



autoimmune hypothyroidism. We aim to expand current understanding by providing a detailed timeline, multidisciplinary treatment course, and review of related literature.

### Case presentation

A 28-year-old South Asian male working as a porter in Qatar presented to the Emergency Department (ED) with vomiting and was discharged with a diagnosis of gastritis. Two days later, he returned after a self-inflicted left wrist laceration. He expressed a wish to die and reported a one-month history of command auditory hallucinations instructing him to kill himself. This was his first episode of self-harm.

Eight weeks before presentation, the patient developed fatigue, constipation, hypersomnia, low mood, poor concentration, reduced appetite, hopelessness, and social withdrawal. Over the following month, he developed guilt-related and religious beliefs, followed by command auditory hallucinations, visual hallucinations, thought insertion and withdrawal, and persecutory delusions. While awaiting surgical treatment in the ED, he attempted self-strangulation.

### Personal and psychiatric history

The patient had no past psychiatric or medical history, family history of mental illness or self-harm, substance use, or forensic involvement. He lived with co-workers, reported financial stress, and was described as introverted and calm, with no evidence of impulsive or borderline personality traits.

### Physical examination

Examination showed a deep left wrist laceration with partial flexor tendon injury. He was alert with Glasgow Coma Scale (GCS) 15/15, with stable vital signs and an otherwise unremarkable examination.

### Mental status examination, investigations and psychometric assessment

As stated in Table 1, Mental status examination (MSE) revealed remarkable findings. Table 2 illustrates Laboratory

and diagnostic findings during hospitalization. Table 3 present psychometric assessment scores at admission and discharge, demo Psychometric Assessment Scores at Admission and Discharge demonstrating substantial improvement in psychiatric symptomatology following initiation of levothyroxine replacement and adjunctive antipsychotic treatment.

Laboratory investigations demonstrated severe primary autoimmune hypothyroidism with markedly elevated TSH, suppressed FT4, and elevated thyroid autoantibodies. Renal function and liver enzyme abnormalities showed improvement during hospitalization. Repeating thyroid function testing was unavailable before discharge.

### Diagnosis

The patient fulfilled Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria for Psychotic Disorder Due to Another Medical Condition (Autoimmune Hypothyroidism). The patient also exhibited clinically significant depressive symptoms secondary to hypothyroidism. However, because psychotic symptoms were the predominant clinical feature at presentation psychotic Disorder Due to Another Medical Condition was considered the primary diagnosis. Severe hypothyroidism was confirmed by markedly elevated TSH, low free T4, and elevated anti-thyroid peroxidase antibody levels (Table 2). The absence of prior psychiatric illness, negative toxicology screening, temporal relationship between thyroid dysfunction and symptom onset, and rapid symptom resolution following levothyroxine replacement strongly supported a diagnosis of myxedema psychosis secondary to autoimmune hypothyroidism. However, because levothyroxine and olanzapine were initiated concurrently, a direct causal relationship cannot be established with certainty.

### Management and Hospital Course

The patient was admitted on February 27, 2025, and remained hospitalized until March 9, 2025. He underwent

**Table 1.** Mental status examination findings.

| ASPECT OF MENTAL STATUS EXAMINATION | FINDINGS                                                                                                                                                                                                                   |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General appearance and behavior     | Medium-built male; deep laceration over the volar aspect of the left wrist; underweight; disheveled; poor hygiene; poor eye contact; frequently looked at the ceiling or kept eyes closed; cooperative but slow to respond |
| Speech                              | Decreased rate and volume of speech, relatively long pauses between answers                                                                                                                                                |
| Affect                              | Blunted; restricted emotional range                                                                                                                                                                                        |
| Mood                                | Depressed; tearful; self-described as “empty”; low reactivity                                                                                                                                                              |
| Thought form                        | Coherent; logically connected; slowed thinking; no formal thought disorder                                                                                                                                                 |
| Thought content                     | Religious delusions, delusions of references and guilt, thought insertion and withdrawal                                                                                                                                   |
| Perception                          | Second-person auditory hallucinations; visual hallucinations of deity figure                                                                                                                                               |
| Judgment and insight                | Impaired acted on hallucinations                                                                                                                                                                                           |
| Cognition                           | Oriented to time, place, and person; poor concentration                                                                                                                                                                    |

