



COVID-19 infection and thyroid function

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ABSTRACT

The novel coronavirus, known as severe acute respiratory syndrome coronavirus-2 (SARS-COV-2), is the cause of the global coronavirus 19 (COVID-19) pandemic that began in late 2019. COVID-19 infection can range from very mild to asymptomatic leading to critical illness and death. Along with several organ systems that can be affected by COVID-19 is the thyroid gland. In some patients, COVID-19 infection can trigger a hypersensitive immune response and widespread inflammation, known as a “cytokine storm.” Since the most common causes of thyroid problems are antibodies attacking the thyroid (autoimmune thyroid disease), this activation of the immune system can also cause inflammation and thyroid dysfunction.

Keywords:

SARS-CoV-2, COVID-19, thyroid gland, subacute thyroiditis.

Target: The aim of the study was to evaluate thyroid function in all patients admitted to hospital with confirmed COVID-19 to determine if this infection was associated with abnormal thyroid function.

On March 11, 2020, the World Health Organization (WHO) declared a pandemic of a new coronavirus infection COVID-19, the causative agent of which is the RNA-containing β -coronavirus SARS-CoV-2, which was first identified in 2019 in Wuhan, the People's Republic of China and received global distribution at an exponentially growing rate. At the time of writing this publication in February 2020, WHO has over 108 million confirmed cases of COVID-19 and over 2 million deaths.[1,2].

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organ systems that can be affected by COVID-19 is the thyroid gland. In some patients, infection with COVID-19 can trigger a hypersensitive immune response and widespread inflammation, known as a “cytokine storm.” Since the most common causes of thyroid problems are antibodies attacking the thyroid (autoimmune thyroid disease), this activation of the immune system can also cause inflammation and thyroid dysfunction. The thyroid may also be affected indirectly as a result of the overall severity of the infection. [2].

Among many medical specialties, COVID-19 is also exacerbating challenges in endocrinology. It is well known that the management of diabetes forms the backbone of the work of most clinical endocrinologists. The COVID-19 pandemic has affected many aspects of endocrine care. It is now well established that diabetic patients are at a significantly higher risk of contracting more severe forms of the disease.[3].

Widely known association with the pathology of the thyroid gland (TG), in

particular with subacute thyroiditis, a number of viral infections, such as influenza, adenovirus, Cocksackie, Epstein-Barr and others. In addition to direct indications of a past infection, antibodies to various viruses are often detected in patients' blood serum, however, the absence of virus antigens in thyroid tissue casts doubt on the direct viral etiology of thyroid disorders. Nevertheless, the inability to identify or the absence of viruses directly in the biopsy or autopsy material of thyroid tissues does not mean that viruses do not play any role in the pathogenesis of thyroid disease.[5].

A key role in the development of thyroid diseases is played by disorders in the functioning of the hypothalamic-pituitary-thyroid system, including disorders in the biosynthesis of thyroid hormones associated with various environmental and/or genetic factors. Pathology of the thyroid gland is multifaceted due to its etiopathological mechanisms.

Autoimmune diseases of the thyroid gland (AIDTG) are primarily a violation of immunoregulation in combination with organic dysfunction resulting from an antigen-specific attack, complemented by insufficient suppression (and, therefore, activation) of lymphocytes, the action of which is directed to antigens on certain target cells, i.e. e. thyrocytes, as well as in combination with the production of various cytokines (for example, interferon gamma (IFN- γ)) that act on target cells at close range. Violation of immunological tolerance underlies the formation of AIDTG, including as part of autoimmune polyglandular syndromes [7].

In the absence of dysfunction of the gland of additional risks or special rules for the prevention and management in case of COVID-19 infection is not observed. But there are a number of special questions that arise in relation to situations with impaired thyroid status. Many of our patients who are on replacement therapy for hypothyroidism, as well as patients with diffuse toxic goiter are anxious about whether their underlying endocrine autoimmune disease or medication creates unfavorable ground in terms of greater risk of infection or greater likelihood of severity.

