Impact Of Chronic Heart Failure On Comorbidities In Hot Climates On The Quality Of Life And Clinical Condition Of Patients

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Abstract: It is well known that one of the leading causes of death among the population is cardiovascular disease, and they are often complicated by CHF.
In European countries, the prevalence of CHF is 2.1%, with 90% of women over the age of 70 and 75% of men. In the United States, these numbers range from 1–1.5% and occur in 10% of the population over the age of 60.
According to a number of leading researchers around the world, the inclusion of concomitant diseases in CHF not only worsens its overall outcome, increases the number and duration of hospital treatments , but in some cases is also the leading cause of death. Some authors compare the dynamics of deaths observed in CHF with deaths due to oncological diseases.

Keywords: comorbidity, CHF (chronic heart failure), microalbuminuria, anemia, renal dysfunction.

1. INTRODUCTION

According to a number of leading researchers around the world, the inclusion of concomitant diseases in CHF not only worsens its overall outcome, increases the number and duration of hospital treatments [28], but in some cases is also the leading cause of death. Some authors compare the dynamics of deaths observed in CHF with the deaths recorded due to oncological diseases [1].

Observations confirm that the detection of comorbid cases in CHF sometimes exceeds 90%. These include diabetes mellitus (DM), coronary heart disease (CHD), arterial hypertension (AH), obesity, and anemia [20, 14, 29].

In our country, in most cases, the etiological cause of CHF (58.8%) is CHD, and it is often (68.3%) associated with AH [23]. According to the data we studied in the hot climate of Bukhara, the average comorbidity was 2.1 ± 0.67 in patients with CHF, this figure was 1.9 ± 0.53 in those under 60 years of age, and 2.2 ± 0.75 in older people (R <0). , 01). The highest rates of CHD, diabetes, anemia, fatty liver disease, deforming osteoarthritis, and osteochondrosis were identified in patients [25].

According to Strongin's observations, more chronic kidney disease (CKD) occurs in the comorbid structure . It was found that the combination of these two complications alone, in contrast to patients with heart failure, increased the average number of hospital admissions for

all causes by 1.30 ± 0.44 and 1.05 ± 0.32 r = 0.01, respectively, and the average number of treatments per year. Duration is 15.2 ± 3.9 and 17.3 (P> 0.001), respectively, significantly increasing its cost [17].

It has been proven that 96% of patients over 65 years of age and with heart failure have at least one, and 40% of patients have 5 or more concomitant diseases. CHF occurred in comorbid cases such as 30-60%, anemia in cases, and renal dysfunction in up to 55% [12, 18].

In recent years, special attention has been paid to the fact that CHF is accompanied by anemia. According to various scientific sources, the prevalence of anemia occurs in 4% to 55% of patients with CH, depending on its diagnostic criteria. Anemia is an independent risk factor for the unfavorable prognosis of CHF, and dramatically increases the number of deaths from not only general but also cardiovascular disease [3]. The results of a SOLVD retrospective study showed that a 1% decrease in hematocrit increased the overall mortality of patients with CHF by 2.7%, and a similar situation has been demonstrated in a number of other observations [32, 30].

OPTIME tests have shown a 13% increased risk of death or re-hospitalization when hemoglobin levels are less than 12 g / dl. A number of scientific observations have shown that not only anemia, but also iron deficiency has a sharp negative impact on the course of chronic diseases [20, 22].

The results of epidemiological and population surveys testify to the fact that early, even subclinical disorders of renal function lead to a sharp deterioration in the condition of patients with CHF. According to a number of authors, renal dysfunction in CHF is detected in 32–60% of cases using criteria such as creatinine, creatinine clearance, ball filtration rate, cystatin C, microalbinuria [2, 10]. The addition of CHF renal dysfunction dramatically increases the number of hospitalizations and re-admissions as well as deaths [20, 21, 24, 25, 31].

As mentioned above, CHF often occurs in a comorbid state with anemia and DM. Observations show that CHF, when combined with DM type 2 and the addition of CHF to the process, worsens the outcome of the disease and increases the risk of death by 1.29–3.19 times [19]. They have a negative effect on each other, leading to irreversible organic changes in all organs and, above all, in the kidneys, and accelerate the unpleasant consequences. This indicates the need for early detection and monitoring of changes in renal function in this group of patients. Its most widely accepted and widely used methods are the determination of serum creatinine, its glomerular filtration rate (GFR) and urinary albuminuria [15, 16].

