

RESEARCH ARTICLE

Depressive Symptoms and the Presence of Outcomes in Heart Failure

Felipe Montes Pena^{1*}, Renato Teresa das Chagas², Jamil da Silva Soares³, Maria Angela Montes Belo Pena⁴¹Prontocardio Hospital, Campos dos Goytacazes, Brazil²State University of the North Fluminense, Campos dos Goytacazes, Brazil³Alvaro Alvim Hospital School, Campos dos Goytacazes, Brazil⁴Saint Joseph Foundation, Campos dos Goytacazes, Brazil

*Corresponding author: Felipe Montes Pena : fellipena@yahoo.com.br



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Abstract:

Introduction: Heart failure is a disease with a high risk of complications and reduces life expectancy. Ventricular function and neurohumoral activation are defining characteristics of the disease. The presence of depressive symptoms is extremely common and determinant for the HF, and its influence may determine the prognosis of the disease.

Methods: Consecutively hospitalized patients with HF were analyzed and recruited for three months, receiving clinical follow-up for six months after admission. Sociodemographic and clinical variables were analyzed and submitted to a type II Beck questionnaire to analyze depressive symptoms. They received clinical follow-up in person or by phone call to determine whether there was hospital readmission or death in the aforementioned period. Chi-square test, Student's t-test were used to compare groups with and without depressive symptoms, multivariate analysis was used to determine mortality predictors in the group with depressive symptoms up to the sixth month.

Results: Initially, 103 patients were included, and after six months 94 patients remained alive. The mean age was 63.5 ± 12.1 years. Most patients were female (58.4%). New York Heart Association functional class was in II and III in 75% of the sample. In the sample, 59 (61.4%) had DS by the Beck questionnaire type II. There were 28 (29.2%) patients with the analyzed outcomes and in the multivariate logistic regression analysis, the presence of age was a determining factor for the outcomes.

Conclusion: The presence of heart failure associated with depressive symptoms becomes a combination with increasingly evident complications, as well as it also becomes a long-term relevant factor for readmission and death. Depressive symptoms in our sample proved to be a major factor in deaths and readmissions. A multidisciplinary care is extremely important for the improvement of care.

Keywords: Depressive symptoms, Heart failure, Mortality, Predictors, Readmission

Introduction

Heart failure (HF) is characterized by impaired cardiac function, a high rate of complications and reduced life expectancy. The worsening of cardiac function and neurohumoral activation are the defining characteristics of HF, which contribute to clinical deterioration, and the focus of interventions has usually been to block the renin angiotensin system and the sympathetic nervous system [1,2].

Depressive symptoms (DS) are associated and common in patients with HF, and may be important and determinant in terms of general status and functional class [3]. Patients hospitalized for heart failure have an elevated event rate (greater than 50%), with a mortality rate from 10 to 15% and rehospitalization rate within 6 months of discharge from 30 to 40%. Three great causes seem to directly affect the rehospitalization of patients with heart failure: comorbidities, congestion and target organ damage [4]. The interest in the psychosocial approach to HF has been reinforced by the enormous costs produced by the association of DS and HF. Although reviews of recent literature identify DS as important topic, quantitative and biochemical methods are needed to precisely define the magnitude of this relationship [5-7].

In subsequent studies in outpatients, Gottlieb et al. [8] found an equally significant association between depression and age, sex and functional status. The exact form for detection, prevention and intervention on DS, as well as the factors associated with triggering it in patients with HF must be established, due to the fact that risk factors and prevalence in different populations are not well defined. Therefore, the early identification of the potential overcome of these patients suggests a reduction in the incidence of DS [9]. This article aims to proceed with the analysis of the presence of DS as a determining factor for rehospitalization and deaths in patients with HF, determining its correlation up to six months after hospital discharge.

Material and methods

This is a cross-sectional study of patients with HF consecutively admitted to cardiology wards in public hospitals in Campos dos Goytacazes, RJ. Patients were recruited over a three-month period and were discharged after periods of hospitalization. All admitted patients had had a previous diagnosis of HF or were diagnosed when admitted by the Boston criteria. After hospital discharge, they received face-to-face follow-up via return to outpatient consultations or by telephone.

Left ventricular ejection fraction was measured by transthoracic echocardiography using Simpson's method and those who had a left ventricular ejection fraction < 50% were included. Exclusion criteria included: concomitant diagnosis of severe cancer, use of antidepressants in the 30 days prior to admission, disorders that prevented understanding and communication with the investigator, alcohol abuse or dependence in the last six months, psychotic symptoms, historic of psychosis, bipolar disorder, dementia (or mental status score < 23) or inability to sign the informed consent form.

