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CHANGES IN HAEMOGRAM OF PULMONARY TB PATIENTS DURING POSITIVE CLINICAL AND RADIOLOGY IMPROVEMENT

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Summary

We studied changes in the complete blood count in 48 patients with infiltrative and disseminated pulmonary tuberculosis before and after treatment against positive clinical and radiographic improvement.

The haemogram of patients with tuberculosis varies during the treatment. The mean concentration of haemoglobin in red blood cells and the count of red blood cells in peripheral blood of patients with infiltrative (in 60% of cases) and disseminated (in 45% of cases) tuberculosis increased equally: Hb to 139.5 and 139.3 g/l; RBC to 4.33·10^12/l and 4.4·10^12/l, respectively. In 9 (36 ± 9.2%) patients with infiltrative tuberculosis, there was a reduction in the average haemoglobin content in red blood cells of patients to 117.7 g/l, while in disseminated tuberculosis, haemoglobin level did not fall below 132.7 g/l. The obtained results are explained both by a more intensive haematotoxic effect of tuberculosis infection (in case of significant infiltration) and by a toxic adverse effect of prolonged specific chemotherapy, which these patients require.

In the haemogram of patients with infiltrative tuberculosis, there was a greater severity of inflammation events, and in disseminated form – of allergic and autoimmune processes.

In favourable cases, quantity and quality of blood cells become normal, reflecting the cessation of bacterial excretion, toxicity, and discussion of foci and areas of infiltration.

Allergenic or toxic effects of different antibacterial medicines on haematopoiesis cannot be excluded. They often caused eosinophilia, in some cases - leukocytosis, band left shift, lymphocytosis, rarely leukopenia, which may stimulate the lymphoid and reticular reaction. The results indicate the feasibility to add TB chemotherapy with cytoprotective medicines.

Key words: haemogram of patients with tuberculosis.

Rational: High TB morbidity is an urgent medical and social problem not only in Ukraine, but also in the whole world. By the projections of MOH, nearly one billiard of people will be infected in the period between 2000 and 2020, 200 million will be ill and 35 million will die due to tuberculosis, unless the epidemic control is increased [1, 6, 7]. This is precisely why, the diagnostic methods allowing to make a diagnosis at the lowest cost become increasingly important [2, 3, 4].

The list of mandatory minimum for tuberculosis diagnosis includes clinical, laboratory and radiological test methods.

Clinical blood count, being one of the most important diagnostic methods, in many cases plays an important role in making diagnosis. Using it, pathology of the haematopoietic system, presence of autoimmune, inflammatory, toxic, infectious and other processes in the body can be determined [5, 8, 9, 10].

Objective: To study changes in the complete blood count in patients with infiltrative and disseminated pulmonary tuberculosis before and after treatment against positive clinical and radiographic improvement.

Materials and methods: A total of 48 patients treated at the Odessa City Clinical TB Dispensary, aged from 21 to 70 years were studies; they were 29 men and 19 women, out of which 28 have infiltrative form (group 1) and 20 have disseminated form (group 2) of pulmonary tuberculosis. All the studied patients had positive clinical and radiographic improvements, namely absence of complaints, improvement of physical examination results and x-ray pattern: induration/ scarring of foci in lungs affected with tuberculosis. Furthermore, parameters of the complete blood count were evaluated: haemoglobin, red blood cells, white blood cells, changes in leukocyte counts, ESR before and after treatment.

Results and conclusions:

As a result of the haematological survey, the mean haemoglobin value after treatment was found to be increased in 15% (60 ± 9.42) of patients with infiltrative tuberculosis (from 133.4 g/l to 139.5 g/l), to be decreased to 117.7 g/l in 9% (36 ± 9, 2) of patient and not

changed in 1 patient (4%) (110 g/l). At the same time, in 9% (45 ± 11,4) of patients with disseminated tuberculosis, the post-treatment haemoglobin level increased from 134.3 g/l to 139.3 g/l, in 9% (45 ± 11,4) it decreased to an average of 132.7 g/l and in 2 patients (10.0%), haemoglobin value was at the same level (130 g/l).

The red blood cells count in patients with both infiltrative and disseminated pulmonary tuberculosis tended to increase. In patients with infiltrative tuberculosis, the pre-treatment mean value was 4.25·10^12/l, and the post-treatment value was 4.3·10^12/l, as well as in patients with disseminated form, it was 4.33·10^12/l before treatment and 4.4·10^12/l after a course of chemotherapy, respectively.

