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The effect of clinical variables on distress and depressive symptoms among heart transplant recipients

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ABSTRACT

Background: Heart transplantation (HTx) is the standard treatment for end-stage cardiomyopathy and coronary artery disease. Although major improvements have been made in the prevention and treatment of acute graft rejection, comorbidities still limit the long-term survival of heart transplant recipients. The risk of poor outcome, such as major health status aggravation and death, can stimulate the occurrence of depression and stress in this population. The aim of this study was to determine the impact of comorbidities on depressive symptoms and distress among heart transplant recipients.

Material/methods: The sample included 131 HTx recipients from one site. Data were collected during a follow-up in-hospital appointment, using the questionnaires assessing depression (Beck Depression Inventory Short Form) and stress (Perceived Stress Scale-10). Statistical analyses included descriptive statistics, Pearson correlations, t-tests, and generalized linear models.

Results: Study patients were 75.6% (n = 97) male, 100% (n = 131) Caucasian, 74% (n = 89) married, with the mean age of 54 years at time of heart transplantation. Nearly half of the participants (40.5%) presented depression symptoms at the time of evaluation. Severe stress was observed in 30% of individuals. Depression symptoms and severe distress were more commonly observed in patients with many comorbidities, requiring multiple drug therapy, and high NYHA score. Moreover, in a multivariate logistic regression, depression and high distress level occurrence were predicted by the following independent factors: cardiac allograft vasculopathy, cancer, diabetes, higher NYHA score, and comorbidities.

Conclusions: The prevalence of depression and severe distress is common among heart transplant recipients. Patients with many comorbidities are at higher risk of psychological indisposition.

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Background

Heart transplantation (HTx) is the standard treatment for end-stage cardiomyopathy and coronary artery disease with excellent

Abbreviations: AKF, Altered kidney function; AR, Acute Rejection; BDI SF, Beck Depression Inventory Short Form; BMI, Body Mass Index; CAV, cardiac allograft vasculopathy; CKD, chronic kidney disease; DM, diabetes mellitus; EF, Ejection Fraction; HTx, heart transplantation; ISHLT, International Society for Heart & Lung Transplantation; NYHA, New York Heart Association classification; PSS, Perceived Stress Scale.

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long-term survival, reaching up to 85% at the first year 75% - 5 years after HTx and 56% 10 years after HTX.¹ Nevertheless, despite improvements in functional capacity and overall quality of life, heart transplant recipients commonly present depression symptoms and impaired psychological status, with prevalence reaching up to 20–30%.^{2,3}

Recovery from surgery, as well as life following organ transplantation, requires a strict and often stressful adherence to medications, medical surveillance, and diet. Moreover, patients also face the omnipresent risk of organ rejection and medication side effects that can range in severity from nuisance to life threatening. The multitude of stresses associated with organ transplantation, coupled with medication side effects, results in rates of anxiety

ranging from 17% to 28%.² Nevertheless, previous studies regarding the severity of depression and its effects on the HTx patient population have focused primarily on the influence on life quality.

In the analysis presented in 2012, the high prevalence of depression in Polish society was described and in 3% of the inhabitants, at least one episode of depression of any severity was observed. Classic depression symptoms were also more often noted in elderly and children or adolescents (5 and 2%, respectively).⁴

On the other hand, depression in post-cardiac transplant patients often does not manifest as “classic” symptoms such as anhedonia or tearfulness. Instead, it presents as regression, agitation, withdrawal, or demanding behavior and irritability.^{5,6} Newly onset of depression is more likely if a patient suffered from a mood disorder pre-transplant, has poor social support, had overly optimistic preoperative expectations, or experienced significant changes in either family or caregiver dynamics post-HTx. Previous studies has also shown the impact of the side effects of immunosuppressive therapy on depression symptoms occurrence.⁷ Other researchers, on the other hand, have described a high prevalence of transplant-related distress that aggravated within time.^{8,9}

Nevertheless, depression following solid organ transplantation has been associated with increased morbidity and mortality. More neurological symptoms, lower mobility, higher health uncertainty, more sleep problems, poorer recreational functioning and higher NYHA scores are observed more commonly in depressive heart transplant recipients.¹⁰

The aim of the study was to determine risk factors for depression and severe distress among heart transplant recipients.

