Amyotrophic Lateral Sclerosis Syndrome and Hyperthyroidism: Report of 4 Patients

VERAJIT CHOTMONGKOL, M.D.*

Abstract

Four patients with clinical diagnosis of amyotrophic lateral sclerosis syndrome and laboratory results of hyperthyroidism were reported. There were 3 women aged 27, 59, 59 years and 1 man aged 50 years. All of them had symptoms and signs of dysarthria and dysphagia, fasciculations of the tongue, muscle weakness with generalized hyperreflexia. After treatment with antithyroid drugs, motor weakness and dysphagia improved.

Key word : Amyotrophic Lateral Sclerosis Syndrome, Hyperthyroidism, Case Report

Amyotrophic lateral sclerosis (ALS) is a progressive and fatal disease of unknown etiology. It affects men about twice as often as women and the mean age of onset is the early 50s. There is no proven treatment for this disease. The patient has a life expectancy ranging from several months to a few years[1,2].

In general, thyroid function test results are normal in large numbers of patients with ALS[3]. Reports of hyperthyroidsm in ALS are rare[4-7]. The author reports herein 4 patients presenting with ALS syndrome and hyperthyroidsm.

CASE REPORT

Case 1:

A 59-year-old woman was admitted to Srinagarind Hospital in July 1992 with symptoms of progressive weakness for 8 months and dysphagia for 2 months. She denied diplopia, cramps, paresthesias and bladder or bowel dysfunction.

The patient was alert with nasal speech. Her pulse rate was 70-105 beats per minute and regular. The thyroid gland was not enlarged. Tremor and exophthalmos were not detected. There was systolic ejection murmur grade II-III at cardiac apex.

* Department of Medicine, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand.

Neurological examination revealed scattered fasciculations without atrophy of the tongue, generalized quadriparesis grade III-IV with mild spasticity, brisk deep tendon reflexes and positive ankle clonus bilaterally.

Complete blood count, electrolyte, glucose, liver function test and electrodiagnostic studies were normal. Thyroid function test showed a serum T4 level of 9.4 μg/dl (normal, 4.8-12.8 μg/dl), T3 level of 267.3 ng/dl (normal, 52-175 ng/dl), TSH level of 0.1 μIU/ml (normal, 0.4-4.5 μIU/ml) and free T4 level of 2.1 ng/dl (normal, 0.7-2.01 ng/dl).

The patient was treated with methimazole. Three months later, her speech, dysphagia and muscle weakness had improved but hyperreflexia and ankle clonus still persisted. On follow-up after about 3 years, her clinical status was stable.

Case 2:

In July 1992, a 27-year-old woman presented with progressive weakness of both upper extremities for 1 year and both legs for 1 month.

On examination, she was fully oriented. The pulse rate was 90 beats per minute. She had no exophthalmos or enlargement of the thyroid gland but had smooth skin. Her speech was nasal. Abnormal neurological findings revealed an atrophic tongue with fasciculations. Generalized atrophy and weakness of muscles of the upper extremities, including intrinsic muscles of hands, were found. Deep tendon reflexes of all extremities were hyperactive. Bilateral ankle clonus and extensor plantar responses were noted. Pinprick and positional sensation were normal. Electrodiagnostic studies revealed normal motor and sensory nerve conduction velocity except mild, slow motor nerve conduction velocity of the left median nerve. Electromyography of the right extensor carpi radialis muscle showed giant motor unit action potential. Thyroid function test showed a serum T4 level of 15.3 μg/dl, T3 level of 316.9 ng/dl, TSH level of 0.1 μIU/ml and free T4 level of 4.4 ng/dl. During treatment with propylthiouracil for 3 years, muscle power of upper extremities moderately improved. Atrophy of muscles of hands, atrophy and fasciculations of the tongue and generalized hyperreflexia still remained.

Case 3:

A 59-year-old woman presented in October 1996 with symptoms of dysphagia for 9 months. She also noticed an enlargement of the thyroid gland for 1 year. Physical examination revealed a thin old woman with staring eyes. Slight diffuse enlargement of the thyroid gland was found. Neurological examination demonstrated an atrophic tongue with fasciculations and nasal voice. Mild weakness of motor muscles of all extremities with fasciculations at both arms, bilateral Hoffmann's signs and hyperreflxia were detected. She also had atrophy of muscles of both hands. Electrodiagnostic studies showed bilateral carpal tunnel syndrome, normal nerve conduction velocities, fasciculations at the left deltoid and biceps muscles and giant motor unit action potentials at the right flexor carpi radialis, the right deltoid muscles and the left abductor pollicis brevis muscle. Thyroid function test revealed a serum T4 level of 14.1 μg/dl, TSH level of less than 0.1 μIU/ml, and free T4 level of 3.1 ng/dl. The patient was treated with methimazole and radioactive iodine ^{131} respectively. On follow-up within 1 year, her symptom of dysphagia had improved.

