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(CASE REPORT)

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Severe hypothyroidism approaching myxedema coma: A case report

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Abstract

Severe hypothyroidism is not a presentation that is encountered daily in the hospital setting. Patients' major complaints are generally seen in common diseases or significant past medical history. Active symptoms of myxedema coma may resemble symptoms of chronic medical conditions in exacerbation and may therefore be very challenging to differentiate at first sight. Early recognition of severe hypothyroidism leading to myxedema coma is crucial so that intensive treatment can be initiated upon suspecting a diagnosis, even before receiving lab findings to support it.

We report this rare case of a 57-year-old male with a history of hypothyroidism treated with levothyroxine, who was admitted for congestive heart failure (CHF) exacerbation and severe sepsis due to a complicated urinary tract infection (UTI). On admission, the patient presented with leukopenia and moderate to severe anasarca with pulmonary edema on computed tomography (CT) imaging. Antibiotics and goal-directed medical therapy were reinitiated, except for beta blockers and ACE inhibitors in the setting of hypotension and bradycardia. Subsequently, the patient also presented with clinical symptoms and labs that led us to the diagnosis of severe hypothyroidism approaching myxedema coma. He was experiencing hemodynamic instability after attempting resuscitation protocol, which led us to consult the intensive care unit (ICU) for critical supportive measures. The patient was started on intravenous levothyroxine therapy and hydrocortisone. This treatment approach yielded positive outcomes, as evidenced by improvement in both vital signs and clinical symptoms. This case demonstrates clinical presentation and risk factors that may coincide with other diseases or comorbidities, which could delay the essential treatment of rare diseases like myxedema coma.

Keywords: Myxedema coma; Hypothyroidism; Hypothermia; Levothyroxine

1. Introduction

Hypothyroidism results from low levels of thyroid hormone with varied etiology and can be divided into primary, secondary, or central. Its symptoms vary greatly, as does its etiology and patient presentation. The prevalence of hypothyroidism is about 4.6% globally, with women more likely to be affected (1,2). Severe hypothyroidism, although rare, can present as a far more fatal myxedema coma, whose incidence is estimated to be 0.22 per million patients per year (2).

This pathophysiology contributes to low intracellularly T3 and precipitates multiorgan failures due to a decrease in metabolism causing hypotension, bradycardia, and hypothermia, leading to respiratory depression, cardiogenic shock, infections, and precipitating factors (3,4). It presents with very nonspecific multiorgan dysfunction, which comorbidities can mask. The hemodynamic instability and mortality rates of myxedema coma are as high as 60%, making early recognition and treatment imperative (2).

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2. Case Presentation

A 57-year-old male with a past medical history of CHF, pulmonary hypertension, chronic obstructive pulmonary disease (COPD), and hypothyroidism treated with levothyroxine 75 micrograms (mcg) was admitted inpatient to the hospital due to signs and symptoms of CHF exacerbation and severe sepsis as a result of complicated UTI. The patient was complaining of lower abdominal pain, difficulty voiding, and shortness of breath.

The initial vitals were a temperature of 36.8 C, blood pressure of 124/78 mmHg, pulse of 68 beats/min, respiration rate of 22, and pulse oximetry of 100% with oxygen supplement of a 4 liter nasal cannula. A CT scan of the abdomen and pelvis showed moderate to severe generalized anasarca, severe cardiomegaly, and small bilateral pleural effusions.

Laboratory studies revealed decreased white blood cells of 2.8, decreased sodium of 125 mmo/L, and elevated NT-proBNP of 651 pg/mL. Urinalysis appeared cloudy and was positive for leukocytes and 4+ bacteria, supporting the diagnosis of UTI. Subsequently, the patient became hemodynamically unstable with a blood pressure of 80/48 mmHg. Because of his heart-reduced ejection fraction of 10% to 15%, albumin 25% parenteral infusion was initiated to improve intravascular volume stability. When no significant improvement was appreciated following the infusion, ICU evaluation was requested for hemodynamic support.

The patient showed signs and symptoms that were suspected to be features of myxedema coma, including bradycardia, hypotension, hypothermia, hypoglycemia, and hyponatremia. A thyroid panel revealed TSH of 41.9 u/ml and free T4 of 1.26 ng/dL. Cortisol levels were ordered to rule out adrenal insufficiency. Endocrinology was consulted and free T4 was monitored closely. Intravenous (IV) levothyroxine 200 mcg therapy and IV hydrocortisone 100 mg were initiated along with continued supportive measures, including passive rewarming. After 48 hours, the patient started responding to treatment, and the parenteral levothyroxine dose was decreased from 200 mcg to 100 mcg.

The patient responded to the treatment and became hemodynamically stable. After two days under observation, the hemodynamic support was discontinued and the patient was downgraded from ICU. Levothyroxine was then transitioned from parenteral to oral administration. The infection was treated with antibiotics and guideline-directed medical therapy for heart failure was optimized, as recommended per cardiology. The patient was extensively educated on medication compliance and the severity of complications if severe hypothyroidism developed, leading to a myxedema coma. The patient was discharged on oral levothyroxine 100 mg and scheduled for outpatient follow-up with an endocrinologist.

3. Discussion

This case shows the importance of early management to prevent serious outcomes of severe hypothyroidism. Myxedema coma shares nonspecific symptoms with other common comorbidities and illnesses like heart failure (5). Severe hypothyroidism leading to myxedema coma has a significant mortality rate and can be precipitated by sepsis, CHF, and other conditions. As in this patient, the clinical presentation can be challenging due to generalized symptoms that strongly support a patient's medical history masking the real disease and delaying a critical diagnosis.

A diagnostic scoring system was proposed in 2014 to identify and diagnose myxedema coma immediately. The analysis was performed under logistic regression using a scoring system that includes temperature and neurological, gastrointestinal, and cardiovascular systems. All components of the system seem to be effective when used accordingly, with a 95% confidence interval (0.65 to 1.00) and significant sensitivity and specificity (6). Early recognition of symptoms like bradycardia, hyponatremia, hypoglycemia, hypotension, and hypothermia in our patient prevented severe or life-threatening outcomes.

In cities and rural areas where the economy has been impacted, underserved populations have difficulty maintaining reasonable medication compliance, leading to the exacerbation of diseases and high rates of readmissions (7). Moreover, malabsorption of levothyroxine by autoimmune disease can definitely cause disease progression (8). New data estimated that inpatient mortality is close to 7% with patients who reached the diagnosis of myxedema coma, compared with that of hypothyroidism which is only 0.7% (9). The mortality rate has been decreasing significantly due to improved ICU management, treatment and early recognition (9).

The most challenging aspect is recognizing this uncommon disease on time, as it mimics several common illnesses seen in hospital settings on a daily basis (10). The awareness of this rare disease should be part of the common diagnosis

differentials, and possible implementation of the mentioned scoring system might be beneficial and substantial as a part of triage when it is suspected that the disease or other similar diseases are presented.

4. Conclusion

Myxedema coma is certainly a rare complication, but it is a serious and life-threatening one. Early recognition of this disease and from similar illnesses will increase the chance of survival. It is imperative to hemodynamically support the patient. Starting treatment immediately while waiting for laboratory results is essential for a successful outcome. In this case, the patient significantly improved within 24 hours after starting treatment with high doses of levothyroxine. Hypothyroidism is a disease encountered by many health professionals, and even though encountering patients with a complication of myxedema coma is an uncommon experience, becoming familiar beforehand and responding promptly could save lives.

Compliance with ethical standards

Disclosure of conflict of interest

The above listed authors have no conflicts of interest to declare.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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