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THE ASSOCIATION BETWEEN HEART FAILURE WITH PRESERVED AND MILDLY REDUCED EJECTION FRACTION AND DEPRESSION IN THE ELDERLY PATIENT

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Abstract

Background and aim. *Modern society is experiencing an accelerated increase in the number of elderly people, to the detriment of children and young adults, in the context of declining birth rates, high adult mortality and increasing life expectancy due to advances in medicine. Cardiovascular diseases are becoming more common in the general population, representing the leading cause of death, being responsible for a third of the total number of deaths worldwide, and heart failure is the most common cause of hospitalization in patients over 65 years. Depression is one of the most common mental illnesses, presents different clinical pictures, which vary from person to person and in relation to age, being shown that there are somatic disorders due to depression, including cardiovascular disease.*

Materials and method. *We studied 127 patients hospitalized in the Geriatrics Department of the Calarasi County Emergency Hospital, diagnosed with heart failure (HF), being divided into 2 groups: the first group, which included 63 patients with heart failure with mildly reduced ejection fraction and the second, which included 64 patients with heart failure with preserved ejection fraction.*

Results. *The main risk factor present in the studied patients was dyslipidemia, which is present in 90% of patients with a mildly ejection fraction and in 88% of patients with a preserved ejection fraction. Hypertension was also present in 75% of patients in the first group and in 63% of those in the second group. Depression was present in 67% of patients with mildly reduced ejection fraction and in 64% of those with preserved ejection fraction. The degree of depression was higher among women, 11% of those with HF with mildly reduced ejection fraction and 14% of those with preserved ejection fraction had major depression. The degree of depression increases with age, patients over 80 years presented predominantly moderate-severe depression (41% of patients in the first group, and 50% in the second). Patients with NYHA class III heart failure had predominantly moderate-to-severe depression: 50% of patients with mildly reduced ejection fraction and 67% of those with preserved ejection fraction.*



Conclusion. *Depression is an important independent risk factor for heart failure in the elderly patients. Due to the fact that the symptoms of the two pathologies are often similar, the diagnosis of depression can be difficult to make, which is why it should be investigated in all patients with heart failure. It is important to understand the peculiarities of the polypathology of the elderly, which often poses problems for the diagnosis and treatment of the clinician.*
Keywords: *heart failure, depression, elderly*

Rezumat

Societatea modernă se confruntă cu o creștere accelerată a numărului persoanelor vârstnice, în detrimentul copiilor și al adulților tineri, în contextul scăderii natalității, a mortalității ridicate în rândul adulților și al creșterii speranței de viață datorită progreselor în medicină. Bolile cardiovasculare sunt tot mai frecvente în populația generală, reprezentând prima cauză de mortalitate, fiind responsabile de o treime din numărul total de decese la nivel mondial, iar insuficiența cardiacă reprezintă cea mai frecventă cauză de spitalizare la pacienții cu vârsta peste 65 de ani. Depresia reprezintă una dintre cele mai frecvente boli psihice, prezintă tablouri clinice diferite, ce variază de la persoană la persoană și în raport cu vârsta, fiind demonstrat că există afecțiuni somatice cauzate de depresie, printre care se numără bolile cardiovasculare.

Material și metodă. *Au fost studiați 127 de pacienți internați în secția Geriatrie a Spitalului Județean de Urgență Călărași, diagnosticați cu insuficiență cardiacă, fiind împărțiți în două loturi: primul lot, în care au fost incluși 63 de pacienți cu insuficiență cardică cu fracție de ejecție ușor redusă și al doilea, în care au fost incluși 64 de pacienți, cu insuficiență cardiacă cu fracție de ejecție păstrată.*

