

Psychosis as a Presenting Feature of Thyroid Storm: A Case Report

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ABSTRACT

Aim and background: Hyperthyroidism is frequently associated with irritability, anxiety, restlessness, impairment in concentration, insomnia, and fatigue. Rarely such patients can also develop mania, depression, and even delirium. Psychosis is a rare complication of hyperthyroidism and has been reported in 1% of cases. A thyroid storm is a life-threatening endocrine emergency with an incidence rate of 1 to 2%. Hence, knowing the common and uncommon presentations of thyroid storm is important for its prompt diagnosis and treatment. In this article, we present an unusual case where psychosis was the manifesting symptom of thyroid storm.

Case description: A 55-year-old woman presented to the psychiatry outpatient department with features of psychosis, agitation, and suicidality. Upon admission, the patient was started on antipsychotics but showed no improvement in restlessness and autonomic hyperactivity. Investigations in the upcoming days revealed hyperthyroid status, and a diagnosis of thyroid storm was considered. She was treated with methimazole and propranolol, which improved. Despite improvement in other domains, she continued having hallucinations and delusional ideas, for which antipsychotic treatment was continued. She achieved remission within six months and was reportedly euthyroid on regular medications.

Conclusion: Recognition of organic causes of psychiatric presentations is crucial for successful treatment outcomes.

Clinical significance: Psychosis can at times be the only presentation of a severely deranged thyroid profile. Hyperthyroidism leading to thyroid storm is an emergency and treatment of such patients should be multidisciplinary in approach. It poses a therapeutic challenge as delay or lack of appropriate medical treatment can result in significant morbidity and even mortality.

Keywords: Case report, Hyperthyroidism, Nihilistic delusion, Psychosis, Thyroid storm, Toxic crisis.

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INTRODUCTION

Primary psychotic disorders have traditionally been associated with brain dysfunctions wherein no discernable anatomic pathology, underlying medical condition, or causative substance usage could be found. Accumulating body of research shows that any prescribed drug, underlying illness, or substance affecting the functioning of the central nervous system (CNS) can present with mental and behavioral symptoms.¹ When such symptoms take the form of psychotic disorders, they are known as secondary psychoses. Alterations in the thyroid profile (including thyroid storm) are frequently associated with behavioral disturbances in the form of low or elevated mood, irritability, insomnia, and disruption of biological, cognitive, and autonomic functions. It can even lead to frank psychiatric presentations in the form of delusions, hallucinations, and disorganized behavior.

Hyperthyroidism is characterized by excessive synthesis of thyroid hormone by the thyroid gland.² A low serum thyroid-stimulating hormone thyroid stimulating factor (TSH) level and raised serum concentrations of thyroid hormones indicate clinical hyperthyroidism. Although a majority of such patients present with affective disturbances,^{3,4} psychosis as a rare complication was reported in 1% of cases. An interesting fact to be noted, most patients who develop psychosis in a background of hyperthyroidism had been previously diagnosed with mania and/or delirium.⁵ Treatment in such cases is rectification of the abnormal thyroid status. As the psychotic picture is secondary to the thyroid pathology, correction of hormonal abnormality leads to the resolution of psychosis. Therefore, antipsychotic medications are only instated during the acute phase.⁴

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A thyroid storm is a life-threatening complication of hyperthyroidism. It has an incidence rate of 1 to 2% and is associated with high mortality risk. Hence, recognition of this condition and its various presentations are crucial for diagnosis and appropriate management.⁶

CASE DESCRIPTION

A 55-year-old woman with nil significant past psychiatric and personal history presented with acute onset symptoms of decreased sleep, restlessness, agitation, erratic food habits, fearfulness, and progressive decline in self-care over four months and was brought

by family members for treatment. Information was obtained from her son and niece, who were the primary caregivers. The family members recalled an acute onset of symptoms and noted that the patient would frequently get up at night. In the initial weeks of the four-month duration, she had difficulty in maintaining sleep, but gradually she would not be able to initiate it either. At the time of admission, she had been sleeping for 1–2 hours per day for weeks together and would hardly be able to sit in one place. Her food intake was erratic, not following any fixed schedules but she would eat larger amounts at each meal. But over the next three months, she would refuse oral intake and complain of loss of appetite with occasional nausea and vomiting.