Case 4:

A 50-year-old man presented in April 1997 with symptoms of dysphagia for 1 month. He had a history of hyperthyroidism and treated with antithyroid drug 2 years ago. However, he discontinued the drug for about 6 months before this illness. Physical examination revealed a sthenic man with nasal voice and mild diffuse enlargement of the thyroid gland. Abnormal neurological examination revealed fasciculations without atrophy and limitation of movement of the tongue. There were atrophy and fasciculations of the intrinsic muscles of the left hand and generalized hyperreflexia. Electrodiagnostic studies demonstrated normal conduction velocities of motor and sensory nerves. Electromyography showed a denervation pattern with normal motor unit action potential. Thyroid function test revealed a serum T4 level of 8.5 μg/dl, T3 level of 511.4 ng/dl, TSH level of 0.2 μIU/ml and free T4 level of 2.3 ng/dl. After treatment with methimazole for 2 months, his dysphagia had slightly improved.

DISCUSSION

ALS involves the loss of both upper and lower motor neurons in the spinal cord and/or brainstem. Anal and bladder sphinctors are usually not affected. Sensory function is preserved and mental status is unimpaired. The physical signs of upper motor neuron involvement includes weakness, spas-

ticity, hyperreflexia and Babinski's sign/Hoffmann's sign. Degeneration of lower motor neurons results in muscle weakness, atrophy (amyotrophy) and fasciculations. Dysphagia and dysarthria may be due to upper or lower motor neuron involvement or combined lesions. Electromyography and nerve conduction studies are important investigations in the diagnosis of ALS. Typically, the electromyogram shows widespread evidence of both denervation (fibrillations) and reinnervation (enlarged motor units). Peripheral nerve conduction velocity, especially in sensory nerve fiber, are normal.

Although the association of ALS and hyperthyroidism, in general, is considered coincidental, pyramidal tract dysfunction, including ALS syndrome, in hyperthyroidism that improves after treatment of the hyperthyroidism state has been reported[6-10]. The pathophysiologic basis for this abnormality in hyperthyroidism is unknown. It may be thyrotoxicity-induced or from an altered immune state.

The patients in this report had symptoms and signs suggestive of ALS syndrome. All of them were associated with hyperthyroidism and the neurological symptoms improved after treatment with antithyroid therapy. Because of the bad prognosis of idiopathic ALS, thyroid function should be evaluated in patients with ALS syndrome.

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กลุ่มอาการอะมีย์โอโทรฟิค แลเทอรัล สเคลอโรสิส และภาวะต่อมธัยรอยด์ทำงานเกิน: รายงานผู้ป่วย 4 ราย

*วีรจิตต์ โชติมงคล, พ.บ.**

รายงานผู้ป่วย 4 ราย ที่มีลักษณะทางคลินิกเข้าได้กับกลุ่มอาการ Amyotrophic lateral sclerosis ร่วมกับผลการตรวจการทำงานของต่อมธัยรอยด์มีค่าสูงกว่าปกติ โดยเป็นผู้หญิง 3 ราย มีอายุ 27, 59 และ 59 ปี และผู้ชาย 1 ราย อายุ 50 ปี อาการและอาการแสดงที่สำคัญได้แก่ พูดและกลืนลำบาก fasciculation ที่ลิ้น กล้ามเนื้อแขน ขา อ่อนแรงและรีเฟลกซ์ไวทั่วๆ ไป หลังการรักษาด้วยยาต้านการทำงานของต่อมธัยรอยด์ อาการกลืนลำบากและกล้ามเนื้ออ่อนแรงดีขึ้น

คำสำคัญ : อะมีย์โอโทรฟิค แลเทอรัล สเคลอโรสิส, ภาวะต่อมธัยรอยด์ทำงานเกิน, รายงานผู้ป่วย

* ภาควิชาอายุรศาสตร์, คณะแพทยศาสตร์ มหาวิทยาลัยขอนแก่น, จ.ขอนแก่น 40002