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Case Report

Is it Worsening ADHD or Graves' Disease? A Case Report of Undiagnosed Graves' Disease in a Patient with ADHD

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INTRODUCTION

Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental disorder affecting children and adolescents with a worldwide prevalence of 7.2%.[1] ADHD is a heterogeneous disorder consisting of symptoms of inattention and/or hyperactivity-impulsivity which cause impairment in multiple settings, including home and school.

ADHD phenomenology includes three presentations: inattentive, hyperactive-impulsive, and combined.[2] The predominantly inattentive ADHD subtype includes difficulty with listening, paying attention to details, sustaining focus, following instructions, and organizing tasks or activities. Patients with the hyperactive-impulsive presentation of ADHD often fidget, struggle to remain still or seated, are restless, talk excessively, and are often described as being "on the go" or "driven by a motor". The combined subtype of ADHD includes six or more symptoms from each of the inattentive and hyperactive-impulsive categories.[2] To receive a diagnosis of ADHD, symptoms must have been present for the last six months and must have caused difficulties in two or more settings. In addition, multiple symptoms must have been experienced prior to the age of 12 years.[2] Many children and adolescents with ADHD (24-50%) also experience symptoms of emotional dysregulation, including irritability, aggressive outbursts, and mood lability.[3]

Hyperthyroidism is defined as the excessive synthesis and secretion of thyroid hormones, while thyrotoxicosis comprises the physical signs and clinical manifestations caused by the excessive concentration and action of thyroid hormones in bodily tissues.[4] Graves' disease, which accounts for 60-80% of cases of hyperthyroidism in children and adolescents (some sources indicate more than 95% of cases),[4,5] is an autoimmune disorder in which autoantibodies (Thyroid Stimulating Immunoglobulin, TSI) activate the thyroid stimulating hormone (TSH) receptor (TSH-R), leading to hypersecretion of thyroid hormones.[6] The disease's complex immune pathogenesis also includes a cytotoxic process whereby antithyroid peroxidase (TPOAb) and antithyroglobulin (TgAb) autoantibodies attack the thyroid gland.[4,6] The clinical presentation of Graves' disease typically includes a triad of symptoms, comprising goiter, exophthalmos, and tachycardia.[4] Other symptoms include nervousness, excitability, difficulty concentrating, tremor, systolic hypertension, hyperkinesia, sweating, weight loss, difficulty sleeping, heat intolerance, muscle weakness, frequent bowel movements, polyuria, and menstrual disorders in girls.[4,7]

ADHD and thyrotoxicosis share many symptoms, such as hyperactivity, increased energy, irritability, emotional lability, and difficulty concentrating and sleeping. Hyperthyroidism/thyrotoxicosis is less common in adolescents than in adults,[4] nonetheless it is a serious condition that must be considered in the differential diagnosis of patients with a history of ADHD who present with worsening ADHD-like symptoms despite no changes in pharmacotherapy.

CASE REPORT

A 16-year-old girl in foster care for the past two years with a history of ADHD, disruptive mood dysregulation disorder, and enuresis was admitted to the adolescent behavioral health unit after medical stabilization for an intentional overdose of desvenlafaxine, lurasidone, and melatonin. A month before this admission, the patient had been hospitalized in another facility due to anger outbursts and attempts to run away from her foster home. At discharge, she had been prescribed lurasidone 60mg daily, desvenlafaxine 50mg daily, clonidine 0.2mg twice a day, and melatonin 3mg at bedtime, and had been placed with her older sibling.

During the patient's hospitalization at our facility, she reported recent stressors, such as the sudden death of her father two months prior and frequent changes in placement. The patient described her suicide attempt as an impulsive act on the wave of emotional turmoil after finding sentimental objects related to her father at the house she shared with her older sibling. The patient reported a history of unstable mood, irritability, difficulty sleeping, impulsivity, high energy, difficulty concentrating, racing thoughts, anxiety, and palpitations. On examination, she was observed to be anxious, restless, visibly jittery, and displaying rapid speech. On admission, recorded vitals indicated tachycardia (heart rate of 120 bpm) and high blood pressure (systolic 146/diastolic 84 mmHg).

Regarding the patient's prior history, her current case worker reported that the patient had experienced sexual and physical abuse in her childhood when she lived with her mother. After she was removed from her mother's care, the patient lived with her father and stepmother before entering the foster care system. According to the case worker, the patient had experienced many psychiatric hospitalizations and multiple foster placements in the past two years due to episodes of anger outbursts (one to two times per month), running away, and physical aggression toward foster parents and children. Furthermore, the patient endorsed a history of engaging in self-harm behaviors, such as cutting and scratching, marked impulsivity, and risky sexual behaviors. Based on collateral information provided by her older sibling, the patient had a history of ADHD, combined type.

