CHEST

Original Research

DIFFUSE LUNG DISEASE

A Comparison of Health-Related Quality of Life in Idiopathic Pulmonary Fibrosis and Chronic Hypersensitivity Pneumonitis

Molly Lubin, MD; Hubert Chen, MD, FCCP; Brett Elicker, MD; Kirk D. Jones, MD; Harold R. Collard, MD, FCCP; and Joyce S. Lee, MD

Background: **Patients with interstitial lung disease (ILD) have poor health-related quality of life (HRQL). However, whether HRQL differs among different subtypes of ILD is unclear. The aim of this study was to determine whether HRQL was different among patients with idiopathic pulmonary fibrosis (IPF) and chronic hypersensitivity pneumonitis (CHP).**

Methods: **We identified patients from an ongoing longitudinal cohort of patients with ILD. HRQL was assessed using the Short Form (SF)-36 medical outcomes form (version 2.0). Regression analysis was used to determine the association between clinical covariates and HRQL, primarily the physical component summary (PCS) and mental component summary (MCS) score. A multivariate regression model was created to identify potential covariates that could help explain the association between the ILD subtype and HRQL.**

Results: **Patients with IPF (n = 102) were older, more likely to be men, and more likely to have smoked. Pulmonary function was similar between the groups. The patients with CHP (n = 69) had worse HRQL across all eight domains of the SF-36, as well as the PCS and MCS, compared with patients with IPF ($P < .01$-$.09$). This pattern remained after controlling for age and pulmonary function ($P < .01$-$.02$). Covariates explaining part of the relationship between disease subtype and PCS score included severity of dyspnea ($P < .01$) and fatigue ($P < .01$). Covariates explaining part of the relationship between disease subtype and MCS score included severity of dyspnea ($P < .01$), female sex ($P = .02$), and fatigue ($P = .02$).**

Conclusions: **HRQL is worse in CHP compared with IPF. HRQL differences between ILD subtypes are explained in part by differences in sex, dyspnea, and fatigue.**

CHEST 2014; 145(6):1333–1338

Abbreviations: CHP = chronic hypersensitivity pneumonitis; DLCO = diffusing capacity of the lung for carbon monoxide; HRQL = health-related quality of life; ILD = interstitial lung disease; IPF = idiopathic pulmonary fibrosis; MCS = mental component summary; PCS = physical component summary; SF = Short Form; UCSD-SOBQ = University of California, San Diego Shortness of Breath Questionnaire

The interstitial lung diseases (ILDs) are a heterogeneous group of conditions characterized by varying degrees of pulmonary fibrosis and inflammation. This pathology leads to impairments in pulmonary physiology that affect day-to-day functioning. We know from prior research that patients with ILD tend to have decreased health-related quality of life (HRQL) as compared with population norms.[1,2] According to common definitions of HRQL, this suggests that their life is marked by decline in physical, social, emotional, and cognitive functioning as a result of their illness.[3,4]

Although many of the ILDs, such as sarcoidosis and connective tissue disease ILDs, are associated with extrapulmonary manifestations that may impact HRQL, idiopathic pulmonary fibrosis (IPF) and chronic hypersensitivity pneumonitis (CHP) predominantly affect only the lung. IPF is a progressive, debilitating condition of the aging population with a median survival of 3 years and for which there exists no approved therapy in the United States.[5] Hypersensitivity pneumonitis is characterized by exposure to an inhaled antigen that leads to inflammation and, in chronic cases, progresses to fibrosis.[6,7] Although the conditions differ in their underlying pathophysiology, patient demographics, time course, and prognosis, both diseases lead to pulmonary impairment with debilitating effects on daily functioning and HRQL.

Studies have shown that degree of pulmonary impairment is not the only significant driver of poor HRQL in patients with ILD but that other factors, such as dyspnea, depression, and age, matter.[8,9] Whether differences in HRQL exist among different subtypes of ILD is not well understood. Given the phenotypic differences between IPF and CHP (including age and presence of comorbidities such as depression[10]) as well as the lack of treatment available and overall worse prognosis in IPF compared with CHP, we hypothesized that patients with IPF would report worse HRQL compared with patients with CHP. The aim of this study was to determine whether HRQL was different among patients with IPF and CHP and, if present, to identify potential reasons for this difference.

Materials and Methods

Study Design and Patient Population

Patients with IPF and CHP were identified from an ongoing longitudinal cohort of patients with ILD seen at the University of California, San Francisco from January 2010 to August 2012. During this time period, only 2% of patients who were eligible for inclusion into the ILD cohort chose to decline. Informed consent was obtained on all patients. The University of California San Francisco Committee on Human Research approved the protocol (10-01592).

