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General anxiety symptoms after acute lung injury: Predictors and correlates

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ABSTRACT

Objective: Acute lung injury (ALI) is common in the intensive care unit (ICU), typically requiring life support ventilation. Survivors often experience anxiety after hospital discharge. We evaluated general anxiety symptoms 3 months after ALI for: (1) associations with patient characteristics and ICU variables, and (2) cross-sectional associations with physical function and quality of life (QOL).
Methods: General anxiety was assessed as part of a prospective cohort study recruiting patients from 13 ICUs at four hospitals in Baltimore, MD using the Hospital Anxiety and Depression Scale — Anxiety Subscale (HAD-A), with associations evaluated using multivariable linear and logistic regression models.
Results: Of 152 patients, 38% had a positive screening test for general anxiety (HAD-A ≥ 8). Pre-ICU body mass index and psychiatric comorbidity were associated with general anxiety (OR, 95% confidence interval (CI): 1.06 (1.00, 1.13) and 3.59 (1.25, 10.30), respectively). No ICU-related variables were associated with general anxiety. General anxiety was associated with the number of instrumental ADL dependencies (Spearman's rho = 0.22; $p = 0.004$) and worse overall QOL as measured by EQ-5D visual analog scale (VAS) (rho = −0.34; $p < 0.001$) and utility score (rho = −0.30; $p < 0.001$), and by the SF-36 mental health domain (rho = −0.70; $p < 0.001$) and Mental Component Summary score (rho = −0.73; $p < 0.001$).
Conclusion: Many patients have substantial general anxiety symptoms 3 months after ALI. General anxiety was associated with patient characteristics and impaired physical function and quality of life. Early identification and treatment of general anxiety may enhance physical and emotional function in patients surviving critical illnesses.

Introduction

Critical illnesses, requiring life support therapies such as mechanical ventilation in the intensive care unit (ICU) setting, can have a significant impact on psychological outcomes [1]. In particular, survivors of critical illnesses are at high risk for experiencing anxiety symptoms [2–4]. Up to 50% of ICU survivors experience clinically important general (or non-specific) anxiety symptoms one year after discharge [1,2], which is much higher than the US general population's 18% prevalence of any type of anxiety disorder [5]. Such anxiety symptoms are associated with somatization, as well as impaired psychological functioning and lower health-related quality of life (HRQOL) [3,6–11].

Within the ICU setting, acute lung injury (ALI), and its more severe subset, acute respiratory distress syndrome (ARDS), is an archetypal critical illness [12]. ALI is characterized by acute onset of severe hypoxemia caused by non-cardiogenic pulmonary edema evidenced by bilateral pulmonary infiltrates on chest x-ray [13,14]. A variety of pulmonary (e.g. pneumonia) and non-pulmonary (e.g. pancreatitis) risk factors are associated with onset of ALI [13,14]. Patients with ALI commonly experience severe dyspnea and require mechanical ventilation in the ICU. In-hospital mortality of ALI may be as high as 45% [15,16].

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There have been few prior studies of general anxiety symptoms in survivors of critical illnesses, leaving substantial gaps in the extant literature on risk factors, as well as the association between general anxiety symptoms and HRQOL or physical function. Other studies have identified associations between depressive symptoms and physical functioning in ICU survivors [8,17,18]. We hypothesized a priori that several baseline patient characteristics and ICU variables would be associated with general anxiety symptoms, and that general anxiety symptoms would be associated cross-sectionally with HRQOL and physical function. As such, the objectives of this study were to evaluate survivors 3 months after ALI for general anxiety symptoms and associations with: (1) patient characteristics and ICU variables, and (2) physical function and health-related quality of life (HRQOL).

Methods

Study design and patient sample

This evaluation was conducted as part of a multi-site prospective cohort study. A total of 520 participants were recruited from 13 intensive care units (ICUs) in four hospitals in Baltimore, MD. Participants were consecutive, mechanically-ventilated adults with ALI [19] enrolled between October 2004 and October 2007. ICUs specializing in neurological conditions, and ALI patients with primary neurological disease and/or brain trauma were not eligible for enrollment. In addition, the following were key exclusion criteria: (1) >5 days of mechanical ventilation during hospitalization prior to enrollment; (2) pre-existing ALI for >24 h before transfer to a study ICU; (3) pre-existing illness with a life expectancy <6 months; (4) a limitation in use of life support at time of enrollment; (5) prior lung resection; (6) pre-existing cognitive impairment or communication/language barriers, and (7) no fixed address for follow-up purposes. Informed consent for prospective follow-up was obtained in writing from the patients once they regained decision-making capacity or from a substitute decision-maker for patients who remained incapable of making medical decisions. Institutional review board approval was obtained from the Johns Hopkins University and all participating study sites.