After a month of onset of the illness, the patient was found in a very disconcerted state and had tried tying a noose around her neck. She had been rescued by her niece, to whom she had confided that the family members would bury her alive, and the Gods were trying to take away her organs. Following this incident, the patient’s condition deteriorated more, she would try running away from home repeatedly and would be fearful of offerings and ceremonies related to Gods. She had also stopped taking care of her hygiene and had to be coaxed repeatedly to change clothes or take a bath.

The patient had no past history of psychiatric or medical illness. Her family history was significant for the completed suicide of her elder daughter, who seemed to have been suffering from symptoms suggestive of depression. The daughter had never received any treatment for the same, primarily due to a lack of knowledge and awareness about mental illnesses.

On examination, the patient was found to be thin built with a weight of 27 kg and a body mass index (BMI) of 17.4 kg/m². Vital signs showed a temperature of 99.6°F, a heart rate of 124 beats per minute, and elevated blood pressure of 160/100 mm Hg. Mental status examination revealed an unkempt and shabby appearance, significant agitation, increased psychomotor activity, and increased speech production. She had an anxious effect with nihilistic delusion in the form of having no organs inside her body as the Gods had taken away everything making her empty. Auditory hallucinations in the form of three female voices were present, which were threatening and commenting in nature. Delusions seemed to have developed secondary to the hallucinations, as she reported hearing such voices for the last four months. Secondary depressive features in the form of expressing helplessness and low mood were found, where the patient expressed concerns about the futility of continuing treatment (she believed she had no organs left).

Investigations

Electrocardiogram showed sinus tachycardia. Echocardiography revealed no abnormalities. This was done to rule out any cardiovascular disorders which might be underlying or comorbid.

Vitamin deficiencies leading to psychiatric presentations were ruled out by checking vitamin D3 and B12 levels, which were normal. Thyroid test reports on second-day post-admission were serum T4, 13.57 µg/dL; serum T3, 0.89 ng/mL, and serum TSH, 0.10 micro IU/mL. Anti-microsomal antibody tested negative and the Ultrasonogram (USG) neck revealed no abnormality. Other baseline investigations like complete hemogram, liver function test, renal function tests, serum electrolytes, and lipid profile were within normal limits. Viral markers were negative. Electroencephalography and computed tomographic scan brain (non-contrast) were done to rule out CNS causes (like space-occupying lesions, vascular events, encephalitis,

Table 1: Adapted from the Burch–Wartofsky Point Scale⁷

Items	Points	Patient score
Temperature (°C)		
37.2–37.7	5	5
37.8–38.3	10	
38.4–38.8	15	
38.9–39.4	20	
39.4–39.9	25	
>40.0	30	
Cardiovascular tachycardia (beats per minute)		
100–109	5	
110–119	10	
120–129	15	15
130–139	20	
>140	25	
Atrial fibrillation		
Absent	0	0
Present	10	
Congestive heart failure		
Absent	0	0
Mild	5	
Moderate	10	
Severe	20	
Gastrointestinal–hepatic dysfunction manifestation		
Absent	0	
Moderate (diarrhea, abdominal pain, nausea/vomiting)	10	10
Severe (jaundice)	15	
CNS disturbance manifestation		
Absent	0	
Mild (agitation)	10	
Moderate (delirium, psychosis, extreme lethargy)	20	20
Severe (seizure, coma)	30	
Precipitating event status		
Absent	0	0
Present	10	
Total score	>45 = thyroid storm	50

or other CNS infections). Brain parenchyma was intact. Other hormone assays were not done because correction of thyroid status led to remission of symptoms. To rule out other causes of hyperthyroidism, an endocrinology referral was made (Table 1).

Burch–Wartofsky scale score for thyroid storm was found to be 50, indicating a diagnosis of thyroid storm (<25: storm unlikely, 25–44: impending storm, >45: thyroid storm).