Of course, there is no evidence that these people are more likely to be infected than the general population. population, but it is worth maximizing the ratio risk and benefit before breaking the maximum possible isolation or hygiene rules in a pandemic. [4,6].

For patients with hypothyroidism, it is important to remember that compliance with the rules of thyroxine replacement therapy increases their resistance to any infection, and poor compensation of hypothyroidism can artificially lower body temperature, making it difficult to adequately assess the severity of an infectious disease and thereby reduce the likelihood of timely assistance. Interruption of thyroxine replacement is unacceptable and should continue both in the hospital and in the intensive care unit.

With diffuse toxic goiter, selected monotherapy with thyrostatics or combined treatment with thyrostatics and thyroxine should also be continued. Since elective surgery or radioactive iodine treatment will be postponed for the time being, conservative tactics should be continued and indications for follow-up studies should be discussed remotely with the doctor.

Patients with diffuse toxic goiter who have recently started thyrostatic therapy should not forget that these drugs have side effects (sore throat and diarrhea) with fever, and these phenomena, formally resembling infection, may be associated with agranulocytosis. Carefully following the instructions will avoid extremely unwanted errors. Persons treated for high-grade thyroid cancer (surgically or surgically in combination with radioactive iodine) should also comply with all necessary preventive measures. And although the form of cancer they have suffered and the treatment they are undergoing do not create any additional risks of infection, there may be concerns due to delays in the planned dynamic examination. It is important to warn patients about a possible delay in the examination of several months and about that it will not harm your health. [9].

Materials and methods.

The study evaluated 93 consecutive patients admitted with COVID-19 infection to

the therapeutic department of the Bukhara Regional General Hospital, in 2020. The non-COVID group included 101 consecutive ICU patients with a thyroid function test. available results admitted to the same institution in 2019. Patients with pre-existing thyroid disease were excluded, so data from 78 patients in the COVID-19 group and 85 patients in the control group were analyzed. Of note, pre-existing thyroid disease was not more common in the COVID-19 group, suggesting that thyroid disease does not predispose to COVID-19 infection. The analysis was carried out using MS Excel.

Research results.

The COVID-19 group was younger and included more men than women compared to the non-COVID control group (mean age 65 vs 73 years; men 69% vs 56%). In the COVID-19 group, 13 of 85 (15%) patients showed hyperthyroidism on thyroid function tests compared to 1 of 78 (1%) in the control group. More men than women had abnormal thyroid function tests (64% vs 36%). In patients with hyperthyroidism, serum TSH levels were low, while serum free T levels were low. T4 levels remained within the normal range and were similar in both groups. Without serum T3 levels were low and similar in both groups. Serum CRP levels were higher in the COVID-19 group than in the control group. No patient reported neck pain, which is usually associated with an episode of subacute thyroiditis. Among patients in the COVID-19 group who were followed up after discharge, 6 patients with primary thyroid tests suggestive of hyperthyroidism had normal thyroid function tests 1.5–2 months later. Some of these patients had a thyroid ultrasound and scan that showed clear signs of thyroiditis. This supports the idea that the abnormal thyroid function tests noted in patients with COVID-19 may be secondary to subacute thyroiditis. Some of these patients had a thyroid ultrasound and scan that showed clear signs of thyroiditis. This supports the idea that the abnormal thyroid

function tests noted in patients with COVID-19 may be secondary to subacute thyroiditis.

Findings.

The results of this study showed that thyroid dysfunction is common in patients with COVID-19, with low TSH most commonly found. Low TSH levels appear to be associated with higher levels of the inflammatory cytokine IL-6 in Lanya's study, while Mueller's study found that a significant proportion of COVID-19 patients requiring intensive care initially have low TSH levels. which may indicate hyperthyroidism. phase of subacute thyroiditis. While more research is needed, these studies suggest that COVID-19 associated with systemic immune activation can cause thyroid inflammation and lead to hyperthyroidism or thyroiditis.

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