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Why Does Anemia Lead to Chronic Heart Failure?

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Abstract
Epidemiological study indicates the impact of anemia in the pathogenesis, prognosis and complications of cardiovascular diseases. In the last decade, the possibilities of treating anemia in patients with CHF have been studied actively. The research was carried out in 120 patients with chronic heart disease in cardiology department of multidisciplinary clinic of Tashkent medical academy. Results showed that over 90% percent of patients were suffering from anemia which was increasing the risk of death from heart failure.

Keywords: Anemia, heart failure, iron deficiency, cardiorenal syndrome.

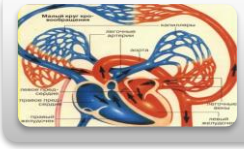
Purpose of the research: To study and assess the influence of anemia in patients with chronic heart failure

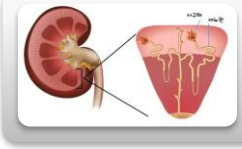
Introduction

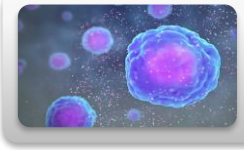
Chronic heart failure has a high impact of the quality of human life. It is a long-term cardiovascular condition which the heart is not able to pump the adequate amount of blood to support functions of other organs and systems.

Chronic heart failure result from weakening of the heart, damage to the heart, or stiffening of the heart muscles. In these cases, the heart's pumping power is lowered, increasing the pressure in the heart and decreasing the heart's ability to properly pump blood, which contains necessary oxygen and nutrients, to support the body's needs. Symptoms usually progress slowly and become worse over time rather than begin suddenly. In addition, CHS increasingly common in elderly patients diabetes mellitus (DM), which are associated increases the risk of anemia. At such patients, as well as patients with CHF III-IV functional class NYHA, its frequency increases. Data on the prevalence of anemia in CHF are numerous, but very controversial, which due to the use of various criteria for diagnosing and heterogeneity of patient populations. An adverse effect of anemia on outcomes has also been shown for patients with acute and chronic cardiac ischemia.

The etiology of anemia in patients with CHF is quite diverse. Possible pathogenetic mechanisms for the development of anemia in patients with CHF:

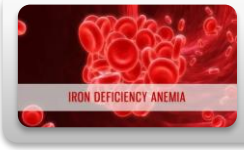

hemodilution;


impaired renal function and decreased production of erythropoietin;


activation of cytokines;

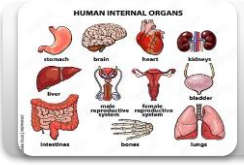

bone marrow dysfunction;


malnutrition;



iron deficiency;


drug effects;



anemia of chronic disease

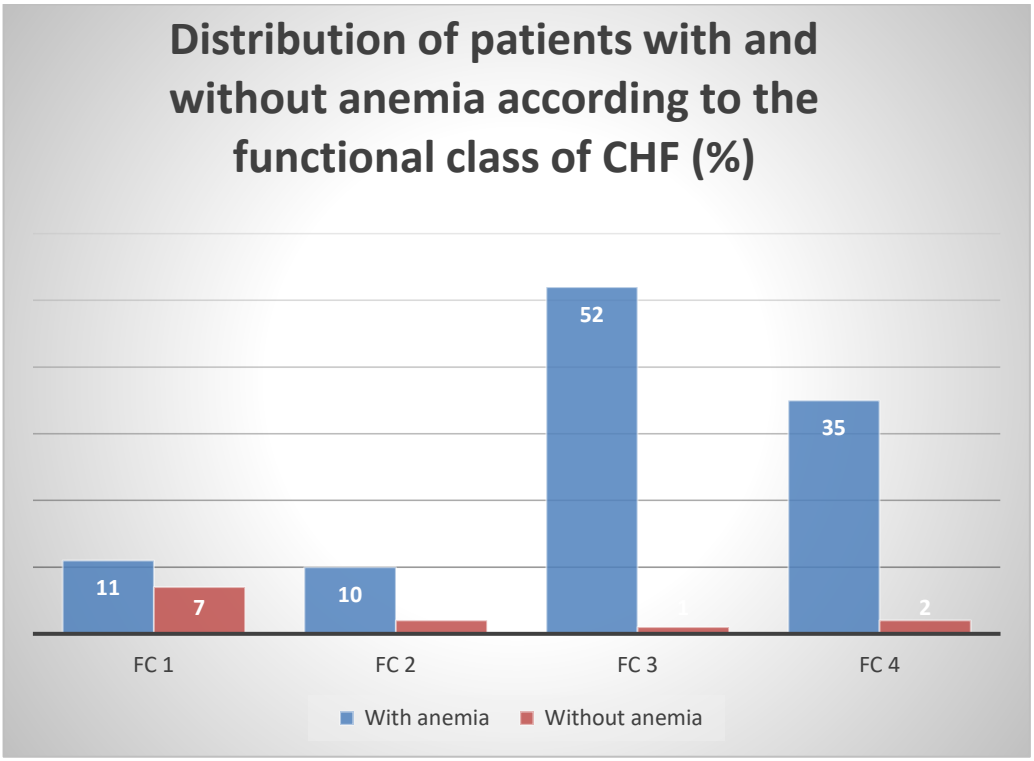
A decrease in hemoglobin concentration may be a consequence of hemodilution. An increase in circulating plasma volume is often due to activation of the RAAS and the vasopressin system, leading to Na + and water retention. The result of hemodilution is pseudoanemia, which, according to its prognosis, is worse than true anemia. At the same time, fluid retention in the patient's body is often asymptomatic. In a study by

