

Grave's Hyperthyroidism presenting as Thyroid Encephalopathy without typical hyperthyroid features

S. Alkhoul¹, S.M. Khan², N. Sultan¹

1. General Internal Medicine Department, University Hospital Kerry, Cloon More, Tralee, Co. Kerry, Ireland.
2. General Internal Medicine Department, University Hospital Limerick, St Nesson's Rd., Dooradoyle, Co. Limerick, Ireland.

Abstract

Presentation

69 year old male patient, presented to emergency department of University Hospital Kerry, with complaints of forgetfulness, agitation, intermittent myoclonic jerks and Parkinsonian features. He had the symptoms for nearly 3-4 weeks and had noted them to be progressively worsening. During the course of admission, he deteriorated even further and agitation and aggressive behaviour became the dominant features.

Diagnosis

Baseline blood and urine investigations were reported to be normal. The initial workup comprised of imaging modalities, including the CT-brain and MRI-Brain, both of which were noted to be unremarkable. Lumbar Puncture was organized and the CSF analysis was noted to be normal as well. EEG was done which showed evidence of encephalopathy. As part of workup for encephalopathy, Thyroid profile was done which showed marked hyperthyroidism and the presence of TSH-receptor antibodies was noted, confirming the diagnosis of Grave's hyperthyroidism and possible Thyroid Encephalopathy.

Treatment

Patient received initial treatment with Intravenous methylprednisolone (followed by oral prednisolone as tapering), carbimazole with thyroxine (block and replace regimen) and levetiracetam (anti-epileptic). Patient improved on the treatment but symptoms would return as soon as steroids tapering was initiated. Patient steroids were continued along with initiation of IVIG and rituximab. Agitation settled completely with mild improvement of confusion on

initiation of IVIG and rituximab. Block and replace regimen with carbimazole and thyroid profile was continued.

Discussion

Presentation of Grave's hyperthyroidism usually presents with more typical features. Encephalopathy is one of the rare features that usually is present with typical Grave's features, but is even rarer for Thyroid encephalopathy to present without any other Grave's disease features. Therefore, in any case presenting with features of encephalopathy, thyroid profile should be part of regular work up for encephalopathy, even if there are no other features of hyperthyroidism.

Introduction

One of the unusual presentation of thyrotoxicosis is encephalopathy which is more associated with positive autoantibodies¹. Such presentation will delay the right diagnosis and the suitable treatment as it is usually expected to see some features of hyperthyroidism in someone with hyperthyroid encephalopathy. The exact mechanism of action for the development of encephalopathy is unclear, but several theories predict the possible mechanism for encephalopathy. It is presumed, that Thyroid Peroxidase antibodies bind to the cerebellar astrocytes and therefore have direct role in pathogenesis of encephalopathy². The Anti CNS antibodies are also a type of antibodies that are suspected to rise in the autoimmune thyroid disorders and are known to affect the myelin sheath integrity. The release of certain cytokines may also have some effect on the brain function and may contribute to encephalopathy³.

Case Report

69 year old male patient, presented to hospital with forgetfulness on background of early dementia, myoclonic jerks and some Parkinsonian features. He was noted to have irritability and agitation but this did not comprise as a major presenting feature. On examination, he was alert with a Glasgow Coma Score of 15/15. He has slight tachycardia of 110 beats per minute. Neurological examination was normal except for more than usual upper limb rigidity. No clinical signs of Grave's disease were noted.

After couple of days, he became more aggressive and agitated with altered level of consciousness. Psychiatry team was taken on board to address the agitation and irritability, who started him on antipsychotic medications. His GCS dropped to 6/15 acutely, after the antipsychotic medications were commenced as per the advice of Psychiatry team. Concerning for acutely worsening

neurological features, a CT Brain was ordered which was reported as unremarkable. A further MRI Brain was also done, which also was insignificant for the presenting features. A lumbar puncture was arranged for CSF analysis, which did not show any abnormality on the biochemistry report. Neurology Team was consulted at this point, who advised an EEG (Electroencephalogram). EEG was done which showed excess of diffuse slow wave activity which was consistent with a moderate diffuse encephalopathy. Despite the discontinuation of all sedative medications, his GCS stayed low. Work up for encephalopathy was initiated and it was noted that patient's thyroid profile showed severe hyperthyroidism. Serology reports tested positive for high titres of anti thyroid peroxidase antibodies. A diagnosis of Thyroid Encephalopathy was considered, and he was started initially on intravenous methylprednisolone (dose of 1g for 7 days), carbimazole and thyroxine (Block and replace regimen), levetiracetam (anti-epileptic medication). The patient's GCS returned back to normal, along with improvement in his orientation and speech.

After 7 days of IV Methylprednisolone, patient was shifted from IV steroids to oral prednisolone, with an intent to taper down steroids. Prednisolone 40mg was started and dose tapered down every second day by 5mg. It was noticed that all the symptoms improvement was steroid dose dependent. An attempt to taper down the steroids doses would result recurrence of agitation and irritability (this happened when dose was tapered down to 20mg). Therefore, the steroid dose was increased (back to 40mg of prednisolone). Re-tapering of steroids was attempted with introduction of intravenous rituximab as next line as per consensus of neurology and endocrinology team. Gradual improvement in clinical status was noted with complete resolution of agitation and irritability. Thyroid function were also noted to improve with the block and replace regimen with carbimazole and thyroxine. Patient was referred for physiotherapy as prolonged hospital stay and immobility had resulted in muscle mass loss. He showed good recovery in terms of mobility and ADLs after rehabilitation.

Discussion

Although rare, thyroid disorders can cause encephalopathy. Most of the times when encephalopathy is noted, earlier features of thyroid dysfunction are noted and therefore an early treatment of the thyroid disorder can prevent patient progressing to severe features such as encephalopathy. This was one of the rarer instances, where encephalopathy preceded other signs and symptoms of thyroid dysfunction. Therefore, testing for thyroid dysfunction should be a mandatory part of patients presenting with encephalopathic features.

Declaration of Conflicts of Interest:

None declared.

Corresponding author:

Shima Alkhouli,
General Internal Medicine Department,
University Hospital Kerry,
Cloon More, Tralee,
Co. Kerry,
Ireland.

E-Mail: shimaalkhouli@hotmail.com

References

1. Churilov, L. P., Sobolevskaia, P. A., & Stroev, Y. I. (2019). Thyroid gland and brain: Enigma of Hashimoto's encephalopathy. *Best practice & research. Clinical endocrinology & metabolism*, 33(6), 101364. <https://doi.org/10.1016/j.beem.2019.101364>
2. Leyhe, T., & Müssig, K. (2014). Cognitive and affective dysfunctions in autoimmune thyroiditis. *Brain, behavior, and immunity*, 41, 261–266. <https://doi.org/10.1016/j.bbi.2014.03.008>
3. Chaudhuri, J., Mukherjee, A., & Chakravarty, A. (2023). Hashimoto's Encephalopathy: Case Series and Literature Review. *Current neurology and neuroscience reports*, 23(4), 167–175. <https://doi.org/10.1007/s11910-023-01255-5>