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Asymptomatic hyperthyroidism progressing to thyroid storm manifesting as organic mood disorder with secondary encephalopathy: A case report

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Abstract. Thyroid storm is a rare but life-threatening endocrine emergency, often precipitated by untreated or poorly managed hyperthyroidism. Psychiatric manifestations, including psychosis and mood lability, can obscure the diagnosis, particularly in patients without prior thyroid symptoms and history. In this article, we present an unusual case where psychosis and mood lability were the initial symptoms of thyroid storm. Case Presentation, we reported a case of a 24-year-old male with no symptoms of hyperthyroidism or prior medical and psychiatric history, admitted to the emergency department with signs of psychosis and mood lability. There was no significant improvement in behaviour disturbances during hospitalization. After 6 days of observation, his condition worsened, and further workup revealed overt hyperthyroidism. Assessment on the Burch-Wartofsky Point Scale (BWPS) and Japanese Thyroid Association (JTA) scale also revealed highly suggestive of thyroid storm. After intensive thyroid storm management, his condition was improved, but two days later, a seizure occurred as an indication of secondary encephalopathy. Therefore, this patient was referred to an advanced hospital for further workups and intensive care treatment. Discussion, this case highlights the diagnostic challenge of thyroid storm presenting primarily with psychiatric symptoms in an individual with no prior history of thyroid or psychiatric illness. Thyrotoxicosis can mimic psychosis or mood disorders, leading to delayed recognition and treatment. Early identification and a multidisciplinary approach are crucial to prevent morbidity and mortality of thyroid storm. Conclusion, the diagnosis of psychiatric disorder should only be established after other possible organic causes have been excluded. Physicians should be cautious and suspicious of thyroid dysfunction or any endocrine disorder in patients presenting with acute psychiatric symptoms, even in the absence of classical hyperthyroid signs.

Keywords: Thyroid storm, hyperthyroidism, psychosis, mood lability, organic

INTRODUCTION

Hyperthyroidism is generally classified into overt or subclinical, depending on the biochemical severity levels. Overt hyperthyroidism is a low or undetectable serum thyrotropin (TSH) with elevated serum levels of triiodothyronine (T3) or free thyroxine estimates (free T4). Subclinical hyperthyroidism is a low or undetectable serum TSH with T3 and free T4 within the normal reference range. Both overt and subclinical may lead to characteristic signs and symptoms of hyperthyroidism, although subclinical hyperthyroidism is usually considered milder. Then, subclinical hyperthyroidism is classified into type 1 (TSH between 0.1 and 0.4 mU/L) or type 2 (TSH <0.1 mU/L). Both have different risks of progression to overt hyperthyroidism [1,2]

In rare cases, untreated or poorly managed hyperthyroidism can progress to thyroid storm, a life-threatening endocrine emergency including profound neuropsychiatric deterioration. Thyroid storm is a life-threatening complication of hyperthyroidism, presenting as clinical syndromes of multiorgan dysfunction with or without precipitating causes. In the United States, one in six cases of hospitalization for hyperthyroidism is related to thyroid storm, with a 12-fold higher risk of mortality. The estimated occurrence of thyroid storm was 1.4 cases per 100,000 people per year in females and 0.7 cases per 100,000 people per year in males. The clinical manifestations of thyroid storm range from fever, tachycardia, central nervous system (CNS) manifestations, congestive heart failure, and gastrointestinal manifestations (nausea, vomiting, diarrhea, abdominal pain, jaundice).[3–5] The most frequent CNS manifestations include emotional lability, anxiety, agitation, confusion, delirium, paranoia, mania, frank psychosis, seizures, and even coma.[6] Hyperthyroidism modulates the brain's beta receptor density and its sensitivity to catecholamines. This augmentation of beta receptor-mediated adrenergic activity is believed to be responsible for neuropsychiatric symptoms. Recent studies also revealed that many TSH receptors are present in the hippocampus and cortex of the brain. In Graves' disease, the increased stimulation by TSH receptor antibodies leads to an excessive local production of T3, which contributes to psychiatric symptoms.[7,8]

Although considered a rare manifestation, patients may present signs of psychosis, mania, depression, or a combination of those. Psychosis according to Diagnostic Standard Manual 5 (DSM-5) is abnormalities in two or more of the following five domains consisted of delusions, hallucinations, incoherent speech, disorganized or abnormal behavior, and negative symptoms (alogia, diminished affect, avolition, and else) with one abnormality in the domain of delusion, hallucinations or incoherent speech.[9] DSM-5 also describes the primary criterion of mania as: (1) a distinct period of abnormally and persistently elevated, expansive, or irritable mood; and (2) abnormally and persistently increased goal-directed activity or energy.[10] While depression must fulfill at least depressed mood and loss of interest or pleasure in activities (anhedonia), at least one of which must occur for at least two weeks.[11]