Treatment

On the day of admission, during assessment it was concluded that the psychiatric symptoms emerged first and later followed by physical symptoms, hence a diagnosis of primary psychotic disorder was considered and treatment with tablet olanzapine at 5 mg was started. A differential diagnosis of severe depression with psychotic features was considered as well. Additionally, tablet clonazepam

0.25 mg was given due to significant anxious distress and insomnia. Autonomic hyperactivity was considered to be due to the agitation, as investigation reports were not available on day 1. There was insignificant relief of hypertension, tachycardia, or insomnia, even with increased doses of benzodiazepine.

After recognition of the underlying pathology, treatment for thyroid storm was initiated and was as follows: tablet propranolol 40 mg thrice daily and methimazole 20 mg thrice daily with adequate intravenous fluids. An intake output chart was maintained and she started showing symptomatic improvement from day 3, with vitals becoming stable over the next few days. Clonazepam was decreased to 0.25 mg, night dosage only. Despite improvement in all other domains, she continued to have hallucinations and delusional ideas, for which olanzapine had to be optimized up to 10 mg per day.

The patient had been discharged on methimazole 20 mg twice daily, propranolol 40 mg once daily with olanzapine 10 mg once daily at night. She achieved remission within six months and was reportedly euthyroid on subsequent follow-ups.

DISCUSSION

Patients presenting with predominant psychiatric symptoms might actually have underlying medical disorders and present as a challenge to the liaison psychiatry team. This becomes more difficult if the patients already had a pre-existing psychiatric condition as well. Groups considered to be at higher risk for medical illness presenting with psychiatric symptoms include the elderly, patients with a history of substance abuse disorder, patients without a prior history of psychiatric illness, patients with preexisting medical illness, and patients from lower socioeconomic strata. In organic psychiatric disorders, the treatment of the underlying organicity is therapeutic, leading to the resolution of both the medical condition as well as psychiatric manifestations.

In our patient, the treatment of thyroid storm and hyperthyroidism did lead to such relief but not in all aspects. This mandated the continuation of antipsychotics as well. As the patient had developed secondary depressive symptoms, the mitigation of psychosis resulted in the disappearance of depressive features. The psychopathology mimicked that of a depressive illness and inadequacies in history or mental status examination might have led to the addition of antidepressants as well. This would have unnecessarily increased the adverse effect burden of multiple drugs and polypharmacy. Although the exact cause of hyperthyroidism could not be verified in our case, a referral to the Department of Endocrinology was made for individual purposes.

Several propositions have attempted to explain the etiopathogenesis of hyperthyroidism causing neuropsychiatric symptoms. A hyperthyroid state seems to modulate β -receptor density in the brain as well as their sensitivity to catecholamines; the augmentation of β -receptor-mediated activity is thought to be liable for neuropsychiatric manifestations.⁸ The hippocampus and cortex of the brain have a considerable number of TSH receptors. Their excessive stimulation by TSH receptor antibodies leading to an increase in local production of T3 (in Grave's disease) is also hypothesized to produce psychiatric symptoms.⁹ It has been demonstrated that thyroid hormones increase Na^+ current density in the hippocampal region in rat models, leading to neuronal excitability, which in turn could lead to behavioral manifestations and neurological symptoms.¹⁰

It is also of paramount importance that clinicians avoid diagnostic overshadowing (defined as the tendency to attribute

symptoms of mental or physical illness to the primary mental illness) and consider the impact of culture during the patient evaluation process.

CONCLUSION

Recognition of organicity in psychiatric presentations is crucial for successful treatment outcomes. Underlying medical causes should be evaluated in cases with atypical presentation of psychiatric illnesses. The atypicalities in our case are as follows: late age of onset of behavioral symptoms, acute onset, and rapid progression leading to deterioration within weeks. Organicity should be considered if there is no past history of psychiatric or medical illness (thyroid derangements and metabolic disorders in our patient) and shows resistance to conventional psychopharmacological treatment.

Clinical Significance

Psychosis can at times be the only presentation of a severely deranged thyroid profile. Hyperthyroidism leading to thyroid storm is an emergency and poses a therapeutic challenge, as delay in appropriate treatment can result in significant morbidity and even mortality.

These kinds of cases require intensive care, as they require a multidisciplinary approach (here, departments of internal medicine and endocrinology) and usage of multiple drugs. Close monitoring of symptoms even in follow-ups is recommended to identify the adverse effects of drugs, the effect of such drugs on other systems, and treatment rationalization from time to time.

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