Normal Thyroid Function in 32 Patients with Amyotrophic Lateral Sclerosis

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Thyroid function tests were evaluated in 32 patients with amyotrophic lateral sclerosis (ALS) with radioimmunoassay of triiodothyronine, thyroxine, thyroid-stimulating hormone, and free thyroxine. The presence of antithyroid antibody activities were also tested. All patients were found to have normal thyroid values except one, who had low triiodothyronine and all patients had negative for antithyroid antibody activities. The data suggest that ALS could not be related to a thyroid disorder.

Key words: Amyotrophic lateral sclerosis, Thyroid function test, Euthyroid state

Amyotrophic lateral sclerosis (ALS) is a tragic disorder of the human nervous system that compromises upper and lower motor neurons, resulting in weakness and dysfunction of extremities and/or bulbar musculature. Despite intensive investigation, the etiopathogenesis is still unknown. No documentary data are presently available that support a relationship of ALS to a viral infection, toxic metals, or any other causative agents or circumstance. A number of conditions are associated with motor neuron dysfunction, but not seem to be responsible for the common sporadic form of ALS. Lead (1), plasma cell dyscrasia (2), and pancreatic dysfunction (3) all have been associated with motor neuron disease syndromes. An autoimmune pathogenesis is suggested by the presence of immune system abnormalities in ALS (4). However, only few reports have been studied concerning the iodine metabolism and thyroid function in patients with ALS (5-7). In this report, we have examined the patients with ALS to determine whether thyroid alterations are present or not.

MATERIALS AND METHODS

Since 1969 the diagnosis of ALS was established

in our department in more than sixty patients by history, clinical and laboratory examination, electrophysiological study, and muscle biopsy. Thyroid function tests were determined in 32 (20 men and 12 women aged 26 to 64 years (means 52.7 years)) of these patients. The control group consisted of 50 non-neurological patients (8).

In all patients the serum concentration of triiodothyronine (T_3), thyroxine (T_4), thyroid-stimulating hormone (TSH), and free T_4 were measured by the radioimmunoassay. All sera were also tested for the presence of antithyroid antibody activities (antithyroglobulin (Tab), antimicrosomal antibody (Mab)) by the commercial hemagglutination tests. No patients were receiving any medication known to influence thyroid function assessment. With statistical variable as T_3 , T_4 , TSH, free T_4 , Tab, and Mab, the following tests were performed: calculation of mean values ($\pm$ standard deviation), examination for the normal range and Student's t-test. The limit of significance was $p < 0.05$.

RESULTS AND DISCUSSION

The results of thyroid function tests and the frequency of the circulating antithyroid antibody titers

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Table. Thyroid function and circulating thyroid antibodies in patients with amyotrophic lateral sclerosis and control subjects

Thyroid Function Tests	Normal Range	Patients with ALS		
		All (n=32) Mean $\pm$ SD	Male (n=20) Mean $\pm$ SD	Female (n=12) Mean $\pm$ SD
T ₃ , ng/dl	70-190	103.9 $\pm$ 39.2	101.2 $\pm$ 41.0	108.7 $\pm$ 38.0
T ₄ , μ g/dl	5.0-13.0	8.7 $\pm$ 1.5	8.7 $\pm$ 1.5	8.6 $\pm$ 1.8
TSH, μ U/ml	-10	3.6 $\pm$ 1.8	3.6 $\pm$ 2.5	3.9 $\pm$ 1.0
free T ₄ , ng/dl	1.1-2.0	1.4 $\pm$ 0.1	1.4 $\pm$ 0.1	1.4 $\pm$ 0.1
Antithyroid antibody titers T-ab		none	none	none
M-ab		none	none	none

T₃: triiodothyronine, T₄: thyroxine, TSH: thyroid-stimulating hormone, Tab: antithyroglobulin antibody, Mab: antimicrosomal antibody, ALS: amyotrophic lateral sclerosis, SD: standard deviation

were summarized in the Table. The T₃, T₄, TSH and free T₄ levels were found to be within the normal range, except for only one patient, who exhibited low level of T₃ (15ng/dl). This patient did not have a hypothyroidism, but considering to be in a low T₃ syndrome. There were not statistically significantly different between patients with ALS and the normal subjects. Thyroid antibodies were not detectable in the sera of all patients with ALS. No patients exhibited the thyroid enlargement.

The etiology of ALS is still obscure. Motor neuron diseases have been associated with several different disorders (9), viral infections (10), heavy metal intoxications (1), metabolic deficiencies (2, 3), and immunological disturbances (4),

An autoimmune pathogenesis is suggested by the presence of immune system abnormalities in patients with ALS (4). However, the evidence implicating immunological abnormalities is inconclusive. Hyperthyroidism may cause a variety of neurological disorders (11) and some of these syndromes have to be considered in the differential diagnosis of ALS, but only few reports are available concerning the thyroid function studies in patients with ALS (5-7). The purpose of this study was to evaluate whether there was any thyroid alterations in patients with ALS. However, the main results of this studies were normal thyroid parameters found in the all patients

with ALS except the only one being low T₃ level, and all patients had negative for antithyroid antibody activities.

In the literatures two patients with ALS and hyperthyroidism were described (12). McMenamin and Croxson (6) reported motor neuron disease with coexisting hyperthyroid Graves' disease and circulating thyroid autoantibodies were also detected in that case, suggesting the nature of motor neuron disease and the detection of circulating autoantibodies warranted speculation on a possible immunological association. Kiessling (6) reported normal range of thyroid functions and no evidence of thyroid antibodies in 44 patients with ALS. Appel et al. (7) reported eleven of 58 patients with ALS had evidence of thyroid disease and 6 had a thyroiditis.

Unfortunately there were no opportunity to accomplish the study by scintilating thyroid scan and a suppression test to give additional proof of non-coexisting thyroid autonomy.

In conclusion, we found normal thyroid values in patients with ALS and ALS could not be related to thyroid disorders.

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