Any psychiatric disorder secondary to brain dysfunction and physical disease as the underlying etiology can be put in the F06 class of ICD-10 (International Classification of Diseases 10), which is "Other mental disorders due to brain damage and dysfunction and to physical disease." Organic mood (affective) disorder is part of the F06 class, which is characterized by changes in mood or affect (overall level of activity, depressive, hypomanic, manic, or bipolar) as a consequence of organic disease.[9,12] Organic mood disorder secondary to endocrine disturbances is wel documented but less recognized, especially in acute care settings. In rare cases, thyroid storm can present primarily as psychiatric conditions (psychosis, mania, depression, or a combination) with subtle or absent classical signs of thyrotoxicosis (such as goiter, ophthalmopathy, or palpitations).[13]

Early recognition of these atypical psychiatric symptoms is critical, as progression to thyroid storm significantly increases morbidity and mortality if not promptly managed.[14] Mortality rates for thyroid storm vary between 1.2% to 25%,

depending on factors such as age, comorbidities, and promptness of treatment.[5] An average diagnostic delay of 18 hours has been associated with severe complications such as acute respiratory distress syndrome (ARDS), severe neurological deficits, cardiac arrhythmias, and prolonged ICU stays. In some cases, delayed diagnosis has led to multiorgan failure and death.[15] Therefore, this case report highlights the importance of holistic and careful examinations to improve patient outcomes. This case showed an individual presenting signs of acute psychosis and mood lability as initial manifestations of asymptomatic hyperthyroidism, where delayed recognition culminated in a full-blown thyroid storm, emphasizing the need for increased clinical vigilance.

CASE PRESENTATION

Timeline of the disease

A 24-year-old man with no past psychiatric history was brought by his family to the emergency room because he was talking nonstop for two days without sleeping, overtalkative, also crying and laughing alternately for no reason. He also presented acute symptoms of restlessness, agitation, fearfulness, decreased appetite, and progressive decline in self-care. From deep mental examination, this patient heard whispers from God to fulfill all his long-awaited wishes, such as having an iPhone, a car, a house, and a trip to Bali. About 1 week earlier, he was raging during an event like possessed, then suddenly apologized to the host and guests while crying. He also started to have sleep deprivation at night. Then, the parents took him to the physician a week ago, trying to find out the cause because they were not convinced that their son had a mental disorder. At the clinic, the physician found a slight fever and throat inflammation, then diagnosed with tonsillitis. He was treated with antibiotics and antipyretics. In the past two days, there had been a significant decline in self-care and a reduced appetite. He must be bathed and fed by his parents. If ignored, he would not go to the bathroom or eat at all.

There is no other history of past illness or hospitalization. No family history of mental disorder or thyroid hormone diseases. There is no history of drug abuse, problems during school life, financial problems, or social activity. After thorough history taking, no significant traumatic event was found. But the family insisted the stressor was pressure from superiors at work. On initial examinations, the patient was fully conscious with Glasgow Coma Scale of 15. Vital signs showed temperature of 36,2 °C, raised heart rate of 120 beats per minute, elevated blood pressure of 157/87 mmHg, and respiratory rate of 20 times per minute. Physical examination found no enlarged thyroid gland or lymph nodes. Mental status examination found shabby appearance, uncooperative behaviour, increased psychomotor activity, and increased production of speech (logorrhea) or overtalkativeness. He had a depressed affect with sustained crying and looked scared. This might be related to his bizarre delusion of hearing God's whisper to fulfill all his long-awaited wishes. Delusions seemed to have developed secondary to the auditory hallucinations. Depressive features were seen in the form of repeated asking for apologies, weeping, and repentance. The early score of PANSS-EC (Positive and Negative Syndrome Scale - Excited Component) was high due to agitation and increased psychomotor activity. From the emergency room, the patient was transferred to the PICU (Psychiatric Intensive Care Unit) for observation and diagnosed with acute psychotic disorder.

Until the 6th day of treatment, there was no significant improvement. Mental status examination found fluctuating consciousness, rambling, agitation to the point of being restrained, and incoherent speech. Physical examination found elevated blood pressure, palpitation at a range of 120-140 beats per minute, hyperhidrosis, and fever. The patient was referred to an internist, and thyroid hormone test was carried out. Decreased TSH level and increased T4 level confirmed the diagnosis of overt hyperthyroidism. Initially, the internist also requested to check the cortisol level, but it was not available. Multiple ECG evaluations still showed atrial fibrillation and hypertension had not improved, so suspicion arose towards thyroid heart disease.