Rezultate. *Principalul factor de risc prezent la pacienții luați în studiu a fost dislipidemia, aceasta fiind prezentă la 90% dintre pacienții cu fracție de ejecție ușor scăzută și la 88% dintre pacienții cu fracție de ejecție păstrată. Hipertensiunea arterială a fost de asemenea prezentă la 75% dintre pacienții primului lot și la 63% dintre cei din al doilea lot. Depresia a fost prezentă la 67% dintre pacienții cu fracție de ejecție ușor redusă și la 64% dintre cei cu fracție de ejecție păstrată. Gradul depresiei a fost mai mare în rândul femeilor, 11% dintre cele cu IC cu fracție de ejecție ușor redusă și 14% dintre cele cu fracție de ejecție păstrată au prezentat depresie majoră. Gradul depresiei crește odată cu înaintarea în vârstă, pacienții cu vârsta peste 80 ani prezentând preponderent depresie moderat-severă (41% dintre pacienții primului lot și 50% în cel de-al doilea). Pacienții cu insuficiență cardiacă clasa NYHA III au prezentat preponderent*

depresie moderat-severă: 50% dintre pacienții cu fracție de ejecție ușor scăzută și 67% dintre cei cu fracție de ejecție păstrată.

Concluzie. *Depresia reprezintă un factor de risc independent important pentru insuficiența cardiacă la pacientul vârstnic. Din cauza faptului că simptomatologia celor două patologii este deseori similară, diagnosticul de depresie poate fi greu de pus, motiv pentru care trebuie investigat la toți pacienții ca insuficiență cardiacă. Este importantă înțelegerea particularităților polipatologiei vârstnicului care pune deseori probleme de diagnostic și tratament clinicianului.*

Cuvinte cheie: *insuficiență cardiacă, depresie, vârstnic.*

Introduction

The World Health Organization considers that aging is a physiological process, specific to all living beings, which takes place throughout life, starting with the cessation of growth and is a progressive, irreversible change in the living substance. From a biological perspective, aging is considered a phenomenon that occurs in all animal species, resulting from the interaction between genetic, environmental and lifestyle factors, which influence longevity. This process causes metabolic disorders, changes at the molecular and structural level, at the level of organs and systems, favoring the appearance of pathologies associated with age[1].

Regarding cardiovascular pathology, it is important for the clinician to know the effects of aging processes, as these are preventable factors of cardiovascular risk and it is necessary to perform screening for them. It was thus proposed to identify changes strictly related to age, which should be absent in young adults, their incidence to increase with age, to be present in all older adults and not to be associated with any known pathology. Studies on an aging population have shown that coronary atherosclerosis has an increased prevalence in developed countries and is one of the occult diseases that significantly affects heart function. High blood pressure is a more common subclinical condition than coronary atherosclerosis. Thus, screening for the two conditions is useful in differentiating between aging and disease[2].

Heart failure is the most common cause of hospitalization in patients over 65 years old, those over 75 years accumulating even two thirds of the total number of days of hospitalization for heart failure. Mortality one year after the first hospitalization for heart failure exceeds 30%. Among elderly in patients with comorbidities such as diabetes, renal failure, peripheral vascular disease, dementia, mortality rates may exceed 60% during the year following the first hospitalization[3].

The most common causes of heart failure in the elderly are coronary atherosclerotic disease and hypertension, which often coexist. Other common causes in developing countries are: arrhythmias, endocrinopathies, infiltrative, idiopathic and dilated cardiomyopathy, infections and alcohol[4,5]. Age is also an isolated risk factor for the development of HF after acute myocardial infarction.



Clinically, heart failure is manifested by intolerance to physical exertion, fluid retention, edema and visceral congestion, which often leads to hospitalization, poor quality of life and low life expectancy. In recent decades, HF has become an increasingly widespread phenomenon, closely linked to an aging population, with a growing awareness in clinical geriatrics[5].

At this time, depression in the elderly is seen as a single clinical entity, its clinical picture showing many differences from the clinical picture of depression in adults. The prevalence of depression varies between 12-45%, with an average of 20%[6,7].

Many practitioners see depression in people over 60 as a natural process and a consequence of aging. In practice, in the elderly, some symptoms of the disease may be exacerbated and, at the same time, others may be diminished, compared to the clinical picture we are accustomed to encounter in young people[8]. Loss of appetite, sleep disturbances or fatigue, which are often less severe in younger people, are examples of depressive behavior, which are amplified in the elderly. The elderly have a less intense clinical profile than younger patients, denying a number of significant symptoms, such as suicidal ideation, guilt or psychotic manifestations[9].

