



The association between mood, anxiety and adjustment disorders and hospitalization following lung transplantation☆☆☆



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ARTICLE INFO

Article history:

Received 5 January 2016

Revised 19 April 2016

Accepted 21 April 2016

Available online xxxx

Keywords:

Adjustment disorder

Anxiety

Depression

Hospitalization

Lung transplantation

ABSTRACT

Objectives: Psychiatric comorbidities such as mood, anxiety and adjustment disorders are common among individuals seeking lung transplantation. The objective of this study is to describe the association between these disorders and length of initial hospitalization and number of hospitalizations in the first year following transplantation.

Methods: This was a retrospective cohort study of all lung transplantation patients between January 1, 2008 and July 1, 2014 at a large academic center. We evaluated whether pretransplantation mood, anxiety or adjustment disorders were associated with length and number of hospitalizations after transplant, adjusting for age, sex, native disease, forced expiratory volume in 1 s prior to transplantation, wait list time and lung allocation score.

Results: There were 185 patients who underwent transplantation during the 7.5-year study period of whom 125 (67.6%) had a mood, anxiety or adjustment disorder. Patients with an adjustment disorder had decreased length of initial hospitalization [*B* coefficient = −5.76; 95% confidence interval (CI) = −11.40 to −0.13; *P* = .04]. Patients with anxiety disorders had an increased number of hospitalizations in the first year following transplantation (rate ratio = 1.41; 95% CI = 1.06–1.88; *P* = .02). There was no association between mood disorders and length or number of hospitalizations. Mood, adjustment and anxiety disorders were not associated with time to initial rehospitalization.

Conclusions: Among the three most common pretransplantation psychiatric disorders, only anxiety disorders are associated with increased hospitalization in the first year following lung transplant. Interventions designed to better control pretransplantation and posttransplantation anxiety may be associated with less frequent hospitalization.

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1. Introduction

Patients with chronic and end-stage lung disease are more likely to have psychiatric diagnoses including mood and anxiety disorders such as major depression and general anxiety than the general population

[1–3]. As a consequence, psychiatric comorbidities are common among individuals seeking lung transplantation [4]. One of the roles of the psychiatrists, psychologists and social workers involved in listing evaluations is to determine whether a patient's condition rises to the level of an untreatable psychiatric disease associated with inability to follow through with necessary therapy [5]. A high risk of nonadherence arising from a psychiatric condition represents an absolute contraindication to transplant because, in part, accepting such patients is a misallocation of a scarce resource [6].

Although few data exist describing the number of patients who are rejected on psychosocial grounds, between 15% and 28% of patients eventually listed for lung transplant have a history of or active major depression and between 8% and 23% have a history of or active panic

☆ Financial/nonfinancial disclosures: The authors declare no conflicts of interest.

☆☆ Funding: Support for this research was provided by a grant from the National Institutes of Health (5T32HL007633–30). The funding source had no role in study design; collection, analysis and interpretation of data; writing the report; or decision to submit the article for publication.

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disorder [7–9]. Aside from general recommendations to manage psychiatric comorbidities appropriately and to provide needed psychosocial support in the peritransplant period, there have been few studies on mood, anxiety and adjustment disorder in the lung transplant population [10]. The limited data that are available on the impact of these conditions on posttransplant survival are mixed. Some authors have found that patients with depression or anxiety are more likely to be alive 1 year after transplant [8], others report that patients with severe depression that persists after transplant have worse survival [11,12] and still others have found no association with depression and survival to or following organ transplantation [13,14].

Because this literature has largely focused on the impact of psychiatric diagnoses on survival or time to rejection, significantly less attention has been paid to the relationship between anxiety, depression and adjustment disorders on other important transplant outcomes such as resource utilization. For example, small studies from the heart transplant literature suggest that patients with psychiatric disorders are more likely to be hospitalized and have a longer length of stay following transplantation [15]. There are, however, no similar studies in the lung transplant population [16]. Identifying patients who are high risk for prolonged and more frequent posttransplantation hospitalizations because of their psychiatric comorbidities can help mobilize resources to help reduce the frequency and length of their hospitalizations. Conversely, if there is no association between psychiatric comorbidities and resource utilization following transplantation, this may provide further evidence that pretransplant psychiatric disorders are currently screened and managed optimally during the listing process.

The objective of this study is to assess the association between pretransplant psychiatric comorbidities including mood, anxiety and adjustment disorders and length of initial posttransplantation hospitalization and total number of hospitalizations in the first year following transplantation. In our clinical experience, it is more difficult to mobilize, to motivate and to control pain as well as dyspnea following transplantation in patients with pretransplantation anxiety, mood and adjustment disorders. In this setting, we hypothesized that these conditions would be independently associated with increased length of initial hospitalization and increased number of hospitalizations in the first year following lung transplantation.