Multiple muscle spasms were reported during the sixth and seventh days of observation. All extremities became rigid and spastic, fiixed eye upwards, inability to speak, but the consciousness still intact. These symptoms lasted less than five minutes and disappeared completely, but recurred at least once daily. Neurological examination conducted by a neurologist showed no abnormalities. Then, the patient was diagnosed with muscle spasms without seizures. In the observation room, his condition tended to improve within two days after receiving treatment for thyroid storm. Marked by more stable vital signs and controlled behavior. The patient became less agitated, so the physical fixation (restraint) was off for more than half a day. He would express his complaints, be more talkative, and independently go to the bathroom. But, he started to have sleep deprivation and seems to have a lot of energy all day (overtalkative, wandering back and forth, irritable mood, and squeamish). Then, the diagnosis was changed from acute psychosis to organic mood disorder by the psychiatrist. When the patient was momentarily cooperative, reexamination showed no goiter, exopthalmos, enlarged lymph nodes, or upper extremity tremor. The intensive thyroid storm management and observation were continued in the subacute ward. However, on the 8th day, the patient experienced a generalized tonic-clonic seizure for less than five minutes. After the seizure, consciousness was still intact. Due to limited facilities such as cerebrospinal fluid examination and brain imaging, the patient was referred to a higher-level hospital. The neurologist and internist considered the possibility of secondary encephalopathy.

Table 1. Burch-Wartofsky point scale for thyroid storm

Parameters	Scale				Patient	Score
Temperature	<37,2	: 0	38,9 – 39,2	: +20	Fever >38,3 C	+15
	37,2 – 37,7	: +5	39,3 – 39,9	: +25		
	37,8 – 38,2	: +10	>40,0	: +30		
	38,3 – 38,8	: +15				
Altered mental	None			: 0	Psychosis	+20
status	Mild (agitation)			: +10		
	Moderate (delirium,psychosis,etc)			: +20		
	Severe (seizure, coma)			: +30		

Digestion Disorder	None			: 0	-	0
	Moderate (diarrhea, vomiting, pain)			: +10		
	Severe (jaundice)			: +20		
Heart rate	<90	: 0	120 - 129	: +15	>120 beats per minute	+15
	90 - 109	: +5	130 - 139	: +20		
	110 - 119	: +10	>140	: +25		
Heart Failure	None			: 0	-	0
	Mild (extremity edema)			: +5		
	Moderate (bilateral wet rales)			: +10		
	Severe			: +15		
Atrial Fibrilation	None	: 0	Present	: +10	AF RVR	+10
Precipitating conditions	None	: 0	Present	: +10	Present	+10
Total					70	

Investigation

Thyroid hormone level on the seventh day post-admission reported TSH 0,200 pmol/l and fT4 23,760 IU/mL. Electrolyte serum showed mild hypokalemia (3,4 mmol/L). Other findings from blood tests were leukocytosis (19.810/uL) with increased levels of neutrophil (from 70% to 82%) and decreased levels of lymphocyte (from 15% to 12%). Serum transaminase (AST 35 IU/L, ALT 57 IU/L) and lipid profile (cholesterol 240 mg/dL, triglyceride 284 mg/dL) were also slightly elevated. No substance was found in the toxicology test and the HIV test was nonreactive. The electrocardiogram showed atrial fibrillation with rapid ventricular response. Echocardiography to rule out any cardiovascular disorder was not performed due to limited facilities. Later on, computed tomography of the brain showed no abnormalities in the referred hospital. Serum serology test for toxoplasmosis was not conducted due to unavailability. Electroencephalography was also not possible because of the agitation and uncooperative behaviour. Burch-Wartofsky Point Scale (BWPS) score for thyroid storm was found to be 70, indicating a diagnosis of thyroid storm in table 1. Susceptible precipitating factors contributing to the progression of thyrotoxicosis to thyroid storm were drug reaction and severe emotional distress. Japan Thyroid Association (JTA) classification includes this case in the TS1 category in Table 2. The TS1 category implied evidence of thyrotoxicosis and at least 1 neuropsychiatric manifestation. Fluctuating consciousness, agitation, and psychosis were found in this case.

Table 2. Japan Thyroid Association (JTA) classification for thyroid storm

Criteria for diagnosis		
Evidence of thyrotoxicosis with elevated free T3 or T4 levels		
Sign and symptoms 1. Central nervous system (CNS) manifestations such as agitation, delirium, psychosis, lethargy, coma 2. Fever ≥ 38 ^{0}C 3. Tachycardia ≥ 130x/men or heart rate ≥ 130 in atrial fibrillation 4. Congestive heart failure (CHF) signs: lung edema, whet rales more than half of the lung, cardiogenic shock, NYHA class IV or Killip ≥ III 5. Gastrointestinal manifestations such as nausea, vomiting, and total bilirubin ≥ 3,0 mg/dL		
Diagnosis		
TS1	First combination	Thyrotoxicosis + at least 1 CNS manifestation and fever, tachycardia, CHF, or gastrointestinal manifestations
TS1	Alternative combination	Thyrotoxicosis + at least 3 combinations of fever, tachycardia, CHF, or gastrointestinal manifestations
TS2	First combination	Thyrotoxicosis + at least 2 combinations of fever, tachycardia, CHF, or gastrointestinal manifestations
TS2	Alternative combination	Does not meet criteria of TS1 with unchecked free T3 of free T4

