

SECTION 15.  
MEDICAL SCIENCES AND PUBLIC HEALTH

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**COMORBID DISEASES OF THE THYROID GLAND  
IN PATIENTS WITH MALIGNANT BREAST TUMORS,  
WHO SUFFERED FROM THE CHORNOBYL  
ACCIDENT**

**Introduction.** Secrete exogenous and endogenous risk factors for breast cancer. Exogenous factors include ionizing radiation, which is in the first place among these factors [1, 2]. As endogenous factors, allocate factors that are associated with the reproductive system of the body, genetic factors, endocrine – metabolic factors, which include diseases of the thyroid gland (TG) [3–5].

M. Y. Sokolova, T. V. Varlamova (2005) reported the presence of the thyroid dysfunction – hypothyroidism on the background of nodular goiter – 13.9 %, autoimmune thyroiditis – 34.7 %, diffuse enlargement of the TG – 19.4 % in women in premenopausal and menopausal period. Menopause in women with hypothyroidism occurs earlier [6]. A number of sources indicate the direct effect of thyroid hormones on the proliferation of epithelial cells of the lobular – alveolar structures of the mammary gland by regulating the level of epidermal growth factor receptors [7–9].

As increase in T3 and T4 concentrations above normal in serum has an inhibitory effect on the level of prolactin. A decrease in plasma T3 and T4 levels increases the release of prolactin and, accordingly, causes the development hyperprolactinemic states. State of hyperprolactinemia in primary hypothyroidism is called the Van-Wieck-Hennes-Ross syndrome. Adequate replacement therapy for hypothyroidism with thyroid hormones in this state leads to normalization of prolactin secretion [10, 11].

Different disorders of the hormonal status in women with thyroid pathology can lead to changes in the receptor system in the mammary glands and the development dysendocrine hyperplasia in them. The severity of proliferative changes does not always correlate with the severity of thyroid dysfunction. Even subclinical forms of thyroid disorders can cause pathological changes in the lobular – alveolar structures of the mammary glands, which will have certain clinical manifestations. However, we can expect a tendency to increase the severity of these

changes when a large number of regulation factors (hormonal, metabolic, ionizing radiation and others) are involved in the process of their formation, which dictates the need to study this issue [12–15].

**Aim.** The objective is to study the nature of structural and functional changes in the thyroid gland in patients with malignant tumors of the mammary glands that have suffered from the Chernobyl accident.

**Materials and methods.** Examination of 80 patients with malignant tumors of the mammary glands at the age of 27–85 years. In 78 patients were diagnosed with breast cancer with stages of the spread of the tumor process: T1N0M0 – 8 patients, T1N1M0 – 2 patients, T2N0M0 – 8 patients, T2N1M0 – 23 patients, T2N2M0 – 1 patient, T3N1M0 – 11 patients, T4N1M0 – 10 patients, T4N2M0 – 2 patients, T2N1M1 – 1 patient, T4N3M0 – 1 patient, T3N1M1 – 2 patients, T4N1M1 – 4 patients, T4N2M1 – 1 patient, T4N3M1 – 4 patients; breast sarcoma – T2bN1M0 – was diagnosed in 1 patient; carcinosarcoma – T3N0M0 – in 1 patient. The participants in the aftermath of the accident were 12 people, living in radiation – contaminated areas – 68. The exposure dose was known to 64 people and average ( $7.57 \pm 2.22$ ) cSv ( $9.85–20.15$  cSv) for the participants in the emergency response and ( $1.13 \pm 0.26$ ) cSv ( $0.14–2.12$  cSv) for those living in radioactive contaminated areas.

Mammography was performed in two projections: craniocaudal-straight and oblique-side, with the help of mammographs Senographe 700 T and 800 Tsm (firm GE Medical Systems).

Echographic study of the structure of the mammary gland and the thyroid gland was performed on the ultrasound devices Nemio XG SSA-580, № 2B730- 815 ENA (firm Toshiba Medical Systems corporation), Nemio XG SSA-580, № 2B730-815 RU, № E7B1124930 (firm Toshiba Medical Systems corporation) by linear sensors with a frequency of 10 MHz. Computed tomography was performed on a multi-detector computed tomography 64 KT «LightSpeed VCT» (firm General electric). MRI was performed on a magnetic resonance imager «Magnetom Vision Plus 1.5 T» (firm Siemens).

For trepan biopsies, special needles were used in combination with a biopsy system gun «Magnum», which makes it possible to obtain a tissue column sufficient for histological examination, and for determining estrogen receptors, progesterone, as well as immunohistochemical determination of the expression level HER-2/neu.

The functional state of the thyroid gland was studied by studying the level of the thyroid hormone free fraction – thyroxin, TTG and the titer values of antibodies to thyroid peroxidase (TPOAb) in peripheral venous blood by an immunochemical method with electrochemiluminescent detection.

