Hypothyroidism is a relatively common disorder, classically presenting with fatigue, cold intolerance, decreased appetite and constipation. Symptoms of psychosis associated with hypothyroidism - termed myxedema madness in 1949 by Asher et al. can be vague and range from inattentiveness, lethargy, delusions, hallucination, depression and delirium (1,2). Alternatively, the behavioral manifestations can be so conspicuous that a primary psychiatric diagnosis is sometimes given as opposed to hypothyroidism. This is a case of a woman presenting with psychosis, secondary to hypothyroidism who had an unusual pattern of remission to baseline after thyroid hormone supplementation.

Patient Presentation

46-year-old female who was brought to the emergency department by her family due to atypical behavior, including: refusing to speak for the last week, poor oral intake, not showering, and aggressively pushing family members. Her family stated they had never see her behave this way before.

Past medical history:
• Depression and anxiety.
• No previous psychiatric hospitalizations.
• Hypothyroidism status post-ablation, over 15 years ago for Graves (non-compliant with levothyroxine).

Review of systems:
• Negative except feeling “really cold.”

Day 1: On admission she was noted to be acting bizarrely including responding to internal stimuli and pacing around the unit.

Admission labs: elevated thyroid stimulating hormone (TSH) 120 mIU/L (normal values 0.5 to 5.0 mIU/L).

Day 2: Patient was transferred to the medical floor:
• Given IV thyroid hormone replacement: levothyroxine 200 mcg twice and a one-time dose of levothyroxine 300 mcg PO.
• Rest of her admission she was taking 300 mcg levothyroxine PO daily.
• Also received two doses of hydrocortisone when initially brought to the medical floor.

Days 3-5: Behavior returned to baseline two days later and remained at baseline for an additional two days.

Day 6: She was again found to be paranoid, delusional, agitated and was tearful, believing that a man previously from her army unit was on the floor purposefully harassing her.

Labs were drawn and her TSH continued to trend downward, reaching 30.9 mIU/L.

That evening, the patient was given 5mg Haldol/2 mg Ativan IM injection for agitation.

Day 7 and 8: Over the next two days her behavior again returned to baseline and she was discharged with a prescription for 250 mcg of levothyroxine daily.

Day 9: On the day of discharge her TSH level was 22.86 mIU/L.

When asked about her thoughts on the previous day’s events she told the treatment team: “I think it was all related to the psychosis, I don’t think it was real”.

Discussion

• Exact mechanism by which a hypothyroid state produces these behavioral symptoms is unknown.
• Animal research has found a correlation between a hypothyroid state and an increase in dopamine levels (3). Increased dopamine levels may be associated with symptoms of psychosis, or with a previous diagnosis of schizophrenia (4).
• Additionally, dopamine agonists such as amphetamine may provoke symptoms of psychosis, while dopamine receptor antagonists reduce psychotic symptoms (4).
• Recommended treatment for myxedema madness is replacement of thyroid hormone, which usually reverses the psychotic symptoms. Interestingly, no correlation appears to exist between degree of thyroid dysfunction and the psychiatric symptoms. (5)
• In this case, the patient returned to her baseline functioning for a period of time once levothyroxine therapy was started, and relapsed back into a psychotic state again for a couple days while her TSH continued to trend downward.
• Many published cases report that upon resolution of the classic symptoms of hypothyroidism (such as lethargy and drowsiness) following hormone replacement, psychotic symptoms such as delusions can persist. In one study, patients reported that months passed before feeling that they had returned to their normal baseline mental status. (6)
• Much more research must still be done to understand the exact relationship between thyroid hormone levels and their influence on brain function and behavior.

Conclusions

Measurement of thyroid function remains an important test during an inpatient psychiatric admission, as psychosis can sometimes be the only presenting symptom, and by treating the underlying metabolic disorder patients may return to baseline functioning. This case suggests that patients should be monitored closely after symptoms improve, as there is a risk that the patient may fall back into a psychotic state easily, even after 48 hours of steady improvement.

References