2. Materials and methods

2.1. Design

This was a retrospective cohort study. We reviewed medical records to collect data on all patients who underwent lung transplantation between January 1, 2008 and July 1, 2014 at Brigham and Women's Hospital (BWH), a large academic center. These data included previous clinical and demographic variables that have been associated with survival following transplantation and that might influence the association between pretransplant psychiatric comorbidities and posttransplant hospitalization. Specifically, we recorded age at the time of transplant, sex, native lung disease, most recent percent predicted forced expiratory volume in 1 s (FEV1) prior to transplantation, lung allocation score (LAS) at the time of transplantation and time on the wait list prior to transplantation. Age was scaled by 10-year increments and native disease was classified as the presence or absence of pulmonary fibrosis, obstructive lung disease, cystic fibrosis or other disease. Percent predicted FEV1 and LAS were scaled in 10-point increments [11]. Time on the wait list was measured in years. We also recorded the length of initial hospitalization, whether initial discharge was to a rehabilitation facility, the number of total hospitalizations in the first year following transplantation, date of death (if applicable) and whether death occurred before initial discharge or before the first year following transplantation.

As part of the transplantation evaluation, each patient referred to our transplant center undergoes a comprehensive evaluation by a psychiatrist and a social worker. These assessments are performed for the

purpose of determining or confirming the presence of psychiatric diagnoses with the potential to impact candidate health and to consider the potential for modification. These evaluations are standardized and include a review of past mental health encounters, psychiatric diagnosis, psychiatric hospitalizations and current and past pharmacologic and nonpharmacologic therapy; a comprehensive substance use and abuse history; and a diagnostic assessment, including the presence of psychiatric disorders according to *Diagnostic and Statistics Manual (DSM) IV* and *DSM IV-R* criteria. We reviewed the most recent attending psychiatrist consultation note prior to transplantation and recorded his or her *DSM* diagnoses, if any, for mood, anxiety or adjustment disorders. We did not include comments from the narrative about prior diagnoses made, for example, by primary care providers or other mental health professionals as we did not know what criteria, if any, had been used to make these diagnoses.

2.2. Predictor variables

Patients were considered to have a mood disorder if they were diagnosed with major depressive disorder, bipolar affective disorder, dysthymia, depression not otherwise specified or mood disorder not otherwise specified. Patients were considered to have an anxiety disorder if they were diagnosed with panic disorder without agoraphobia, generalized anxiety disorder, agoraphobia without panic, social phobia, other specific phobia, obsessive-compulsive disorder or anxiety disorder not otherwise specified. Patients were considered to have an adjustment disorder — defined as an abnormal reaction to a specific stressor that results in functional impairment but that does not otherwise meet criteria for a primary mood or anxiety disorder — if they were diagnosed with: adjustment disorder with depression, adjustment disorder with anxiety, adjustment disorder with mixed emotional features, adjustment disorder with disturbances of emotions and conduct or adjustment disorder not otherwise specified. Finally, we collected Global Assessment of Functioning scores, a scale of 1 through 100 used to rate psychosocial functioning, for each patient, where available.

2.3. Outcomes

We collected data on two primary outcomes: length of initial hospitalization following transplantation and total number of hospitalizations in the first year following transplantation. We did not exclude planned hospitalizations as they were most often for medical treatment for conditions — for example, intravenous steroids for acute rejection diagnosed as an outpatient — that might be affected by the presence of a psychiatric disorder. Two nonblinded authors (AC and SS) recorded all data (Pearson's correlation coefficient for interobserver variability = 0.95). Any disagreements were resolved through review by a third author (DW). Study data were collected and managed using Research Electronic Data Capture, an electronic data capture tool hosted at BWH [17]. The institutional review board at BWH approved the study.

2.4. Statistical analysis

We used simple descriptive statistics to identify percentages, means and standard deviations and medians and quartiles for selected demographic and clinical variables. To examine the association between the selected psychiatric diagnoses and duration of initial hospitalization following transplantation, we used separate multivariate linear regression models with mood, anxiety and adjustment disorder as our predictors of interest. To account for the above demographic and clinical factors, we included age, sex, native disease, FEV1, LAS and time on the wait list as covariates in our model. Because patients with comorbidities such as malignancy or significant heart, renal, vascular or liver disease are excluded from lung transplant listing, we did not include standard measures of medical comorbidities in our model.

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