

Case Report

Stroke in a Young Man Secondary to Paroxysmal Atrial Fibrillation and Thyrotoxicosis: A Case Report

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Keywords

Stroke · Atrial fibrillation · Thyrotoxicosis · Total thyroidectomy

Abstract

We report a case of a male patient with stroke caused by atrial fibrillation (AF) due to thyrotoxicosis. At hospital admission, he presented hypertension and AF. Magnetic resonance imaging confirmed a right-side ischemic area. The thyrotoxicosis was confirmed by thyroid function and thyroid scintigraphy that showed goiter with diffuse hypercaptation. The patient was treated with tapazole and total thyroidectomy, and pathological findings suggested Graves' disease. Hyperthyroidism is associated with increased supraventricular ectopic activity in patients with a normal heart, and may be an important causal link between hyperthy-

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roidism and AF. The patient experienced significant clinical improvement, but presented long-term neuropsychiatric disorders.

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Introduction

Thyrotoxicosis is a rare thyroid dysfunction, with an annual incidence of 0.5–1.4 cases/1,000 individuals, and is predominant in women (10:1). It is characterized by a series of adrenergic events, which can affect all organs and body systems, particularly the heart. Atrial fibrillation (AF) is the most common arrhythmia observed in patients with thyrotoxicosis and is reported in 15% of patients [1–2]. We report the case of a male patient who experienced stroke due to paroxysmal AF due to thyrotoxicosis, and previous reports have been summarized in [Table 1](#).

Case Report

Clinical Summary

Forty-five days before admission to the hospital, a Caucasian 41-year-old male patient developed sweating, palpitations, and anxiety. Ten days prior to admission, the symptoms exacerbated with left paresthesia progressing to left hemiparesis, predominantly brachifacial. He had no relevant personal or family medical history. Upon admission to the hospital, he presented mild hypertension and cardiac rhythm of AF and psychiatric manifestations such as visual hallucinations. Physical examination revealed a slightly increased thyroid size. Brain magnetic resonance imaging confirmed an ischemic area on the right side of the frontoparietal region ([Fig. 1](#)), whereas the duplex carotid and magnetic resonance angiography of the cerebrovascular system yielded normal findings. The patient underwent anticoagulation treatment with warfarin (5 mg/day) 1 year after ictus and was investigated for stroke etiology.

Pathological Findings

Tests for inflammatory activity, lipid profile, serology for HIV, syphilis, Chagas disease, as well as cerebrospinal fluid were normal. One month after admission, thyrotoxicosis was confirmed through assessment of thyroid function (TSH: <0.004 μ UI/mL) and thyroid scintigraphy that revealed goiter with diffuse hypercaptation. Initially, the patient was treated with tapazole (60 mg/day) and then underwent total thyroidectomy, from which the pathological findings confirmed lymphocytic thyroiditis, suggesting Graves' disease ([Fig. 2](#)). During the monitoring period, the patient partially recovered from the motor and sensitive deficits with a modified Rankin scale (mRS) score of 2, and the cardiac rhythm reversed to sinus rhythm.

Follow-Up and Outcomes

After total thyroidectomy, the patient required continuous T4 replacement therapy. At 1 year of follow-up, the patient was independent in daily life activities (mRS 1), and his Barthel index was 90.

Discussion

It is well established that AF increases the risk of stroke. In the Framingham study, chronic AF was associated with an elevated risk of stroke; AF in the absence of rheumatic heart disease was associated with a >5-fold increase in stroke occurrence. Hyperthyroidism is associated with augmented supraventricular ectopic activity in patients with healthy hearts, and the activation of arrhythmogenic foci by elevated thyroid hormones may be an important causal link between hyperthyroidism and AF [3, 4]. In relation to psychiatric manifestations, studies suggest complex interactions between thyroid hormones and neurotransmitter circuits of the central nervous system [5]. This report aims to emphasize the importance of thyrotoxic screening examinations even in young men.

Conclusions

We have reported the case of a male patient with stroke due to paroxysmal AF due to thyrotoxicosis. We suggest that the thyroid crisis may be a determining factor in cerebrovascular diseases.

Statement of Ethics

All patients included in this study consented to the publication of the case report.

Disclosure Statement

The authors declare no conflicts of interest.

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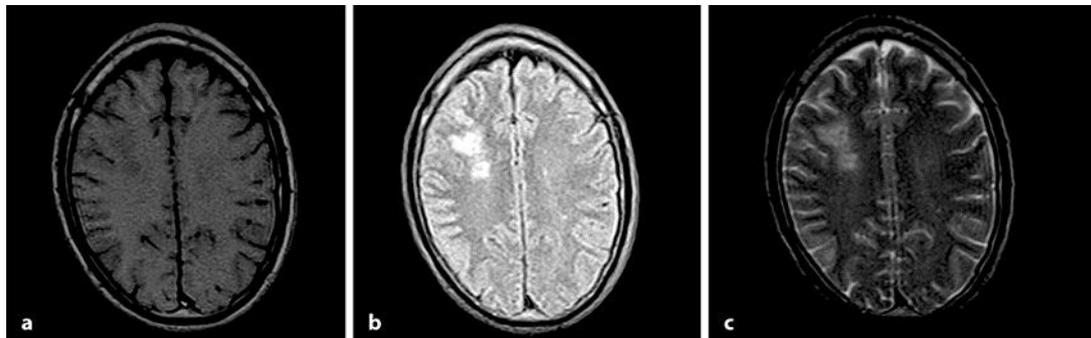


Fig. 1. T1 (a), FLAIR (b), and T2 (c) magnetic resonance imaging confirmed the ischemic area in the right frontal and parietal lobe.

