Changes in the thyroid gland in the long period after a new coronavirus infection

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Abstract: Three years of the pandemic of the new coronavirus infection SARS-Cov-2 (SC-2) have raised a number of questions for doctors of various specialties regarding the mechanisms of action of this infection on the human body. The main target of coronavirus, undoubtedly, is the vascular system, but in such patients, doctors also identify many complications from other systems, including the endocrine system [1-3].

Keywords: new coronavirus infection; thyroid; euthyroid goiter, TAPB, TSH, at-TPO

INTRODUCTION. Recent scientific studies note that the development of euthyroid pathology syndrome in SC-2 is associated with changes in the hypothalamic-pituitary-thyroid system [4;5]. Thus, in the acute period, as well as the next six months after an SC-2 infection, cases of manifestation of Graves' disease, the development of central transient hypothyroidism, subacute and painless thyroiditis have been described [5; 6; 7], which is associated with the reaction of the immune system to a viral infection [8; 12]. At the same time, questions about the dynamics of changes in the thyroid gland (TG) in patients with thyroid pathology in the long-term period after undergoing SC-2 remain open [9; 10] and require detailed study[11].

PURPOSE OF THE STUDY: To investigate the impact of the new coronavirus infection (SC-2) on patients with chronic thyroid pathology in the long-term period and determine the features of their management in a pandemic.

MATERIAL AND METHODS RESEARCH: The work was carried out on the basis of the Samarkand State Medical Institute, the Endocrinological Center of the city of Samarkand, where consultations were held for patients with thyroid diseases. A retrospective study of medical records and a prospective study of patients with thyroid pathology who did not require surgical treatment were conducted from 2021

to 2023. At the beginning of the pandemic, 812 patients with thyroid diseases who did not require surgical correction were under follow-up observation by an endocrinologist surgeon. The age of the patients ranged from 29 to 82 years (52.8±8.1); women prevailed (86.7%). The study included patients with a follow-up period of more than three years (mean 3.59±1.13 years). Confirmed previous SC-2 was in 49% (399 people). The study included 200 patients divided into two groups. The main group consisted of 100 people who had suffered from SC-2, a comparison group, and also 100 patients without a confirmed history of SC-2. Randomization of patients into groups did not reveal significant differences in gender and age. The examination of patients was carried out 6-12 months after undergoing SC-2 and included determination of the hormonal status of the thyroid gland: thyroid-stimulating hormone (TSH), thyroxine (T4 light), triiodothyronine (T3 light), antibodies to thyroid peroxidase (at-TPO), ultrasound examination (ultrasound) of the neck organs, fine-needle puncture biopsy (FNAB) under ultrasound control, scintigraphy and computed tomography (CT) as indicated. FNA was performed in 23 patients of both groups. In all cases, the cytological picture of Bethesda II was noted, in 6 - with a concomitant autoimmune reaction. A feature of the new SC-2 pandemic was that, due to epidemiological restrictions, not all patients were able to visit a doctor in a timely manner and undergo dispensary observation. The endocrine and surgical departments of the hospital did not function during the pandemic due to repurposing to provide specialized care to patients with SC-2. Statistical processing of the study results was performed using the Statistica 8.0 and Biostat package. The results were processed by variation statistics using the Fisher-Student method.

RESEARCH RESULTS: Nosologically, nodular euthyroid goiter prevailed (78%), the remaining 22% were autoimmune thyroiditis with nodulation, recurrent postoperative goiter, and postoperative hypothyroidism. In the comparative characteristics of the studied groups, we noted the following patterns. In the main group of patients with nodular euthyroid pathology who underwent SC-2, in comparison with the control group, there was often a significant ($t=2.856$; $p=0.004$) trend towards an increase in gland volume: 28 and 11%, respectively. A moderate increase in thyroid volume of 15-30% was also significantly more often observed in the main group and amounted to 16 and 9%, respectively ($t=1.283$; $p=0.047$). A significant increase in gland volume (>30%) in the main group of patients was 12%, in the comparison group 2% ($t=2.494$; $p=0.013$). There is also a tendency towards more pronounced growth of nodes in patients of the main group; it was 18%, while in the comparison group only 4% ($t=2.938$; $p=0.003$). A moderate increase in the size of the node(s) was 16% in the main group; 4% in the comparison group ($t=2.593$; $p=0.042$). A significant increase in the size of nodes over 30% in the main group was 2%, in the comparison group - 0% ($p>0.05$). Noteworthy is the tendency for the

