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ORIGINAL ARTICLE

Palliative care in heart failure

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KEYWORDS
Palliative care;
Heart failure;
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Abstract
Introduction: Heart failure is a prevalent clinical syndrome with high morbidity and mortality rates. Palliative care has an important role in symptomatic control. This study was designed to characterize the population referred to a palliative care unit and to identify those who benefit from early and regular intervention.
Aims: To characterize heart failure patients referred to a Palliative Care Team and identify those who would benefit from a regular intervention.
Methods: We performed a retrospective analysis of all the heart failure patients referred to our palliative care team between January 2015 and December 2017.
Results: A total of 54 patients were included with a mean age of 80 years. The mean score on the Palliative Performance Scale was 57. The median duration of disease was 46 months, 61.1% of patients were in NYHA class III, 57.4% had ejection fraction >40%, and 51.9% had ischemic cardiomyopathy. Most patients (94.4%) were referred during hospitalization; 60.8% were discharged, half with home-based assistance. Mortality one month after referral was 53.7%, and 83.3% after six months. We found no variables predictive of mortality within a month of referral.
Conclusions: This study contributes to the characterization of the heart failure population referred to palliative care. No clinical sign was predictive of one-month mortality, but the high mortality rate shows that patients are referred in advanced stages of the disease or frailty.

PALAVRAS-CHAVE
Medicina paliativa;
Insuficiência cardíaca;
Controlo sintomático

Medicina paliativa na insuficiência cardíaca

Resumo
Introdução: A insuficiência cardíaca (IC) é uma síndrome clínica prevalente e responsável por elevada morbimortalidade. Os cuidados paliativos têm um papel importante no controlo sintomático destes doentes.

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Objetivo: Caracterização dos doentes com IC referenciados a uma equipa de Cuidados Paliativos e identificação daqueles que beneficiam de uma intervenção mais precoce e regular.
Métodos: Realizada uma análise retrospetiva de todos os doentes referenciados à equipa de cuidados paliativos entre janeiro de 2015 e dezembro de 2017.
Resultados: Foram incluídos 54 doentes, com idade média de 80 anos. A *palliative performance scale* média era de 57. A IC tinha uma mediana de 46 meses de evolução, com uma classe funcional de NYHA de III em 61,1% dos doentes e fração de ejeção do ventrículo esquerdo >40% em 57,4%. A cardiopatia isquémica era a etiologia em 51,9% dos casos. A maioria dos doentes (94,4%) foi referenciada a partir do internamento. Desses, foi possível a alta hospitalar em 60,8% dos casos, tendo metade mantido acompanhamento domiciliário e os restantes, seguimento em consulta externa. A mortalidade a 30 dias foi de 53,7% e aos seis meses de 83,3%. Nenhuma variável mostrou relação estatisticamente significativa com a mortalidade no primeiro mês.
Conclusões: Este trabalho contribuiu para a caracterização dos doentes com insuficiência cardíaca referenciados a uma equipa de cuidados paliativos. Não foram documentados sinais clínicos preditores de mortalidade no primeiro mês após referenciação à equipa. A elevada mortalidade no primeiro mês sugere que os doentes são referenciados em fases da doença avançadas ou de elevada fragilidade.

Introduction

Heart failure (HF) is a public health problem that affects more than 26 million individuals worldwide.[1] Based on data from the EPICA study, the estimated prevalence of HF in Portugal was 4.36% in 1998.[2] With aging populations, and more effective treatment of HF and its causes, these figures are rising.[1] The clinical course of HF is characterized by progressive functional decline punctuated by exacerbations from which recovery is only partial.[3] These decompensations are the leading cause of hospitalizations in adults in developed countries and the readmission rate within a year of hospitalization can reach 31.9%.[4]

Mortality from HF is higher than from some forms of cancer, including colon cancer in men and breast cancer in women.[5] Patients with HF have a heavy symptom burden, severe functional limitation and emotional stress, all of which diminish their quality of life.[6] Palliative care (PC) has a crucial role in this regard, through timely identification and relief of physical, psychosocial and spiritual problems.[7] PC interventions can be carried out in parallel with treatment of the underlying disease.[8] Discussions with a palliative care team (PCT) are recommended in the heart failure guidelines of the European Society of Cardiology[9] and the American College of Cardiology.[10] The results of the PAL-HF trial showed that a multidisciplinary approach to HF patients, associating palliative care with usual care, has a positive impact on quality of life.[11]

