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IMPROVING METHODS FOR EARLY DIAGNOSIS AND PREVENTION OF ANEMIA IN PATIENTS WITH ISCHEMIC HEART DISEASE

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ABSTRACT

In recent years, the global community has faced a pressing issue that is not only significant for the medical field but also has socio-economic implications for countries—the pandemic of chronic non-communicable diseases among the population and the resulting increase in mortality and disability. Scientific research highlights a growing incidence of ischemic heart disease and hypertension, accompanied by rising rates of disability and mortality.

Anemia is a widespread condition in patients with chronic heart failure (CHF) and worsens the disease's progression. According to studies, anemia is detected in 30–50% of patients with CHF. The development of anemia is mainly associated with iron deficiency, chronic inflammation, renal insufficiency, and decreased erythropoietin production. Clinically, anemia presents with symptoms such as fatigue, shortness of breath, tachycardia, and pale skin.

Diagnosing anemia in CHF requires assessing hemoglobin, ferritin, iron levels, and renal function indicators. Treatment involves iron supplementation, the use of erythropoietin-stimulating agents, and blood transfusions when necessary. Timely diagnosis and treatment of anemia reduce the risk of complications and improve the quality of life in patients with CHF.

Key words: Chronic heart failure, anemia, erythropoietin, functional test.

INTRODUCTION

Despite therapeutic advances, patients with ischemic heart disease (IHD) remain part of a high-risk group with a poor prognosis. Nearly 45% of hospitalized IHD patients are expected to require rehospitalization at least once within the following 12 months, with the risk of death or rehospitalization ranging from 30% to 60%. These patients, particularly in older age groups, show the highest rates of mortality and hospital admissions. Many patients with coronary heart disease are diagnosed with anemia, which exacerbates heart failure severity and leads to the progression of complications. A decrease in hemoglobin levels worsens the

prognosis for almost all cardiovascular diseases. Correcting anemia using erythropoiesis-stimulating agents (erythropoietin and intravenous iron preparations) may be an effective adjunct therapy for patients with heart failure resistant to standard treatment. Oral iron supplements are generally less effective in treating anemia. Recent studies by European researchers have shown that the combination of erythropoietin and intravenous iron therapy has a positive impact on the course of cardiovascular disease (V.M. Provorot, S.A. Avdeeva, 2010).

AIM

The purpose of the study is to analyze the etiology, pathogenesis, and clinical significance of anemia in chronic heart failure (CHF), as well as to discuss diagnostic and therapeutic approaches to determine its impact on patients' prognosis and quality of life. Additionally, it aims to identify various pathogenetic mechanisms of anemia in CHF and develop recommendations for individualized treatment strategies based on these mechanisms.

MATERIALS AND METHODS

The study involved patients who visited the outpatient clinic and were treated in the inpatient department of the Regional Branch of the Republican Specialized Scientific-Practical Medical Center of Cardiology in Bukhara between 2021 and 2023. Based on pre-established criteria, 128 patients aged 18 to 70 years were included in the study. Among them, 52 (40.6%) were male, and 76 (59.4%) were female, with a mean age of 51.4 ± 2.5 years. All patients underwent standard diagnostic procedures required for confirming ischemic heart disease (IHD), including electrocardiography (ECG), echocardiography (ECHO), functional tests, and laboratory analyses. The laboratory tests included a complete blood count, ferrokinetic parameters, and additional tests to determine the pathogenetic characteristics of anemia, such as vitamin B12, erythropoietin, and soluble transferrin receptor levels. The patients were divided into two groups: the control group (42 patients) with IHD without anemia and the main group (86 patients) with IHD accompanied by anemia.

RESULTS OF THE STUDY

In the initial phase of the study, the mean hemoglobin levels of patients in the comparative and main groups were assessed, and the degrees of anemia in the main group were determined (Table 1).

Indicator	**Control Group (n=30)**	**Comparison Group (n=42)**	**Main Group (n=86)**		
			Mild anemia n=39	**Moderate anemia n=35**	**Severe anemia n=12**
Hemoglobin	132,4±2,4	122,6 ±2,1	104,3±2,2	79,1±2,1	57,7±1,9

As shown in Table 1, mild (45.3%) and moderate (40.6%) anemia were predominant among patients in the main group.

In the next phase of the study, a comparative analysis of ferrokinetic parameters and pathogenetic markers for anemia was conducted (Table 2).

