Case Report

Psychotic appearances in a young girl: Thyroid storm

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Abstract

Thyroid storm is a rare but life-threatening disease characterized by a severe clinical manifestation of thyrotoxicosis. In this report, a 14-year-old teenage girl presented to the emergency department (ED) under suspicion of sexual assault by her father. The initial vital signs were low-grade fever, sustained tachycardia, and psychosis-like behavior. A series of examinations was performed during the ED survey, but no definite diagnosis was found. After a 24-hour observation period, her consciousness level deteriorated, followed by the onset of seizures. She was promptly diagnosed with thyroid storm. This case should alert ED physicians to the potential clinical significance of thyroid storm in a pediatric patient presenting with psychotic symptoms.

1. Introduction

Thyroid storm is a rare, fatal condition characterized by severe clinical manifestations of thyrotoxicosis, such as congestive heart failure, cardiac arrhythmias, hyperthermia, cognitive dysfunction, and seizure. It can develop in patients with untreated hyperthyroidism or be precipitated by an acute event, such as trauma, surgery, infection, an acute iodine load, or parturition. This disease is not easily diagnosed, particularly in patients who do not have underlying hyperthyroidism. Immediate care is vital because delay of treatment can lead to cardiac collapse or other serious complications.

2. Case report

A 14-year-old girl was brought by her mother and a policeman to our emergency department (ED) under suspicion of having been sexually assaulted by her father. According to the mother, the girl had exhibited strange behavior at a shopping center that morning. She kept walking around by herself in the shopping center with no purpose. Upon noticing her, a store clerk approached and found the girl to be agitated, talking to herself, and unclear. The store clerk informed a policeman for further management. Once the policeman had contacted her mother, she thought that the girl may have been assaulted by her father, which most likely gave rise to psychotic behavioral complications. Consequently, they decided to bring this patient to our ED for a full sexual assault examination.

At the ED, her vital signs were as follows: Glasgow Coma Scale (GCS), E4V4M6; body temperature, 37.4°C; pulse rate, 140 per minute; respiratory rate, 20 per minute; pulse saturation, 98% under room air; and blood pressure, 122/88 mmHg. She was approximately 150 cm tall and weighed 40 kg. She was agitated, fearful of strangers, and mildly confused during the initial contact interview. Her mother stated that she had had low-grade fever and mild cough in the past 5 days. Owing to the suspicion of sexual assault, we promptly consulted with a gynecologist under the standard
found (opening pressure was 12 cmH2O, white blood cell performed under suspicion of meningitis, but nothing was diseases, but the results were normal. A lumbar puncture was tomography to detect the possibility of cranial nerve system signs deteriorated over time. We performed brain computed resuscitation and antibiotic and antipyretic treatment, her response syndrome criteria. Although we prescribed fluid her clinical condition fulfilled the systemic inflammatory speculated that the patient was in a septic condition because and psychiatric disease. Examples of substrate deficiency included substrate deficiency, drug toxicity, medical illness, diagnosis of psychotic appearances. This differential diagnosis patient depended in part on understanding the differential hemodynamic status and conscious level improved dramatically, and a heart disease patient who takes a medications, including a β-blocker, a thioamide, and gluco- corticoids. She was later admitted to the pediatric intensive care unit under the tentative diagnosis of thyroid storm. On the 3rd day, her thyroid-stimulating hormone level was <0.03 mIU/mL (normal range: 0.25—4.00 mIU/mL) and her free T4 was 2.54 ng/dL (normal range: 0.68—1.43 ng/dL). Her hemodynamic status and conscious level improved dramatically after beginning antithyroid medications. She was discharged in a stable condition after 5 days of treatment and hospitalization.