Advanced HF is defined in clinical terms by the presence of all the following criteria despite optimal therapy: (1) severe and persistent symptoms (New York Heart Association [NYHA] functional class III or IV), (2) severe cardiac dysfunction, (3) at least one hospitalization in the last 12 months due to malignant arrhythmias or decompensation requiring high-dose intravenous diuretics or signs of low output requiring vasoactive drugs, and (4) impairment of exercise capacity of cardiac cause.[12] Although some models, such as the Seattle Heart Failure Model,[13] claim to estimate survival, the unpredictability of the course of end-stage organ diseases makes it difficult to foresee whether patients will require regular intervention by a PCT.

The PCT of the Local Health Unit of Matosinhos (ULSM) serves a population of around 170 000 inhabitants. Only 20% of the annual assessments carried out by the team are for non-cancer conditions, and of these, 30-40% are for HF. There are no specific criteria for referral; patients are assessed following referral to the PCT by their attending physicians.

The aim of this study is to characterize patients referred to the PCT of ULSM and to determine the presence of clinical signs of frailty that predict mortality within a month of referral, and thereby to identify patients who will benefit from early and regular intervention by a PCT.

Methods

We performed a retrospective cohort study that included all the HF patients referred to the PCT of ULSM between January 1, 2015 and December 31, 2017. Data were obtained from electronic clinical records on demographic (age at referral and gender) and clinical characteristics (duration of disease, number of hospitalizations for decompensation before referral, NYHA class, score on the Palliative Performance Scale [PPS], left ventricular ejection fraction [LVEF], presence of right ventricular dysfunction, ischemic etiology, major valve disease [defined as mild to moderate aortic and/or mitral stenosis or regurgitation], hyponatremia or cardiorenal syndrome, current therapy, daily loop diuretic

Table 1 Characteristics of the study population (n=54).

Age, years	80±8
Female, n (%)	30 (55.6)
PPS	57±12
Weight, kg	67.5±16
Chronic organ disease, n (%)	
Cerebrovascular disease	10 (18.5)
Chronic pulmonary disease	17 (31.5)
Chronic kidney disease	26 (48.1)
Chronic liver disease	2 (3.7)

PPS: Palliative Performance Scale score.
Data are presented as mean ± standard deviation or n (%).

dosage, other associated chronic organ disease, and survival one and six months after assessment).

Statistical analysis

The statistical analysis was performed using IBM SPSS®, version 20. Categorical variables (gender, NYHA class, presence of right ventricular dysfunction, ischemic etiology, major valve disease, hyponatremia or cardiorenal syndrome, current life-prolonging therapy, associated comorbidities, renal replacement therapy and survival one month after assessment), are presented as frequencies and percentages, and continuous variables (age, duration of disease, number of hospitalizations for decompensation before referral to the PCT, PPS score, LVEF, and daily dosage of furosemide) are presented as means and standard deviation or medians and interquartile range (IQR) for normal and non-normal distributions, respectively. Associations between categorical variables were identified using the chi-square test, and the Student's t test or the Mann-Whitney test was used for continuous variables, depending on whether the distribution was normal. Statistically significant differences were considered to be present when the test value did not exceed a 5% significance level ($p<0.05$).

The study conformed with the recommendations of the Declaration of Helsinki of the World Medical Association.

Results

A total of 54 patients were included, whose characteristics are presented in Table 1. Their mean age was 80 years, mode 82, minimum 57 and maximum 94 years. Almost half (n=24, 44.4%) had a PPS score of 60. Half had chronic diseases of other organs, most often chronic kidney disease (CKD). No patients were receiving renal replacement therapy.

Table 2 presents the clinical characteristics of HF patients referred for PC. Mean disease duration was 46 months (IQR 23-118), although one patient had had the disease for 37 years. A quarter of the sample (n=14) had not been hospitalized for decompensation by the time of referral to the PCT. Only one patient had an implantable cardioverter-defibrillator.