Treatment

Initial treatment was Olanzapine 10 mg once daily by intramuscular injection for 3 consecutive days and Lorazepam 2 mg at night. The patient was administered several doses of Diazepam 10 mg by intramuscular injection daily due to agitation and aggressive behavior. In addition, he was also given hepatoprotectors and Risperidone twice daily. On the fourth day, the patient experienced hypersalivation, stiff jaw, hyperhidrosis, tremor of both hands, high blood pressure, and palpitations as signs of extrapyramidal syndrome. Diphenhydramine 20 mg via intramuscular injection was administered as the antidote for extrapyramidal syndrome. On the sixth day, all antipsychotic was suspended due to fever and unstable vital signs to rule out malignant neuroleptic syndrome. The patient was referred to an internist and neurologist for further workups.

Thyroid storm treatment was given after the lab results came out. Oral medications consisted of Methimazole (Thiamazole) 10 mg every 8 hours, Propranolol 10 mg every 8 hours, Amlodipine 10 mg during the day, and Candesartan 16 mg at night. Injectable medications consisted of Dexamethasone 5 mg every 12 hours, Lansoprazole 30 mg every 24 hours, and Paracetamol 1 gram every 8 hours only if there was fever. The patient also received intravenous neuroprotectors from a neurologist. To control mood disorders, the patient received Lorazepam 1 mg every 12 hours, and also a mixture of Haloperidol 0.5 mg and Trihexyphenidyl 0.5 mg every time he agitated. To treat seizures on the eighth day, the patient received Diazepam 10 mg injection and was prescribed another shot of Diazepam in case seizures reoccurred. The patient was then referred to an advanced regional hospital for further investigation and workup due to the lack of proper intensive care unit (ICU) and other supportive facilities.

DISCUSSION

Patients with overt hyperthyroidism are more likely to suffer from depression, psychosis, or anxiety. Affective disorders are more prevalent in psychiatric patients with low serum TSH levels (subclinical hyperthyroidism).[8] The clinical manifestations of hyperthyroidism range from asymptomatic to the worst complications, which include thyroid storm. Elevated thyroid hormone levels amplify catecholamine signaling through increased numbers of cell surface beta-adrenergic receptors, resulting in adrenergic symptoms such as palpitations, heat intolerance, diaphoresis, tremor, stare (fixed eye position due to eyelid retraction), lid lag, and hyperdefecation. This patient showed no common signs and symptoms of hyperthyroidism. The test found no goiter (enlarged thyroid gland), diaphoresis, tremor, or diarrhea. But this patient indeed experienced an elevated heart rate since admission. Psychiatric manifestations range from anxiety, rapid or pressured speech, insomnia, to psychosis (if hyperthyroidism is severe).[16,17] These manifestations were also found in this case, where overtalkativeness and psychosis were the initial reasons for admission.

This case was initially diagnosed with acute psychotic disorder due to the onset of agitation, which occurred only a week before admission. On the 7th day of observation, the diagnosis changed to organic mood disorder with hyperthyroidism as the underlying disease. In the DSM-5, the diagnostic criteria for a manic episode require a distinct period of abnormally and persistently elevated, expansive, or irritable mood and increased activity or energy, lasting at least one week and present most of the day or nearly every day. During this period, three (or more) of the following symptoms must be present to a significant degree (four if the mood is only irritable) which are: (1) inflated self-esteem or grandiosity; (2) decreased need for sleep; (3) more talkative than usual (overtalkative); (4) flight of ideas or subjective experience that thoughts are racing; (5) distractibility; (6) increase in goal-directed activity or psychomotor agitation; and (7) excessive involvement in activities that have a high potential for painful consequences (such as unrestrained buying sprees, sexual indiscretions, or foolish business investments). The mood disturbance must be sufficiently severe to cause marked impairment in social or occupational functioning, require hospitalization to prevent harm to self or others, or include psychotic features.[18,19] This patient also expressed irritable mood and another 4 symptoms to establish the diagnosis of manic episode (part of organic mood disorder). The other 4 following symptoms were sleep deprivation, overtalkativeness, psychomotor agitation, and distractibility. Therefore, the diagnosis change from acute psychosis into organic mood disorder is based on thorough daily observations during the treatment period.

