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Factors Predicting Arrhythmia-Related Symptoms and Health-Related Quality of Life in Patients Referred for Radiofrequency Ablation of Atrial Fibrillation

An Observational Study (The SMURF Study)

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ABSTRACT

OBJECTIVES The purpose of this study was to correlate the arrhythmia-related symptoms and health-related quality of life (HRQoL) in patients with atrial fibrillation (AF) who are eligible for radiofrequency ablation (RFA) with a number of objective indicators.

BACKGROUND Although the clinical consequences of AF have been studied extensively, the variation in the symptoms of patients with AF and HRQoL remains under-researched.

METHODS We studied 192 patients eligible for RFA of AF referred to the University Hospital, Linköping, Sweden, between January 2012 and April 2014. The ASTA (Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia) symptom scale was used to assess arrhythmia-related symptoms in the patients. The ASTA HRQoL scale and the short-form 36 (SF-36) physical and mental components summaries (PCS and MCS) were used to express disease-specific and overall HRQoL of the patients, respectively.

RESULTS Anxiety, low-grade inflammation, and left atrial dilatation significantly predicted arrhythmia-related symptoms ($R^2 = 0.313$; $p < 0.001$). Depression was the most important predictor of arrhythmia-specific HRQoL (standardized beta: 0 .406), and the produced model explained a significant proportion of the variation in arrhythmia-specific HRQoL ($R^2 = 0.513$; $p < 0.001$). The most important predictor of PCS was obesity (body mass index >30 kg/m^2) (standardized beta: −0.301), whereas the most important predictor of MCS was anxiety (standardized beta: −0.437).

CONCLUSIONS Anxiety, depression, and low-grade inflammation were the factors that predicted both arrhythmia-related symptoms and HRQoL in patients with AF. Obesity was the most significant predictor of patient general physical status. These factors need to be addressed in patients with AF to improve management of their disease. Intensive risk factor modification can be of great importance. (Reasons for Variations in Health Related Quality of Life and Symptom Burden in Patients With Atrial Fibrillation [SMURF]: NCT01553045) (J Am Coll Cardiol EP 2017;■:■–■)

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ABBREVIATIONS AND ACRONYMS

EF = ejection fraction

HADS = Hospital Anxiety and Depression Scale

hsCRP = high-sensitivity C-reactive protein

IQR = interquartile range

LA = left atrial

LAV = left atrial volume

MCS = Mental Component Summary of Short-Form 36

MR-proADM = mid-regional portion of pro-adrenomedullin

NT-proBNP = N-terminal pro−B-type natriuretic peptide

PCS = Physical Component Summary of Short-Form 36

RFA = radiofrequency ablation

TEE = transesophageal echocardiography

TTE = transthoracic echocardiography

Atrial fibrillation (AF) is the most common sustained cardiac arrhythmia, and is estimated to affect at least 2.9% of the Swedish population (1). AF is associated with increased mortality, increased risk of cerebral thromboembolism, and development of heart failure (2).

The prevalence and the clinical consequences of AF have been studied extensively, but less is known concerning symptoms and health-related quality of life (HRQoL) (3). The most commonly reported symptoms in AF are palpitations, breathlessness during activity, tiredness, and worry/anxiety (4). In the same context, one third of patients with AF have been described as "asymptomatic" (5); however, both categories have experienced reduced HRQoL (3).

A number of studies attempted to explain the variation in AF-related symptoms. There were studies that showed a relationship between perceived symptom burden and rhythm control, AF episode duration, ventricular rate, personality, and sex (6–8). In contrast, another study failed to show that AF characteristics could predict the severity of symptoms of AF (9). Thus, the available data could not fully explain the variation in patients' symptoms and HRQoL.

The aim of this study considered the variety of arrhythmia-related symptoms and HRQoL in patients with AF who were eligible for radiofrequency ablation (RFA) as measured by patient-reported outcome measures, and to correlate these with indicators, such as biomarkers, echocardiographic data, hemodynamics, AF episode frequency and duration, anxiety and depression, obesity, and other comorbidities (10).

METHODS

STUDY DESIGN AND SETTINGS. This was an observational, single-center cohort study conducted between January 2012 and April 2014. Patients referred for RFA due to AF, to the University Hospital in Linköping, Sweden, were considered for participation. The inclusion criteria were 1) age 18 years or older with paroxysmal or persistent AF; 2) patients referred for first time RFA; and 3) patients with sufficient knowledge of the Swedish language to fill out the study questionnaires independently.

Exclusion criteria were 1) patients who had previously undergone catheter or surgical AF ablation; 2) patients with previous or expected heart surgery; 3) patients with severe HF with left ventricular ejection fraction (EF) <35%; or 4) patients with acute coronary syndrome during the past 3 months. The protocol of the study was previously published (10).

INFORMED CONSENT AND ETHICAL CONSIDERATIONS. The Regional Ethical Review Board of the Faculty of Health Sciences, Linköping, Sweden, approved the protocol for this study. All patients gave their written consent, and the study complied with the Declaration of Helsinki (11).

PATIENT-REPORTED OUTCOME MEASURES. Patient-reported outcome measures were assessed with 3 previously described questionnaires (10).

The 36-item short-form health survey. The 36-Item Short-Form Health Survey (SF-36) is a generic questionnaire designed to measure an individual's physical and mental health. It comprises 35 items grouped into 8 scales and 1 question outside the scales (12). The 8 scales are summarized in physical and mental component summaries (PCS and MCS, respectively). PCS and MCS are standardized to a norm, with a mean ± SD of 50 ± 10. Scores >50 indicate better PCS and MCS scores compared with the norm, whereas lower scores represent worse PCS and MCS scores (13).

The arrhythmia-specific questionnaire in tachycardia and arrhythmia. The disease-specific questionnaire Arrhythmia-Specific questionnaire in Tachycardia and Arrhythmia (ASTA) is a validated questionnaire (14,15) divided into 3 separate parts. Part I evaluates the patient's latest episode of arrhythmia and current medication. Part II assesses symptom burden, including a 9-item symptom scale with a 4-point response scale (ASTA symptom scale) (15). Outside of the symptom scale, there are questions with regard to the frequency of arrhythmia episodes, the average and the longest duration of an arrhythmia episode, and experience of near syncope, syncope, and palpitations in connection with arrhythmias. Part III assesses HRQoL with a 13-item scale, with the same 4-point response scale (ASTA HRQoL scale) as for the symptom scale (14). The ASTA HRQoL scale is divided into a 7-item physical subscale and a 6-item mental subscale. Values range from 0 to 100 and higher scores reflect a higher symptom burden and a worse effect on HRQoL due to the arrhythmia (14,15).

Hospital anxiety and depression scale. The Hospital Anxiety and Depression Scale (HADS) questionnaire consists of 2 subscales, in which anxiety is assessed with 7 questions (HADS-A) and depression with another 7 questions (HADS-D). Responses are scored on a scale of 0 to 3, with higher scores denoting more psychological distress. The score for each subscale can range from 0 as the lowest to a