The data in Table 2 indicate that iron deficiency anemia (IDA) and anemia of chronic inflammation (ACI) were the most frequent types among the patients. Vitamin B12 deficiency anemia was observed mainly in older patients. To investigate the risk factors for anemia development in patients with ischemic heart disease, a detailed assessment was conducted, including anamnesis collection and physical-functional examinations.

Table 2. Comparative Analysis of Pathogenetic Markers of Anemia in Study Groups

№	Parametrs	Main group n=86	Control group n=42
1	Hemoglobin, g/l	101.4±0.9	136.5±1.1
2	Hematocrit, %	37.3±0.62	40.9±0.37
3	Erythrocytes, $x10^{12}$l	3.6±0.04	4.3±0.04
4	ESR, mm/hour	15.7±1.09	12.5±1.07
5	Serum iron, mmol/l	7.9±0.2	18,3±0.4
6	Transferrin, mg/l	4.9±0.1	3.8±0.1
7	Transferrin saturation, %	16.2±3.2	26.3±8.6
8	Ferritin, mg/l	284.6±8.3	351.5±9.0
9	Vitamin B 12, pg/ml	206±11,2	224,6±3,1
10	Erytropoetin,mIU/l	10,4±0,9	19,8±2,1

RESULTS AND DISCUSSION

During the study, it was revealed that patients in the main group had several comorbid conditions. The pathogenetic type of anemia was closely associated with the characteristics of these underlying diseases.

The most frequently observed comorbid conditions were gastric and duodenal erosions and ulcers, diabetes mellitus, chronic kidney disease, hypertension, and liver pathologies. Identifying these factors is crucial for determining the pathogenetic type of anemia in patients with ischemic heart disease (IHD).

Inflammation plays a central role in the pathogenesis of anemia in IHD patients. Ferritin is widely recognized as an inflammatory marker. Despite its significance, the high prevalence of iron deficiency among IHD patients reduces

the diagnostic reliability of ferritin in pathogenetic assessment. Therefore, measuring transferrin saturation alongside ferritin levels is essential for the accurate diagnosis of anemia in these patients.

In conclusion, anemia in patients with IHD has a multipathogenic character, with comorbid conditions playing a significant role in its development and acting as independent risk factors. Among the different forms of anemia, iron deficiency anemia associated with chronic inflammation is the most prevalent. Early diagnosis and prevention of anemia are essential in improving outcomes for these patients.

The findings of this study emphasize the importance of introducing predictive markers for the pathogenetic assessment of anemia in practical medicine. These results can contribute to early diagnosis and the prevention of anemia and heart dysfunction, particularly in patients with widespread comorbid conditions.

Early diagnosis of anemia in IHD patients improves treatment effectiveness, reduces complications, and enhances patients' quality of life. Modern medicine relies on evidence-based practices, which are grounded in advanced laboratory and instrumental diagnostics.

Identifying ferritin and transferrin saturation levels in IHD patients enables clinicians to distinguish the pathogenetic features of anemia. This approach reduces unnecessary medication use, shortens hospital stays, and results in economic efficiency.

CONCLUSION

The results of our study show that the incidence of anemic syndrome in ischemic heart disease (IHD) is high. In many cases, other risk factors contributing to heart failure progression also play an important role.

In patients with IHD and anemia, the severity of anemia is closely related to the clinical stage of the disease. Therefore, it is necessary to carefully monitor ferrokinetic indicators in these patients and adjust treatment as needed.

The comorbidity of IHD and anemia requires a multidisciplinary approach. Monitoring ferritin, transferrin, and transferrin saturation levels should be used to assess iron deficiency and evaluate the effectiveness of anemia treatment.

REFERENCES

1. Agababyan, I., Ismoilova, Y., & Sadykova, Sh. Features of the treatment of ischemic heart disease against the background of iron deficiency anemia of varying severity. // Journal Vestnik Vracha, 2019. 1(4), 11–14. sadykova432@gmail.com

2. Al Ghwass M.M., Halawa E.F., Sabry S.M., Ahmed D. Iron deficiency anemia in an Egyptian pediatric population: A cross-sectional study. // Ann. Afr. Med. – 2015. – 14. – pp. 25–31. Ghwafss55@mail.ru