**Results and discussion.** According to the results of the ultrasound study on the structural changes in the TG and markers that characterize the functional state of the TG in women with breast cancer, show that 60 out of 80 patients who asked for help with various forms of breast cancer and examined in the clinic, revealed the presence of structural changes in the thyroid gland, which is 75 %.

Thyroid nodules were diagnosed in 38 patients, which is 47.5 %, so multinodular goiter was detected in 14 cases – 17.5 %, nodular goiter in 26 women – 26.25 %, and 3 patients revealed a nodular goiter in combination with chronic autoimmune thyroiditis (CAIT) – 3.75 %. Cystic changes in the TG were detected in 2 patients – 2.5 %, chronic thyroiditis – in 3 patients – 3.75 %, CAIT – in 6 patients – 7.5 %, areas of mixed echogenicity – small hydrophilic areas and small fibrotic – altered areas in 8 patients – 10 %. 3 patients underwent surgery for the removal of the TG, which is 3.75 %. Structural changes in the TG with ultrasound were not detected in 20 patients with breast cancer, which is 25 %.

When analyzing the nature of structural changes in the thyroid gland, depending on the stage of prevalence of the tumor process, it was found that in 10 patients (12.5 %) with a tumor process in the mammary gland, which corresponds T1N0M0, 4 of them had nodular goiter, in 2 patients – areas of mixed echogenicity, 1 patient underwent surgery for the removal of the thyroid

gland, 1 patient had CAIT, 1 patient had CAIT and nodular goiter and 1 patient had no structural changes in the thyroid gland.

Of 3 patients (3.75 %) where the stage of the process corresponded T1N1M0, in 1 patient there was a nodular goiter, in 1 patient chronic thyroiditis and in 1 patient no structural changes in the thyroid gland were detected.

Among 6 patients (7.5 %) with a stage T2N0M0 – in 1 patient, structural changes in the thyroid gland were not found, in 2 patients – areas of mixed echogenicity were found, where small hydrophilic areas alternate with small fibrotic areas, in 1 patient – nodular goiter and 2 patients underwent surgery in the amount of removal of the thyroid gland.

In 24 patients (30 %), the tumor corresponds T2N1M0, in 9 patients structural changes in the TG ultrasound not were found. Multinodular goiter was diagnosed in 3 patients, nodular goiter – in 6 patients, but in 2 of them both nodular goiter and CAIT were diagnosed. CAIT as an independent disease was detected in 4 patients and chronic thyroiditis – in 2 patients.

In 11 patients (13.5 %), where mammary gland neoplasms corresponded to the stage T3N1M0 – a multinodular goiter was detected in 2 patients, in 4 patients with a nodular goiter, CAIT in 1 patient, CAIT and multinodular goiter in 1 patient, in 3 patients the structural changes in the TG were not identified. Thus, nodules in the TG were found in 7 patients from 11 patients. In 9 women (11.75 %) with a tumor process that corresponded – T4N1M0 – the nodular masses in the thyroid gland were found in the majority of patients, namely, in 5 patients. 3 of them had a multinodular goiter, 2 nodular goiter, 1 patient had small hydrophilic areas with small fibromodified areas, 1 patient had cysts, 1 patient had cysts in both lobes of the thyroid gland, 2 patients had structural changes in the thyroid gland not detected.

In 2 patients (2,5 %) with a tumor process T4N2M0 – an edematous – infiltrative form of breast cancer, cystic changes in the thyroid gland were diagnosed and in 1 patient with a nodular goiter.

In 2 patients with a common process T4N3M0 (2.5 %) in the thyroid gland in 1 patient small hydrophilic areas and small fibro – modified areas were found, in another multinodular goiter.

2 patients (2.5 %) with disseminated stage of the process T4N1M1 – had a nodular goiter and in 1 patient no changes in the thyroid gland were detected. Patients diagnosed with breast cancer, which corresponds to the stage T4N2M1 (2.5 %) in the TG in 1 patient was diagnosed with a nodular goiter, in another patient no pathological changes in the TG were revealed. In 1 patient (12.5 %) with breast sarcoma, which corresponds to the stage T2bN1M0 – small hydrophilic and small fibro – modified areas in the thyroid gland were found. 1 patient (12.5 %) with a tumor stage T2N1M1 (metastatic liver damage) had a nodular goiter.

With the stage T3N1M1 of the tumor process, 2 patients were treated – 2,5 %, 1 of them had CAIT and a multinodular goiter, 1 patient had no structural changes in the thyroid gland after ultrasound examination.

5 patients with diagnosed breast cancer, which corresponded to the stage T4N3M1 (6.25 %) in the thyroid gland, were diagnosed with multinodular goiter in 3 patients, CAIT in 1 patient and 1 patient no pathological changes in the thyroid gland were detected.