As part of the diagnostic evaluation, routine laboratory tests were conducted, and results revealed low TSH <0.01 mcIU/ml (lab reference value 0.35-4.94) and elevated free T4 level of 1.7 ng/dl and repeat level next day of 1.8 ng/dl (lab reference value 0.7- 1.5). According to the patient's current case worker, elevated thyroid hormone levels were also present during the last hospitalization a month prior. However, due to a lack of stable placement, the patient had not followed up with a primary care physician for further evaluation and management.

During this admission, a pediatric endocrinologist was consulted

and an additional workup was recommended to identify the etiology of the patient's thyrotoxicosis. T3 total was found to be elevated at 334 ng/dl (lab reference value 35-193), thyroperoxidase (TPO) and thyroglobulin antibodies returned elevated at 733 IU/ml (lab reference range 0-6) and 42 IU/ml (lab reference range 0-5), respectively. Thyroid stimulating immunoglobulin (TSI) result was pending during the hospitalization. Based on the clinical features and available laboratory results, thyrotoxicosis due to Hashimoto's thyroiditis was initially suspected due to only mildly elevated free T4 level.

To address ADHD symptoms, the patient was resumed on her regimen of clonidine and the dosage was adjusted to 0.2mg at bedtime. The pediatric endocrinologist suggested adding atenolol 25mg daily for symptom control of thyrotoxicosis with the plan to continue it until the patient's free T4 would normalize or decrease in value. The endocrinologist also recommended continuous monitoring of the patient's vital signs.

During the hospitalization, the atenolol dose was titrated to 25mg in the morning and 12.5mg after dinner for a total of 37.5mg/day. Following atenolol treatment for a few days, the patient appeared less jittery and anxious, more attentive, better able to maintain eye contact, and her blood pressure values improved along with the normalization of her heart rate. Overall, the patient's symptoms ameliorated both subjectively and objectively. She denied enuresis throughout her hospital stay.

The patient was eventually discharged home with her older sibling after obtaining consent from her case worker. Her primary diagnoses at discharge included adjustment disorder with mixed disturbance of emotions and conduct, ADHD, combined type, grief reaction due to the recent loss of her father, social anxiety disorder, and thyrotoxicosis possibly due to Hashimoto's thyroiditis. Follow-up appointments were scheduled with primary care, endocrinology, and psychiatry. A recommendation was made to reassess the patient's ADHD symptoms in the outpatient setting after normalization of thyroid hormone levels and to consider using first-line pharmacotherapy (e.g., psychostimulants) if ADHD symptoms persisted despite clonidine unless contraindications were present.

According to hospital records, after discharge, the patient failed to follow up with primary care. However, the pending result of TSI came back elevated at 3.42 IU/L, which was consistent with a diagnosis of Graves' disease. The pediatric endocrinologist, who had been consulted during the patient's hospital stay and was following the patient at discharge, started methimazole 10mg daily to inhibit thyroid hormone production with the plan to repeat thyroid laboratory monitoring in two to three months.

DISCUSSION

Comorbid medical conditions can exacerbate psychiatric diagnoses and complicate their treatment, especially when they share similar symptoms. The presence of undiagnosed Graves' disease in the context of ADHD was explored in a previous case study,[8] in which the undiagnosed thyroid disease greatly impacted the treatment of a patient with Tourette's disorder and ADHD and initially led to poor clinical response and polypharmacy. This is similar to the case of our patient whose worsening symptoms were initially attributed to an exacerbation of a previous diagnosis of ADHD rather than a comorbid thyroid disease. However, after the discovery of abnormal thyroid functioning, the patient's worsening clinical presentation was largely ascribed to the co-occurring diagnosis of thyrotoxicosis given the fact that symptoms greatly improved following the initiation of treatment with atenolol.

This case warns the clinicians of how easily serious medical conditions like thyrotoxicosis could be missed and left untreated in patients with a history of ADHD if laboratory tests (in this case TSH) are not routinely ordered. For our patient, the delay in early detection and treatment of her medical condition was compounded by being in the foster care system, the lack of consistency in case management, and the numerous difficulties related to continuity of medical care associated with placement instability. Therefore, in inpatient psychiatric settings, the recommendation is to order routine laboratory tests, such as TSH, for all patients who are admitted and to start treatment (i.e., "Test and Treat,") for medical conditions impacting psychiatric presentations.

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