Participants first received a questionnaire with sociodemographic data such as age, sex, marital status, employment, educational level and monthly income. The disease assessment was performed by examining the New York Heart Association (NYHA)[10] functional class and obtained information on cardiovascular risk factors, HF etiology, and treatment administered. Due to the mixed characteristics of the Brazilian population, the ethnicity of the patient was not considered. This scale is used to quantify the degree of functional limitation imposed by HF. Four classes are assigned depending on the degree of effort required to cause symptoms. Patients may experience symptoms of HF at rest (class IV), during daily activities (class III), performing normal activities (class II) or only during those activities that limit normal individuals (class I)[11]. No patients were in functional class I, since only patients with NYHA functional class between II and IV were included in the study. Present comorbidities were questioned and studied.

To identify DS, Beck Depression Inventory II (BDI) [12-13] was administered to all patients in the study within five days of admission. This scale, validated in Brazil and currently used in international studies, allows the identification of DS and its intensity through a score obtained by 21 indicator items. The score ranges from 0 to 63, according to Beck, distributed as follows: from 0 to 9 depression is considered absent from 0 to 9, between 10 and 18 is considered mild to moderate, between 19 and 29 is considered moderate to severe, and above 30 is considered serious. We considered as having DS patients ≥ 10 points. BDI [14] was used to measure DS. This scale includes 21 symptoms and attitudes, covering emotions, behavioral changes, and somatic symptoms. In addition to the original scale, we computed the score excluding symptoms (fatigue, sleep and appetite disturbances) that might result from HF rather than DS, and therefore might lead to an overestimation of the association between DS and stages of heart failure. The application of the questionnaire was performed by physicians previously trained in the method [15]. The study was approved by the Research Ethics Committee of Faculdade de Medicina de Campos and all patients consented.

Statistical analysis

In the statistical analysis, the participants were classified as patients with or without DS based on the questionnaire adopted and, for comparison of results, they were divided in groups. Group 1 was composed of patients who were not readmitted nor died after six months after hospital discharge, and group 2 was composed of patients who were readmitted and died after six months of initial hospital admission. The presence or absence of rehospitalization and deaths in the six-month follow-up were determined as study outcomes.

The chi-square test, Fisher exact and Student's t-test were used to compare categorical and continuous variables between the analyzed groups. Multivariate logistic regression was used to assess predictors of mortality up to the sixth month after admission, selecting variables with $p < 0.10$. The significance level adopted was $p < 0.05$. Statistical tests were reproduced on PSPPIRE Data Editor software.

Results

The initial sample had 103 patients, nine of whom died, comprising the follow-up with 94 patients. The average age of the sample consisted of 63.5 ± 12.1 years. Most patients were female (58.4%), living with someone (62.5%), literate (75.0%) and regularly employed (58.4%). Most were in functional class II and III (75.0%). The non-ischemic etiology was more common 55 (57.3%). The baseline characteristics of the sample and the characteristics of the compared groups were similar as presented in chart 1. The average LVEF and standard deviation was 39.5 ± 7.3 , ranging from 21 to 49%. The characteristics of the compared groups were similar as presented in Table 1.

Table 1 – Baseline characteristics of the sample studied

Variables	All patients n (%)	Group 1 n (%)	Group 2 n (%)	p. value
Age – years (media and standard deviation)	63,5±12,1	63,5±12,1	70,9±14,6	0,06
Sex				
Male	40 (41,6)	26 (40,6)	14 (43,8)	0,25
Female	56 (58,4)	38 (59,4)	18 (56,2)	
Education				
Literate	70 (75,0)	48 (75,0)	22 (31,2)	0,32
Illiterate	26 (25,0)	16 (25,0)	10 (68,8)	
Way of life				
Alone	36 (37,5)	14 (23,4)	22 (31,2)	0,76
With family member	60 (62,5)	50 (76,6)	10 (68,8)	
Employment relationship				
Employee	56 (58,4)	37 (42,2)	19 (59,4)	0,13
Unemployed	40 (41,6)	27 (57,8)	13 (40,6)	
Housing				
Own	61 (63,5)	40 (62,5)	21 (65,6)	0,35
Not own	35 (36,5)	24 (37,5)	11 (34,4)	
Alcoholism	23 (23,9)	15 (23,4)	8 (25,0)	0,57
Comorbidities				
Systemic arterial hypertension	88 (91,6)	59 (92,2)	29 (90,6)	0,97
Diabetes Mellitus	32 (33,3)	22 (34,4)	10 (31,3)	0,98
Dyslipidemia	43 (44,8)	29 (45,3)	14 (43,8)	0,64
Sedentarism	79 (82,3)	49 (76,6)	30 (93,8)	0,42
Smoking	33 (34,3)	21 (32,8)	12 (37,5)	0,50
Etiology				
Ischemic	41 (42,7)	29 (45,3)	12 (37,5)	0,06
Non-Ischemic	55 (57,3)	35 (54,7)	20 (67,5)	
Functional Class				
II	31 (32,3)	24 (37,5)	7 (21,9)	0,01
III	41 (42,7)	23 (35,9)	18 (56,3)	0,12
IV	24 (25,0)	17 (26,6)	7 (21,9)	0,25

In table 2 shows greater the proportion of the number of events according to the degree of depressive symptoms, being noticeable that, in the moderate symptoms, with a proportion of 15 (46.8%), patients with events in this stage of

symptoms. All in the severe stage of depressive symptoms presented the outcomes studied.