**Table 2.** Laboratory and diagnostic findings during hospitalization.

| TEST                                     | ADMISSION RESULT                                                                                        | FOLLOW-UP RESULT                                                  | REFERENCE RANGE |
|------------------------------------------|---------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|-----------------|
| Thyroid-stimulating hormone. (TSH)       | >100 mIU/l                                                                                              | Not repeated                                                      | 0.4–4.5 mIU/l   |
| Free thyroxine t4                        | <0.5 ng/dl                                                                                              | Not repeated                                                      | 0.7–1.8 ng/dl   |
| Anti-TPO (thyroid peroxidase) antibodies | 589 IU/ml                                                                                               | Not repeated                                                      | <35 IU/ml       |
| Anti-thyroglobulin antibodies            | 1421                                                                                                    | Not repeated                                                      |                 |
| AST / ALT                                | 171 / 128 U/l                                                                                           | 125/108 U/l                                                       | <40 U/l         |
| Creatinine                               | 151 µmol/l                                                                                              | 115 µmol/l                                                        | 62–115 µmol/l   |
| Troponin-t                               | 59 ng/l                                                                                                 | No significant interval increase on serial measurements           | <14 ng/l        |
| Electrocardiogram (ECG)                  | Sinus bradycardia, IRBBB                                                                                | Normal sinus rhythm.no acute ischemia, nonspecific T-wave changes | —               |
| Echocardiographic                        | Normal LV and RV function; no regional wall motion abnormalities; no significant valvular heart disease | Not repeated                                                      | —               |
| CT brain                                 | No acute intracranial abnormality                                                                       | Not repeated                                                      |                 |
| CBC, electrolyte                         | Within normal limits                                                                                    | Within normal limits                                              | —               |
| Wrist X-ray (left wrist)                 | Soft tissue swelling only without fracture                                                              | Not repeated                                                      | —               |
| Cervical spine X-ray                     | Normal study                                                                                            | Not repeated                                                      | —               |
| Urine drug screen                        | Negative                                                                                                | Not repeated                                                      | —               |

**Table 3:** Psychometric assessment scores at admission and discharge.

| SCALE                                           | SCORE UPON ADMISSION             | INTERPRETATION                                                                     | SCORE UPON DISCHARGE          | INTERPRETATION                                                            |
|-------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------|-------------------------------|---------------------------------------------------------------------------|
| Brief psychiatric rating scale (BPRS)           | 75/128                           | Severe psychiatric symptoms                                                        | 22/128                        | Minimal residual psychiatric symptoms                                     |
| Hamilton depression rating scale (HAM-D)        | 31/52                            | Severe depression                                                                  | 8/52                          | Mild depressive symptoms/remission                                        |
| Positive and negative syndrome scale (PANSS)    | Total: 108 (P: 23, N: 27, G: 58) | Severe psychosis                                                                   | Total: 45 (P: 8, N: 9, G: 28) | Marked improvement in psychotic symptoms                                  |
| Columbia suicide severity rating scale (C-SSRS) | High risk                        | Recent suicide attempt with persistent suicidal ideation and command hallucination | Low Risk                      | Resolution of suicidal ideation and significant reduction in suicide risk |

multidisciplinary evaluation and treatment. Following the wrist-cutting suicide attempt and attempted strangulation while awaiting surgery, he was placed under observation with psychiatric assessments.

Endocrinology started levothyroxine 75 mcg/day, titrated to 100 mcg/day on hospital Day 5 consistent with the severity of hypothyroidism and the need for thyroid hormone replacement. Psychiatry initiated olanzapine 10 mg nocte, and Lorazepam was prescribed on an as-needed basis; however, only a single 2 mg dose was administered during the hospitalization, with no subsequent doses required.