3. George J., Yiannakis M., Main B., Devenish R., Anderson C., An U.S., Williams S.M., Gibson R.S. Genetic hemoglobin disorders, infection, and deficiencies of iron and vitamin A determine anemia in young Cambodian children. // J Nutr. – 2012. - 142(4). – pp. 781–787. eiannakis22@gmail.com

4. Konovodova E.N., Burlev V.A., Tyutyunnik V.L., Yakunina N.A. Latent iron deficiency in pregnant women. // Russian Bulletin of Obstetrics and Gynecology. – 2012. - No. 2. – pp. 41–46. yakunina98@00gmail.com

5. Kopylov F.Yu., Shchekochikhin D.Yu. Anemias in cardiological practice. // Difficult Patient. – 2011. - No. 4(9). – pp. 16–22. Shchekochikhin.d.yu.@mail.ru

6. Moiseev S.V. Anemia in oncological diseases. // Oncology. Journal named after P.A. Hertsen. – 2012. - No. 1. – pp. 77–82. moisov77@mail.ru

7. Mwangi M.N., Phiri K.S. Iron for Africa—Report of an Expert Workshop. // Nutrients. – 2017. 9–15 p. mwangi3444@mail.ru

8. Nutrition study in Uzbekistan. United Nations Children's Fund. Tashkent. 2019. axmedovagulmira@gmail.com

9. Pasricha S.R., Drakesmith H. Iron deficiency anemia: Problems in diagnosis and prevention at the population level. // Hematol. Oncol. Clin. N. Am. – 2016. – 30. – pp. 309–325. drakesmith27@gmail.ru

10. Patel K.V. Epidemiology of anemia in older adults. // Semin Hematol. 2008. No. 45(4). pp. 210–217. patellll@gmail.com

11. Prakash V.K. Nutritional Anemia in Young Children with focus on Asia and India. // Indian Journal of Community Medicine. 2011. Vol. 36(1). – pp. 8–16. roookashgupta55@mail.ru

12. Santosh H.N., Nagaraj T., Sasidaran A. Anemia of chronic disease: A comprehensive review // Journal of Medicine, Radiology, Pathology & Surgery.- 2015.- Vol. 1.- pp. 13–16. sasidaran998@mail.ru

13. Salimova M.R. The level of anemia incidence in the Republic of Uzbekistan and the strategy for combating iron deficiency anemia. // Young Scientist. – 2017. - No. 3(137). – pp. 265–267. monasalimova@gmal.com

14. Stevens G.A., Finucane M.M., De-Regil L.M., Paciorek C.J., Flaxman S.R., Branca F., Pena-Rosas J.P., Bhutta, Z.A., Ezzati, M. Global, regional, and national trends in hemoglobin concentration and prevalence of total and severe anemia in children and pregnant and non-pregnant women for 1995–2011: A

systematic analysis of population-representative data. // Lancet. Glob. Health. – 2013. – 1. – pp. 16–25. Soren567@mail.ru

15. Stevens G., Finucane M., De-Regil L., Paciorek C.J., Flaxman S.R., Branca F., Peña-Rosas J.P., Bhutta Z.A., Ezzati M. Global, regional, and national trends in total and severe anemia prevalence in children and pregnant and non-pregnant women for 1995–2011: a systematic analysis of population-representative data. // Lancet Global Health. – 2013. - No. 1. – pp. 16–25. Stavens87@gmail.ru

16. Vatutin N.T., Taradin G.G., Kanisheva I.V., Venzhega V.V. Anemia and iron deficiency in patients with chronic heart failure. // Cardiology. – 2019. - No. 59. – pp. 4–20. Venzhega67@mail.ru

17. Zharylkasynova G.Zh., Mavlyanov I.R., Yuldasheva R.U. Iron deficiency anemia in the Republic of Uzbekistan: past and present // Problems of Biology and Medicine. - 2020. No. 4. Vol. 120. - pp. 193–197. Gouhar72@gmail.com

18. Zhuravskaya I.M., Ivanova O.P., Petrov V.N. Anemias in the elderly. // Nursing Care. - 2012. - No. 1. – pp. 29–39. ivanova9876@mail.ru

19. Zubrikhina G.N., Blindar V.N., Matveeva I.I. Differential diagnosis of anemic syndrome in true iron deficiency state and functional iron deficiency in patients with chronic diseases (malignant neoplasms). // Therapeutic Archive. – 2016. - No. 4. – pp. 61–67. zubrikhinaghhh66@gmail.ru