

Steroid-Responsive Encephalopathy Associated with Autoimmune Thyroiditis (SREAT): A Case Report

Hessah Abdulaziz Al Hussaini

Department of Internal Medicine, College of Medicine, King Faisal University,
Al Ahsa, Kingdom of Saudi Arabia

ABSTRACT

Background: Steroid-responsive encephalopathy associated with autoimmune thyroiditis (SREAT), also known as Hashimoto's encephalopathy, is a disorder characterized by an encephalopathy associated with anti-thyroid antibodies in the absence of alternative causes. It has a wide range of clinical, laboratory and radiological features.

Objective: Cases of steroid-responsive encephalopathy associated with autoimmune thyroiditis are difficult to diagnose and requires a high index of suspicion, as this will determine the early timing of management and disease outcome.

Patient and Methods: Here we present a case report of twenty-year-old woman presenting with neurological and psychological symptoms. She was found to have high anti-thyroid peroxidase antibodies (Anti-TPO) with normal thyroid function and negative screening for other etiologies of encephalopathy. Based on her presentation, she was diagnosed with steroid-responsive encephalopathy associated with autoimmune thyroiditis.

Results: Patient was started on high dose steroids upon which she responded partially. Then she required the addition of immunotherapy in the form of Rituximab to improve her symptoms.

Conclusion: After exclusion of other causes of encephalopathy, the presence of thyroid antibodies prompts the suspicion of SREAT and therefore the early initiation of steroids to improve patients' outcome.

Keywords: Steroid-Responsive Encephalopathy Associated with Autoimmune Thyroiditis, SREAT, Hashimoto's encephalopathy, Encephalopathy, Autoimmune thyroiditis.

INTRODUCTION

Steroid-responsive encephalopathy associated with autoimmune thyroiditis (SREAT) was first reported in 1966 by **Brain et al.** ⁽¹⁾.

It is also called Hashimoto's encephalopathy and, to a lesser extent, non-vasculitic autoimmune meningoencephalitis. It is defined as an encephalopathy with positive thyroid antibodies after exclusion of other alternative causes and responding to steroid therapy ⁽²⁻⁴⁾.

It has wide variety of clinical, laboratory and radiological features, making it difficult to diagnose and leading to delay in management ⁽⁵⁾. Many authors have some concerns regarding the actual diagnosis of SREAT as there is no evidence of thyroid autoimmunity affecting the central nervous system (CNS), especially with the presence of thyroid antibodies in general population ⁽⁶⁾.

But, the presence of encephalopathy, high thyroid antibodies titre and the response to steroids together can make SREAT diagnosis possible ^(7, 8).

Here, we present a patient diagnosed with SREAT after exclusion of all possible causes of encephalopathy.

CASE PRESENTATION

A twenty-year-old lady, who was adopted and separated, smoker but otherwise not known to have any medical illness, presented to emergency department with multiple neurological complaints.

It was noticed that she had irritability, restlessness and severe sleep disturbance for two weeks. In addition, she had shock-like movements in all over her body and involuntary eye movements for the same duration. Two days before presenting to emergency department, she was confused and not communicating, with poor oral intake and urinary incontinence.

On physical examination, she was conscious but not following commands nor having verbal input. She was vitally stable. She had irregular ocular movements and continuous myoclonic jerks of head, trunk and extremities.

Patient was admitted to intensive care unit, intubated, mechanically ventilated and was kept on general anaesthesia and muscle relaxants. She was worked up for the possibilities of CNS infection, Rhombo encephalitis, paraneoplastic syndrome, autoimmune syndrome or toxin-related encephalitis. Her workup showed negative septic screen, negative toxicology screen, negative paraneoplastic workup, normal brain magnetic resonance imaging (MRI) and single-photon emission computed tomography (SPECT), normal whole body computed tomography (CT) and positron emission tomography (PET) and normal electroencephalogram (EEG).

Upon workup for autoimmune causes of her presentation, she was found to have significantly elevated anti-thyroid peroxidase antibodies (Anti-TPO) with normal thyroid function (Table 1).



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Table 1: Thyroid function tests of the patient

	Value	Reference
TSH	0.402 mIU/L	0.27 – 4.2
FT4	12.4 pmol/L	12 - 22
Anti-TPO	419 IU/ml	0 – 5.61
Anti-TG	3.9 IU/ml	0 – 4.11

TSH: Thyroid stimulating hormone, FT4: Free T4, Anti-TPO: Anti-thyroid peroxidase, Anti-TG: Anti-thyroglobulin

Patient was started for high dose intravenous methylprednisolone and improved, as she was off sedation, extubated and having less myoclonic jerks. Based on her neurologic and psychologic presentation without clear cause, high Anti-TPO titre and her response to steroids, she was diagnosed with steroid-responsive encephalopathy associated with autoimmune thyroiditis (SREAT). She was kept on small dose oral steroids with addition of rituximab for further improvement of her symptoms.

Ethical approval: Patient file was reviewed in King Fahad Medical City, Riyadh and accepted for publication.

Patient approval:

Patient consent was not possible as patient lost follow up, but personal patient information will not be identified.

DISCUSSION

Steroid-responsive encephalopathy associated with autoimmune thyroiditis (SREAT) is a rare syndrome characterized by an encephalopathy with positive thyroid antibodies after exclusion of other alternative causes and being responding to steroid therapy (2-4). The estimated prevalence of SREAT is 2:100,000 (9), with female predominance in 4:1 ratio (4).

The underlying pathophysiology of SREAT is not well understood, but it is thought that it is immune-mediated disorder rather than the direct effect of deranged thyroid function on CNS (8).