In most cases, patients were referred to the PCT while they were hospitalized (n=51, 94.4%) and their first assessment took place during the same hospitalization. Only three patients were referred from an outpatient consultation or from primary care. Median follow-up was one month (IQR 0.5-3.25), with a maximum of 22 months. Fourteen patients took part in the program administering subcutaneous furosemide in the patients' homes.

Table 2 Clinical characteristics of HF patients referred for PC (n=54).

Duration of disease, months	46 (23-118)
NYHA class, n (%)	
II	15 (27.8)
III	33 (61.1)
IV	6 (11.1)
No. of previous hospitalizations for HF	2 (0-3)
Daily furosemide dose, mg	88±46
LVEF	
Preserved (≥50%)	25 (46.3)
40-49%	6 (11.1)
30-39%	9 (16.7)
<30%	14 (25.9)
Right ventricular dysfunction	23 (42.6)
Ischemic heart disease	28 (51.9)
Major heart valve disease	33 (61.1)
Atrial fibrillation	35 (64.8)
Current medication	
Beta-blocker	30 (55.5)
ACEI/ARB	29 (53.7)
MRA	11 (20)
Cardiorenal syndrome	14 (25.9)
Hyponatremia	3 (5.6)

ACEI: angiotensin-converting enzyme inhibitor; ARB: angiotensin receptor blocker; HF: heart failure; LVEF: left ventricular ejection fraction; MRA: mineralocorticoid receptor antagonist; NYHA: New York Heart Association.
Data are presented as mean ± standard deviation or n (%) or median (IQR).

Of the patients whose first assessment was during hospitalization, 60.8% were discharged, of whom around half were followed at home and the other half as outpatients; 47.1% did not require rehospitalization during follow-up.

Over half of the patients (53.7%) died in the first month of follow-up, and only 16.7% were still alive at six months. Although most died in hospital, 32.2% were able to die at home.

No clinical signs predicted mortality within a month of referral to the PCT, as can be seen in Table 3.

We performed a subanalysis of patients with LVEF <40% (n=23) (Table 4). These patients had a mean age of 76.7 years, six years less than those with LVEF ≥40%. They had fewer hospitalizations for decompensation before referral, a statistically significant difference ($p=0.018$). Life-prolonging therapy was not associated with one-month mortality in the subgroup with LVEF <40% ($p=0.494$).

Discussion

Palliative care is still little used in chronic organ diseases, especially HF. In this study we aimed to increase knowledge

Table 3 Impact of characteristics of heart failure on mortality at one month.

	Present	Absent	p
NYHA class ≤II (and those are all NYHA II, versus NYHA III and IV)	9 (31)	20 (69)	0.54
Preserved LVEF	16 (29.6)	12 (24.1)	0.79
Right ventricular dysfunction	12 (41.4)	17 (58.6)	1.00
Ischemic heart disease	15 (51.7)	14 (48.3)	1.00
Major heart valve disease	18 (62.1)	11 (37.9)	1.00
Atrial fibrillation	18 (62.1)	11 (37.9)	0.78
Cardiorenal syndrome	5 (17.2)	24 (82.8)	0.13
Hyponatremia	2 (6.9)	27 (93.1)	1.00
Anemia	16 (55.2)	13 (44.8)	0.586

LVEF: left ventricular ejection fraction; NYHA: New York Heart Association.
Data are presented as n (%).

Table 4 Subanalysis of the population with left ventricular ejection fraction <40% (n=23).

	LVEF<40%	LVEF≥40%	p
Female	8 (34.7)	22 (70.9)	0.013
Age	76.7±8.1	83.4±6.2	0.020
PPS	57±13	57±11	0.993
Ischemic etiology	19 (82.6)	9 (29.1)	0.000
Atrial fibrillation	11 (47.8)	24 (77.4)	0.043
No. of hospitalizations for decompensation	22 (21.20)	31 (31.11)	0.018

LVEF: left ventricular ejection fraction; PPS: Palliative Performance Scale score.
Data are presented as mean ± standard deviation or n (%) or n (mean rank).

of this subject, to characterize patients referred to our team, and to determine which clinical signs can identify those who will benefit from early intervention by a PCT.

