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Idiopathic thyroid storm mimicking SIRS in a patient with hypothyroidism- a diagnostic dilemma

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ABSTRACT

Thyroid storm, defined as an endocrine emergency in 1926, remains a challenge for physicians in the 21st century. The mortality rate of untreated thyroid storm is very high. Hence, if a thyroid storm is suspected, treatment should not be delayed. This disease can be fatal! We present the case of a 86-year-old female presenting with altered mental status. All the tests came out negative except for elevated free t4 (ft4) with a very low TSH level (ft4-7.87, TSH< 0.005). Patient was diagnosed with thyroid storm in the setting of subclinical hypothyroidism and improved significantly with treatment. Furthermore, it is essential to confirm the TSH level in a patient with subclinical hypothyroidism. By carefully finding the extent of the disease, one can easily distinguish between hypo-or hyper- thyroid disease. The clinical features of thyroid storm may be related to other co-morbidities which makes diagnosis a clinical challenge. Nonetheless, it is important to be aware of the possibility of development of a thyroid storm in patients with a history of subclinical hypothyroidism. In addition, patients, if diagnosed with a thyroid storm, should be treated immediately with appropriate medications since thyrotoxicosis is life threatening.

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1. Introduction

Thyroid storm, defined as an endocrine emergency in 1926, remains a challenge for physicians in the 21st century [1]. Clinical criteria is the best way to assess the patient as no laboratory abnormalities are specific to the condition. Furthermore, the pathophysiology behind the development of the storm is not well understood. Meanwhile, a heightened response to thyroid hormone along with increased availability of the free hormone makes the process complicated [1]. Subjectively, patients experience differences in signs and symptoms with varying degrees of organ decompensation [1].

Overall the incidence of thyroid storm is pretty rare. In the USA, the overall incidence of hyperthyroidism is estimated to be around 1%, with the majority of cases being subclinical in terms of presentation [2]. Among hospitalized hyperthyroid patients, the incidence of thyroid storm has been noted to be < 10% [2]. However, the mortality rate of thyroid storm without treatment is about 90% [2]. With treatment, the mortality rate drops to about 30% [2]. The most common cause of death is due to multiple organ failure [2]. However, patients may suffer from congestive heart failure, sepsis, or respiratory failure ultimately leading to death as well [2].

Thyroid storm may be secondary to a number of underlying processes [3]. It is most commonly associated with underlying Graves' disease [3]. Regardless of the underlying etiology, the rare transition to a state of thyroid storm usually requires a second superimposed insult. Most commonly this is infection, although trauma and surgery have been reported as other most common causes [3]. The mortality rate of thyroid storm is very high; hence, patients who have survived thyroid storm should receive definitive therapy for their underlying thyroid dysfunction to avoid any recurrence of this potentially fatal condition.

2. Case report

An 86-year-old female with past medical history significant for sub-clinical hypothyroidism presented with altered mental status. She was in her usual state of health when she developed fever and worsening fatigue for 1 day associated with generalized weakness. As per EMS, she was found unresponsive with elevated temperatures at nursing home. No recent trauma or sick episode was reported. Her hypothyroidism was subclinical with normal t4 levels without any acute worsening symptoms in the last few years. On admission, she was febrile with temperature of 103.4F, tachycardic with a pulse of 144 beats per minute, and tachypniec with a respiratory rate of 28 breaths per minute. She was worked up for potential sources of infection including urinary tract infection, pneumonia and meningitis. She was also worked up for renal and hepatic causes in addition to being evaluated for urinary toxins and metabolites to rule out medication overdose. No spurious use of thyroxine-rich compounds was found as per the

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nursing home. On admission, thyroid levels were abnormal with elevated free t4 (ft4) and very low Thyroid-Stimulating Hormone(TSH) levels (ft4-7.87, TSH< 0.005). She was diagnosed with thyroid storm in a setting of subclinical hypothyroidism. She was started on steroids, anti-thyroid medications (propylthiouracil), and beta-blocker (propranolol). During the course of her admission, her ft4 was regularly checked which decreased from 7.87 to within normal range at discharge in about a weeks time. She regained her mental status and was stable (back to baseline) at discharge.

3. Discussion

This case demonstrates a very rare yet clinically significant complication of hypothyroidism, associated with significant morbidity. Thyroid storm represents the extreme consequence of a severe thyrotoxicosis [4]. Fortunately, a thyroid storm is a rare event mostly affecting hyperthyroid patients who have been inadequately treated. It is, however, very rare to see in a patient with hypothyroidism. Theoretically, patients with hypothyroidism (on levothyroxine) can develop a state of thyrotoxicosis. However, reports of subclinical hypothyroidism leading to a thyroid storm is extremely rare and has never been reported in the literature. Prognosis is unfavorable in many cases leading to imminent death, unless adequate treatment is quickly done [4].

Our patient had subclinical hypothyroidism. Suspecting thyroid storm in a hypothyroid patient is usually low on the differential. It is essential to confirm the TSH level in a patient with subclinical hypothyroidism. By carefully finding the extent of the disease, one can easily distinguish between hypo- or hyper- thyroid disease. Furthermore, if a thyroid storm is suspected, treatment should not be delayed. This disease can be fatal! Also, free t4 levels should be monitored every day. Once the ft4 starts to decline, the patient's clinical status will improve rapidly.

In conclusion, development of thyroid storm in a patient with sub-clinical hypothyroidism is a relatively uncommon and dangerous situation. The clinical features of thyroid storm may be related to other co-morbidities which makes diagnosis a clinical challenge. Nonetheless, it is important to be aware of the possibility of development of a thyroid storm in patients with a history of hypothyroidism. All patients with sub-clinical hypothyroidism presenting with altered mental status should be assessed with an initial TSH and free t4 level. In addition, patients, if diagnosed with a thyroid storm, should be treated immediately with appropriate medications since thyrotoxicosis is dangerous. Clinicians must be aware of this rare presentation as this disease can be life-threatening!

Disclosure statement

No potential conflict of interest was reported by the author.

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