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Clinical paper

Factors associated with health-related quality of life among cardiac arrest survivors treated with an implantable cardioverter-defibrillator☆

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ABSTRACT

Aim: To explore factors associated with health-related quality of life (HRQoL) among cardiac arrest (CA) survivors treated with an implantable cardioverter-defibrillator (ICD) in relation to gender, and to compare their HRQoL with a general population.

Methods: This cross-sectional study included 990 adults treated with an ICD after suffering CA. All participants received a questionnaire including demographics, comorbidities and instruments to measure HRQoL (EQ-5D-3L and HADS), ICD-related concerns (ICDC), perceived control (CAS), and type D personality (DS-14). HRQoL (EQ-5D-3L) was compared to a general Swedish population, matched for age and gender. Linear regression analyses were used to explore factors associated with HRQoL.

Results: The CA survivors reported better HRQoL in EQ index and less pain/discomfort compared to the general population ($p < 0.001$). In contrast, they reported more problems in mobility and usual activities ($p < 0.01$). Problems with anxiety and depression were reported by 15.5% and 7.4% respectively. The following factors were independently associated with all aspects of worse HRQoL: being unemployed, suffering more comorbidity, perceiving less control, and having a type D personality. Further, being female and suffering ICD-related concerns were independently associated with worse HRQoL in three of the four final regression models.

Conclusions: This extensive population-based study showed that most CA survivors living with an ICD rate their HRQoL as acceptable. In addition, their HRQoL is similar to a general population. Women reported worse HRQoL compared to men. Several factors associated with HRQoL were identified, and might be used when screening patients for health problems and when developing health promoting interventions.

Introduction

Cardiac arrest (CA) constitutes a major health problem, associated with high mortality, across the world [1]. However, survival rates have improved over the last decades [2]. According to guidelines, patients surviving a CA without a reversible cause should be considered for receiving an implantable cardioverter defibrillator (ICD) [3]. Implantation rates between 12–30% among patients surviving an out-of-hospital cardiac arrest (OHCA) have been reported [2,4,5].

Only a few large studies have described self-reported health-related quality of life (HRQoL) among survivors [6,7]. HRQoL is a multidimensional concept describing quality of life (QoL) related to health, and include dimensions like perceived health status and psychological distress [8]. In general, HRQoL among survivors appears to be acceptable. However, a significant number of survivors report serious problems, and might therefore be in need of targeted support and rehabilitation [9–13]. Although the knowledge is increasing, factors associated with HRQoL have not been thoroughly explored. A recent study found that female survivors are reporting poorer HRQoL than men [9]. However, effect sizes were small, indicating other factors of

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greater importance than gender. The lack of knowledge about factors associated with HRQoL makes it hard to develop health-promoting interventions for CA survivors. Moreover, there is a lack of knowledge of HRQoL among CA survivors living with an ICD.

ICD-recipients in general are reporting good HRQoL, but a considerable proportion suffers from psychological distress [14–16]. Factors previously reported to be associated with HRQoL are age, gender, education, employment, living conditions, personality (type D), comorbidity, ICD-related concerns, and ICD-shocks [14,15]. However, there might be differences between ICD-recipients surviving CA compared to those receiving their ICD for other reasons. Since a large proportion of ICD-recipients have not suffered CA [14,17], previous results might not be transferable to a CA population. In addition, there is a need for larger studies investigating health-related outcomes among CA survivors in general. Therefore, the aim of this study was to explore factors associated with HRQoL among CA survivors treated with an ICD in relation to gender, and to compare their HRQoL with a general population.

Methods

Design

This study has a cross-sectional, correlational and comparative design. The Regional Ethical Review Board in Linköping, Sweden (No. 2010/321-31) approved the study.

Participants and procedure

Previously collected data on ICD-recipients was used in this study [14]. All adult patients included in the Swedish ICD- and Pacemaker Registry during 2012 were invited. Patients receiving their ICD during the last six months were excluded (n = 108). All eligible patients were sent an invitation to participate. Those accepting received the questionnaire, which resulted in 3067 included patients (response rate of 55%). There were no significant differences between responders and non-responders with regard to age, gender, time since implantation, or ICD indication. In the present study we included all ICD-treated CA survivors, i.e. patients receiving their ICD due to secondary prevention after suffering a ventricular fibrillation (VF) according to the registry (n = 990).