3. Discussion

In this report, making the precise diagnosis for a pediatric patient depended in part on understanding the differential diagnosis of psychotic appearances. This differential diagnosis included substrate deficiency, drug toxicity, medical illness, and psychiatric disease. Examples of substrate deficiency include hypoglycemia in a patient with diabetic mellitus treated by medication, an alcoholic patient who takes ethanol, and a heart disease patient who takes a β-blocker. Additionally, patients with drug overdose or intoxication may also present psychotic appearances. These drugs operate in different ways but exhibit a similar toxidrome. They include anticholinergic drugs (e.g., diphenhydramine, atropine, and scopolamine), anticholinergic plants (e.g., Jimson weed), and sympathomimetic drugs (e.g., pseudoephedrine, amphetamine, methamphetamine, and cocaine). The toxidrome of both anticholinergic drugs and sympathomimetic drugs is similar, except that the former routinely appears as dry skin without sweating, whereas the latter commonly appears as diaphoresis and wet skin. In addition, hallucinogenic agents (such as marijuana, phencyclidine, and ketamine), drug-related syndromes (such as serotonin syndrome, baclofen withdrawal, benzodiazepine withdrawal, and neuroleptic malignancy syndrome), and even steroids can all initially present to the ED with psychotic appearances. Furthermore, some medical illnesses can also give rise to psychotic appearances: a central nervous system abnormality (such as a space-occupying lesion, intracranial injury, stroke, or infection), systemic lupus erythematosus, a metabolic disorder (such as urea cycle defect, in-born error, and Wilson disease), electrolyte imbalance, and thyroid storm.

Except for thyroid storm, we ruled out most of the differential diagnoses for psychosis through history taking, physical examination, and laboratory survey. In contrast, the diagnosis of thyroid storm was based on clinical symptoms and the alertness of physicians. In our case, in the initial stages of history taking, the possibility of sexual assault, the absence of palpable mass in the neck, and the lack of optic proptosis in the patient made the initial diagnosis of thyroid storm difficult. This situation is complicated by the fact that there are no valid, universally accepted diagnostic tools to accurately help identify thyroid storm. One tool that we used to grade the thyroid storm was the Burch and Wartofsky scoring system (Table 1). A score of 45 or higher is highly suggestive of thyroid storm, whereas a score below 25 makes thyroid storm unlikely. Although this scoring system is likely sensitive, it is not very specific. For example, the body temperature of our patient increased to 38.5°C during observation, which scored only a 15, but she had seizure attacks that scored 30 and a heart rate that scored 25. In contrast, she had no signs of heart failure or gastrointestinal—hepatic dysfunction. However, a total score of 70 revealed a high likelihood of thyroid storm.

Thyrotoxicosis is much less common in children than it is in adults. In a national population-based study of thyrotoxicosis in the United Kingdom and Ireland in 2004, the annual incidence was 0.9 per 100,000 children <15 years of age. Females had a significantly higher incidence than males in the 10—14-year-old age group. In contrast to children and adolescents, the annual incidence of thyrotoxicosis was 80 per 100,000 in women and eight per 100,000 in men in another study. A variety of presenting symptoms were reported: weight loss (64%), fatigue/tiredness (54%), change in behavior (50%), and heat intolerance (47%). In thyroid storm, the clinical symptoms are more severe than hyperthyroidism. Cardiovascular symptoms include tachycardia, congestive heart failure, acute pulmonary edema, cardiogenic shock, and even death from cardiovascular collapse.
hyperpyrexia, agitation, anxiety, delirium, psychosis, stupor, and coma are also common. Moreover, severe nausea, vomiting, diarrhea, abdominal pain, and hepatic failure with jaundice can also occur. Physical examination may reveal a goiter, ophthalmopathy, lid lag, hand tremor, and warm and moist skin.

Although thyroid storm is life threatening, it can be managed with aggressive treatment. Cardiovascular manifestations can be effectively controlled by β-blockers, such as propranolol, by blocking the adrenergic tone and peripheral conversion of T4 to T3. Thioamides, such as propylthiouracil or methimazole, are used to block new hormone synthesis, and their effective doses are larger than those used for regular hyperthyroidism. An iodine solution blocks the release of thyroid hormone and should be used at least 1 hour after thioamide prescription. In addition, glucocorticoids are used to reduce T4 to T3 conversion, promote vasomotor stability, and possibly treat an associated relative adrenal insufficiency.\(^\text{11}\)

In conclusion, thyroid storm is a rare but life-threatening condition. It should be included among the differential diagnoses applied to pediatric patients with altered mental status, psychosis, fever without a source, and sustained tachycardia. Emergency physicians should be alert to these cases and initiate prompt treatment to prevent catastrophic complications.

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References