anahtar kelimeler : Organofosfat zehirlenmesi, Ekstrapiramidal bulgular, Pestisitler

INTRODUCTION

Pesticides are materials commonly used over a wide area to control insects, weeds and fungus (plant diseases). Pesticides are used as insecticide, herbicide, fungicide or disinfectant depending on the target organism. Insecticides are generally subdivided into groups as organophosphates (OP), organochlorines, carbomates and pyrethroids. Individuals are frequently exposed to many different pesticides or pesticide mixtures at the same time or consecutively. Suicides using pesticides are accepted as an important cause of pesticide poisonings[1]. Organophosphate insecticides link to the phosphate radicals in the active region with a covalent bond to irreversibly inhibit the enzymes acetylcholinesterase, found in erythrocytes and in the central nervous system, and butyrylcholinesterase, found in plasma[2]. Organophosphate intoxication is generally easily recognized when history and symptoms are typical. Intoxication due to anticholinergic medications is frequently observed with bradycardia, bronchospasm, increased salivation, urine retention and diarrhea. In contrast observation of extrapyramidal symptoms in acute organic phosphorus insecticide poisonings are very rare. This case aims to present an acute organic phosphorus insecticide poisoning who attended the emergency service with extrapyramidal symptoms.

1. Bülent Ecevit University, Medical Faculty, Anesthesiology and Reanimation Department
2. Dokuz Eylül University, Medical Faculty, Anesthesiology and Reanimation Department
3. Ankara Numune Eğitim ve Araştırma Hastanesi Anesthesiology and Reanimation Department

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CASE REPORT

A 27-year old female patient was send to our emergency service with an intoxication diagnosis. At the previously attended hospital she had been prediagnosed with intoxication and activated carbon was administered, however when aspiration of the active charcoal was suspected and bronchoscopy was applied and when activated carbon was identified in the lungs she was referred to our hospital. When the patient was evaluated in the emergency service, cooperation could not be obtained. The case had spontaneous eye openings, eye movement was free and her four extremities were unresponsive to painful stimulus. The case had arterial blood pressure of 120/50 mmHg and heart rate of 105 beats/min. From a neurological point of view the case had a facial expression like a mask, with bradykinesia and left upper extremity rigidity. The case's deep tendon reflexes were ++/++. Anamnesis obtained from the patient's family indicated the patient had taken organic phosphorus insecticide (paration) for the purpose of suicide. Laboratory analyses revealed no abnormal values other than pseudocholinesterase enzyme levels of 146 mmol/dL (normal: 4900-11900 mmol/dL). With these symptoms the case was diagnosed as acute organophosphate intoxication and was admitted to the reanimation unit. Treatment with atropine and pralidoxime was begun. On follow-up pseudocholinesterase levels began to rise and reached 2243. Cranial MR imaging revealed no pathology. When neurological symptoms regressed and organ dysfunction was not found, the patient was discharged from the reanimation unit 8 days later after psychiatric consultation. Neurology policlinic admission was recommended for the patient.

DISCUSSION

Pesticides are generally widely used throughout the world. In the United States of America, more than 18000 products are licensed for use. In our country they are frequently used in agriculture[3]. Sahin et al.[4] evaluated poisoning cases in Turkey and reported organophosphate poisoning was responsible for 15% of all poisoning cases. Reasons for poisoning include suicide attempts, mistaken drinking of the poison and inhalation during use or poisoning through skin and mucosa[5].

Organophosphates inhibit the activity of cholinesterase enzyme which allows hydrolysis of acetylcholinine, a neurotransmitter, and people exposed develop acute cholinergic crisis. The acute phase of organophosphate poisoning includes muscarinic signs such as miosis, hypersalivation, and excessive sweating and nicotinic signs such as muscle weakness and twitching. After the first remission of this acute cholinergic crisis intermediate syndrome together with neuropathy and muscle weakness may be observed[6]. Of patients poisoned with organophosphates only 0.5% develops neurotoxic symptoms in the form of extrapyramidal syndrome like parkinsonism[7].

Senanayake et al.[8] reported on the extrapyramidal symptoms of 6 patients poisoned with fenthion, an organophosphate insecticide. The extrapyramidal symptoms, in order of frequency, were dystonia, tremor observed at rest, cogwheel rigidity and choreoathetosis. These symptoms began between 4 and 40 days after poisoning and resolved on their own within 1-4 weeks in survivors. Hsieh et al.7 in a study evaluating 633 patients applying to hospital with organophosphate poisoning reported three patients had temporary neuromuscular dysfunctional symptoms of blepharoclonus, oculogyric crisis, intermittent dystonia, rigidity and tremor, while two patients developed facial mask, dyskinesia, and akathesia after acute cholinergic crisis. Other causes of these extrapyramidal symptoms were ruled out and they reported possible temporary extrapyramidal syndrome as a neurotoxic result of organophosphate poisoning not requiring treatment. Patients recovered within 24-42 days. Hashim et al.[9] in a case report reported observing symptoms such as resting tremor, facial expression like a mask, cogwheel rigidity and hyperreflexia on the 24th day after the patient was removed from ventilator support. Cranial MR and CT showed no abnormality and there was no family history of Parkinson disease. The patient was treated with Madopar and benzhexol and on the 38th day was discharged with slight rigidity and 1 month later was asymptomatic. The cases

in the literature are summarized in Table 1.