The general population data were collected by a county council in the southeast of Sweden in 2006, including both metropolitan and rural areas. The study was performed using a postal questionnaire, including the Euro-QoL 5D-3 level (EQ-5D-3L) used in this study. The population consisted of all persons between 18–84 years of age (n = 315 587) who lived in the county. A stratified randomized sample was selected and 13 440 received the questionnaire. In total, after three reminders, 7 238 (54.3%) persons returned the questionnaire.

For the present study, 1 000 persons from the general population were randomly selected to match the distribution of gender and age in the sample of CA survivors. The general population data were first stratified according to gender and age (5 years interval). After that, persons were randomly selected from each stratum to match the same proportion in the CA group.

No significant differences were detected in gender ($\chi^2(1) = 0.11$, $p = 0.737$) or age ($Z = -0.42$, $p = 0.763$) between the CA survivors and the matched general population. However, significantly more CA survivors had a university degree (22.4% vs. 28.1%, $\chi^2(1) = 6.97$, $p = 0.008$) and a lower proportion had an employment outside home (40.9% vs. 25.6%, $\chi^2(1) = 44.23$, $p < 0.001$) compared to the general population.

Measurements

Data on ICD-indication and time since implantation of the device were obtained from the Swedish ICD- and Pacemaker Registry. The questionnaire included self-reported data on demographics, comorbidities, experiences of receiving shocks and validated instruments to measure HRQoL (EuroQol-5D-3 level, EQ-5D-3L & hospital anxiety and depression scale, HADS), ICD-related concerns (ICDC), perceived control (control attitude scale, CAS), and personality (standard assessment of negative affectivity, social inhibition and type D personality, DS-14).

The EuroQol-5D-3 level (EQ-5D-3L)

The EQ-5D-3L is a generic measure of health status and includes a descriptive system of five domains: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression [18]. The prevalence and severity of problems are rated on a three-point scale, from no problems (1) to severe problems (3). The ratings can be used to calculate a preference-based index and to describe a health state profile. Higher index values indicates a better health state (from 1.0 = best possible health to −0.59 = worst possible health). The UK value sets were used for calculating index values. The EQ-5D-3 L also includes the EQ VAS, a scale ranging from worst possible health (0) to best possible health (100). The EQ-5D-3 L has acceptable measurement properties [10,19].

Hospital anxiety and depression scale (HADS)

The HADS is a screening instrument for symptoms of anxiety and/or depression including 14 items divided in two scales (7 for anxiety and 7 for depression). All items have four response categories, ranging from 0–3. Higher scores indicate more problems [20]. The HADS has previously been used in CA research, and acceptable measurement properties have been reported [9,12,21].

ICD-related concerns (ICDC)

The ICDC was developed to measure concerns related to having the device [22]. The ICDC consists of eight items, e.g. “I´m worried about my ICD firing” with possible responses from “not at all” to “very often” (0–4), summarized as a total score (range 0–32). Higher scores indicate more concerns. The ICDC has previously been used in ICD studies [14,23].

Control attitude scale (CAS)

The CAS was developed to assess perceived control among cardiac patients and their relatives, and includes two items for perceived control and two items for helplessness. [24] Patients rate their responses from “not at all” to “very much” (0–7), and the responses are then summarized to a total score ranging from 4 to 28, with higher values indicating more perceived control. Acceptable psychometric properties have been reported [25].

Type D personality (DS-14)

The DS-14 was developed for detecting type D personality, i.e. a person burdened by negative emotions, and not willing to share them with others [26,27]. It consists of 14 items, seven for negative affectivity and seven for social inhibition, with a five-point response scale from “false” to “true” (0–4). Total scores are calculated separately for negative affectivity and social inhibition (range 0–28). Having type D personality requires a score ≥10 for both scales. DS-14 has demonstrated satisfactory measurement properties [15,28,29].

Data analysis

Descriptive statistics was used to present characteristics of participants and study variables. The Chi-square test and the Mann-Whitney U test were used to investigate differences between men and women. The