

## COMPARATIVE STUDY OF THYROID STATE IN NEW CASES OF PULMONARY TUBERCULOSIS AND TUBERCULOSIS CASES TREATED PREVIOUSLY

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**Abstract.** *An epidemic situation on tuberculosis in Ukraine is characterized the height of relapses of the disease. Because tuberculosis shows an immune deficient disease, and a thyroid actively participates in forming of antituberculosis immunity, comparative study of thyroid state in new cases of tuberculosis and cases previously treated is of currency. In 60 patients (30 persons with new cases of tuberculosis and 30 persons previously treated) echostructure of thyroid is studied, and also the levels of free thyroxine, thyroid stimulating hormone and antibodies to thyroglobulin and thyreoperoxides are measured by immune-enzyme method in a blood stream. Pathology of echostructure of thyroid is diagnosed in 53, 33% of new cases of tuberculosis and in 60, 66% of cases previously treated. The level of free thyroxine was significantly lower and level of thyroid stimulating hormone was significantly higher in new cases comparing with persons previously treated. The percentage of autoimmune thyroiditis and the percentage subclinical hypothyroidism were higher in new cases comparing with persons previously treated. The changes found is the ground for recommendation to screen thyroid state persons with tuberculosis relapsed and treatment failure.*

**Key words:** *pulmonary tuberculosis, relapse, thyroid pathology.*

Regardless of the stabilization of the morbidity of tuberculosis epidemic situation in Ukraine in total remains to be strengthen. Nowadays the most threat is multidrug-resistant tuberculosis spreading [5] and as the result the increasing of rate of cases with relapsed tuberculosis and cases of treatment failure. Relapsed tuberculosis is characterized by more severe clinical and x-ray signs of the disease in compare with firstly diagnosed cases [3]. According to WHO data multidrug-resistant tuberculosis is diagnosed in 16% patients with firstly diagnosed tuberculosis and in 44% patients

with relapsed disease. The efficacy of treatment of patients with relapsed tuberculosis in Ukraine was 34,2% and 35% in treatment failure in 2012. The patients with relapsed pulmonary tuberculosis and treatment failure represent a great threat epidemic due to massiveness of bacilli expelling and drug-resistance of mycobacterium tuberculosis (MTB). The causes of relapses are still remaining insufficiency studied. At the same time it is known that concomitant diseases influence on the development of relapses playing the role of trigger mechanism in tuberculosis process reactivation [4]. Thyroid pathology with insufficiency of thyroid function affects on the reactivation any of immunodeficiency disease because thyroid hormones stimulate T-lymphocytes forming immune response of the body to tuberculosis infection [2,6,7,8]. That is why the study of thyroid state in previously treated tuberculosis (relapsed tuberculosis, treatment failure) is of currency.

Above mentioned is the ground of **the main goal of the research**: comparative study of thyroid state in patients with new cases of tuberculosis and previously treated tuberculosis (relapsed tuberculosis, treatment failure, treatment after interruption and other cases of revised treatment).

**Materials and Methods:** 60 patients treated in Kharkov region antituberculosis dispensary N1 during 2010-2014 years. 30 persons at the age of 18 to 58 years (in average - 35,18 years) composed the group of firstly diagnosed tuberculosis (FDTB). 30 persons at the age of 18 to 60 years (in average - 38, 81) composed the group with previously treated patients (PTTB). This group included 16 patients with relapsed tuberculosis, 9 patients with treatment failure, 3 patients with chronic case of tuberculosis («other TB») and 2 patients with treatment interruption. There were 18 men (60%) and 12 women (40%) in group FDTB and there were 20 men (66,66 %) and 10 women (33,33%) in group PTTB. Infiltrative pulmonary tuberculosis prevailed in both groups. Infiltrative tuberculosis was diagnosed in 26 patients (86,66%) in group FDTB. 3 patients of this group suffered with caseous pneumonia and 1 patient had disseminated pulmonary tuberculosis. Infiltrative tuberculosis was

diagnosed in 26 patients (86,66%), 2 patients suffered from fibrous-cavernous tuberculosis and 1 patient had infiltrative-ulcerous tuberculosis bronchitis in group PTTB. Every patient with pulmonary tuberculosis had a cavitation. Tuberculosis in all 60 patients followed by bacilli expelling. Thus, gender, age and structure of the morbidity were approximately equal in both groups.

Echostructure of thyroid was investigated in every patient. The levels of free thyroxine and thyroid stimulating hormone were measured in the bloodstream of everybody before starting of antituberculosis chemotherapy. Echostructure of thyroid was examined with diagnostic apparatus SSF-240A by Toshiba Medical Systems production and the hormone were measured by immune-enzyme method with the aid of «ALCOR BIO» (Saint-Petersburg, Russia) and spectrum-photometer Tecan Sunrise (Austria).

