

Case series: Rare Cases of Thyroid Storm in COVID-19 Patients

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Abstract

The present study aimed to present two cases with a history of hyperthyroidism who had symptoms of a thyroid storm along with COVID-19 infection. Therefore, the diagnosis and treatment of these special cases along with COVID-19 should be considered important.

INTRODUCTION

The inflammation and inflammatory responses caused by the Coronavirus Disease 2019 (COVID-19) involve the thyroid¹. Evidence suggests that COVID-19 involves the hypothalamic-pituitary-thyroid axis. Various manifestations of thyroid disease have been observed in COVID-19 cases, including hypothyroidism, thyrotoxicosis, and nonthyroidal illness syndrome². Thyrotoxicosis, which has been observed during the initial phase of subacute thyroiditis and Graves' disease, can be caused by COVID-19 as well²⁻⁴. Thyroid storm is a life-threatening condition accompanied by severe clinical manifestations of thyrotoxicosis; however, it has not yet been reported in COVID-19 cases. Nevertheless, due to the importance of thyroid storm, it is necessary to consider the coincidence of this condition in COVID-19 cases.

CASE REPORT

On December 1, 2020, a 39-year-old man with a previous history of Graves' disease for the past three years and lymphoblastic lymphoma since last year referred to the hospital. He had discontinued hyperthyroidism treatment since the year before, which was methimazole 10 mg. He had undergone four cycles of chemotherapy, and his lymphoma disease was in the remission phase. The patient presented with weakness and fatigue that became severe two weeks before hospitalization. He reported respiratory symptoms, shortness of breath, diarrhea, and urinary frequency. He was also restless and had warm and sweaty skin. Moreover, it is noteworthy that his eye examination results indicated proptosis. At the time of referral to the hospital, he had a fever (39 @C) and tachycardia (pulse=140).

The patient had a history of contact with COVID-19 cases during the last two weeks before admission. Therefore, nasal swabs were collected for the COVID-19 real-time reverse transcription-polymerase chain reaction (RT-PCR) test and the result was positive.

According to the results of the high-resolution computed tomography, there was evidence of patchy areas of ground-glass on the right side. Moreover, based on the electrocardiogram, the patient had atrial fibrillation, and his thyroid function indicated suppressed thyroid-stimulating hormone (TSH) (<0.05 mIU/mL, normal range: 0.35–4.95), elevated free thyroxine (FT4=2 pmol/L, normal range: 0.89-1.7 mg/dl), and normal free triiodothyronine (FT3=2.5 pmol/L, normal range: 1.7–2.7). The patient was evaluated based on the diagnostic criteria of Burch et al⁵. and obtained a score of 60 which included agitation (10), diarrhea (10), 39 @C fever (20), atrial fibrillation (10), and precipitant history (10).

For this patient, treatment for thyroid, COVID-19, pneumonia, secondary infection due to COVID-19 was administered which included antibiotics, vancomycin, imipenem, remdesivir, methimazole, and hydrocortisone. Symptoms of the patient, including heart palpitation and diarrhea relieved, and his level of consciousness improved after three days. Finally, he was discharged in a good general condition after eight days.

The second patient was a 50-year-old man with a 10-year history of hyperthyroidism and was under treatment, including daily consumption of methimazole 5 mg. The patient experienced abdominal pain in the left flank region two weeks before admission to the hospital. Results of the initial imaging were normal, and the patient was discharged with a prescription of painkillers and Tavanex antibiotics; nevertheless, the symptoms and vomiting continued. Moreover, diarrhea and loss of appetite were added to the symptoms. Gradually, the patient developed a fever and his level of consciousness decreased as well. Eventually, on October 5, 2020, he was referred to the emergency room of Imam Reza Teaching Hospital in Mashhad, Iran with delirium, imbalance, and urinary incontinence. He had a fever of approximately 38.5 @C and tachycardia (pulse=100), while the results of other initial examinations were normal.

The test results are as follows: thyroid function was assessed, showing suppressed TSH (<0.01 mIU/mL, normal range: 0.35–4.95), normal free thyroxine (FT4 4 pmol/L, normal range: 1.7-3.7), and elevated free triiodothyronine (FT3 3.1 pmol/L, normal range: 0.89–1.76). Moreover, lung computed tomography scan and echocardiography were normal.

The patient was evaluated based on the diagnostic criteria of Burch et al.⁵ and obtained a score of 60 which included delirium (20), diarrhea, nausea, emesis, and abdominal pain (10), 38.5 @C fever (15), Tachycardia (5), and precipitant history (10).

A thyroid storm was suspected; hence, proper treatment was administrated, including hydrocortisone 100 ml, methimazole 10 mg, and propranolol 20 mg every six h. Given the history of contact with a positive COVID-19 case, a nasal swab sample was collected and examined for COVID-19 RT-PCR which was positive. Therefore, the patient was transferred to the COVID-19 ward for further treatment. In addition to treatment for thyroid storm, he was treated with remdesivir, interferon, and injectable antibiotics. His consciousness gradually increased during the first to sixth days of hospitalization; accordingly, the Glasgow Coma Scale increased from 9 to 14. He opened his eyes to some extent and was able to express his needs and make short conversations. Nevertheless, from the seventh day, he developed respiratory distress and underwent intubation. He was connected to a mechanical ventilator and transferred to the COVID intensive care unit; however, the patient died on the eighth day.

DISCUSSION

Both of the studied patients had thyroid manifestations along with COVID-19. However, despite the administration of the proper treatment for the thyroid storm and improvement of their symptoms, one of them eventually developed respiratory symptoms of cytokine release syndrome and died. It must be noted that the manifestations of COVID-19 and thyroid storm together make a much worse prognosis for the patient. However, in previous studies, there was no evidence of thyroid storm. It must be noted that thyroid storm is a clinical diagnosis that can be confirmed by diagnostic criteria of Burch et al.⁵. Prompt diagnosis of thyroid storm is essential for the reduction of its mortality and morbidity. It is very important to consider the unknown aspects of COVID-19 disease for proper diagnosis and treatment.

CONFLICT OF INTERESTThe authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

NM, MM, and MN were involved with patient management; NM,MM and MN reviewed the literature; NM,MM prepared the manuscript; MM,NM: edited the manuscript; all authors approved the final version of the manuscript.

ETHICAL APPROVAL

It should be noted that this study was approved by the Ethics Committee of Mashhad University of Medical Sciences (code: IR.MUMS.REC.1399.559). All the data were acquired based on the consent obtained from the patients or their guardians.

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