Table 2 – Proportion of events according to the degree of depressive symptoms

Variables	N (%) – Symptoms Degree	N (%) - Events
Absent	37 (38,5)	9 (24,3)
Slight	32 (33,3)	15 (46,8)
Moderate	22 (22,9)	8 (36,4)
Severe	5 (5,3)	5 (100)

As for the multivariate analysis of logistic regression, the third chart shows that among the variables analyzed, only age presented predictive criteria for readmission and deaths in these groups of patients ($p=0.01$) and in the analysis of Student's *t*-test for correlation between the presence of depressive symptoms and rehospitalization/or death the result was $p<0.0001$ for the studied sample. The analysis presented characterizes that the presence of DS was a determining factor for the rehospitalization of patients with HF to occur. (Table 3)

Table 3 - Multivariate logistic regression analysis

Variables	Coefficient Beta	t	p. value
Age	0,01	0,25	0,01
Ischemic etiology	-0,13	-0,14	0,16
NYHA 's functional class II	-0,11	-0,11	0,26

Discussion

Depression can significantly influence the mortality and readmission of patients with HF. Overall mortality at three months is estimated at 7.9% and, at one year, 16.2%. These patients have a higher probability of readmission or death when compared to non-depressed patients [16-17]. In relation to our study, the group observed that 37 (38.4%) patients evolved in the first six months with hospital reintegration or death.

Many studies have evaluated the prognostic value of depression in patients with cardiovascular disease and it have been used to investigate this association [18-20]. Frasure-Smith et al. [21] are an exception, which used an oriented psychiatrist with individual interviews in patients with infarction. In 222 patients, they have noted a significant negative prognosis at six months post-discharge. A BDI score >10 has prognostic value when evaluated in patients with acute myocardial infarction at rehospitalization after six months [22]

The mechanism for bad outcomes in patients with depression in HF carriers depends on multiple items. Firstly, patients with depression have a higher functional class than non-depressed patients, which represents significant lung deterioration, increased fluid retention, or both. These findings explain the presence of somatic symptoms and worsening of the functional class [23-24]. These patients have worse social interaction and financial support and low adherence to treatment with a higher incidence of adverse outcomes [25-26]. Finally, an increase in heart rate variability, considered a reflection of autonomic activity, which can occur in patients with isolated depression [27-29]. In our sample, the presence of high depressive symptoms among hospitalized patients is observed, referring to a greater number of outcomes in those with higher scores on the Beck questionnaire.

More than 20% of patients with HF have at least moderate levels of depression that are linked to increased morbidity and mortality from all causes, even at syndromic levels and after adjustment for disease severity [30-31]. In the statistics presented in this article, the sample showed 61.5% with some degree of DS. In addition, a prospective study has shown that early depression significantly increased the risk of incident HF in a dose-dependent manner. Therefore, depression is seen as an important target for secondary prevention and intervention in HF. In the same direction, the supposed emerging and sustaining factors of depression, such as emotion regulation, may be relevant, but are poorly studied in HF [32].

Readmissions in patients with HF are common due to a HF trajectory marked by sudden and acute exacerbations of the disease, naturally also evolving with frequent complications and death, characterized by the degenerative evolution of the disease. Approximately 20% of patients with HF are readmitted within 30 days of discharge, [33] contributing to the 30.7 billion dollars spent annually on HF [34]. Costs are expected to rise rapidly in the future due to the aging of the population. In our study, certain outcomes such as readmissions and deaths within six months, we noticed that the consequences of DS associated with HF, the greater the severity of the DS, lead to frequent readmissions at high levels.

Limitations of this research include the small sample dimension, potential for generalization bias. Although the study results should be interpreted with caution, the statistical relevance and sample balance suggest clinical significance. We obtained a diversified sample due to the miscegenation of the Brazilian population. During quantitative research, we reduced social desirability bias by reminding participants that we were interested in their personal experience and that there were no right answers. We were also limited in our ability to determine whether decision delays and hospitalizations were appropriate or inappropriate courses of action.

Conclusion

A patient-centered approach is needed to help HF patients improve their self-management and to ensure proper identification and management of symptoms other than dyspnea, as well as subsequent decision-making. The influence of DS on the probability of delay in decision-making emphasizes the critical need for careful assessment and management of depression among patients with HF as part of routine care in clinical follow-up. We reinforce that only a multidisciplinary team can improve the care provided to patients with HF.

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