Assessment of primary outcome: general anxiety symptoms

The primary outcome for this evaluation was the prevalence of general anxiety symptoms 3 months after ALI onset. Outcome assessment was performed by research assistants who were blinded to the exposure variables. General anxiety symptoms were measured with the 7-item anxiety subscale (range 0 to 21, with higher scores indicating worse symptoms) of the Hospital Anxiety and Depression Scale (HAD-A) [20]. The HAD-A is a validated measure commonly used in a wide variety of medical populations, with a score of ≥8 signifying a positive screening test for general anxiety symptoms (i.e., clinically significant symptoms of anxiety) [20–23].

Assessment of patient characteristics

Patient variables were evaluated based on prior studies of psychological outcomes of ICU patients [3,24,25] and a priori hypotheses for other potentially relevant characteristics. Baseline patient characteristics were collected from the medical record and interview with the patient or proxy, and included demographics, educational achievement, body mass index, and relevant comorbidities. Comorbidities were measured with the Charlson index, which is a standardized method of measuring comorbidity burden that assigns weights to the 19 categories of baseline comorbidity evaluated (e.g. a weight of 1 for diabetes, 2 for moderate to severe renal disease, 3 for moderate to severe liver disease) to derive a total comorbidity score [26]. Specific comorbidities were also examined in this study as follows: cardiovascular disease, chronic pulmonary disease, chronic fatigue, HIV/AIDS, psychiatric history (i.e., any record of psychiatric diagnosis and/or treatment), drug/alcohol abuse (i.e., current or prior illicit drug use or excess alcohol use), and at least moderate pain or discomfort.

Assessment of in-ICU variables

Critical illness and ICU hospitalization variables were evaluated based on prior studies of psychological outcomes of ICU patients [18,27–32]. These variables included ICU type (surgical vs. non-surgical); severity of illness at ICU admission (Acute Physiology and Chronic Health Evaluation [APACHE II] score) [33]; maximum daily organ failure in the ICU (Sequential Organ Failure Assessment (SOFA) score) [28–30]; proportion of ICU days with sepsis from microbiologically-proven infection [34]; hospital and ICU length of stay; low blood glucose (mean daily minimum glucose value) [31]; and the mean daily dose and duration of use of selected medications (benzodiazepines [in midazolam-equivalents], opiates [in morphine-equivalents] and systemic corticosteroids [in prednisone-equivalents]).

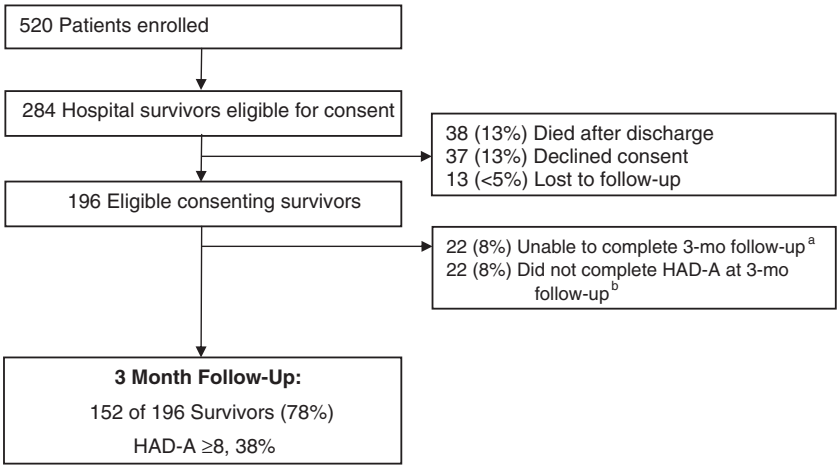

Fig. 1. Flow diagram of study participants. Abbreviations: HAD-A, Hospital Anxiety and Depression Scale — Anxiety Subscale. [a] Patients were unable to complete a 3-month follow-up visit for the following reasons: unable to locate participant (n = 14), participant declined visit (n = 4), cognitively or physically incapable (n = 2), and other reasons (n = 2). [b] Some patients had a follow-up visit, but did not have complete HAD-A data for the following reasons: physically incapable (n = 9), cognitively incapable (n = 5) and other reasons (n = 8).