Material and methods

This study was a single center -survey study. Data were collected from June 2012 to June 2014. This investigation conformed to the principles outlined in the Declaration of Helsinki. The study protocol was approved by the bioethics committee of Jagiellonian University, Krakow, Poland (KBET/246/B/2012), and all participants provided informed consent.

Variables & measures

In the study, pre-HTx baseline data and comorbidities at the time of assessment were obtained from medical records. Depression symptoms and stress levels were assessed during a follow-up in-hospital appointment by pre-trained nurses and psychologist using the Beck Depression Inventory Short Form (BDI SF) and Perceived Stress Scale-10 (PSS-10).

BDI SF is a questionnaire composed of 13 items. Thirteen items were selected based on their high correlations with the total BDI score and their correlation with the clinical ratings Beck and Beck suggested the following cutoffs: 0–4- none or minimal, 5–7-mild, 8–15-moderate, 16+ - severe. The item's content includes sadness, pessimism, sense of failure, dissatisfaction, guilt, self-dislike, self-harm, social withdrawal, indecisiveness, self-image, work difficulty, fatigue, and appetite. Each item has four options responses, scored, 0, 1, 2 or 3. The patient's score is the sum of items total. The BDI demonstrates high internal consistency, with alpha coefficients of 0.86 and 0.81 for psychiatric and non-psychiatric populations, respectively. The internal consistency reliability was 0.78 for the short form.^{11,12}

Perceived Stress Scale-10 measures the degree of stress affecting patient life. Scores of approximately 13 were considered average, whereas scores of 20 or higher were indicative of high (severe) levels of distress. The PSS demonstrates high internal consistency, with alpha coefficients of .86.¹³

Clinical data from medical records included comorbidities and other medical conditions. Cardiac allograft vasculopathy (CAV) was detected via coronary angiography, which was performed during patients' examinations within past 12 months. CAV has historically been defined as any luminal irregularity or stenosis ranging from 30% to 70% by coronary angiography.¹⁴ For the purposes of this study, we defined CAV (yes/no) as CAV grade 1 or higher using ISHLT nomenclature.¹⁴ Additional clinical variables included the following: time elapsed since transplant, ejection fraction (EF), arrhythmia (yes/no), acute rejection detected via biopsy (yes/no), body mass index (BMI kg/m²), NYHA scores evaluated by cardiologist during the routine hospitalization and common immunosuppression-induced comorbidities, including diabetes, hypertension (yes/no), renal dysfunction (yes/no), and cancer (yes/no). Medical data regarding psychiatric evaluation were also included – diagnosed depression. The time frame for the measures and collection of the clinical variables was maximum 3 months before filling questionnaires.

Procedure

After gaining study approval by the university Institutional Review Board, patients who met criteria for inclusion were contacted and scheduled for a follow-up in-hospital evaluation after given informed consent.

Statistical analysis

All statistical analyses were performed using SPSS for Windows and R. Descriptive statistics were produced based on patient demographics and treatment-related and psychometric data and are presented as means, medians (Me) and standard deviations (SDs). To compare the variables, the independent-samples *t*-test was used. The correlations between the quantitative variables were assessed using the Spearman's correlation coefficient - depressive symptoms and stress and number of comorbidities, NYHA scores, EF. Univariate and multivariate logistic regression analyses were performed to determine the risk factors for depression and stress. The factors that were significant based on the univariate analyses were subsequently included in the multivariate logistic regression models. The Hosmer–Lemeshow test was used for the goodness of fit for logistic regression models for depression and stress. It is used frequently in risk prediction models. A value of $P \leq 0.05$ was considered statistically significant.

Results

Patient characteristic

The sample included 131 alive recipients who underwent HTx between January 1992 and March 2014 in the Department of Cardiovascular Surgery & Transplantology. The inclusion criteria were as follows: 1) ≥ 18 years of age, 2) ≥ 3 months following HTx, 3) obtained informed consent and 4) capable of following directions and answering questions. Most of the participants were male, married and lived within the area. The mean age of the study group was 54.4 years (± 13.19), and the average time since HTx valued 9.9 years (± 5.43) (Table 1).

In the study group, most of the patients presented preserved left ventricle ejection fraction (mean LVEF 57.9%) and mild heart failure symptoms (93.1% of individuals in NYHA I or II scores). CAV was diagnosed in 26.7% of the recipients. Most (58.8%) patients presented with hypertension. 32.8% had chronic kidney disease with a mean estimated glomerular filtration rate of 59 mL/min, 20.6% had diabetes mellitus. (Table 2).

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