



Cardiac anxiety after sudden cardiac arrest: Severity, predictors and clinical implications[☆]



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ARTICLE INFO

Article history:

Received 15 May 2014

Accepted 16 November 2014

Available online 18 November 2014

Keywords:

Sudden cardiac arrest

Cardiac anxiety

Psychosocial adjustment

Quality of life

ABSTRACT

Background: Survival from cardiac arrest is a medical success but simultaneously produces psychological challenges related to perception of safety and threat. The current study evaluated symptoms of cardiac-specific anxiety in sudden cardiac arrest (SCA) survivors and examined predictors of cardiac anxiety secondary to cardiac arrest.

Methods: A retrospective, cross-sectional study of 188 SCA survivors from the Sudden Cardiac Arrest Association patient registry completed an online questionnaire that included a measure of cardiac anxiety (CAQ) and sociodemographic, cardiac history, and psychosocial adjustment data. CAQ scores were compared to published means from implantable cardioverter defibrillator (ICD), inherited long QT syndrome (LQTS), and hypertrophic cardiomyopathy (HCM) samples and a hierarchical regression was performed.

Results: Clinically relevant cardiac anxiety and cardioprotective behaviors were frequently endorsed and 18% of survivors reported persistent worry about their heart even when presented with normal test results. Compared to all other samples, SCA survivors reported significantly higher levels of heart-focused attention ($d = 0.3\text{--}1.1$) and greater cardiac fear and avoidance behaviors than LQTS patients. SCA patients endorsed less severe fear and avoidance symptoms than the HCM sample. Hierarchical regression analyses revealed that younger age ($p = 0.02$), heart murmur ($p = 0.02$), history of ICD shock ≥ 1 ($p = 0.01$), and generalized anxiety ($p = 0.008$) significantly predicted cardiac anxiety. The overall model explained 29.2% of the total variance.

Conclusions: SCA survivors endorse high levels of cardiac-specific fear, avoidance and preoccupation with cardiac symptoms. Successful management of SCA patients requires attention to anxiety about cardiac functioning and security.

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1. Introduction

Advances in resuscitation and medical technology have revolutionized care and improved survival outcomes for more than 350,000 adults who experience sudden cardiac arrest (SCA) in the United States each year [1]. Although a majority of studies have focused on medical outcomes, the behavioral and psychosocial sequelae of cardiac arrest are a major cause of long-term morbidity and disability among survivors

[2–5]. This life-threatening event may also lead some survivors to develop disease-specific anxiety or cardiac anxiety, a condition characterized by cardiac specific-fear, avoidance behaviors, and excessive cardiac symptom monitoring [6]. This cluster of symptoms is clinically relevant to cardiology patients, as it has been associated with higher rates of CVD-related distress, avoidance of physical activity, patient-reported disability, and worse perceived health outcomes [6–10]. Cardiac anxiety is equally problematic for health care providers, as patients are more likely to seek medical reassurance for normal alterations in cardiac function, resulting in medically unnecessary emergency department visits, costly diagnostics and procedures, and provider burden [7]. No prior studies have examined the extent to which symptoms are present and predictors of cardiac anxiety in this particular population. Therefore, the purpose of this report is to provide an initial evaluation of the severity of cardiac anxiety in a large cross-section of SCA survivors and identify factors that predict cardiac anxiety following cardiac arrest.

[☆] Funding sources: This work was supported by a research contract with the Sudden Cardiac Arrest Association. The SCAA received grant funds from the Medtronic Foundation in support of this study.

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2. Methods

2.1. Study population

SCA survivors were recruited from the Sudden Cardiac Arrest Association's (SCAA, Washington, DC) SCA survivor registry. SCA survivors who were aged 18 years or older and able to read and complete study questionnaires were contacted to participate in this retrospective cross-sectional online study.

2.2. Data collection procedures

This study is part of a larger project, Cardiovascular Outcomes and Psychosocial Education 2012 (COPE 2012), whose purpose was to determine the acute and chronic needs of SCA survivors affiliated with the SCAA survivor registry. Information about the study was distributed to SCA survivors registered with the SCAA online database between October 2012 and January 2013 and included a link to an online survey. Interested participants completed study questionnaires regarding sociodemographic information, cardiac history, psychosocial adjustment, and cardiac-specific anxiety after SCA. The study protocol was approved by the Internal Review Board at East Carolina University.

2.3. Measurement instruments

2.3.1. Cardiac anxiety questionnaire

The CAQ is a previously validated, 18-item self-report measure with three subscales (cardiac fear, avoidance, and heart-focused attention), designed to assess cardiac-specific anxiety [6]. For each item, participants indicated how often they have felt in the described manner or performed the described behavior on a 5-point Likert scale bounded by 0 (never) and 4 (always). Individual items were summed and divided by 18 to obtain a CAQ scale score. Means were also used to calculate subscale scores. Prior research supports the measure's internal consistency ($\alpha_s = 0.83$) and convergent validity with other established measures of psychological distress [6,8]. Cronbach's alpha in the current study was 0.89.

2.3.2. Psychosocial adjustment

Two single-item dichotomous measures were used to assess current symptoms of depression and generalized anxiety. Symptoms were rated as present or absent and used as measures of general psychological adjustment in the regression analysis.