The association between chronic heart failure and depressive disorders has a high prevalence and incidence in the elderly. Several studies have shown how depression tends to exacerbate coexisting chronic heart failure and its clinical picture and vice versa, especially in the elderly. The negative synergism between chronic heart failure and depression in the elderly can only be addressed taking into account the multifactorial pathophysiological characteristics underlying both conditions, such as behavioral factors, neurohormonal activation, inflammatory mediators, hypercoagulability and vascular damage. However, the pathophysiological link between these two conditions is not yet well established. Despite the high prevalence of depression in elderly patients with chronic heart failure and its negative prognostic value, it is often undiagnosed, especially due to common symptoms. So, screening for mood disorders, using approved questionnaires, is recommended in elderly patients with chronic heart failure, even if it cannot replace the psychiatric history[10].

Materials and methods

The study included 127 patients, admitted to the Geriatrics Department of the Calarasi County Hospital, who were diagnosed with heart failure. They were divided into 2 study groups, depending on the ejection fraction of the left ventricle. In the first group were

included 63 patients with ejection fraction between 41-49% (HFmrEF), and in the second group were 64 patients with ejection fraction over 50% (HFpEF). Patients with moderate-severe valvulopathies, a history of major cardiovascular events (myocardial infarction or stroke), cardiomyopathies, severe hypertension with hypertensive heart disease, patients with severe respiratory failure, with moderate-severe renal impairment, with chronic liver disease or cognitive impairment were excluded from the study. Patients were evaluated clinically, paraclinically and imaging, by history, complete clinical examination, geriatric assessment of mental and psychological status (using the Geriatric Depression Scale), ECG, biological (NT-pro BNP, blood glucose, assessment of renal function, liver, markers of myocardial necrosis), lung radiography and echocardiography.

Results

We begin by evaluating the general characteristics of the cohort under study. The majority of patients included in the study, in both groups, were women. In the group of patients with heart failure with mildly reduced ejection fraction (HFmrEF) were included 51 (81%) women and 12 (19%) men, in the group with preserved ejection fraction (HFpEF) were 43 (67%) women and 21 (33%) of men. The minimum age for inclusion in the study was 60 years (criterion for admission to the geriatric department). The average age in the first group was 72 years, with a maximum age of 90 years, and in the second group the average age was 70 years, with a maximum of 84 years.

Common risk factors were also investigated: smoking (active or historical smoking), sex, BMI, onset of menopause before the age of 45, the presence of high blood pressure and dyslipidemia. It was observed that all patients had at least one cardiovascular risk factor present. The main risk factor present in the studied patients was dyslipidemia, which was present in 57 (90%) of patients with a mildly reduced ejection fraction and in 56 (88%) of patients with preserved ejection fraction (see Figure 1). Hypertension was also present in a large number of patients studied: 47 (75%) of the patients in the first group and 40 (63%) of those in the second group had hypertension. We can also observe that 9 (18%) of females with heart failure with mildly reduced ejection fraction entered menopause before the age of 45 and 11 (24%) of those with preserved ejection fraction.

In the patients with a mildly reduced ejection fraction, 29 (46%) have 3 risk factors present, 6 (10%) have 1 risk factor, 20 (32%) have 2 risk factors, 5 (8%) have 4 risk factors and 3 (5%) of them have 5 risk factors. Regarding patients with retained ejection fraction 10 (16%) have 1 single risk factor present, 16 (25%) have 2 risk factors, 16 (25%) have 3 risk factors, 17 (27%) have 4 risk factors and 4 (6%) have 5 cardiovascular risk factors.

Regarding the presence of depression in the study group, it was present in 42 (67%) of patients with mildly reduced ejection fraction and in 41 (64%) of those with preserved ejection fraction (see Figure 2). Of these, in the group of patients with heart failure with a mildly reduced ejection fraction, 27 (64%) patients had mild depression, 11 (26%) had moderate depression and 4 (10%) had severe depression. Of the patients with preserved ejection fraction, 23 (55%) associated mild depression, 14 (33%) moderate depression and 4 (10%) severe depression. There were no statistically significant differences in the degree of depression in women and men in

the group of patients with heart failure with preserved ejection fraction [28 (65%) women and 13 (62%) men]. Regarding patients with heart failure with mildly reduced ejection fraction, a predisposition of women to develop depression was observed [36 (71%) of women had depression and 6 (50%) of men]. Regarding the degree of depression, in both groups, men presented mild depression [5 (83%) in the first group and 9 (69%) in the second group] and moderate depression [1 (17%) in the first group, respectively 4 (31%) in the second group] and no man showed severe depression. Among women with heart failure with a slightly reduced ejection fraction, 22 (61%) associated mild depression, 10 (28%) moderate depression and 4 (11%) severe depression. In patients with preserved ejection fraction, depression was present in 14 (50%) of them in mild form, 10 (36%) in moderate form and 4 (14%) in severe form.