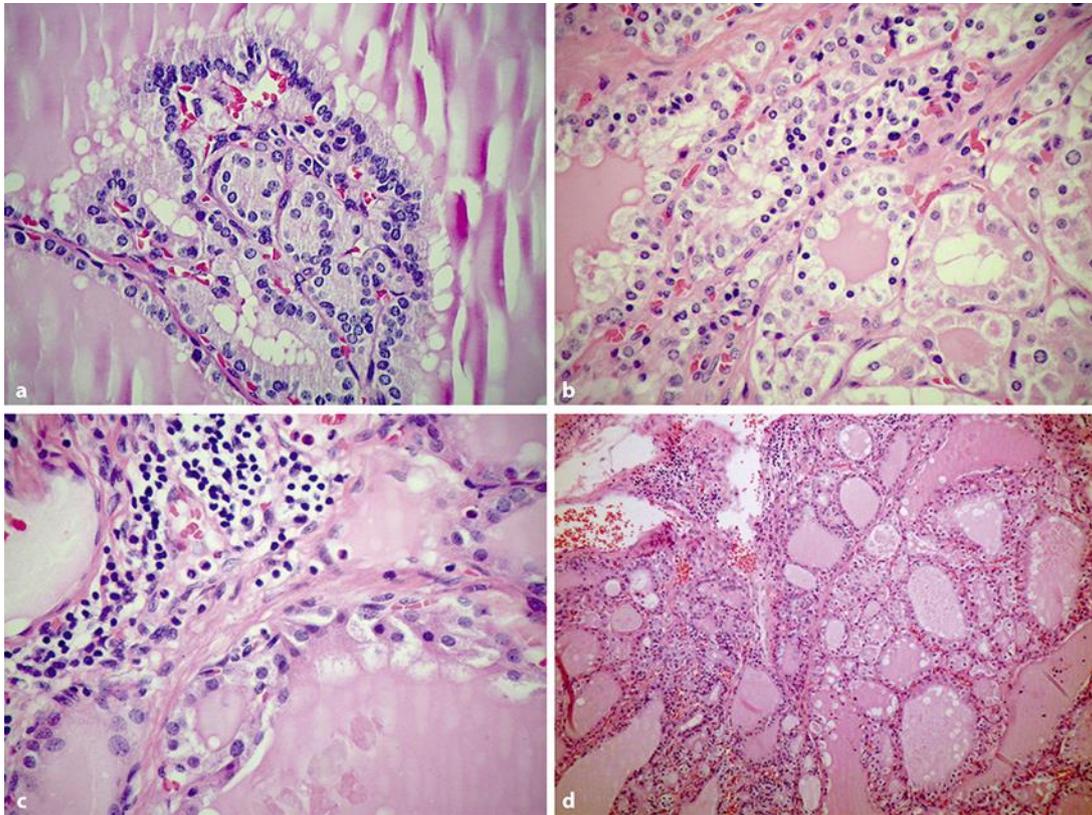


Fig. 2. **a** Thyroid with follicles showing hyperplastic epithelium, filled with colloid with intense vacuolization in the periphery evidencing morphological signs of hyperfunction. HE. $\times 100$. **b** Details of the lymphocytic infiltrate that diffuses through the follicles. HE. $\times 200$. **c** Follicular epithelium with a hyperplastic appearance, with cells showing granular and oxyphylic cytoplasm and colloid fluid and vacuolated at the periphery. Presence of lymphocytes in the interstitium. HE. $\times 200$. **d** Details of the hyperplastic epithelium and its papillary projection. HE. $\times 200$.

Table 1. Previous studies on stroke and thyroid dysfunction

First author [Ref.], Study year	Study design	Population	Thyroid dysfunction	Outcomes and conclusions
Tanabe [6], 2017	Case report	A 49-year-old Japanese female patient with cerebral venous thrombosis (CVT)	Thyroid crisis	Clinicians should consider CVT when they encounter a stroke in a patient with hyperthyroidism
Shi [7], 2014	Retro-spective	351 first-onset ischemic stroke patients	Elevated thyroid autoantibodies	Thyroid autoantibodies may be associated with the presence of intracranial stenosis in young patients after stroke
Wollenweber [8], 2013	Single-center cohort	165 patients with ischemic stroke	Hyperthyroidism: 11.5% Hypothyroidism: 13.9%	Hyperthyroidism is a risk factor for poor outcome 3 months after ischemic stroke
Selmer [9], 2012	Cohort	586,460 adults who had their thyroid function evaluated for the first time and who were without previously recorded thyroid disease or atrial fibrillation (AF)	Thyrotoxicosis	The risk of AF was closely associated with hyperthyroidism
Sheu [10], 2010	Cohort	3,176 patients with hyperthyroidism and 25,408 without hyperthyroidism	Hyperthyroidism	Hyperthyroidism is associated with an increased risk for ischemic stroke in young adults
Rastogi [11], 2008	Experimental	Euthyroid ($n = 15$) and thyrotoxic ($n = 60$)	Thyrotoxicosis	High mortality in hyperthyroid animals after stroke
Squizzato [12], 2005	Literature review	Studies on the relationship between thyroid diseases and cerebrovascular diseases	Hyperthyroidism and hypothyroidism	In subclinical hyperthyroidism, the incidence of AF is increased, and in overt hyperthyroidism, cardioembolic stroke is associated with thyrotoxic AF
Rocha [13], 2001	Case report	Report of 2 patients with cerebral vasculitis and Basedow-Graves disease	Basedow-Graves disease	There is a possible pathogenic link between Graves' disease and cerebral vascular disorders, possibly through a common autoimmune mechanism