Plastic surgery repaired the palmaris longus tendon via tenorrhaphy. Multidisciplinary care also involved Nephrology, Cardiology, and Internal Medicine.

By day 7, the patient demonstrated marked psychiatric improvement, characterized by a euthymic mood, restored

insight, and increased social engagement. During the 11-day hospitalization, progressive improvement was also observed in facial edema and laboratory abnormalities, including renal function and liver enzyme levels (Table 2).

At discharge, psychotic symptoms and suicidal ideation had resolved, insight and judgment were restored, and the patient remained fully oriented. Following multidisciplinary assessment, his risk of self-harm was considered significantly reduced. He was discharged on olanzapine 10 mg nightly, with plans for gradual dose reduction after stabilization of thyroid function and ongoing psychiatric follow-up.

### Follow-Up Plan

The patient was discharged on March 9, 2025, after an 11-day admission with multidisciplinary follow-up. He returned to his home country, precluding long-term

psychiatric and endocrine follow-up. Consequently, repeat thyroid tests, medication adjustments, and outcome data were unavailable; remission refers to his status at discharge rather than recovery.

## Discussion

This case reinforces literature describing myxedema madness as a reversible psychotic state due to hypothyroidism. [3,8] Hypothyroidism-induced psychosis, while rare, presents a diagnostic challenge due to its ability to mimic primary psychiatric conditions. Contemporary literature supports the idea that psychotic presentations can arise abruptly and may even precede classical hypothyroid symptoms [9,10].

In this case, the presence of command hallucinations, religious delusions, and impaired judgment resulting in a suicide attempt aligns with previously reported cases. Chan E noted similar profiles in patients presenting with new-onset psychosis and suicidal ideation who were subsequently diagnosed with hypothyroidism [11].

The severity of psychiatric symptoms can often mislead clinicians, especially when classic hypothyroid features are subtle or absent. [5] Previous research linked hypothyroidism to changes in neurometabolic activity that might contribute to myxedema psychosis, including tyrosine hydroxylase imbalance in the anterior locus coeruleus; abundance of T3 receptors in the amygdala and the hippocampus. Pathogenesis likely involves cerebral hypometabolism, neurotransmitter dysregulation, and immune-mediated neuronal disruption [2].

A differential diagnosis of psychosis in hypothyroidism is Hashimoto's encephalopathy (HE) or steroids responsive encephalopathy with autoimmune thyroiditis. While MP is related to neurochemical alterations accompanying thyroid hormone deficiency, neuropsychiatric changes in HE are caused by an autoimmune response unrelated to hypothyroidism. [12,13] Hence, steroid responsiveness in most HE cases. HE is characterized by encephalopathy, with seizures, ataxia, stroke-like episodes, or cognitive fluctuation, making it unlikely in isolated hypothyroid psychosis. In this case, HE was considered because of elevated anti-thyroid antibody levels. However, the patient had no seizures, fluctuating consciousness, cognitive decline, focal neurological deficits, ataxia, or stroke-like episodes; cognition and orientation remained preserved, and neuroimaging was unremarkable, favoring severe hypothyroidism-associated psychosis. Electroencephalography and cerebrospinal fluid analysis were not performed.

Our patient demonstrated marked clinical improvement within the first week of treatment, with substantial resolution of psychiatric symptoms observed by Days 5–7 and continued recovery throughout hospitalization. This timeline is consistent with findings from systematic reviews and published case reports indicating that psychotic symptoms associated with severe hypothyroidism often improve within days to weeks of initiating treatment.

[2,3] The patient's recovery followed the initiation of both levothyroxine and olanzapine. Thyroid hormone replacement addressed the underlying endocrine disorder, whereas olanzapine likely contributed to the rapid control of psychotic symptoms, behavioral disturbance, and suicide risk. Because both treatments were initiated concurrently, their relative contributions cannot be determined. Nevertheless, available evidence suggests that patients with myxedema psychosis generally experience favorable outcomes following correction of hypothyroidism, particularly when recognized early and managed through a multidisciplinary approach [2,3,7,11].