2.4. Statistical analysis

Descriptive statistics were calculated for sociodemographic data and cardiac history. Dichotomous medical variables were coded as present or absent and coded according to participant response. Cohen's *d* effect sizes were also calculated to compare participants' scores on the CAQ to published means from implantable cardioverter defibrillator (ICD), inherited long QT syndrome (LQTS), and hypertrophic cardiomyopathy (HCM) samples [9,10]. Total scale scores for the CAQ were not consistently provided in studies of these samples, so only mean subscale scores were analyzed to compare our sample to the ICD, LQTS, and HCM data in this particular analysis. In addition, chi-square tests and *t*-tests were used to compare differences between SCA survivors with severe and mild cardiac anxiety. As there are no established and validated clinical cutoff scores for the CAQ, total scores were divided into quartiles to examine differences between high and low levels of cardiac anxiety. Severe cardiac anxiety was defined as total scores in the upper quartile ($CAQ \geq 1.81$), and scores in the lowest quartile ($CAQ \leq 0.73$) were considered mild cardiac anxiety.

Finally, a hierarchical multiple regression was performed to identify predictors of cardiac anxiety after SCA. In this model, CAQ total scores for all participants were entered as a continuous dependent variable, and eight independent variables were included as predictors (i.e., female gender, age, history of heart disease, history of heart murmur, having an ICD, history of ICD shock, depression and generalized anxiety). Demographic (gender, age), cardiac (history of heart disease, history of heart murmur, ICD status, history of ICD shock ≥ 1), and psychosocial (depression, generalized anxiety) variables were added to the model in three progressive steps to determine the relative contribution of these domains and whether adding additional predictors increased the amount of variance in CAQ scores that was explained. Differences with a *p*-value of <0.05 were considered significant. All analyses were performed with SPSS version 20.0 (SPSS Inc., Chicago, Illinois).

3. Results

Among 591 SCA survivors from the SCAA registry database who were contacted about the study, 188 (31%) consented to participate and completed study questionnaires. Notably, 76 survivors (13%) initially contacted for this study were unable to be reached due to invalid or expired email addresses associated with their SCAA registry account. Sociodemographic data and cardiac history for respondents are presented in Table 1.

Table 1

Sociodemographic and cardiac history for SCA survivors with high and low cardiac anxiety.

Characteristic	Entire sample (n = 188)	Mild cardiac anxiety (n = 43)	Severe cardiac anxiety (n = 43)	<i>p</i>
Age in years	55.43 ± 12.07	58.02 ± 11.13	50.00 ± 11.27	<0.01*
Men	104 (55.0%)	32 (74.4%)	19 (44.2%)	<0.01*
White/Caucasian	177 (93.7%)	40 (93.0%)	38 (88.4%)	0.71
Education				
High school	4 (2.1%)	0 (0.0%)	2 (4.7%)	0.49
Some college/college grad	127 (67.5%)	21 (48.8%)	33 (76.7%)	<0.01*
Graduate school	58 (30.7%)	22 (51.2%)	8 (18.6%)	0.01*
Income				
Low: \$0–49,999	29 (15.3%)	4 (9.3%)	13 (30.2%)	0.03*
Medium: \$50,000–149,999	94 (49.7%)	22 (51.2%)	16 (37.2%)	0.28
High: \$150,000+	51 (27.0%)	16 (37.2%)	9 (20.9%)	0.15
Time since SCA (years)	4.7 ± 3.9			
Cardiac characteristics				
Heart disease prior to SCA	45 (23.8%)	9 (20.9%)	8 (18.6%)	0.79
ICD	148 (78.3%)	32 (74.4%)	38 (88.4%)	0.24
History of ICD shock	68 (36.0%)	10 (23.3%)	20 (46.5%)	0.15

* *p* < 0.05.

3.1. Cardiac anxiety secondary to SCA

Scores on the CAQ ranged from 0 to 3.2 (1.29 ± 0.7). Means and standard deviations for CAQ subscales (cardiac fear, avoidance, and heart-focused attention) are presented in Table 2. Frequently endorsed symptoms of cardiac anxiety and cardioprotective behaviors (i.e., rated as “often” or “always” on the CAQ) are summarized in Table 3. Among the items most salient on the CAQ were: persistent worry about their heart even when presented with normal test results (18%), routinely seeking medical attention for any perceived increase in heart rate or chest discomfort (16.2%), and believing that providers do not believe their symptoms are real (10%). Additional comparisons of SCA survivors with mild and severe levels of cardiac anxiety are shown in Table 1. Significant differences in baseline characteristics were found, such that younger age, female gender, higher education and lower income were associated with more severe cardiac anxiety.

3.2. Cardiac anxiety in SCA survivors compared to other cardiac patients

Means and standard deviations for CAQ subscale scores for SCA survivors and comparison groups are summarized in Table 2. Compared to mean scores from other cardiac samples, SCA survivors in this sample reported significantly greater cardiac fear than patients with ICDs ($d = 0.2$) and long QT syndrome (LQTS, $d = 0.1$) but less severe fear than patients with hypertrophic cardiomyopathy (HCM, $d = 0.4$). Statistically significant differences in avoidance were also found, indicating that SCA survivors report more severe avoidance than patients with LQTS ($d = 0.5$) but less avoidance symptoms than patients with ICDs ($d = 0.3$), and HCM ($d = 0.6$). In addition, significant differences in heart-focused attention were found between SCA survivors and patients with ICDs ($d = 0.8$), LQTS ($d = 1.1$), and HCM ($d = 0.3$).

3.3. Predictors of cardiac anxiety after SCA

A hierarchical regression (Table 4) revealed that demographic data (age and female gender) entered at Step 1 was significant, $F(2,136) = 5.84$, $p = 0.004$, $\Delta R^2 = 0.08$. Cardiac variables (history of CVD, heart murmur, ICD, ICD shock) entered at Step 2 were also significant, $F(4, 132) = 4.58$, $p < 0.001$, $\Delta R^2 = 0.09$. Psychosocial variables (generalized anxiety, depression) added in Step 3 were significant and explained an additional 11.9% of the variance in cardiac anxiety scores, $F(2,130) =$

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