Psychosis and mood lability are also reported in multiple case reports as their initial symptoms. Usually, a young adult presents in the emergency room with excessive agitation, accompanied by overtalkativeness, paranoia, and irritability.[20,21] Most physicians directly send these patients to the psychiatric ward with a diagnosis of psychosis or mood disorder. During hospitalization, it was discovered that the organic cause was hyperthyroidism.[22–24] Our case also showed similar acute presentations. The exact mechanism by which hyperthyroidism induces irritability and hyperexcitability is still unclear. However, the theory of how the stimulated hyperadrenergic system disrupts the adrenergic pathway between locus coeruleus and frontal lobe that subserve vigilance and attention is still convincing.[25] Even patients with hyperthyroidism who are intensively treated may also experience psychiatric manifestations. Mental status examination may show restlessness, disinhibition, manic episode, and talkativeness as clinical criteria for organic mood disorder.[26,27] Hyperthyroidism indeed induces anxiety, depression, or agitation, and it is well documented. But if the patients have already developed a manic episode, a thyrotoxic state has likely occurred.[28]

The pathogenesis of hyperthyroidism progressing to thyroid storm has not been fully understood. Infection precipitates thyroid storm in the majority of hyperthyroidism patients.[29,30] Our patient also showed signs of infection before admission and during hospitalization. Prehospital assessment obtains history of fever, throat inflammation, and antibiotic prescription. Both complete blood count (CBC) on the day of admission and third day revealed leucocytosis with neutrophilia. Inflammatory responses induce cytokine release (tumor necrosis factor alpha (TNF-α), interleukin-1, and interleukin-6) that affect the expression of proteins involved in thyroid hormone regulation. Inflammatory signaling pathways include activation of nuclear factor kappa-light-chain-enhancer of activated B cells (NFκB) and activator protein 1. These responses may induce changes in enzymes associated with thyroid hormone metabolism (deiodinases type 1, 2, and 3), thyroid hormone transporters, and thyroid hormone receptors (TR-α and TR-β).[14,29,30] Acute infection accompanied by emotional stress is believed to be the main factor causing untreated hyperthyroidism to develop into thyroid storm in this case. However, this is only a possibility considering other confounding factors in this case.

To assess the severity of thyroid storm, physicians may use either the Burch–Wartofsky Point Scale (BWPS) or the Japanese Thyroid Association (JTA) scale. A BWPS score ≥45 is highly suggestive of thyroid storm, 25-44 supports the diagnosis (impending storm), and <25 is unlikely. All patients diagnosed with thyroid storm should be admitted to the intensive care unit for aggressive management including attaining euthyroid state and prevention of further end-organ damage.[2,3,31] This patient fulfills almost all domains and achieves a score of 70, which is highly suggestive of thyroid storm. The JTA scale also includes this patient in the TS1 category. Aggressive thyroid hormone management was performed after the lab results supported the diagnosis of thyroid storm. Aggressive management includes administration of antithyroid hormone, steroid injection, beta-blocker, fever reducer, parenteral therapy, and also brain damage prevention therapies.

First-line treatment for thyroid hormone regulation is propylthiouracil (PTU), carbimazole, and methimazole (MMI). Those medications inhibit thyroid hormone synthesis by acting on thyroid peroxidase. The decision depends on patient conditions and tolerability. JTA and ETA prefer MMI over PTU due to its rapid correction and favorable safety profile, while ATA concludes otherwise. In pregnancy, PTU is safer in the first trimester due to the risk of birth defects.[2,4,31,32] The patient in this case received MMI with a dose of 30 mg per day. The choice between those drugs is due to preexisting conditions of the patient, which are a tendency to sepsis and elevated transaminases. There is no significant differences in the clinical outcome or adverse effects between MMI and PTU use.[33,34] At the start of MMI therapy, the initial dose of 10-30 mg daily is used to restore euthyroidism and the maximum dose is 100 mg per day. Too low a dose will not restore a euthyroid state and excessive dose lead to iatrogenic hyperthyroidism. MMI can be down-titrated to a maintenance dose of 2,5 -10 mg per day. After 2-6 weeks of MMI therapy, serum free T4 and total T3 should be monitored.[2,32]

Before receiving MMI, the patient should have a baseline CBC, including white blood cell (with differential count) and liver profile (bilirubin and transaminases). Adverse effects of antithyroid drugs vary from minor allergy to toxic events such as agranulocytosis, vasculitis, or liver damage. Drug-induced liver injury has been reported in 0,03-0,5% cases of antithyroid medicated patients. The use of PTU is associated with more severe and potentially fatal liver disease than MMI.[2,35] Propanolol 30 mg a day is also part of intensive thyroid storm management. From the beta-blocker class, propranolol is the most widely used in hyperthyroid and thyroid storm treatment. Propanolol is a non-selective beta-1 and beta-2 blocker to decrease tachycardia and tremor, reverse reduced systemic vascular resistance, and additionally inhibit peripheral conversion of T4 to T3. Doses up to 160 mg or more may be needed to control the symptoms. In patients whose contraindications to propranolol (asthma or reactive airway disease), diltiazem can be considered as an alternative. If patients have concurrent low-output heart failure during thyroid storm, then all negative inotropic medications including propranolol should be considered with caution.[2,31,36]