FT4 indicators over a certain normal level were detected in 1 patient, which is 1.25 % of the examined patients with breast cancer. This patient had a tumor stage T2N1M0 and with ultrasound examination of the thyroid gland structural changes were not identified.

Changes in TSH levels were observed in 6 patients (7,5 %). In 1 patient, who had a tumor stage T2N1M0, the levels of TSH were below normal and in 5 patients with stage T4N1M0 and T4N3M1 and in 3 patients with a stage of tumor process T2N1M0, they exceeded the upper limit of normal. 2 patients had CAIT, 2 patients showed no changes in the thyroid gland, 2 patients had nodular and multinodular goiter. It should be noted that in all 3 cases where there were changes in the levels of T4 and TSH in the histological structure, there was infiltrating ductal carcinoma of the mammary gland.

Digital values of TPOAb above the norm were recorded in 15 patients – 18.75 %. This indicator indicates the presence of autoimmune changes in the thyroid gland, that is, the presence of CAIT. It should be noted that the digital values of this indicator were in the range of increase from 36.22 IU/ml to 1000 IU/ml, with its normal values to 34.0 IU/ml. On average, the indicator amounted to 318.05 IU/ml and exceeded the upper limit of normal values by an average of 9.35 times, and sometimes even 29.41 times.

All patients revealed structural changes in the TG with ultrasound examination. 9 patients had nodular changes in the TG, more precisely, 4 of them had a multinodular goiter, and 4 patients had a nodular goiter. In 5 patients with ultrasound examination, a diagnosis of CAIT was established, in 1 patient of them – nodular goiter and CAIT were diagnosed, 1 patient had cystic changes in the TG and 1 patient was diagnosed with hydrophilic and fibrous areas in the TG. As can be seen from the analysis, in all patients, except for elevated TPOAb values, structural changes in the TG are predominantly nodular. 8 patients with CAIT were categorized as patients who had a stage T2N1M0, 1 patient with a stage T2N0M0, 1 patient with a tumor stage T3N0M0, 2 patients had a stage T3N1M0, and 3 patients were with a stage T4N1M0. Thus, it can be said that all patients were with locally – common tumor process in the mammary glands. 9 patients who had changes in indicators of TPOAb had invasive ductal carcinoma and 1 patient had an invasive carcinosarcoma of the mammary gland, 3 patients had an invasive lobular carcinoma and 2 patients had an invasive nonspecific carcinoma. It should be noted that in 1 patient the digital values of TPOAb were at the upper limit of the norm. This was a patient with invasive ductal carcinoma and nodular goiter. Thus, we can assume that CAIT was in 16 patients, that is, in 20 % of the total number of patients with breast cancer who were analyzed.

Structural pathological changes in the thyroid gland were not identified in 20 patients with breast cancer – 25 %. Among them, 10 patients were with the stage T2N1M0, 1 patient was with the stage T1N0M0 and 2 patients had a common process that was treated to the stage T3N1M0, 3 patients were treated to the category T1N1M0 and 4 patients had disseminated forms of breast cancer. So, in 1 patient the tumor process corresponded T3N1M1, in 1 patient – T4N1M1, in 1 patient – T4N2M1, and in 1 patient – T4N3M1. All tumors were invasive ductal carcinoma by histological structure.

### Conclusions.

1. Structural changes in the thyroid gland in patients with breast cancer, who are considered victims of the Chernobyl nuclear power plant accident, were diagnosed in 75 %, of which 71.25 % of patients did not know about the presence of pathological changes in the thyroid gland before the examination in the clinic. In the structure of the identified pathological changes in the thyroid gland, 47,5 % accounted for the nodular goiter, 10 % for small hydrophilic and small fibrous areas, 3.75 % for previously undergone surgery for thyroid removal, 3.75 % for chronic thyroiditis, 7.5 % – CAIT, 2.5 % – cystic changes in the thyroid gland, 3.75 % – nodular goiter and CAIT.

2. Changes in indicators that characterize the functional state of the thyroid gland in patients with breast cancer were found in 27.5 % of patients. An increase in FT4 was noted in 1.25 %, a change in TSH in 7.5 %, a change in the values of TPOAb in 18.75 %. CAIT with ultrasound examination was diagnosed in 2.5 % of patients, by studying antibodies to thyroperoxidase in peripheral venous blood in 18.75 % of patients.

3. All patients with elevated levels of TPOAb revealed structural changes in the TG during ultrasound examination. In the majority – 11.25 % of 18,75 % of patients were diagnosed with nodular changes in the TG. In 5 % of patients with ultrasound, the picture is characteristic of CAIT, in 1.25 % of patients cystic changes in the TG are diagnosed and in 1.25 % of patients with hydrophilic and fibrous areas in the TG.

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