In one of the meta-analyzes, 26 cohort studies examined the correlation between microalbuminuria and cardiovascular disease in 170,000 patients. It has been found that the risk of developing cardiovascular disease is higher than 50% in patients who do not have it [15, 16].

In connection with the active introduction of modern methods of diagnosis and treatment, especially pathologies of the cardiovascular system, an increase in the life expectancy of the population in the Republic of Uzbekistan, the study of comorbidity, along with other states, is becoming a priority for our country.

The aim of this study. To study comorbidity and its effect on the quality of life and clinical condition in CHF patients living in regions with a hot climate.

2. MATERIAL AND METHODS

We examined 323 patients who were inpatient treatment in the cardiology department of a multidisciplinary hospital in Bukhara. Bukhara region is considered one of the southern and hottest regions of Uzbekistan, which has a sharply continental climate, in summer the temperature of the thermometer rises above 40C. It should be added that in the vicinity of the city of Bukhara, the administrative center of the region, the famous healer Avicenna was once born and lived.

All patients underwent the following examinations: complaint, anamnesis, objective examination; generally accepted clinical-laboratory and specific biochemical tests, including the amount of proteinuria in the urine (as recommended by the World Health Organization - hemoglobin <130 g / l for men, <120 g / l for women, from the method based on the Yaffe reaction in the determination of creatinine used), electrocardiography; determination of endurance to physical load - a six-minute walking test was performed using a method proposed by Guyatt and co-authors [21; 22]. Patient quality of life was assessed using a "special questionnaire produced by the University of Minnesota" [23], and a clinical status assessment scale was used to indicate the severity of clinical symptoms in CHF [24].Exo Cardioramma examination was performed to study the functional status of the myocardium.

Among the examined patients there were 150 men (46.43%), 173 women (53.56%). All patients had CHF and were divided by age into 2 groups up to 59 years old - 161 people and the second group - 162 people over 60 years old. The average age in group 1 was 52.55 ± 6.42 years, the average age in group 2 was 67.56 ± 6.7 years ($p < 0.01$). CHF was diagnosed and assessed in accordance with the recommendations of the Heart Society of New York.

The patients were divided into two groups depending on blood hemoglobin indices. In the first group, hemoglobin indices were 112.4 ± 10.2, in the second group, hemoglobin was 134.9 ± 8.9 ($P < 0.05$). The average age of patients with anemia was 64 ± 10.1 years, and those with normal hemoglobin values were 57.9 ± 9.1 years ($P < 0.05$).

The research results were processed by the methods of variation statistics: Student's t-test using the BIOSTAT software package. Numerical data are presented as M + SD, where M is the arithmetic mean, SD is the mean deviation. Differences were considered statistically significant at $p < 0.05$.

3. RESEARCH RESULTS AND DISCUSSION

According to the study, the patients were assigned to FC as follows: I FC-26.93%; II FC-50.51%; III FC-22.29%; IV-0.26%. Body mass index on average in the group under 60 years old was 29.4 ± 4.9, in the second group over 60 years old - 28.1 ± 4.5.

All patients were found to have comorbid conditions. Thus, there were 43 patients with one concomitant diagnosis - this amounted to 13.31% of patients, with two concomitant diagnoses - 214 patients, which amounted to 66.25%. With three comorbidities - 56 patients, which amounted to 17.33% of patients. 9 patients had 4 or more concomitant pathologies, accounting for 2.78%. On average, the general comorbidity was 2.1 ± 0.67, in the group under 60 years old this indicator was 1.9 ± 0.53, in the group over 60 years old - 2.2 ± 0.75, ($p < 0.01$).

When assessing comorbidity by functional classes, it was found that in patients with 1 FC among 87 people, comorbidity was 1.74 ± 0.61, in patients with 2 FC in 164 patients it was 2.1 ± 0.57 in patients with 3 FC among 72 patients comorbidity was 2.54 ± 0.65.