Patients with IPF or CHP who had completed an HRQL self-assessment were eligible for our study; no patients were excluded based on this criterion. Patients were excluded if they did not have pulmonary function test data from within 6 months of completing the self-assessment; three patients were excluded based on this criterion. All patients with IPF were diagnosed according to consensus criteria.[11] CHP cases were diagnosed by multidisciplinary conference. All hypersensitivity pneumonitis cases were chronic as defined by persistent interstitial changes (reticulation and traction bronchiectasis) on imaging and persistent symptoms (dyspnea or cough). In CHP cases that did not have a surgical lung biopsy, a characteristic high-resolution CT scan[12] and an exposure were required.

Demographic information, pulmonary function test results, and prednisone use at the time of HRQL self-assessment were obtained from the medical record. All other information was obtained from written, patient-administered questionnaires that were completed at the time of the self-assessment. Cough, fatigue, daytime sleepiness, weight loss, and pain were reported by patients as present or absent. Patients also reported whether they experienced pain at four specific sites (hand/wrist, shoulder, knee, foot/ankle). Patients self-classified as never or ever smokers.

Degree of dyspnea was measured with the University of California San Diego Shortness of Breath Questionnaire (UCSD-SOBQ), which provides a numerical dyspnea score. A higher score indicates greater dyspnea.[13]

HRQL Measurements

HRQL information was obtained from the Short Form (SF)-36 medical outcomes short form (version 2.0), which is a generic instrument for assessing HRQL that has been applied to multiple chronic medical conditions. This instrument has been shown to be a sensitive tool for assessing quality of life and has demonstrated ability to capture changes in clinical status.[14,15] The SF-36 is made up of questions pertaining to eight domains of quality of life: Physical Functioning, Role-Physical, Bodily Pain, General Health, Emotional Functioning, Role-Emotional, Vitality, and Mental Health. Completion of the form generates scores for the eight individual domains as well as a physical component summary (PCS) score (composed of the domains of Physical Functioning, Role-Physical, General Health, and Bodily Pain) and a mental component summary (MCS) score (composed of the domains of Mental Health, Role-Emotional, Social Functioning, and Vitality). The score for each domain is generated from a set of questions that are weighted equally to provide a total numerical score that can range from zero to 100. The weighted average of the domain scores provides the summary scores, which are transformed to fit a norm-based scale on which the general US population has a mean score of 50 with an SD of 10. Higher scores indicate better quality of life.

Statistical Analyses

Summary data are reported as mean (SD), median (interquartile range), or percentage, unless otherwise stated. Between-group comparisons were performed using an unpaired t test or χ^2 test, as appropriate. Univariate and multivariate linear regression models were used to examine the relationship between selected covariates and the PCS (primary outcome variable) and the MCS (secondary outcome variable). All multivariate models were adjusted for age to account for potential confounding and FVC % predicted to account for pulmonary disease severity. Clinical covariates were identified as potential variables that might explain some or all of the association between ILD subtype and HRQL (eg, presence of pain, dyspnea severity) (Fig 1). We tested a series of models to examine the individual effects of potential covariates on the relationship between ILD subtype and HRQL (ie, PCS and MCS). Covariates tested in the multivariate model were selected based on their P value on univariate analysis (P value cutoff $\leq .01$). Model performance was compared using the model R^2, the coefficient of determination. The model R^2 describes how well the observed data are described by the model (eg, a perfect model would have an R^2 of 1.0). Different models were compared to understand the effect of different covariates, with the goal of achieving the most parsimonious model that best describes the observed data. As a sensitivity analysis, a backward selection model was also used. All statistical analyses were performed using STATA version 11 (StataCorp LP). Significance was defined as a P value of $< .05$.

Results

Patient Characteristics and Clinical Symptoms

We analyzed a total of 171 patients with ILD. Of these, 102 had IPF, and 69 had CHP. Patients with

Manuscript received August 22, 2013; revision accepted December 19, 2013; originally published Online First January 23, 2014.
Affiliations: From the Department of Medicine (Drs Lubin, Collard, and Lee), the Department of Radiology (Dr Elicker), and the Department of Pathology (Dr Jones), University of California, San Francisco, San Francisco, CA; and Genentech (Dr Chen), South San Francisco, CA.
Funding/Support: This publication was supported by the National Center for Advancing Translational Science, National Institutes of Health [UCSF-CTI KL2TR000143].
Correspondence to: Joyce S. Lee, MD, 505 Parnassus Ave M1093, Box 0111, San Francisco, CA 94143; e-mail: joyce.lee@ucsf.edu

DOI: 10.1378/chest.13-1984