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Features of correction of impaired protein, hormonal, mineral metabolism and microcirculation in the treatment of patients with purulent wounds on the background of thyrotoxicosis

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Abstract

Purulent surgical diseases against the background of endocrine pathologies remains an urgent problem. The course of this pathology against the background of diffuse toxic goiter with a combination of diabetes mellitus negatively affects the outcome of the disease. The aim of the study was to study the clinical and laboratory features of the course of purulent surgical diseases of soft tissues against the background of diffuse toxic goiter and diabetes mellitus. The results of the study showed that the timing of the normalization of the criteria for assessing the wound process and the indicators of general intoxication of the organism of groups I and II were 2-3 days late in patients with purulent surgical diseases of soft tissues against the background of diffuse toxic goiter in combination with diabetes mellitus than in patients with the background of only diffuse toxic goiter.

Key words: *Purulent wounds, diffuse toxic goiter, diabetes mellitus*

Relevance. Thyrotoxicosis is a syndrome, one of the pathologies with a violation of the functions of the thyroid gland, which occurs in various pathological conditions of the human body. The frequency of thyrotoxicosis is 1.2% in Russia [9], and 1.4% in Uzbekistan [7,10,11,12]. However, the problem of thyrotoxicosis is not so much its prevalence, but so much the severity of the consequences. Hormonal shifts occurring with thyrotoxicosis actively affect metabolic processes, which lead to the development of severe changes in all body systems [3; 4; 5; 8,13,14,15,16]. The rather wide prevalence and high frequency of cases of thyroid dysfunction in practice, in particular, thyrotoxicosis, increases interest in this pathology among doctors of various specialties[2;6,17,18,19].

The aim of the study was to determine changes in protein metabolism in patients with purulent surgical wounds suffering from thyrotoxicosis.

Materials and methods:

A retrospective analysis was performed in the number of 87 examined patients. These patients were divided into three groups. The first group included patients (n=37) with purulent wounds of various localizations without thyrotoxicosis. In the second group there were patients (n=23) with purulent wounds on the background of thyrotoxicosis. In group III, the above-mentioned traditional method of treatment, unlike the previous I, II, groups, the treatment complex was supplemented with correction of metabolism; mineral, carbohydrate, protein metabolism, hormonal disorders and microcirculation.

All patients with purulent surgical diseases of soft tissues after appropriate premedication, the operating field was treated with antiseptic solutions three times, local anesthesia was performed in 64 (61.5%) patients with 0.5% novocaine solution. General intravenous anesthesia methods were used in 40 (38.4%) patients. After wound sanitization with antiseptics - a 3% solution of hydrogen peroxide, 0.02% solution of furacilin and necrectomy, using a 25% solution of dimethyl sulfoxide for local treatment, a gauze bandage with levomekol ointment on a water-soluble basis was applied.

Results and 4 discussion

With an increase in thyroid-stimulating hormone, total protein and total bilirubin decrease ($r=-0.3$, $p<0.05$), and with an increase in T4 and slags in the blood (urea and creatinine: $r=0.3$ $p<0.050$; $r=0.4$, $p<0.05$, respectively). In general, the data obtained correspond to the main links in the pathogenesis of thyrotoxicosis. There is a direct relationship between the level of T4 and the indicators of protein metabolism (urea, creatinine, total protein), and an inverse relationship with TSH. The results of treatment of 27 patients with purulent soft tissue diseases on the background of diffuse toxic goiter were analyzed.

All patients with purulent soft tissue diseases on the day of admission, surgical treatment tactics were similar to the previous subgroups, however, the treatment process was supplemented by simultaneous correction of hormonal disorders, carbohydrate, mineral, protein metabolism, as well as in order to normalize oxygen saturation and provide plastic material to wound tissues, treatment aimed at improving microcirculation was carried out.

Analysis of the results of intoxication indicators in patients with purulent soft tissue diseases of group III revealed the following changes in the first day of treatment, the body temperature of patients averaged 39.2 ± 0.360 C. The content of blood leukocytes was on average $9.8 \pm 0.28 \times 10^9/l$. The volume of the average molecules averaged 0.252 ± 0.026 units. Similarly, an increase in LII and ESR was noted.

By the fifth day of treatment, subfebrility persisted (37.6 ± 0.180 S). At the same time, according to all indicators of intoxication of the body: L, MSM, LII and ESR of the blood, their further decrease was noted, that is, there was a tendency to normalization – $7,4 \pm 0,28 \times 10^9$; $0,152 \pm 0,005$; $1,4 \pm 0,06$; $29,2 \pm 1,28$ accordingly. In contrast to the analogous patients of the previous groups, by the seventh-eighth days of treatment, these indicators have normalized, which is on average 2 days ahead of the patients of group II.