The analysis showed that with age and an increase in the FC of CHF, the frequency of comorbid conditions increases in parallel and is most often diagnosed in older age groups.
The most common comorbidities were coronary artery disease, diabetes mellitus, anemia, obesity, fatty liver disease, deforming osteoarthritis, osteochondrosis.
The study of hemoglobin indices depending on the FC of CHF showed the following: with I-FC - 139.9 ± 16.8, with II-FC - 118.5 ± 19.7, with III-FC - 112.2 ± 14.5, with IV-FC - 102.5 ± 10.2 (P <0.05) (Figure-2)
The analysis showed that anemia is also often diagnosed in older patients with CHF and the frequency increases depending on the FC of the disease.
In addition to the above, in order to study renal dysfunction in patients with CHF, we analyzed the number of patients with albuminuria and blood creatinine levels.
If albuminuria was detected in 24.8% of patients under the age of 60, then in older age categories it occurs in 35.1% of patients (P <0.01). This confirms that renal dysfunction in patients with CHF increases with age.
Considering that in the Republic of Uzbekistan, blood creatinine indicators are often used to determine kidney dysfunction, we analyzed its level depending on age, the presence of anemia and FC CHF. The blood creatinine indices in patients under 60 years old were 74.9 ± 17.7 and in 60 years old and over 98 ± 21.9 mkmol / l (P <0.05).
A comparative analysis of this biochemical indicator, depending on the presence of anemia, revealed the following: with hemoglobin 112.43 ± 12.0 g / l, creatinine was 119.64 ± 13.7 mkmol / l and with hemoglobin 134 ± 9 g / l this indicator was equal to 89.6 ± 8.5 mkmol / l (P <0.01).
Analyzes of patients with CHF showed that with increasing age and FC, creatinine levels in the blood increase, the process is aggravated in the presence of comorbid pathology, which confirms the presence of impaired renal function in a certain number of patients we observed.
In the next step, we evaluated their quality of life indicators based on the number of comorbid cases identified in the patients, and the results obtained are presented in

Table 1. Indicators of quality of life scores determined using the Minnesota questionnaire in patients with chronic heart failure at different levels of comorbid conditions

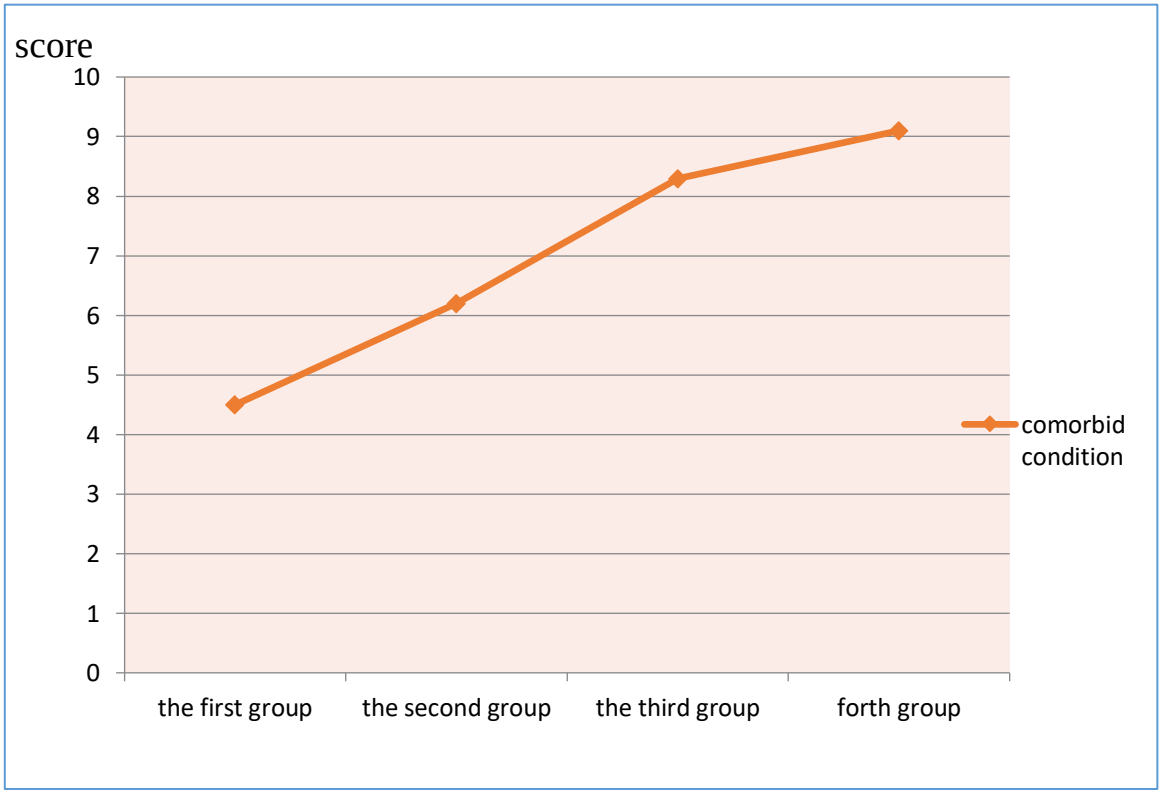
№	**Indicators** / **Comorbid status groups**	**Determined scores**	**Intergroup differences**
1	A comorbid case n=43 (13,3%)	37,2±1,8	P1-2<0,01 P1-3<0,01 P1-4<0,05
2	Two comorbid cases n=214 (66,25%)	48,6±3,2	P2-1<0,01 P2-3<0,01 P2-4<0,05
3	Three comorbid cases n=56 (17,3%)	67,4±8,9	P3-1<0,01 P3-2<0,01 P3-4<0,05