Because of its wide clinical features, SREAT has been initially misdiagnosed with multiple neurological diseases, most commonly viral encephalitis, Creutzfeldt-Jakob disease, stroke or transient ischemic attack, Alzheimer disease and migraine (5, 10). Patients can present acutely as stroke-like acute neurological deficits with/without cognitive impairment and altered level of consciousness, or as slowly progressive cognitive impairment and isolate psychiatric disorder, with/without seizures or myoclonus (3, 6). Most commonly, patients with SREAT present with convulsions, speech disorder, memory impairment and/or confusion (3).

Thyroid function in SREAT is usually normal, but some patients can have concomitant abnormal thyroid function. They can present with subclinical hypothyroidism, primary hypothyroidism and rarely, primary hyperthyroidism. It was noticed that most patients with SREAT have positive thyroid antibodies in serum [and possibly in cerebrospinal fluid (CSF)], most commonly Anti-thyroid peroxidase antibodies (Anti-TPO) or combination of Anti-TPO and Anti-Thyroglobulin antibodies (Anti-TG) (3). It should be noted that the clinical presentation does not correlate with the type and titre of serum thyroid antibodies (7).

Neurological investigation findings in SREAT including CSF analysis, brain magnetic resonance imaging (MRI) and electroencephalogram (EEG) are nonspecific. CSF usually shows high protein level, but it can be normal.

Brain MRI is normal or rarely shows some white matter changes. EEG shows mostly diffuse slowing without epileptic activity, which is similar to EEG findings seen in other causes of encephalopathy (3, 10).

Although some reported few cases of spontaneous remission (11), SREAT carries a poor prognosis if untreated in a timely manner. It can result in permanent neurological deficit. From the name, SREAT first line of therapy is steroids, especially if started early. Most of the time, they lead to marked improvement in patients' presentations.

There is no difference between the effectiveness of intravenous versus oral steroids in management of SREAT. Some patients do not respond to steroid therapy, so immunotherapy can be tried or, in severe cases, plasmapheresis (3, 6). It is important to keep patients on supportive treatment depending on patient presentation. For example, antiepileptics for patients with seizure and treatment of thyroid dysfunction if present (6). Management should be tailored upon clinical improvement mainly as thyroid antibodies titre is not strongly associated with clinical improvement (8). It was found that patients with SREAT have higher risk of relapse if they were presented initially with coma, if they had positive anti-TPO, or if steroid treatment was delayed (3).

Because of diagnostic and management difficulties, some have published algorithms for diagnosis of encephalopathy of unknown origin (including SREAT) and suggested management of SREAT (6, 12).

CONCLUSION

SREAT is a rare, difficult to diagnose disease that needs high index of suspicion. After exclusion of other causes of encephalopathy, the presence of thyroid antibodies prompts the suspicion of SREAT and therefore the early initiation of steroids to improve patients' outcome.

REFERENCES

1. **Caselli R, Boeve B, Scheithauer B, O'Duffy J, Hunder G (1999):** Nonvasculitic autoimmune inflammatory meningoencephalitis (NAIM): a reversible form of encephalopathy. *Neurology*, 53: 1579–1581
2. **Graus F, Titulaer M, Balu R, Benseler S, Bien C, Cellucci T *et al.* (2016):** A clinical approach to diagnosis of autoimmune encephalitis. *Lancet Neurol.*, 15 (4): 391-404
3. **Laurent C, Capron J, Quillerou B, Thomas G, Alamowitch S, Fain O *et al.* (2016):** Steroid-responsive encephalopathy associated with autoimmune thyroiditis (SREAT): Characteristics, treatment and outcome in 251 cases from the literature. *Autoimmunity Review*, 15: 1129–1133
4. **Ercoli T, Defazio G, Muroli A (2019):** Status Epilepticus in Hashimoto's encephalopathy Seizure. *European Journal of Epilepsy*, 70: 1–5
5. **Sharma P, Javali M, Mahale R, Madhusudhan B, Abdul Majeed A, Srinivasa R (2015):** Hashimoto encephalopathy: A study of the clinical profile, radiological and electrophysiological correlation in a Tertiary Care Center in South India. *J Neurosci Rural Pract.*, 6 (3): 309–314.
6. **Afshari M, Afshari Z, Schuele S (2012):** Pearls & Oysters: Hashimoto encephalopathy. *Neurology*, 78: e134-e137
7. **Chong J, Rowland L, Utiger R (2003):** Hashimoto Encephalopathy: Syndrome or Myth? *Arch Neurol.*, 60 (2): 164–171.
8. **Payer J, Petrovic T, Lisy L, Langer P (2012):** Hashimoto Encephalopathy: A Rare Intricate Syndrome. *Int J Endocrinol Metab.*, 10 (2): 506-14.
9. **Ferracci F, Bertiato G, Moretto G (2004):** Hashimoto's encephalopathy: Epidemiologic data and pathogenetic considerations. *J Neurol Sci.*, 217: 165–8.
10. **Castillo P, Woodruff B, Caselli R, Vernino S, Lucchinetti C, Swanson J *et al.* (2006):** Steroid-Responsive Encephalopathy Associated With Autoimmune Thyroiditis. *Arch Neurol.*, 63: 197-202
11. **Holanda N, Lima D, Cavalcanti T, Lucena C, Bandeira F (2011):** Hashimoto's Encephalopathy: Systematic Review of the Literature and an Additional Case. *J Neuropsychiatry Clin Neurosci.*, 23: 4
12. **Montagna G, Imperiali M, Agazzi P, D'Aurizio F, Tozzoli R, Feldt-Rasmussen U (2016):** Hashimoto's encephalopathy: A rare proteiform disorder. *Autoimmunity Reviews*, 15 (5): 466-476.