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Preoperative biomedical risk and depressive symptoms are differently associated with reduced health-related quality of life in patients 1 year after cardiac surgery☆,☆☆

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ABSTRACT

Objective: To examine whether preoperative biomedical risk and depressive symptoms were associated with physical and mental components of health-related quality of life (HRQoL) in patients 1 year after cardiac surgery.
Method: Seventy-five patients completed a psychological evaluation, including the Center for Epidemiological Study of Depression scale, the 12-item Short-Form Physical Component Scale (SF-12-PCS) and Mental Component Scale (SF-12-MCS), the Instrumental Activities of Daily Living questionnaire for depressive symptoms and HRQoL, respectively, before surgery and at 1-year follow-up.
Results: Preoperative depressive symptoms predicted the SF-12-PCS (beta = −.22, $P<.05$) and SF-12-MCS (beta = −.30, $P<.04$) scores in patients 1 year after cardiac surgery, whereas the European System for Cardiac Operative Risk Evaluation was associated with SF-12-PCS (beta = −.28, $P<.02$), but not SF-12-MCS (beta = .01, $P=.97$) scores postoperatively.
Conclusions: The current findings showed that preoperative depressive symptoms are associated with poor physical and mental components of HRQoL, whereas high biomedical risk predicts reduced physical, but not mental, functioning in patients postoperatively. This study suggests that a preoperative assessment of depressive symptoms in addition to the evaluation of common biomedical risk factors is essential to anticipate which patients are likely to show poor HRQoL after cardiac surgery.

1. Introduction

The development of cardiopulmonary bypass (CPB) led to important advances in cardiac surgery, which made many types of cardiac surgery eventually possible including coronary artery bypass graft (CABG) surgery or heart valve surgery [1–3]. Such technological advances over the last decades have reduced the major complication or mortality in patients undergoing cardiac surgery [4,5]. Accordingly, a growing consensus finds it critical to take into account health-related quality of life (HRQoL), and not just survival, as a major outcome after cardiac surgery [6].

Typically based on patient's subjective experience, HRQoL is a multifaceted concept including not only the physical and functional dimensions, but also the social and psychological dimensions [7]. Patients with cardiovascular diseases report problems in a number of domains, including emotion, social interaction and physical activity [8]. While most domains of HRQoL have been shown to improve in patients after cardiac surgery [9–11], some studies have reported that HRQoL failed to improve or worsened in the postoperative period [12–14].

In light of these findings, several studies have been conducted in order to identify the preoperative factors associated with reduced HRQoL in patients after cardiac surgery. This is of particular relevance because the identification of risk factors in patients who are more likely to experience worsened HRQoL may inform treatment decisions before and after cardiac surgery [15,16]. Among biomedical predictors, the severity of cardiac disease, older age, dyspnea (indicating poor left ventricular function), diabetes mellitus and angina pectoris have been associated with impaired HRQoL at long-term follow-up [10,17–20]. However, these findings are inconsistent with studies showing that HRQoL of patients with high relative to low cardiac operative risk are more likely to improve after cardiac surgery [21,22]. Therefore, the impact of preoperative biomedical factors on HRQoL in patients after cardiac surgery has still to be clarified.

Among psychological variables, presurgical measures of HRQoL have been consistently found to predict postoperative HRQoL [18,23], and even cardiac functional status and mortality [14,17,19]. In addition to preoperative quality of life, depression before surgery has emerged as

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a promising psychological predictor of poor HRQoL following cardiac surgery. Indeed, preoperative depression, which is commonly reported in 25%–30% of patients undergoing cardiac surgery [24–27], has been associated with reduced HRQoL in cardiac surgery patients at 6-month follow-up [28–30]. However, because all the studies reporting an association between depression and poor HRQoL were limited to 6-month follow-up, it is still unclear whether preoperative depressive symptoms may predict HRQoL in patients after cardiac surgery during long-term (1 year) follow-up.

Based on these considerations, the aims of the present study were twofold. First, we examined whether biomedical risk factors, as measured with the European System for Cardiac Operative Risk Evaluation (EuroSCORE) [31], would predict HRQoL in patients 1 year after cardiac surgery. The main hypothesis was that high biomedical risk (i.e., high EuroSCORE) would be associated with low postoperative HRQoL. Second, the association between preoperative depressive symptoms and HRQoL 1 year after cardiac surgery was investigated. It was expected that depressive symptoms would predict reduced HRQoL in patients at 1-year follow-up, while controlling for the EuroSCORE.