**The Results and Discussion:** as a result of the study the pathology of the volume and/or structure of the thyroid was diagnosed in 16 patients (53,33%) from group FDTB and in 20 patients (60,66%) from group PTTB. In FDTB patients pathological changes realized mainly in a changing of thyroid volume (more frequently in its hyperplasia than in hypoplasia. Euthyroid state was kept in most of patients. In group PTTB diffused pathology of thyroid like autoimmune type prevailed. Diffused pathology implies diffused decreasing of echogenicity of the thyroid with inclusions of more high echogenicity following by the picture of heterogenicity (“mosaic picture”) of a acoustic density of thyroid and also unequal its structure as moderate and large germicides (Table 1). Autoimmune thyroiditis (AIT) with subclinical hypothyroidism was diagnosed in 6,66% patients with FDTB and in 16,66% cases of PTTB. Besides in the group of PTTB in 2 patients nodular euthyroid goiter was diagnosed and 1 patient from this group had diffused toxic goiter of 4 degree (viscera pathology form). The parameters of hormone significance of this case were not included in group moderate significance of this case.

Within the investigation of hormone state reliable more low significance of free thyroxine ( $12,06 \pm 1,78$  pmol/l) was established in group of PTTB comparing with the group of FDTB ( $14,02 \pm 1,29$  pmol/l). The results of the study also demonstrated reliable more high significance of thyroxine stimulating hormone ( $2,51 \pm 0,34$  mkIU/ml) in group of PTTB comparing with the group of FDTB ( $1,27 \pm 0,51$  mkIU/ml)).

Table 1.

### Pathological changes of thyroid, revealed by ultrasound scanning

Groups of patients	Changes of thyroid volume,	AIT, euthyreosis	Nodular euthyroid goiter	Diffused toxic goiter	AIT, subclinical hypothyroidism
FDTB	13 (43,33%)	1 (3,33%)	-	-	2(6,66%)
PTTB	5 (16,66%)	7 (23.33%)	2 (6,66%)	1 (3,33%)	5(16,66%)

The results of performed investigations reflects the decreasing of thyroid activity in persons previously treated for tuberculosis including relapses of the disease and treatment failure comparing with the persons with firstly diagnosed pulmonary tuberculosis. More high percentage of thyroid pathology found in patients previously treated for tuberculosis can partly explain treatment failure by concomitant disease – thyroid pathology. Besides, the decreasing of thyroid pathology in this group of patients, from one side, reflects inhibitory influence of antituberculosis drugs [1], from other side, is the ground for examination of the persons with relapsed tuberculosis, treatment failure and other groups of previously treated patients for thyroid pathology. Thus, such patients must undergo ultrasound examination of thyroid meaning to reveal morphological changes and also the level of thyroid stimulating hormone in the blood must be measured for timely diagnosis of thyroid

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function changes. One of the cause of more low efficacy of chemotherapy of patients previously treated for tuberculosis may be the decreasing of thyroid activity supplying adequate immune response to tuberculosis infection.

### **Conclusions:**

1. More than in half of tuberculosis patients changes of structure and volume of thyroid gland as its hypoplasia and hyperplasia.
2. In patients with relapsed tuberculosis, treatment failure, treatment after the interruption and other groups of patients previously treated for tuberculosis more high rate of pathological changes of structure and volume of thyroid gland (63,66%) comparing with the patients with firstly diagnosed pulmonary tuberculosis (53,33%).
3. High rate of autoimmune changes of thyroid gland (60%) and also subclinical hypothyroidism (16,66%) is the ground for necessity of the screening of thyroid state of previously treated patients. Ultrasound examination of thyroid gland and measurement of thyroxine stimulating hormone level in free blood storm is recommended for screening of previously treated tuberculosis patients.

### **References.**

1. S.L.Matveyeva The Influence of Antituberculosis Chemotherapy on the Thyroid Function // Collection of scientific publications of Main Military Clinical Centre “MMCH” of Health ministry of Ukraine «Modern Aspects of Military Medicine», Kiiiv. – 2010. - N 17. – P.264-270.
2. S.L.Matveyeva The Role of Previous Thyroid State in the Formation of Cellular Immunity and Outcomes of Chemotherapy of Patients with Cavitory Pulmonary Tuberculosis // Problems of Endocrine Pathology. – 2011 -N3. – P.35-43.

3. V.M. Petrenko, S.A. Cherenko, I.B. Byalik et al Evolution and Efficacy of Anti-mycobacterium Therapy of Patients with Relapsed Tuberculosis // Ukrainian Pulmonology Journal. – 2009. – N3. – P.14-19.
4. O.V. Rukosueva Clinical and Microbiological Peculiarities of Relapsed Tuberculosis or Respiratory System // Problems of Tuberculosis. – 2008. – N10. – P.28-31.
5. The Centre of Medical Statistic of Health ministry of Ukraine. Tuberculosis in Ukraine (analytical-statistic hand-book for 2000-2011 years) // Under red. . Tolstanov - ., 2012. - 98 p.
6. S.A. Cherenko, S.L. Matveyeva Correlation between Clinical Running of Pulmonary Tuberculosis, Thyroid Function and Some Cytokines // Ukrainian Pulmonology Journal. 2011. -N2. - P.35-38.
7. L.R. Frick, , U.A. Rapanelli, A.J. Klecha et al Involvement of thyroid hormones in the alterations of T-cell immunity // Biol. Psychiatry. – 2009. V.11. – p.935-942.
8. C. F. Hodkinson, E. A. Simpson, J. H. Beattie, J. M. O'Connor et al Preliminary evidence of immune function modulation by thyroid hormones in healthy men and women aged 55–70 years // J. Endocrinol . – 2009. – V. 202. – p. 55-63.

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