4	Four or more comorbid conditions n=9 (2,78%)	78,3±15,7	P4-1<0,01 P4-2<0,05 P4-3<0,05

As shown in the table, it was noted that as the number of existing comorbidities in patients increased, the quality of life deteriorated by a significant difference. Quality of life indicators differed by more than 2.5 times (P <0.01) when four or more comorbid conditions were detected compared to patients with a single comorbid condition in the first group.

It is known that in addition to the quality of life of patients, it is important to assess their clinical condition. In this context, we also assessed their clinical status based on the number of comorbid cases identified in the patient in our follow-up. The data obtained are shown in Figure 1.

Figure 1. Scores of clinical status in patients with varying degrees of comorbidity of chronic heart failure



Note: Group 1 - single comorbid case - 43 (13.3%)
Group 2 - two comorbid cases - 214 (66.25%)
Group 3 - three comorbid cases - 56 (17.3%)
Group 4 - four or more comorbid cases - 9 (2.78%)
P <0.05 in all cases

As shown in Figure 1, the clinical condition of the patients changed negatively according to the number of comorbid cases. In the group of patients with a single comorbid condition, the scores were 4.5, while the clinical condition scores were higher than 9 when the number was

four or more. This confirms that comorbidity changes dramatically the clinical condition of the followers.

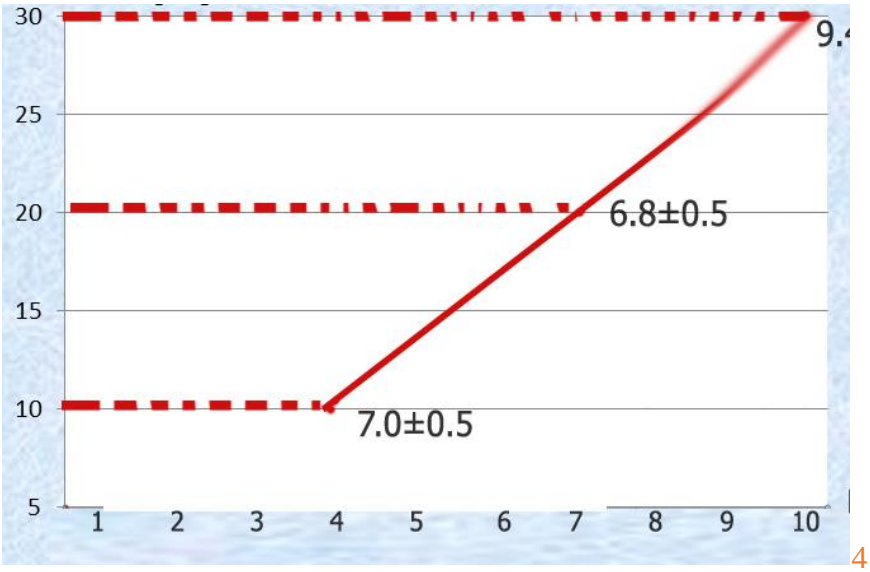
The study of the effect of albuminuria levels on patients' quality of life and clinical condition is also of some practical importance. There is data in the available literature on an increase in deaths from cardiovascular disease as albuminuria increases. With this in mind, we examined the extent to which the quality of life and clinical status score scores of the patients in the follow-up were consistent with albuminuria. Information on them is given in Table 2 and Figures 2.