Another adjuvant therapy, such as glucocorticoids in thyroid storm management, is essential. Glucocorticoids reduce the peripheral conversion of free T4 to T3 and reduce thyroxine production. Steroid administration also reduces the risk of adrenal insufficiency exacerbation. The recommended dose of hydrocortisone is an initial dose of 300 mg intravenous, followed by 100 mg every eight hours. Dexamethasone can be used as a substitute at a dose of 8 mg per day.[3,31] Our patient received Dexamehasone injection 5 mg every 12 hours. Apart from reducing inflammation, steroid administration also increases the amount of endogenous steroids, which decrease during thyroid storm. The dose can be rapidly reduced when the acute process subsides. Steroids acutely depress serum T3 levels by reducing T4 to T3 conversion. This effect is beneficial in thyroid storm management and is routinely used in the ICU setting.[2,31,37]

Apart from antithyroid drugs, steroids, beta-blockers, and antipyretics, our patient also received a proton pump inhibitor (PPI). The administration of PPI prevents stress ulcer (not directly for thyroid storm management). Gastric mucosa is at high risk of irritation due to corticosteroids and low intake. Glucocorticoids, such as hydrocortisone or dexamethasone, are integral to thyroid storm treatment, but compromise gastric mucosal integrity, increasing the risk of stress ulcers and GI bleeding, especially in critically ill patients.[38,39] The choice of Pantoprazole injection is decided based on its minimal interaction with other drugs at CY450, effective and stable to gastric pH, rapid acting, and available in our hospital.

To control psychiatric manifestations, psychotropic medications should be considered. The requirement for antipsychotics depends on the patient's condition. Those with a combination of psychosis and mania may require antipsychotics, but hypomania and paranoia only require further observation.[40] Our patient initially presented with psychosis and mood lability, with mania being the most dominant manifestation. Therefore, the administration of antipsychotics in this case is very reasonable and appropriate. Atypical antipsychotics, especially risperidone, are still considered first-line for thyrotoxic psychosis. Olanzapine is the most common choice, but least efficacious than risperidone and aripiprazole.[41] This patient also received olanzapine injection for 3 consecutive days and oral risperidone initially. On the sixth day of hospitalization, the patient showed extrapyramidal syndrome symptoms and fever. Therefore, all antipsychotic was suspended to rule out malignant neuroleptic syndrome and only prescribed Lorazepam. This case was similar to other previous studies. Even though antipsychotics have been given for 6 days, there has been no significant change in behavior because the underlying disease has not been treated. As long as the organic cause is still untreated, the behavioral disturbances can not be resolved.[42] But after undergoing thyroid storm management, the patient's behavior gradually improved. Although he still appeared emotionally labile, agitation and uncooperative behavior were greatly reduced.

Definitive treatment of hyperthyroidism-related psychosis is medical or surgical intervention of the underlying cause of hyperthyroidism. Surgical removal of the thyroid gland also showed reemergence of psychosis and the necessity of psychotropic medications.[43] But acute control of severe psychiatric and behavioral symptoms is indeed necessary. Typical antipsychotics as first-line agents resolve the psychosis symptoms in 39% of cases and atypical antipsychotics resolve 40% of cases. But combined regimens between antipsychotic and benzodiazepines or mood stabilizers resolve 75% of cases. JTA recommends first-line drugs for restlessness, delirium, and psychosis is atypical antipsychotics such as oral risperidone and olanzapine. But for patients who are intolerant of oral medication, haloperidol and olanzapine via intramuscular injection are recommended. [31,41] Atypical antipsychotics such as olanzapine and quetiapine may assist in lowering free T4 level, but not with TSH.[44] Psychotropic medications such as benzodiazepines, antidepressants, lithium, and antipsychotics are not recommended as the primary treatment for psychiatric symptoms due to the slow onset of action and potential toxicity. During agitation and psychosis, dopamine receptor blockade using an antipsychotic such as Haloperidol is suggested.[8] But still, psychotropic medications only act as adjuvant therapy, and thyroid hormone medications should be the main focus.