Analysis of the results of indicators of the dynamics of the wound process in patients of this group: the pH of the wound medium, the percentage of reduction in the area of the wound surface and the PC indicators according to M.F.Mazurik. In the patients of the analyzed group, on the day of admission, the initial pH of the wound medium was significantly lower (acidosis) and averaged 4.2 ± 0.18 . The

protein of the wound exudate was on average 59.2 ± 1.43 g/l. At the same time, the PC averaged 0.9 ± 0.03 units.

The percentage of reduction in the area of the wound surface increased to $1.8 \pm 0.04\%$ per day, and the PC by this time was 1.8 ± 0.04 .

By the seventh day, the PC was equal to 2.4 ± 0.06 , and the wound area per day significantly decreased by $2.6 \pm 0.05\%$. The pH of the wound medium at the same time averaged 6.6 ± 0.18 . Only by the tenth day of treatment, the pH of the wound medium became neutral. The decrease in the area of the wound surface per day was equal to $2.9 \pm 0.08\%$. The release of exudate from the wound has stopped, which, in our opinion, is due to the transition of the wound process from the 1st to the 2nd phase.

During the bacteriological study of group III, it was revealed that of the 27 examined patients, 16 (59.2%) patients had microflora in the form of an association, 11 (40.7%) patients had monoculture. In most cases, pathogenic staphylococcus was seeded in 12 (44.4%) patients. In 9 (33.3%) cases, E. coli was seeded. The next most frequently detected was proteus - 6 (22.2%) observations. Streptococci followed in 4 (14.8%) cases. Pseudomonas Aeruginosa was sown in 2 (7.4%).

Analysis of the level of microbial contamination of purulent wounds in group III patients also revealed: at the time of admission, microbial contamination averaged 108 mt/g, on the next day after surgical treatment of the wound with the application of an ointment dressing, its values were 105 mt/g. By the 7th day of complex treatment in these patients, the degree of microbial contamination was below the critical level and amounted to 102mt/g of tissue.

The results of the analysis of the terms of wound cleansing and healing in patients of group III indicate that in patients of the analyzed group, wound cleansing from infection occurred on average by 7.0 ± 0.5 days. By the fifth day, infiltrate resorption was noted.

At the same time, the onset of granulation was noted, on average, on the seventh day. By the tenth day, a predominantly regenerative type of cytograms was detected. These data are confirmed by cytological and histological studies.

As a result, on day 6 there is a transition of the wound process to the second phase, and on day 13 there is a transition to the third phase of healing in the first group of patients. In the second group of patients suffering from thyrotoxicosis, the healing time of the wound slows down. As can be seen from the table, the transition to the second phase occurs on day 9, and the transition to the third phase of healing on day 17. All this is due to the negative effect of hormonal disorders on the wound process in thyrotoxicosis.

Thus, in persons suffering from thyrotoxicosis, there are significant changes in metabolism. In particular, this applies to indicators of carbohydrate metabolism (glucose), protein (urea, creatinine, total protein) and fat (cholesterol, HDL, LDL, weight loss). Such shifts can be explained based on the influence of thyroid hormones on metabolic processes in the body. This in turn negatively affects the

healing of the wound process. This is mainly reflected in the slowing down of wound healing 2-3 days later than in patients with purulent wounds without thyrotoxicosis.

Analysis of indicators of mineral and carbohydrate metabolism in patients of group III had the following features: on the day of admission of deviations from the norm, during treatment, normalization of indicators was noted at a significantly faster rate than in group II, outstripping by an average of 3 days. As Table 6.14 shows, on the day of admission, the Na⁺ blood index was equal to 162 ± 3.4 , K⁺ 1.94 ± 0.41 , Ca⁺ blood 3.78 ± 1.16 .

The initial blood sugar level of group III patients was equal to an average of 14.2 ± 1.6 . During the treatment of purulent surgical diseases of soft tissues with simultaneous drug correction of blood sugar levels, the indicators gradually normalized.

The study of thyroid hormone indicators in group III patients with purulent soft tissue diseases on the background of diabetes mellitus and diffuse toxic goiter revealed that the level of thyroid hormones in this group on the day of admission had significant deviations from the norm. In the future, in the process of complex treatment, all these indicators gradually returned to normal.

