

Case Report

An Amyotrophic lateral Sclerosis like symptoms associated with lead toxicity

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Abstract

Lead is a heavy metal that affects many organs such as nervous system, liver, and kidney. The most important affected organ is central nervous system. The present study reported a case similar to Amyotrophic lateral sclerosis due to lead exposure in an opium addicted person. The patient complaint was the weakness of upper and lower limbs in addition to the unsteadiness of gait. Nerve conduction studies showed normal sensory and motor action potential but needle electromyography showed fasciculation in distal and proximal muscles. The patient was encephalopathic and had psychiatric disorder. The blood lead level was also found to be higher than the normal upper limit. Hence, lead poisoning could occur in a patient addicted to opium with symptoms similar to Amyotrophic lateral sclerosis.

Key words: Amyotrophic Lateral Sclerosis; Lead; Toxicity

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1. Introduction

Amyotrophic Lateral Sclerosis (ALS) is described by progressive degeneration of upper and lower motor neurons in the brain and spinal cord (1). This disorder is the most common form of motor neuron disease. The etiology of ALS is unknown in most patients (2). Some disorders may mimic ALS, such as cervical myelopathy, paraneoplastic disorders, heavy metal intoxication, and some hereditary disorders (3). A few studies have reported the relationship between Motor Neuron Disease (MND) and lead poisoning (4-5). Lead is a heavy metal that affects many organs, the most important of which is the central nervous system (6). Lead exposure occurs mainly through the ingestion (10 percent) and inhalation (30-40 percent). Gastrointestinal absorption varies depending on nutritional status and age (7). Lead toxicity is an unusual cause of opium oral consumption due to contaminated opium with lead (8). The symptoms of lead toxicity are irreversible encephalopathy, seizure, coma, fatigue, memory loss, high blood pressure, nephropathy, gastrointestinal disturbances, weight loss, and immuno-suppression (9). Amyotrophic lateral sclerosis due to lead toxicities is very rare. The present study reported a patient with lead intoxication due to opium consumption who had both encephalopathy and ALS.

2. Case report

A 43-year-old man was admitted to the target hospital in December 2016, with a history of two-month fatigue, abdominal pain, weakness, paresthesia of hands and feet, and gait disorder. The patient had not occupational lead exposure, and had experienced about nine kg weight loss

from three months ago. He had developed severe anemia two weeks before hospitalization and, had, therefore, received blood transfusion for anemia. He had also complained about the irritability and behavioral disturbances from six months ago, and past medical and family history was negative. On habit history, the patient was also addicted to opium orally. Clinical examination revealed normal vital signs, mild cognitive impairment and blue lining at the dental margin of the gums. Neurologic examination demonstrated normal cranial nerves with decreased muscle force in proximal and distal upper limbs (3/5 and 4/5, respectively) and 3/5 and 3/5 in lower limbs, respectively. There was also mild atrophy of first dorsal interosseous muscles bilaterally. At the same time, it was documented that all deep tendon reflexes increased (3+), and the plantar reflex was bilaterally equivocal. Sensory and cerebellar examinations were also completely normal. The patient, on the other hand, was reported not to be able to walk alone, and while blood test showed a microcytic, hypochromic anemia (8.1mg/dl), the iron serum levels, liver and renal function tests, ESR and CRP were all normal. Blood smear demonstrated basophilic stippling and fragmented erythrocytes, and target cells. Cervical and brain MRI were also normal. Electrodiagnostic investigation revealed normal sensory nerve and compound muscle action potentials (SNAP and CMAP), but needle electromyography (EMG) showed neurogenic pattern with fasciculation in all distal and proximal, paraspinal and tongue muscles. The blood lead levels were 101.3 µg/dl (with normal upper limit: up to 25 µg/dl) that confirmed the diagnosis of lead poisoning.

3. Discussion

In the current study, a case with ALS like symptoms due to lead-contaminated opium was reported. Some of the previous studies have reported that lead poisoning. Lead poisoning, which was caused by intravenous injection and absorption through lungs and gastrointestinal tract, may be as a risk factor for ALS disease (10-12). In this case, the intoxication was through ingestion of lead-contaminated opium. Many studies have shown an increase in blood lead levels in opium-addicts compared to healthy control (13-14). In terms of pathology, lead and ALS have a similar mechanism including mitochondrial dysfunction due to oxidative stress, impaired intracellular calcium homeostasis, and glutamate excitotoxicity (15). Lead intoxication may lead to damage to the anterior horn cells or the motor neurons. It may also mimic the clinical features of a motor neuron disease and can, therefore, be misdiagnosed as amyotrophic lateral sclerosis. Microcytic, hypochromic anemia and basophilic stippling of erythrocytes may provide evidence in favor of the diagnosis of lead poisoning which was observed in the studied patient (7). Early symptoms of lead neurotoxicity in both adults and children include irritability, headache, decreased attention span, memory loss, and low-level cognitive impairment (7). The patient under examination had behavioral disorder and irritability six months before hospitalization, and as a result, he had visited a psychiatrist. It should be noted that the presentation of ALS due to lead poisoning is rare. The most commonly documented neurological symptom

of lead exposure in adults is peripheral motor neuropathy with the involvement of radial and peroneal nerves.

ALS is a chronic progressive disease of motor function, and ALS patients with acute or sub-acute evolution of motor deficits could be affected by reasons such as toxicity. Most ALS cases are sporadic, the cause of which sporadic is unknown. Sub-acute ALS, on the other hand, which is accompanied by encephalopathy, anemia, impaired psychomotor, and increased serum levels of lead, support the diagnosis of ALS due to lead poisoning. Lead toxicity should be considered in each patient addicted to opium with ALS like symptoms.

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