2. Method

2.1. Participants

After local ethics committee approval, 170 patients admitted for first-time elective cardiac surgery with CPB were enrolled in the study after giving written informed consent. Of the 170 patients enrolled, 78 were excluded because of the following exclusion criteria: inability to read or understand Italian, visual or auditory impairments, canceled or rescheduled surgery, patient withdrawal, incomplete data collection, inaccessibility for follow-up, conflicting research protocol, life-threatening condition, a history of symptomatic cerebrovascular disease (with residual deficit), and/or neurological deficit as obtained from patient's medical records and confirmed by medical staff. To control for psychiatric comorbidity and for pharmacological and/or psychological treatment effects on HRQoL [32–34], patients who had a Diagnostic and Statistical Manual (DSM)-IV Axis I diagnosis other than major depression or dysthymia, or who were receiving preoperative treatment for depression were also excluded from the study [27,35]. Patient's eligibility was checked by the same clinical psychologist, anesthesiologist and operating surgeon. Therefore, 92 patients were eligible for the present study. Of the 92 patients, 17 (18.5%) patients were excluded from the analysis because they did not complete at least one of the psychological questionnaires at the follow-up evaluation. Therefore, a total of 75 patients were included in the analysis (Fig. 1). Patients included in the analysis were mostly men ($n=55$; 73%), with a mean [standard deviation (S.D.)] age of 64.1 (10.3) years and a mean (S.D.) education of 10.3 (7.1) years. The risk of mortality associated with cardiac surgery was calculated for each patient approximately a week before surgery using the logistic regression model of the EuroSCORE [31] based on the following variables: age, sex, chronic pulmonary disease, extracardiac arteriopathy, neurological dysfunction, previous cardiac surgery, serum creatinine, active endocarditis, unstable angina, left ventricular dysfunction, recent myocardial infarct, pulmonary hypertension, emergency operation, other than isolated CABG, thoracic aortic surgery, critical preoperative state and ventricular septal rupture. Higher EuroSCORE values predict a higher risk of mortality due to cardiac surgery. The mean (S.D.) logistic EuroSCORE was 4.3% (2.7%), which represents a moderate risk for mortality in cardiac surgery (i.e., EuroSCORE ranges from 3% to 5%) [31]. It is important to note that the mean (S.D.) EuroSCORE of patients included in the analysis was comparable to that of the Italian sample representative of patients undergoing cardiac surgery ($n=2637$, EuroSCORE mean = 4.3%, S.D. = 2.9%) [36], which was previously used to develop the EuroSCORE [31]. Moreover, several other demographic (e.g., male gender, age) and surgical (e.g., type of surgery) variables of our sample were similar to those of the large Italian sample representative of patients undergoing cardiac surgery (for details, see Ref. [36]). Therefore, it is plausible that our

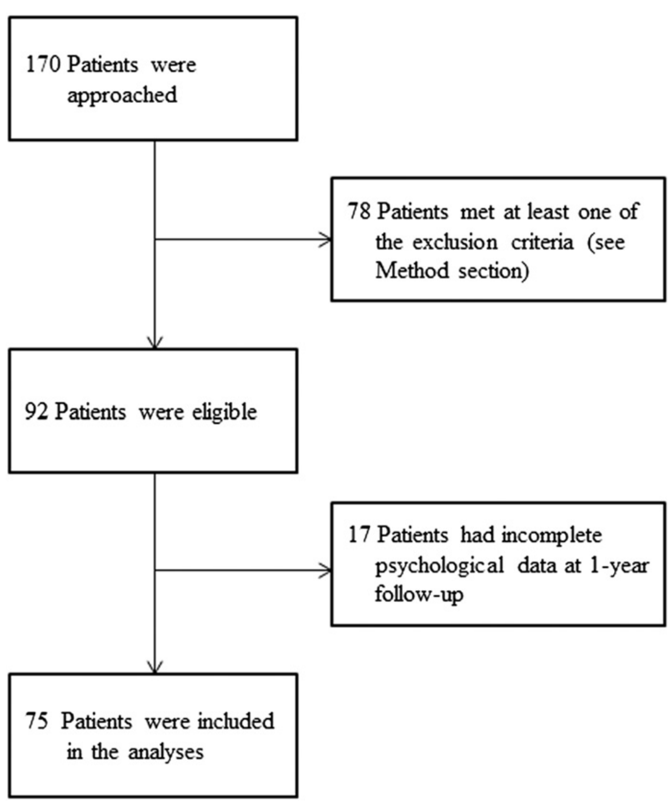

Fig. 1. CONSORT diagram of patient enrollment.