Depending on the decade of age, depression was present mainly in patients aged 60-69 years, 20 (71%) of patients with mildly reduced ejection fraction and 24 (73%) of those with preserved ejection fraction in this age interval showed depression. From the point of view of the degree of depression, in this group of patients we found mainly mild depression [12 (43%) in the patients of the first group and 14 (42%) of the second group]. The age group 80-89 was on the 2nd place at the frequency of the association of depression [8 (67%) in the first group and 4 (67%) in the second group], and the degree of depression most frequently encountered was moderate [4 (33%) from the first group and 3 (50%) from the second group] (see Figure 3).

Discussions

The association between cardiovascular disease (CVD) and depression has been studied for the past 20 years, as the coexistence of these two conditions is a common observation in clinical practice[11]. In our cohort, depression was found in most patients, both those with heart failure with mildly reduced ejection fraction and those with a preserved ejection fraction. Traditional risk factors tend to be more common in patients with depression, such as high blood pressure and diabetes[12]. In our group, patients with diabetes were excluded from the study, but hypertension and dyslipidemia were the main risk factors present. The presence of hypertension in most patients is not surprising, its prevalence increasing with age and, according to national statistics, in Romania, hypertension is underdiagnosed and only 30% of treated patients reach the target values[13]. Obesity was another risk factor present in the study group.

A meta-analysis of 28 studies found a 46% increase in the risk of developing

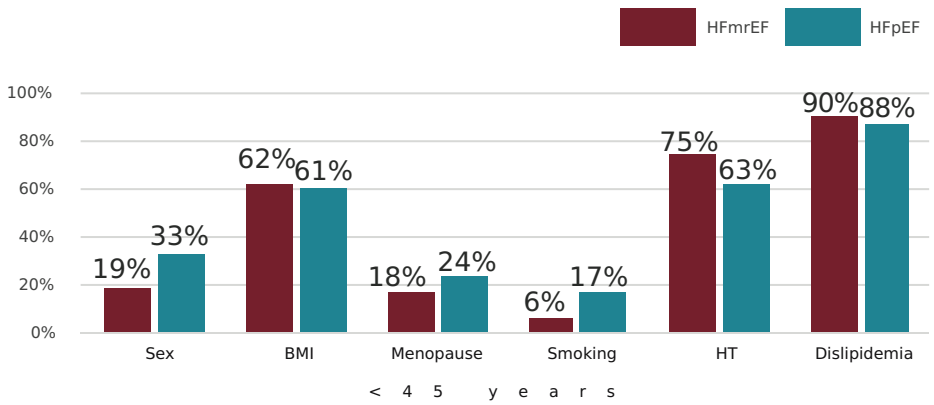


Figure nr. 1. *The main risk factor present was dyslipidemia. It was present in 57 (90%) of patients with HFmrEF and in 56 (88%) of patients with HFpEF. Hypertension was present in 47 (75%) of the patients in the first group and 40 (63%) of those in the second group. 9 (18%) females with HFmrEF entered menopause before the age of 45 and 11 (24%) of those with HFpEF*

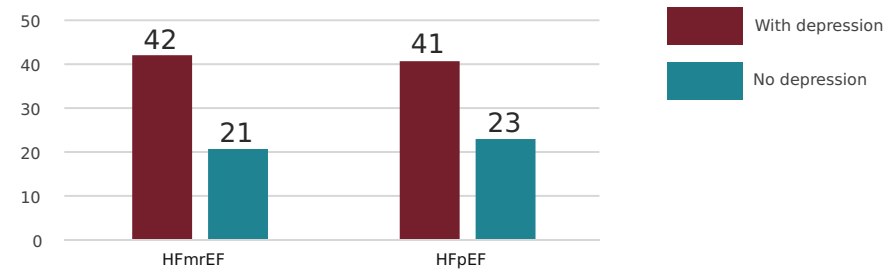


Figure nr. 2. *Depression was present in 42 (67%) of patients with HFmrEF and in 41 (64%) of those with HFpEF*