CONCLUSION

The diagnosis of psychiatric disorders remains challenging, particularly when organic etiologies have not been fully excluded. In young and productive adults, especially healthy individuals with no prior medical or psychiatric history, clinicians must remain vigilant before attributing symptoms solely to primary psychiatric causes. This case emphasizes how asymptomatic hyperthyroidism presenting as psychiatric manifestations, if left untreated and receiving improper antipsychotics, can progress to a thyroid storm, the most severe form of thyroid crisis. Therefore, a thorough evaluation for underlying organic etiologies is essential, even in the absence of overt physical or psychiatric history. The diagnosis of a psychiatric disorder should only be established after other possible organic causes have been excluded. Physicians should be cautious and suspicious of thyroid dysfunction or any endocrine disorder in patients presenting with acute psychiatric symptoms, even in the absence of classical hyperthyroid signs. However, acute control of severe psychiatric and behavioral symptoms is indeed necessary. But still, psychotropic medications only act as adjuvant therapy. The main focus should be on the treatment of thyroid hormone disorder.

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REFERENCES

1. Ursem SR, Boelen A, Bruinstroop E, et al. (2024) A systematic review of subclinical hyperthyroidism guidelines: a remarkable range of recommendations. Eur Thyroid J, 13(1). https://doi.org/10.1530/ETJ-24-0036.
2. Ross DS, Burch HB, Cooper DS, et al. (2016). American Thyroid Association guidelines for diagnosis and management of hyperthyroidism and other causes of thyrotoxicosis. Thyroid, (26): 1343–1421.
3. De Almeida R, McCalmon S, Cabandugama PK. (2022). Clinical review and update on the management of thyroid storm. *Mo Med*, 119: 366–371.
4. Kahaly GJ, Bartalena L, Hegedüs L, et al. (2018) European Thyroid Association guideline for the management of Graves' hyperthyroidism. Eur Thyroid J, 7: 167–186.
5. Thiyagarajan A, Platzbecker K, Ittermann T, et al. (2022) Estimating incidence and case fatality of thyroid storm in Germany between 2007 and 2017: A claims data analysis. Thyroid, 32: 1307–1315.
6. Bindu Nayak KB. (2006). Thyrotoxicosis and thyroid storm. Endocrinology and Metabolism Clinics of North America, (35): 663–686.
7. Bunevicius R, Prange AJ Jr. (2010). Thyroid disease and mental disorders: cause and effect or only comorbidity. Curr Opin Psychiatry, (23): 363–368.
8. Bunevicius R, Prange AJ. (2012). Psychiatric manifestations of Graves' hyperthyroidism. CNS Drugs, 20: 897–909.
9. Substance Abuse and Mental Health Services Administration. (2016). Impact of the DSM-IV to DSM-5 changes on the national survey on drug use and health. In: Center for Behavioral Health Statistics and Quality (CBHSQ), Substance Abuse and Mental Health Services Administration (SAMHSA). U.S. Department of Health and Human Services, 2016.
10. Calabrese JR, Gao K, Sachs G. Diagnosing Mania in the Age of DSM-5. (2017). American Journal of Psychiatry, 1 https://doi.org/ 10.1176/appi.ajp.2016.16091084.
11. Major depressive disorder. (2020). In: Functional Analysis in Clinical Treatment. Academic Press.
12. World Health Organization. International statistical classification of diseases and related health problems 5th edition. WHO Library Cataloguing, 2011.
13. Papi G, Pontecorvi A. (2019). Editorial: The Unusual Presentation of Thyroid Disorders. Front Endocrinol (Lausanne), 10: 560.
14. Akamizu T, Satoh T, Isozaki O, et al. (2012). Diagnostic criteria, clinical features, and incidence of thyroid storm based on nationwide surveys. Thyroid, https://doi.org/ 10.1089/thy.2011.0334.
15. Govindani R, Gavli J, Pratap Singh D, et al. (2024). Chronos and crisis: The dangers of delayed treatment in thyroid storm: A case series. Inter J Sci Res, 21–24.
16. Kravets I. (2016). Hyperthyroidism: Diagnosis and treatment. Am Fam Physician, 93: 363–370.
17. Gulseren S, Gulseren L, Hekimsoy Z, Cetinay P, Ozen C, Tokatlioglu B. (2006). Depression, anxiety, health-related quality of life, and disability in patients with overt and subclinical thyroid dysfunction. Arch Med Res, 37: 133–139.
18. American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (DSM-5 (R). 5th ed. Arlington, TX: American Psychiatric Association Publishing.
19. Kementerian Kesehatan Republik Indonesia. (2015). Pedoman Nasional Pelayanan Kedekteran Jiwa. HK.02.02/MENKES/73/2015, Kementerian Kesehatan Republik Indonesia. http://hukor.kemkes.go.id/ uploads/ produk hukum.
20. Asif H, Nwachukwu I, Khan A, et al. (2022). Hyperthyroidism presenting with mania and psychosis: A case report. Cureus, (14): e22322.
21. Ressler HW, Shah K, Quattlebaum T, et al. (2023). Catatonia and psychosis associated with hyperthyroidism. *Prim Care Companion CNS Disord*, 25. 2023. https://doi.org/10.4088/PCC.23cr03554.
22. Kankpeyeng HB, Iroko D, Dordoye E, et al. (2022). Thyroid psychosis in a young male: an unusual presentation of Graves' disease (a case report). (2019). PAMJ Clinical Medicine; 9. DOI: 10.11604/pamj-cm.2022.9.9.29242.
23. Adiba A. Association of thyrotoxicosis with mania. Am J Psychiatry Resid J, 14: 8–10.
24. Ishihara Y, Sugawa T, Kaneko H, et al. (2019). The delayed diagnosis of thyroid storm in patients with psychosis. Intern Med Japan, 58: 2195–2199.
25. Fukui T, Hasegawa Y, Takenaka H. (2001). Hyperthyroid dementia: clinicoradiological findings and response to treatment. J Neurol Sci, 184: 81–88.
26. Prabhu H, Jagdish TK, Valdiya PS, et al. (1994). Grave's disease with organic mood syndrome (A case report). Med J Armed Forces India, 50: 219–220.
27. Chiera M, Draghetti S, De Ronchi D, et al. (2023). Hyperthyroidism and depression: a clinical case of atypical thyrotoxicosis manifestation. Int Clin Psychopharmacol, 38: 269–272.
28. Bauer M, Goetz T, Glenn T, et al. (2008). The thyroid-brain interaction in thyroid disorders and mood disorders. J Neuroendocrinol, 20: 1101–1114.
29. Akamizu T. Thyroid Storm: A Japanese Perspective. Thyroid, 28: 32–40.
30. Fliers E, Bianco AC, Langouche L, et al. (2015). Thyroid function in critically ill patients. Lancet Diabetes Endocrinol, 3: 816–825.
31. Satoh T, Isozaki O, Suzuki A, et al. (2016). Guidelines for the management of thyroid storm from The Japan Thyroid Association and Japan Endocrine Society (First edition). Endocr J, 63: 1025–1064.