In the course of treatment, by the 7th day, these indicators gradually normalized, ahead of group II patients by 2-3 days, in whom anticoagulants and vasodilators were not included in the treatment complex, and correction of disorders of carbohydrate, mineral and protein metabolism was not carried out.

Our study of group III patients with purulent surgical diseases of soft tissues against the background of combined pathologies, diabetes mellitus and diffuse toxic goiter with correction of disorders of mineral, carbohydrate, protein metabolism and microcirculation revealed the following features of the course of the wound process: all indicators of intoxication of the body, pH of the wound environment and indicators of PO₂ wounds of patients on the day of admission were significantly deviated from norms as in group II. In the process of traditional treatment and early correction of disorders of hormonal, carbohydrate, mineral, protein metabolism and microcirculation, these indicators in patients of group III in dynamics tended to normalize at an accelerated rate than group II, ahead by 2-3 days. At the same time, the average bed days were 8.5 ± 0.5 days, when, as in the II group of patients, these indicators were equal to 10 ± 1.4 days.

It should be noted that a comparative analysis of the results of the study between the II and III groups of patients revealed the following: - inclusion in the complex of treatment of patients with early correction of disorders of hormonal, carbohydrate, mineral, protein metabolism and microcirculation of purulent surgical diseases against the background of diffuse toxic goiter accelerates the normalization of all these indicators, including general intoxication, as well as the timing of purification and wound healing for 2-3 days than in similar patients of group II. All this shows that against the background of diffuse toxic goiter, the treatment of

purulent surgical diseases of soft tissues is more difficult than with the separate occurrence of these endocrine pathologies.

Thus, a comparative analysis of the results of treatment of patients of groups I, II and III revealed the following features:

- with the traditional method of treatment, the application of levomekol ointment to the local treatment of a purulent wound leads to complete cleansing of the wound, normalization of clinical and laboratory indicators of intoxication. At the same time, both indicators of intoxication of the body (L, MSM, LII, ESR) and biochemical indicators of wound exudate (pH, wound exudate protein, Mazurik PC) have important diagnostic and prognostic significance for assessing the course of the wound process. Indicators of the main evaluation criteria and dynamics of the wound process, the timing of wound cleansing from infection by the 2-3 days of treatment, the onset of granulation by the 3-4 days of treatment, the onset of epithelization by the 5-6 days of treatment. The average duration of treatment of patients in the comparison group was 6 ± 0.7 days. All these processes take place against the background of normal indicators of mineral, carbohydrate and protein metabolism, as well as indicators of PO₂.

-the study of patients of group II with purulent surgical diseases of soft tissues against the background of diffuse toxic goiter with the traditional method of treatment revealed the following features of the course of the wound process: all indicators of intoxication of the body, pH of the wound environment and indicators of PO₂ of the wound of patients on the day of admission were significantly deviated from the norm than patients of group I. During the traditional method of treatment, these indicators in dynamics tended to normalize at a slower pace than group I, retreating for 2 days. At the same time, the average bed days were 10 1.4 days, when in group I of patients these indicators were equal to 8 1.5 days.

Conclusions

1. In the traditional treatment of patients with purulent surgical soft tissue diseases without concomitant endocrine diseases, wound cleansing from infection is noted by the 4th day of treatment, the onset of granulation by the 6th-7th day, the onset of epithelization by the 8th-9th day of treatment. All this takes place against the background of abnormal indicators of carbohydrate, mineral, protein metabolism. At the same time, the average duration of treatment of patients is 6.5 ± 0.6 days.

2. In patients with purulent surgical diseases of soft tissues against the background of diffuse toxic goiter, there is a violation of mineral, protein, hormonal metabolism, as well as microcirculation, and as a result, the healing and cleansing process of the wound proceeds much slower than in patients without concomitant endocrine pathologies. At the same time, the terms of purification and wound healing recede from the I group of patients (without endocrine pathology) for 5-6 days.

3. Inclusion of correction of mineral, protein, hormonal, carbohydrate metabolism and microcirculation disorders in the complex of treatment of patients with purulent surgical diseases of soft tissues against the background of diffuse toxic goiter, these indicators in dynamics tend to normalize at an accelerated rate than in patients of group II, ahead by 2-3 days. At the same time, the transition of the I-phase of the wound process to the II-phase is also accelerated by 2-3 days, the average bed days were 8.5 ± 0.5 days.

4. The developed scheme of early correction of disorders of mineral, carbohydrate, protein, hormonal metabolism and microcirculation is the optimal method of treatment of purulent surgical diseases of soft tissues against the background of diffuse toxic goiter.

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