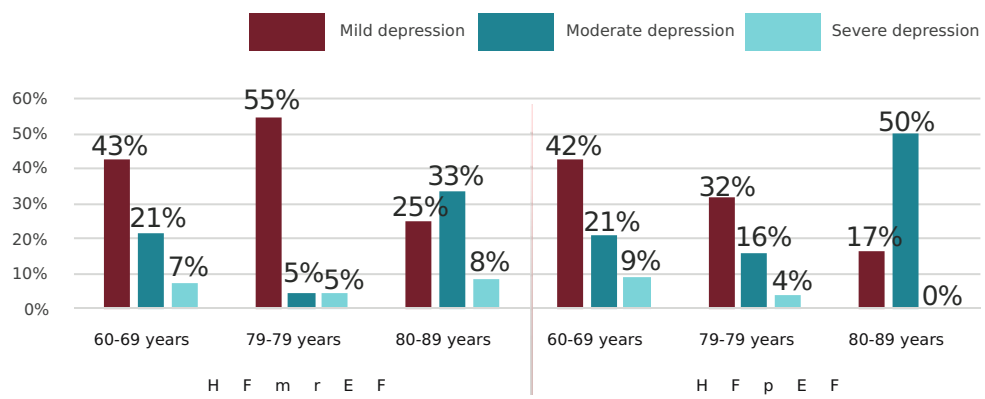


Figure nr. 3. *Mild depression was predominant in 60-69 years group: 12 (43%) patients with HFmrEF and 14 (42%) with HFpEF. Frequently in the age group 80-89 years we encountered moderate depression: 4 (33%) with HFmrEF and 3 (50%) with HFpEF*

cardiovascular disease in depressed patients compared to healthy subjects[14]. In addition, severe depressive symptoms are associated with known risk factors for the development of heart failure (e.g., diastolic dysfunction and left ventricular hypertrophy)[15].

Importantly, depression is a strong independent risk factor for the development of heart failure in high-risk population groups, including the elderly, women, those with isolated systolic hypertension and those with coronary heart disease.

It is known that up to 30% of adult patients with heart failure suffer from depression[17]. It should be mentioned that in the study group over 60% of patients presented depression.

In both groups, women had a higher prevalence of depression and had predominantly moderate-to-severe depression, compared with men who had mild-to-moderate depression. At the same time, it was observed that patients over 80 years of age are predominantly affected by moderate-severe depression, compared to younger patients, where the prevalence of moderate-severe depression was lower. There are no data in the literature on the relationship between the degree of depression and the class of heart failure. In the study cohort, however, it was observed that there is a direct relationship between the degree of depression and that of heart failure. Thus, patients with NYHA class III heart failure presented predominantly moderate-severe depression in both study groups, compared to patients with functional class NYHA class I-II heart failure, who presented predominantly mild depression.

Of course, these observations will serve as a starting point for a future larger study, which hopefully will provide statistically significant results.

Conclusions

Based on our observations we would like to draw the following conclusions:

- Dyslipidemia was the most common risk factor in both patients with heart failure with a mildly reduced ejection fraction (90%) and those with preserved ejection fraction (88%), followed by hypertension (75%, respectively 63%).
- Over 60% of the patients studied had depression.
- Women have a higher prevalence of depression: 81% of women with heart failure with mildly reduced ejection fraction and 67% of those with preserved ejection fraction.
- The degree of depression was higher among women, 11% of those with HF with mildly reduced ejection fraction and 14% of those with preserved ejection fraction had major depression.
- The degree of depression increases with

age, patients over 80 years old have predominantly moderate-severe depression
- Patients with NYHA class III heart failure have predominantly moderate-to-severe depression
- It is important to understand the peculiarities of polypathology present in the elderly and which often poses problems of diagnosis, evolution, treatment and prognosis.
- Further studies are needed to establish the statistical significance of these observations

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