appearance of new nodes in the main group of patients - 10%, while in the comparison group - only 4% (t = 1, 386; p = 0.116). In the group of patients with recurrent postoperative goiter, there was a moderate increase (15-30%) in the volume of thyroid remnants and nodes in both groups, while in the main group it was 8%, and in the comparison group - 3% (t=1.386; p=0.035) [16,17]. In a comparative assessment of the course of postoperative hypothyroidism against the background of replacement therapy, an increase in TSH above 4 mmol/l was noted in 9% of patients in the main group (7.32±1.83 mmol/l) and in 3% (5.24±1.18 mmol/l). k) patients in the comparison group (t=1.489; p=0.137). Noteworthy is the difficulty of correcting hypothyroidism in the main group of patients after SC-2, which was achieved by a longer selection of drug dosages. In patients of both groups with autoimmune thyroiditis with nodulation, the growth of nodes was not noted (p>0.05), but there was a tendency towards a moderate increase (15-30%) in thyroid volume with a predominance in the main group (5%), whereas in the group comparison, this figure was (2%; p>0.05). Thyroid status in both groups remained unchanged (p>0.05). In 4% of patients who underwent SC-2, in contrast to the comparison group (p>0.05), autonomization of thyroid nodes was noted, while patients with autonomization of nodes according to the hormonal spectrum were in the group of subclinical hyperthyroidism. Since the second half of 2022, surgical assistance has been provided to 13 patients: three due to the autonomization of thyroid nodules, and the rest due to a tendency to rapid growth in thyroid volume or nodule size. In 8 cases, thyroidectomy was performed, in 5 cases, hemithyroidectomy. No postoperative complications were observed[13,14,15].

DISCUSSION OF RESEARCH RESULTS: Thus, we have discovered statistically significant changes indicating an unfavorable effect of coronavirus SC-2 on the thyroid gland, which are detected not only in the early period after the infection (the so-called post-Covid syndrome [6]), but also persist in the long-term period. In patients with euthyroid endocrine pathology who underwent SC-2, the following changes were revealed: an increase in the volume of the thyroid gland (t=2.856; p=0.004), an increase in the size of the node(s) (t=2.938; p=0.003) and a tendency to the appearance of new nodes (t=1.386; p=0.116). In addition, there were tendencies towards autonomization of the node(s) (4% in the main group; and 0% in the comparison group, p>0.05), and towards the development of subclinical hypothyroidism during replacement therapy (t=1.498; p =0.137). Undoubtedly, the present study does not provide a complete picture of the possibly global changes that occur in the structure of thyroid pathology against the background of the new coronavirus infection SC-2, which requires further study of this problem. The SC-2 pandemic, which lasted more than two years, revealed a number of problems: the peculiarities of the influence of the virus on all organs and tissues, including the

thyroid gland, as well as the collapse in the provision of routine specialized care in healthcare. Due to the violation of the “clinic-hospital” roadmap, significant difficulties were noted in the early diagnosis of the changes that have arisen and a delay in their timely surgical correction. Currently, the planned waiting list for surgical treatment of patients with thyroid pathology is delayed by 3-4 months.

CONCLUSIONS

1. The adverse effect of coronavirus on the thyroid gland persists in the long term after a new coronavirus infection.

2. Much organizational work is required to improve the rehabilitation and treatment of patients with thyroid diseases who have undergone SC-2

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