The present case underscores the importance of screening for thyroid dysfunction in patients with first-episode psychosis, particularly when psychiatric symptoms are accompanied by depressive features or systemic manifestations suggestive of hypothyroidism. Current evidence supports routine thyroid evaluation during early psychosis assessment, as recognition of endocrine abnormalities may identify reversible secondary causes and enable timely treatment. [8,9]. Furthermore, the patient's course emphasizes multidisciplinary collaboration involving psychiatry, endocrinology, surgery, nephrology, cardiology, and internal medicine. Improvement in psychiatric symptoms and systemic abnormalities during hospitalization supports coordinated management [1,8].

Limitations include no repeating of thyroid testing during hospitalization, limiting correlation between biochemical and psychiatric improvement. Return home shortly after discharge precluded long-term endocrine and psychiatric follow-up, preventing confirmation of sustained euthyroidism and remission. Concurrent levothyroxine and olanzapine initiation precluded attribution of clinical recovery.

## Conclusion

Patient improvement underscores recognizing reversible causes of psychosis. Thyroid screening in patients with atypical psychiatric or somatic symptoms may be lifesaving. Early diagnosis, hormone replacement, and care are essential.

### What is new?

Endocrine disorders should be considered in first-episode psychosis. Routine thyroid function screening in psychiatric populations may detect treatable endocrine pathology, saving lives. Prompt recognition, hormone replacement therapy, and coordinated multidisciplinary care are critical for better outcomes in myxedema madness.

### List of Abbreviations

|     |                             |
|-----|-----------------------------|
| TSH | Thyroid-stimulating hormone |
| MP  | Myxedema Psychosis          |
| ED  | Emergency Department        |
| GCS | Glasgow Coma Scale          |
| MSE | Mental status examination   |

|          |                                                                    |
|----------|--------------------------------------------------------------------|
| DSM-5    | Diagnostic and Statistical Manual of Mental Disorders, 5th Edition |
| Anti-TPO | Thyroid peroxidase antibodies                                      |
| ECG      | Electrocardiogram                                                  |
| IRBBB    | incomplete right bundle branch block                               |
| BPRS     | Brief psychiatric rating scale                                     |
| HAM-D    | Hamilton depression rating scale                                   |
| PANSS    | Positive and negative syndrome scale                               |
| C-SSRS   | Columbia suicide severity rating scale                             |
| HE       | Hashimoto's' encephalopathy                                        |

### Conflict of interest

The authors declare they have no conflict of interests regarding the publication of this article.

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None.

### Consent for publication

This case has been approved for publication by the institution research board of Hamad Medical Corporation with an ID (MRC-04-25-1306). A written consent has been obtained from the patient despite that there is no patient identifiable data included in this case report.

### Ethical approval

The ethical approval has been obtained from the medical research center of Hamad Medical Corporation (with ID no. MRC-04-25-1306)

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### Summary of the case

|   |                       |                                                                                                                                                                                                                                                                     |
|---|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Patient (gender, age) | 28 years, male                                                                                                                                                                                                                                                      |
| 2 | Final diagnosis       | Myxedema madness not primary psychosis                                                                                                                                                                                                                              |
| 3 | Symptoms              | Command hallucinations to self-harm; visual hallucinations of deity figure, religious delusions, delusions of references and guilt, thought insertion and withdrawal, hypersomnia, low mood, poor concentration, appetite loss, hopelessness, and social withdrawal |
| 4 | Medications           | Symptomatic treatment given                                                                                                                                                                                                                                         |
| 5 | Clinical procedure    | Thyroid-stimulating hormone. (TSH)>100 mIU/l (range 0.4–4.5 mIU/l); free thyroxine T4 <0.5 ng/dl (Range : 0.7–1.8 ng/dl), anti-TPO (thyroid peroxidase) antibodies: 589 IU/ml (range <35 IU/ml)                                                                     |
| 6 | Specialty             | Endocrinology, psychiatry                                                                                                                                                                                                                                           |