A.S. Androne mortality in patients with hemodilution was more than twice as high as in patients with other causes of anemia in CHF. CHF is often combined with varying degrees of chronic renal failure (CRF), which develops due to renal vasoconstriction and ischemia and can also lead to the development of anemia due to a decrease in the secretion of erythropoietin (EPO) by the kidneys. Cardiorenal syndrome develops as a result of activation of the sympathetic nervous system by the RAAS and exposure to inflammatory mediators in response to structural damage to the heart muscle in CHF, which leads to narrowing of the renal vessels, ischemia, and ultimately a decrease in glomerular filtration rate. Decreased renal blood flow and increased sodium reabsorption in the proximal renal tubules in patients with CHF are also known to contribute to an increase in plasma volume and hemodilution, which, in turn, can lead to a decrease in hematocrit and anemia.

One of the causes of anemia in CHF is iron deficiency. Iron is involved in energy metabolism, the formation of reactive oxygen species and ATP, cell proliferation, and muscle activity. Iron deficiency in experimental studies led to the development of LV diastolic dysfunction, its hypertrophy, dilatation and fibrosis, and developing with IDA increased the tendency to thrombosis. Typically, such anemia is associated with a decrease in food intake (cardiac cachexia), malabsorption syndrome, and the use of aspirin for prophylactic purposes. Iron deficiency in CHF can be true and functional. With a true deficiency, there is a decrease in the saturation of transferrin and ferritin. Functional iron deficiency, first described by Eschbach in 1987, is regarded as a condition in which iron is not released rapidly enough to meet the increased demands of the bone marrow during erythropoiesis, despite adequate total body iron stores, while transferrin saturation decreases, and ferritin levels remains normal or even elevated. The chronic course of anemia is characterized by poor utilization of iron, reduced synthesis of erythropoietin, and pronounced activation of cytokines, which occurs in 57% of patients. Thus, the development of anemia is promoted by an increase in the level of tumor necrosis factor in patients with CHF, which correlates with the severity of anemia. A number of studies prove that patients with CHF rapidly increase the level of tumor necrosis factor alpha (TNF-alpha), which, in turn, partially inhibits erythropoiesis.

Materials and methods: In the TMA clinic were 120 patients were examined in cadiological department of the hospital from November 2022 to Aprel 2023. The severity of CHF was estimated according to the criteria New York Heart Association (NYHA). From 120 patients 75 (62.5%) of them were women, 45 (37.5%) of them were men.

Results: According to the result of the research iron deficiency anemia was diagnosed in 59 (49.1%) patients, with a decrease in the level of vitamin B12 there were 40 (33.3%) patients, folic acid deficiency anemia there were 9 (7.5%) patients and 12 (10%) of them anemia was not determined. Statistical analysis confirmed the amount of iron defiency anemia in patients with CHF is the highest index.



Conclusion: Anemia was detected in 90 % patien with CHF, all of them were associated with concomitant diseases and other factors which increased risk of readmissions. Results showed that over 68 percent of patients were suffering from anemia which was increasing the risk of death from heart failure.

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