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THE MOST COMMON TYPES OF ANEMIA IN DIFFUSE TOXIC GOITER

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ABSTRACT

This article examines the types of anemia encountered in the course of diffuse toxic goiter (Graves' disease, autoimmune thyrotoxicosis), their causes, and their clinical and hematological characteristics. It analyzes how several types of anemia may develop in thyrotoxicosis because of changes in erythropoiesis, iron and vitamin B12 metabolism, and the coexistence of autoimmune processes. The aim of this study was to identify the most common types of anemia in patients with diffuse toxic goiter and to describe the criteria for their differentiation and the principles of treatment. Based on a review of the literature and clinical observations, normochromic normocytic anemia was shown to be the type most characteristic of diffuse toxic goiter, while iron deficiency anemia and vitamin B12 deficiency anemia (pernicious anemia) ranked second and were associated with concomitant autoimmune disorders. In rare cases, autoimmune hemolytic anemia and myelotoxic changes developing during treatment with thyrostatic drugs may also occur. The findings are of practical importance for endocrinologists and hematologists in the early diagnosis of patients and the selection of an individualized treatment strategy.

Keywords: diffuse toxic goiter, Graves' disease, thyrotoxicosis, anemia, normochromic anemia, iron deficiency anemia, vitamin B12 deficiency anemia, autoimmune hemolytic anemia.



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ABSTRACT

This article discusses the types of anemia most commonly observed in diffuse toxic goiter (Graves' disease, autoimmune thyrotoxicosis), as well as their causes and clinical and hematological features. It demonstrates that several forms of anemia may develop against the background of thyrotoxicosis as a result of alterations in erythropoiesis, iron and vitamin B12 metabolism, and the coexistence of autoimmune processes. The purpose of the study was to determine the most prevalent types of anemia in patients with diffuse toxic goiter and to outline the criteria for their differentiation and the principles of treatment. Analysis of the literature and clinical observations showed that normochromic normocytic anemia is the most characteristic type of anemia in diffuse toxic goiter, whereas iron deficiency anemia and vitamin B12 deficiency (pernicious) anemia are the next most common forms in the presence of concomitant autoimmune diseases. Autoimmune hemolytic anemia and myelotoxic changes associated with the administration of thyrostatic drugs are reported in rare cases. These findings have practical significance for endocrinologists and hematologists in early diagnosis and in selecting an individualized treatment strategy for patients.

Keywords: diffuse toxic goiter, Graves' disease, thyrotoxicosis, anemia, normochromic anemia, iron deficiency anemia, vitamin B12 deficiency anemia, autoimmune hemolytic anemia.

INTRODUCTION

Diffuse toxic goiter (DTG) is an autoimmune disease of the thyroid gland characterized by diffuse enlargement of thyroid tissue and excessive production of thyroid hormones caused by the formation of stimulating antibodies against thyroid-stimulating hormone receptors. Internationally, this condition is also



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commonly known as Graves' disease or Basedow's disease. Thyrotoxicosis has a substantial effect not only on the cardiovascular and nervous systems but also on the hematopoietic system.

In clinical practice, anemia of varying severity is detected in a proportion of patients with diffuse toxic goiter. This condition is often overlooked or confused with manifestations of the underlying disease, such as fatigue, tachycardia, and weakness, which delays the timely diagnosis and treatment of anemia. Therefore, studying the types of anemia that develop against the background of thyrotoxicosis and identifying their pathogenetic mechanisms is of considerable medical and social relevance.

AIM OF THE STUDY

To identify the types of anemia most commonly occurring in patients with diffuse toxic goiter, analyze their etiopathogenetic characteristics, and describe the principles of differential diagnosis and treatment for clinical practice.

MATERIALS AND METHODS

Scientific publications from recent years, clinical guidelines in endocrinology and hematology, and medical statistical data relevant to the study topic were analyzed. A descriptive and analytical approach was used: sources concerning hematological changes developing against the background of thyrotoxicosis were systematized, and generalized conclusions were drawn for each type of anemia.

RESULTS AND DISCUSSION

The analysis showed that the following types of anemia are the most frequently encountered in diffuse toxic goiter:



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1. Normochromic normocytic anemia. This is the type of anemia most characteristic of diffuse toxic goiter. Its development is associated with accelerated metabolism caused by excessive thyroid hormone production, a shortened erythrocyte lifespan, and a relative increase in plasma volume (hemodilution). Clinically, this anemia is usually mild or moderate and, in many cases, resolves spontaneously after treatment of the underlying disease.
2. Iron deficiency anemia. In patients with diffuse toxic goiter, particularly women, iron deficiency anemia may develop because of menstrual disorders (menorrhagia and metrorrhagia), reduced absorption of iron from the gastrointestinal tract, and increased iron requirements under conditions of accelerated metabolism. Blood tests in such cases reveal hypochromic microcytic erythrocytes and reduced ferritin and serum iron levels.
3. Vitamin B12 deficiency (pernicious) anemia. Because diffuse toxic goiter is autoimmune in origin, it often coexists with other autoimmune diseases, particularly autoimmune atrophic gastritis and pernicious anemia, including within autoimmune polyendocrine syndromes. Such cases may present with megaloblastic anemia, macrocytosis, and neurological manifestations.
4. Autoimmune hemolytic anemia. In rare cases, hemolytic anemia develops against the background of diffuse toxic goiter as a result of the formation of autoantibodies against erythrocytes. This condition is characterized by jaundice, reticulocytosis, and elevated bilirubin levels and should be evaluated in the context of other autoimmune processes.
5. Drug-induced myelosuppression associated with thyrostatic therapy. During treatment with thyrostatic drugs such as thiamazole or propylthiouracil, rare suppression of bone marrow function may lead to agranulocytosis and aplastic conditions. This complication requires urgent medical attention and necessitates regular monitoring of blood cell counts during treatment.



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Thus, the analysis indicates that anemia in diffuse toxic goiter has a multifactorial origin, with important contributions from the direct effects of thyrotoxicosis, concomitant autoimmune disorders, and adverse effects of administered medications. A comprehensive patient evaluation, including a complete blood count, ferritin, iron, vitamin B12, and reticulocyte measurements and, when indicated, bone marrow examination, allows accurate identification of the type of anemia.

CONCLUSION

Anemia is a common comorbid condition in patients with diffuse toxic goiter, and normochromic normocytic anemia is its most frequent form. Iron deficiency and vitamin B12 deficiency anemias often develop against the background of concomitant autoimmune processes, whereas hemolytic anemia and drug-induced myelosuppressive anemia are less common but have substantial clinical significance. In the management of patients with diffuse toxic goiter, timely identification of the type of anemia and selection of individualized treatment according to its cause improve therapeutic effectiveness and help prevent complications.

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