Patients in the care of the PCT of ULSM are characterized by advanced age, and thus biological frailty, more than by severity of HF. This finding is in agreement with other studies that demonstrate that older patients are more often referred to a PCT.[14] This is probably why we failed to identify any major factor predicting one-month mortality.

Various characteristics have been identified in previous studies as indicators of poor prognosis, such as functional class III or IV, the presence of ventricular dysfunction, ischemic etiology, and the presence of anemia or hyponatremia.[13] However, the best time to integrate PC into the management of these patients has yet to be determined. There are several reasons for this, including the unpredictability of the clinical course of HF, and the discrepancy between objective measures of severity (such as LVEF) and the symptom burden and impact on quality of life as reported by patients. Although the guidelines recommend the use of risk calculators in this population, studies have shown that these fail to predict one-year mortality in most patients.[15] The decision to refer patients with HF for PC should in fact be independent of prognosis and it should not be considered a last-line treatment; it should focus on improving patients' symptoms and quality of life and may be necessary even in patients awaiting treatments such as heart transplantation.[16] For most patients, the initiation of PC to control symptoms and the development of a care plan can be overseen by their attending physician in partnership with the PCT. Teams specializing in PC should intervene in more complex cases, such as those with refractory symptoms, or to help with difficult medical decisions.

The PPS has been identified as an important predictor of mortality in patients with HF,[17] but we were unable to confirm this finding in our study. This may be because the overall population had a relatively low mean PPS score of 60, and only 10 had a score of over 70. This confirms the perception of the study population's frailty. It should also be noted that the number of other chronic organ diseases was low (a mean of 0.98 per patient), of which CKD was the most prevalent. This frequent association between HF and CKD is due to risk factors that are common to the two diseases and to the hemodynamic interaction between the heart and the kidneys.

With regard to the study aim of identifying clinical factors that could predict short-term mortality, none of the variables under analysis had this ability, probably due to the small sample size and bias induced by their advanced age. Another limitation is the small number of patients included with known signs of frailty, such as ventricular dysfunction, hyponatremia, or cardiorenal syndrome.

The high one-month mortality suggests that patients were referred to the PCT at very advanced stages of frailty and HF. Although palliative medicine has an important role to play in the last days of life, there is a clear benefit in earlier identification of patients requiring PC and particularly in timely development of appropriate care plans.

The mean number of HF patients referred to the PCT of ULSM (n=18) is higher than reported in the literature. A British study published in 2015 concluded that 47% of PCTs in the UK received fewer than 10 referrals for HF annually.[18] This may reflect a greater recognition by the PCT of ULSM of the role of PC in supporting non-cancer patients, but also highlights the specific characteristics of its organization; as part of a Local Health Unit it plays an important part in integrating health care, aiming at interventions directed toward the patient rather than the disease.

The overall number of hospitalizations for HF decompensation before referral was low (median 2, 75th percentile up to 3). However, it should be noted that patients with reduced LVEF are referred to the PCT after fewer decompensation episodes than other patients. This is probably because

ventricular dysfunction is widely seen as a clinically important marker of severity. Whenever a patient is hospitalized for HF, the need for palliation of their symptoms should be considered, since early intervention by the PCT will result in better outcomes and quality of life.[19] This, together with the team's ability to monitor patients regularly at home, may explain why nearly half of the patients referred to the PCT of ULSM were not rehospitalized for decompensated HF. Nevertheless, it should be noted that the follow-up was short, with the majority of patients dying within six months.

Conclusion

Palliative medicine should be integrated into the management of patients with advanced HF. However, the unpredictability of the disease's course makes it difficult to determine the best timing for this intervention. PC can help not only with symptomatic control but also with decision-making concerning treatments and the development of care plans. Ours is a pilot study that, despite failing to identify any clinical factor able to predict one-month mortality, helped to characterize a population referred for PC, highlight the high burden that HF – particularly when advanced – will impose in the future and the complexity of patients' symptoms, and identify areas for improvement that will enable more timely referral of these patients to PCTs.

Conflicts of interest

The authors have no conflicts of interest to declare.

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