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Quality of life predicts outcome in a heart failure disease management program

Christina O'Loughlin, Niamh F. Murphy, Carmel Conlon, Aoife O'Donovan, Mark Ledwidge, Ken McDonald *

Department of Cardiology, St Vincent's University Hospital, Elm Park, Dublin 4, Ireland

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Abstract

Background: Chronic heart failure (HF) is associated with a poor Health Related Quality of Life (HRQoL). HRQoL has been shown to be a predictor of HF outcomes however, variability in the study designs make it difficult to apply these findings to a clinical setting. The aim of this study was to establish if HRQoL is a predictor of long-term mortality and morbidity in HF patients followed-up in a disease management program (DMP) and if a HRQoL instrument could be applied to aid in identifying high-risk patients within a clinical context.
Methods: This is a retrospective analysis of HF patients attending a DMP with 18±9 months follow-up. Clinical and biochemical parameters were recorded on discharge from index HF admission and HRQoL measures were recorded at 2 weeks post index admission.
Results: 225 patients were enrolled into the study (mean age=69±12 years, male=61%, and 78%=systolic HF). In multivariable analysis, all dimensions of HRQoL (measured by the Minnesota Living with HF Questionnaire) were independent predictors of both mortality and readmissions particularly in patients <80 years. A significant interaction between HRQoL and age ($Total_{(HRQoL)}$*age: $p<0.001$) indicated that the association of HRQoL with outcomes diminished as age increased.
Conclusions: These data demonstrate that HRQoL is a predictor of outcome in HF patients managed in a DMP. Younger patients (<65 years) with a Total HRQoL score of ≥50 are at high risk of an adverse outcome. In older patients ≥80 years HRQoL is not useful in predicting outcome.

Keywords: Minnesota living with heart failure questionnaire; Heart failure; Disease management program; Health Related Quality of Life; Predictor

1. Introduction

Heart failure (HF) has been shown to reduce Health Related Quality of Life (HRQoL) to a greater extent than most other chronic diseases [1–3]. In patients with HF, poor HRQoL is associated with higher frequencies of hospital readmission [4–6] and death [4,6,7]. Furthermore, there is evidence to suggest that HRQoL is poorer in younger HF patients when compared to older patients [8].

Patient's perception of their own health status is increasingly being acknowledged to be as important as clinical and biological factors in predicting HF outcomes. HRQoL is recognized as a significant predictor of HF outcomes in a research environment however there has been little progress in developing the utility of these instruments within a clinical setting [9]. Progress in this area is difficult because of inconsistencies in the design of these research studies that make it difficult to generalize these results for practical use in a clinical setting [6,10]. Studies use different HRQOL questionnaires including global (e.g. The Medical Outcomes Study Short Form-36 (SF 36) questionnaire) and disease-specific instruments (e.g. Minnesota living with heart failure questionnaire[6,11] or the Kansas City Cardiomyopathy Questionnaire[12–15] and use different approaches to the multivariable modeling, employing

* Corresponding author. Tel.: +353 1 2304629; fax: +353 1 2304639.
E-mail address: kenneth.mcdonald@ucd.ie (K. McDonald).

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different covariates and different outcomes. Given this, it is difficult to compare results across these studies.

While there have been prior studies examining the impact of HRQOL on outcome in HF populations[6,11–15] there have been no prior studies in HF patients attending a disease management program (DMP). Patients attending a DMP for HF have been shown to have an improved outcome [16,17] and better quality of life [16,18] than patients in routine care and therefore the impact of HRQOL in this population may not be similar.

The aim of this study is to examine the impact of HRQoL on outcome in HF patients attending a DMP which includes both older and younger patients and patients with systolic and preserved systolic function HF. In addition, we explore whether the disease-specific HF questionnaire (Minnesota living with heart failure) can be used to identify patients at higher risk of an adverse outcome and thus provide insight into how this instrument may be of clinical utility.

Table 1
Baseline demographics of the total sample and comparisons between those ≥65 versus <65 years of age.