Table 2. Determining the incidence of albuminuria in chronic heart failure using the Minnesota questionnaire

№	Patients diagnosed with albuminuria	Determined scores	Intergroup differences
1	I FC -12,3%	30,2 ± 1,6	P 1-2 <0,01 P 1-3< 0,001
2	II FC – 18,5%	49,3 ± 2,9	P 2-1 <0,01 P 2-3 < 0,001
3	III FC – 29, 1%	79 ± 17,8	P 3-1 < 0,001 P 3-2 < 0,001

An indication of the score of the clinical condition detected in patients with albuminuria in chronic heart failure

Patients diagnosed with albuminuria%



4 +- 3.4

The indicators presented in Table 2 and Figure 2 show that the level of albuminuria has a very negative impact on the quality of life and clinical condition of patients. At the same time, the quality of life in group 3 albuminuria was almost 2.5 times higher than in group 3, 12.3% (P <0.001). Similar changes were observed in the assessment of the clinical condition (7.0 ± 0.5

and 9.4 ± 3.4 points, respectively. P <0.05). As noted in a number of literatures, renal dysfunction is one of the major life-threatening factors in patients with CHF.
Also, when studying the level of anemia in patients and its impact on the quality of life and the clinical condition of the followers using the Minnesota questionnaire, the indicators listed in Table 3 below were identified.

Table 3. Indicators of quality of life and clinical status scores at different hemoglobin levels in chronic heart failure

№	**Groups**	**Quality of life score indicators determined using the Minnesota questionnaire**	**Indicators of clinical status in points**
1	Hemoglobin 112,4± 10,2г/л n=161	63,4±12,3	7,2±0,5
2	Hemoglobin 134,9±8,9г/л n=162	20,8±7,4	3,6±0,2
	P	<0,001	<0,001

As shown in the table, the detection of anemic syndrome in patients with CHF confirms a sharp negative change in the recorded scores. This proves once again that the addition of anemia in patients with CHF in the hot climate of Bukhara, as well as around the world, is a very negative factor. The results show that in patients with chronic heart failure, early detection of anemia in all systems of medicine (especially primary) and the need for similar antianemic treatments.
In addition to the above, the functional status of the kidneys in the observed patients was assessed using the creatinine index in the blood. Numerous observations have shown that creatine is widely used in the diagnosis of renal dysfunction, but its high levels indicate the development of fibrous processes in the organ. However, due to its convenience and low cost, it is widely used in the practice of our country. Therefore, we also found that when patients with anemic syndrome were diagnosed with creatinine based on hemoglobin, creatinine was 119.64 ± 13.7 μmol / l at hemoglobin 112.43 ± 12.0 g / l and 89 at 134 ± 9 g / l. , 6 ± 8.5 μmol / l (r <0.01), the indicators differed reliably.
We also separately analyzed the effect of creatinine levels on blood quality of life and clinical status scores based on hemoglobin indicators. Its results are presented in Table 4.

Table 4. Indicators of quality of life and clinical status scores in different hemoglobin and creatinine levels of chronic heart failure

№	Groups	Creatinine mkmol / l	Quality of life scores	Indicators of clinical status in points
1	Hemoglobin 112,4± 10,2г/л	119,6±13,7	92,3±15,4	8,9±0,4

	n=161			
2	Hemoglobin 134,9±8,9г/л n=162	89,6±8,5	25,2±6,3	4,2±0,3
	P		<0,001	<0,001

As shown in the table, the presence of anemic syndrome, as determined by the Minnesot questionnaire, has a high (P <0.001) reliable adverse effect on patient quality of life and clinical status. Consequently, the number of re-hospitalizations, the cost of treatments, ultimately changes their life expectancy in a negative way. As CHF FCincreases, creatinine levels in the blood increase, resulting in the development of renal dysfunction in patients.

4. CONCLUSION

1. Even in the hot climate of Bukhara region, the incidence of comorbidity increases with increasing functional classes of chronic heart failure and averages 2.54 in functional class IV;
2. Increased comorbidity in patients leads to a negative change in their quality of life and clinical condition;
3. The presence of comorbidity and albuminuria in chronic heart failure has a sharp negative impact on the quality of life and their clinical status in patients identified using the Minnesota questionnaire;
4. In accordance with the hemoglobin indicators in patients with anemic syndrome in CHF, the indicators of quality of life and clinical status of patients determined using the Minnesota questionnaire change to a reliable negative relative to those without anemia (P<0.001);
5. As renal dysfunction increases (based on creatinine levels), patients' quality of life and clinical status deteriorate sharply (P<0.001).

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