The total white blood cells count before treatment averaged 6.5 ± 0.15 g/l and, at the end of treatment, it was 5.3 ± 0.15 g/l. In rare cases, moderate leukocytosis (up to 10 - 15 g/l), rarely leukopenia, were initially observed. The post-treatment white blood cells count in the peripheral blood of patients was within the normal range.

The most common shifts were observed in the differential WBC count.

The eosinophil count in the peripheral blood tended to increase in patients with infiltrative tuberculosis, and to decrease in patients with disseminated form. Thus, in patients with infiltrative tuberculosis, the pre-treatment average eosinophil count was 2.09% and the post-treatment one was 3.42%, whereupon 10 patients (59%) showed an increase in this parameter to an average of 4.7%, 3 patients (17.6%) had a reduction in the eosinophil count to 2.3% and 4 patients (23.4%) did not change the level of eosinophils (1.5%). In patients with disseminated tuberculosis, the average eosinophil blood count was 2-fold higher than in Group 1 - 4.6% ($p<0.01$) before treatment and 3.8% after treatment, which occurred due to the increase of this parameter to an average of 5.3% in 10 patients (50%) and its decrease to 2.3% in other 10 (50%) patients.

The pre-treatment band neutrophil count averaged 3.75% in patients with infiltrative tuberculosis, and 4.86% in patients with disseminated tuberculosis. At the end of treatment, the average band neutrophil count was 2.5% in Group 1 patients and 2.3% in Group 2 patients, indicating a decrease in specific toxicity.

Segmented forms of neutrophils met with the same rate before (55% - 56%) and after (47% - 62.3%) treatment in patients of both clinical groups.

The lymphocyte count in patients with infiltrative tuberculosis averaged 32.4% prior the conducted therapy and 30.8% after it; out of them, 8 (27.6%) showed an average increase of up to 35.8%, and 11 patients (72.4%) showed a decrease of up to 26.3%. In patients with disseminated tuberculosis, the mean value of lymphocyte count was 36.5% before treatment

and 38.75% after treatment. Moreover, in 13 patients (65.0%) it was increased to average of 45.5%, in other 7 patients (35%) it was decreased and averaged 28.5%. That is, the lymphocyte count both at baseline and after treatment was higher in patients with disseminated forms of pulmonary tuberculosis.

The monocyte count in patients with infiltrative tuberculosis before and after treatment remained stable at the level of 5.9%, in patients with disseminated form: 7.14% before treatment and 5.5% after treatment. Thus, the monocyte count before treatment was also higher in patients with disseminated forms of pulmonary tuberculosis, however, their post-treatment count decreased to normally equal values in both groups.

The ESR level in patients with infiltrative tuberculosis before treatment was in average 18.9 mm/hour. After treatment, in 8 patients (33.3%) its level increased in average to 22.75 mm/hour, in 15 patients (43.75%) its level decreased to 9.5 mm/hour and in 1 patient (4.2 %) the level of ESR was not changed (4 mm/hour). In patients with disseminated tuberculosis, the blood ESR level was 15.11 mm/hour before treatment and 6.88 mm/hour after it.

Conclusion

1. The haemogram of patients with tuberculosis varies during the treatment. The mean concentration of haemoglobin in red blood cells and the count of red blood cells in peripheral blood of patients with infiltrative (in 60% of cases) and disseminated (in 45% of cases) tuberculosis increased equally: Hb to 139.5 and 139.3 g/l; RBC to 4.33·10^12/l and 4.4·10^12/l, respectively. In 9 (36 ± 9.2%) patients with infiltrative tuberculosis, there was a reduction in the average haemoglobin content in red blood cells of patients to 117.7 g/l, while in disseminated tuberculosis, haemoglobin level did not fall below 132.7 g/l. The obtained results are explained both by a more intensive haematotoxic effect of tuberculosis infection (in case of significant infiltration) and by a toxic adverse effect of prolonged specific chemotherapy, which these patients require.

2. In the haemogram of patients with infiltrative tuberculosis, there was a greater severity of inflammation events, and in disseminated form – of allergic and autoimmune processes.

3. In favourable cases, quantity and quality of blood cells become normal, reflecting the cessation of bacterial excretion, toxicity, and discussion of foci and areas of infiltration.

4. Allergenic or toxic effects of different antibacterial medicines on haematopoiesis cannot be excluded. They often caused eosinophilia, in some cases - leukocytosis, band left shift, lymphocytosis, rarely leukopenia, which may stimulate the lymphoid and reticular

reaction. The results indicate the feasibility to add TB chemotherapy with cytoprotective medicines.

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