Our case was evaluated in the acute period after taking organophosphate and had extrapyramidal symptoms of facial expression like a mask, bradykinesia and left upper extremity rigidity. Our case did not have muscarinic and nicotinic symptoms of organophosphate poisoning. The anamnesis and treatment of our case did not include any medications that might cause extrapyramidal symptoms. As a result the extrapyramidal symptoms of our case were linked to acute organophosphate intoxication. Extrapyramidal symptoms developing early in the acute period, as in our case, are extremely rare in organophosphate poisoning (Table 1).

Organophosphate poisoning treatment involves decontamination, preventing ab-

Table 1: Summary of cases with extrapyramidal symptoms in the literature

Authors	Type of Organophosphate	First appearance of extrapyramidal symptoms	Extrapyramidal symptoms	Treatment
Hashim et al.[9]	Malathion	24th Day	-Resting tremor -Face mask -Bradykinesia -Cogwheel rigidity	Atropine, Pralidoxime Benzhexol, Levodopa/benserazide
Nakamagoe et al.[15]	50% fenitrothion	7th day	Resting and postural tremor Cogwheel rigidity Facial mask Fixed flexion at elbow	Activated Carbon, Atropine, Pralidoksime
Hsieh et al.[7] Case 1	Yellowish-green liquid pesticide	4th day 7th day	Dystonia of upper extremities and around the mouth Rigidity, facial mask, cogwheel rigidity, postural instability, dysarthria Dyskinesia	Activated carbon Atropine Pralidoksime Haloperidol 5 mg
Case 2	Monocrotrophos	After 12 hours Within 3 days	Dystonia Trismus, tremor, general stiffness, tongue protrusion, facial grimacing	Activated carbon Atropine Pralidoksime Haloperidol 5 mg
Case 3	Methamidophos	2nd day 6th day	Intermittent dystonia Facial mask, rigidity Dysarthria, tremor, bradykinesia, Akathesia	Activated carbon Atropine Pralidoksime Phenytoin
Shahar et al[16]	Methoate	4th day 5th day	Bradykinesia, Resting tremor Facial mask, Reduced blinking, secondary open eyes	Atropine Obidoxime hydrochloride Amantadine
Our case	Parathion	4th hour	Facial expression like a mask, bradykinesia and left upper extremity rigidity	Atropine Pralidoksime

sorption and supporting respiration[10]. In treatment antidote administration is done according to degree of toxicity. Specific antidote treatment includes atropine and pralidoxime[11]. In our case after the administration of atropine and pralidoxime treatment extrapyramidal symptoms regressed. The mechanisms of extrapyramidal parkinsonism are still undetermined. In the human brain cholinergic neurons are mainly found in the striatum, basal forebrain and mesoencephalic and pontine reticular formation[12]. Acetylcholinesterase is widely distributed in some subcortical regions, especially rich in the extrapyramidal system. Thus, as a result of organophosphate poisoning inhibition of acetylcholinesterase in the cholinergic neurons may produce extrapyramidal symptoms and it is reported that in organophosphate poisoning, as in Parkinson's disease, genetic susceptibility may be responsible[13].

Senanayake and Sanmuganathan proposed that organophosphates selectively access the basal ganglion and disrupt the balance between dopamine and acetylcholine in the basal ganglion and substantia nigra[8]. According to traditional theory this imbalance causes parkinsonism. Hsieh et al.[7] proposed that organophosphate pesticides disrupt acetylcholinesterase function in nigrostriatal dopaminergic system modulation. Vahl et al.[14] proposed that lack of dopaminergic transmission is caused by corticostriatopallidothalamocortical cycle deficiency due to biochemical changes and organophosphate poisoning. Bhatt et al.[13] in patients given levodopa-carbidopa found response deficiency was not only due to insufficient dopamine production but also meant dopamine receptor blockage.

Nakamagoe et al.[15] in a case report of organophosphate poisoning causing parkinsonism reported hypoperfusion in the putamen on SPECT imaging. They reported believing that this abnormal perfusion contributed to the parkinsonism caused by organophosphate poisoning.

In conclusion; in cases with history of insecticide intake, extrapyramidal symptoms and signs should be carefully researched. In addition we are of the opinion that for unconscious cases with these types of symptoms who cannot provide a history, organophosphate intoxication must be kept in mind during differential diagnosis.

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