32. Abdi H, Amouzegar A, Azizi F. (2019). Antithyroid Drugs. Iran J Pharm Res, 2019; 18: 1–12.
33. Endo M. Can methimazole replace propylthiouracil in the treatment of thyroid storm. Clinical Thyroidology 2023. https://doi.org/ 10.1089/ct.2023;35.229-231.
34. Lee SY, Modzelewski KL, Law AC, et al. (2023). Comparison of propylthiouracil vs methimazole for thyroid storm in critically ill patients. JAMA Netw Open, 6: e238655.
35. Suzuki N, Noh JY, Hiruma M, et al. (2019). Analysis of antithyroid drug-induced severe liver injury in 18,558 newly diagnosed patients with Graves' disease in Japan. Thyroid, 29: 1390–1398.
36. Dalan R, Leow M. (2007). Cardiovascular Collapse Associated with Beta Blockade in Thyroid Storm. Exp Clin Endocrinol Diabetes, 115: 392–396.
37. De Groot LJ, Bartalena L, Feingold KR. (2025). Thyroid Storm. In: *Endotext [Internet]*. MDText.com, Inc.
38. Alshamsi F, Belley-Cote E, Cook D, et al. (2016). Efficacy and safety of proton pump inhibitors for stress ulcer prophylaxis in critically ill patients: a systematic review and meta-analysis of randomized trials. Critical Care, 20: 1–12.
39. Caplan A, Fett N, Rosenbach M, et al. (2017). Prevention and management of glucocorticoid-induced side effects: A comprehensive review: Ocular, cardiovascular, muscular, and psychiatric side effects and issues unique to pediatric patients. J Am Acad Dermatol, 76: 201–207.
40. Bennett B, Mansingh A, Fenton C, et al. (2021). Graves' disease presenting with hypomania and paranoia to the acute psychiatry service. BMJ Case Rep, 14. https://doi.org/10.1136/bcr-2020-236089.
41. Golub D, Rodack V. (2018). Antipsychotics in hyperthyroid-related psychosis: Case report and systematic review. Neuro Endocrinol Lett, 39: 65–74.
42. Urias-Uribe L, Valdez-Solis E, González-Milán C, et al. (2017). Psychosis crisis associated with thyrotoxicosis due to Graves' disease. Case Rep Psychiatry, 6803682.
43. Kothari S, Townsend W, Chaudhry Z, et al. (2023). Psychosis secondary to thyrotoxicosis that persisted post-thyroidectomy: a case report. BMC Psychiatry, 23: 750.
44. Iversen T, Steen NE, Birkeland KI, et al. T229. (2018). Antipsychotic drug use and thyroid function in patients with severe mental disorders. Schizophr Bull , 44: S205–S206.