Variable	Total	≥65 years	<65 years	*p*
(%)/Mean±standard deviation				
N	225	161(72)	64(28)	
Age (years)	69±12	76±7	54±9	N/A
Gender: male	138(61)	87(54)	51(79)	<0.001
Heart rate (bpm)	75±14	73±12	79±17	0.02
SBP/DBP (mm Hg)	118/69±21/12	121/69±21/12	112/69±19/12	0.001/0.93
Ejection fraction (%)	36±13	37±13	31±11	0.003
LVSD (EF<45%)	176(78)	119(73)	57(89)	0.02
NYHA class: I&II	196(87)	135(84)	61(95)	0.02
Ischemic heart disease	141(63)	111(71)	30 (48)	0.002
Diabetes	47(21)	35(22)	12(19)	0.62
Pulmonary disease	45(20)	38(24)	7(11)	0.03
Arthritis	51(23)	47(29)	4(6)	<0.001
Cancer	16(7)	14(9)	2(3)	0.25
Medications				
ACE inhibitor and/or ARB	198(88)	138(86)	60(94)	0.09
Beta blocker	110(49)	74(46)	36(56)	0.12
Diuretic	194(86)	145(90)	49(77)	0.008
Nitrate	98(44)	85(53)	13(20)	<0.001
Biochemical markers				
Urea (mmol/L)	9.0±4.3	9.9±4.6	6.7±2.2	<0.001
Creatinine (μmol/L)	119.3±48.6	125.4±53.8	103.9±26.8	0.01
Sodium (mmol/L)	137.5±3.6	137.1±3.7	138.4±3.1	0.01
HRQoL scores				
Total HRQoL	47±24	47±23	49±25	0.29
Physical HRQoL	24±12	24±11	23±13	0.88
Emotional HRQoL	10±7	10±7	10±7	0.87

Abbreviated terms: N/A = Not Applicable; DBP = Diastolic Blood Pressure; SBP = Systolic Blood Pressure; NYHA = New York Heart Association Functional Classification; LVSD = Left Ventricular Systolic Dysfunction; ARB = Angiotensin Receptor Blocker; HRQoL = Health Related Quality of Life.

2. Materials and methods

2.1. Design

This is a retrospective analysis of survivors of a New York Heart Association (NYHA) class IV HF admission to St Vincent's University Hospital (1999–2005) who were subsequently followed-up in a hospital-based disease management program as described previously [19]. Patients with a class IV emergency HF admission were approached for enrolment into the DMP following stabilization of their condition. NYHA functional class IV HF was defined by a history and examination compatible with HF, dyspnea at rest, pulmonary edema on chest X-ray, Doppler-echocardiographic evidence of systolic or diastolic dysfunction and the need for parental therapy for at least 24 h. Inpatient care was provided by the specialist HF service. Excluded were patients with advanced malignancy, dementia, patients who did not have HF as their primary admitting diagnosis and those not deemed to have class IV HF on admission. Patients unable to participate for personal or geographical reasons and nursing home residents were also excluded. The investigation conforms with the principles outlined in the Declaration of Helsinki.

Baseline information including clinical (weight, systolic/diastolic blood pressure and heart rate) and biochemical parameters (renal profile), medical history and co-morbidities including pulmonary disease (having either asthma or chronic obstructive pulmonary disease (COPD) or both) were recorded on discharge from index admission by the HF nurse (see Table 1). The Minnesota Living with Heart Failure (MLHF) questionnaire was administered to patients within 2 weeks of discharge from index admission. NYHA functional classification was also recorded during index admission and within 2 weeks of discharge from index admission by a clinician.

2.2. Outcome measures

All-cause emergency readmissions were defined as any non-elective medical or surgical hospital admission including HF readmissions.

All-cause death was also examined.

2.3. Data collection

All data including index admission, all subsequent contacts and all events post index admission were recorded on a database. To ensure optimal collection of outcome measure data, patients and their families were advised to inform the unit of any hospital admission. The HF nurse requested information about the admission and determined the reason for its occurrence (hospital discharge letter/request for hospital notes). In addition, chart reviews and reviews of the database at St. Vincent's University Hospital were conducted to determine the cause of death and readmission. Patients were also interviewed about events at