Original Article

Factors to Inform Clinicians About the End of Life in Severe Chronic Obstructive Pulmonary Disease

Roberto Benzo, MD, MS, Wendy Siemion, MD, Paul Novotny, MS, Alice Sternberg, ScM, Robert M. Kaplan, PhD, Andrew Ries, MD, MPH, Robert Wise, MD, Fernando Martinez, MD, James Utz, MD, and Frank Sciurba, MD, for the National Emphysema Treatment Trial (NETT) Research Group

Department of Medicine (R.B., W.S., J.U.) and Cancer Center (P.N.), Mayo Clinic, Rochester, Minnesota; Department of Epidemiology (A.S.) and Department of Medicine (R.W.), John Hopkins University, Baltimore, Maryland; Office of Behavioral and Social Sciences Research (R.M.K.), National Institutes of Health, Bethesda, Maryland; Department of Medicine (A.R.), University of California San Diego, San Diego, California; Department of Medicine (F.M.), University of Michigan, Ann Arbor, Michigan; and Department of Medicine (F.S.), University of Pittsburgh, Pittsburgh, Pennsylvania, USA

Abstract

Context. Palliative services have historically been offered to terminal patients with cancer, but much less so in other chronic illnesses such as chronic obstructive pulmonary disease (COPD) because of difficulties in predicting the trajectory to death.

Objectives. The goal of this study was to determine if the change over time of the key parameters (trajectory) in patients with severe COPD can independently predict short-term mortality.

Methods. We analyzed data from 1218 patients with severe COPD. Multivariate models for trajectory change were used to forecast mortality at 12 months.

Results. Changes in several variables by defined cutpoints increase significantly and independently the odds of dying in 12 months. The earliest and strongest predictors were the decrease in gait speed by 0.14 m/s or six-minute walk by 50 m (odds ratio [OR] 4.40, $P < 0.0001$). Alternatively, if six-minute walk or gait speed were not used, change toward perceiving a very sedentary state using a single question (OR 3.56, $P = 0.0007$) and decrease in maximal inspiratory pressure greater than 11 cm H_2O (OR 2.19, $P = 0.0217$) were predictive, followed by change toward feeling upset or downhearted (OR 2.44, $P = 0.0250$), decrease in room air resting partial pressure of oxygen greater than 5 mm Hg (OR 2.46, $P = 0.0156$), and increase in room air resting partial pressure of carbon dioxide greater than 3 mm Hg (OR 2.8, $P = 0.0039$). Change over time models were more discriminative (higher c-statistics) than change from baseline models.

Address correspondence to: Roberto Benzo, MD, MS, Mindful Breathing Laboratory, Division of Pulmonary & Critical Care, Department of Medicine, Mayo Clinic, 200 First Street SW, Gonda 18-440, Rochester, MN 55902, USA. E-mail: benzo.roberto@mayo.edu

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Conclusion. The changes in defined variables and patient-reported outcomes by defined cutpoints were independently associated with increased 12-month mortality in patients with severe COPD. These results may inform clinicians when to initiate end-of-life communications and palliative care. J Pain Symptom Manage 2013;46:491−499.

Key Words
Chronic obstructive pulmonary disease, severe COPD, end-stage COPD, palliative care, end-of-life care, gait speed, mortality, prediction tools

Introduction

Palliative and end-of-life care are becoming increasingly important in the face of an aging population afflicted with multiple chronic conditions. Estimates show that approximately 27% of Medicare's annual $327 billion budget goes to care for patients in their final year of life.[1]

Palliative services have most commonly been offered to terminal patients with cancer where the prediction of mortality is much more precise.[2] In cancer, compared with other chronic illnesses, the juncture at which to introduce a palliative focus is clearer for both patient and physician.

In the arena of chronic illnesses, changing the cynosure of care from therapeutic to palliative is often subtle. The current model for palliative care proposes an intertwined relationship between palliative and life-prolonging care.[3−5] The efficacy of the current dichotomy is supported by a recent randomized study that reported that early referral to palliative care meaningfully improved quality of life in patients with lung cancer[6] compared with usual care. That model, early referral to palliative care, may be applicable to other prevalent chronic and disabling conditions such as very severe chronic obstructive pulmonary disease (COPD).

In COPD, the fourth leading cause of death in the U.S., barriers to providing appropriate and timely end-of-life communications and palliative care are very much rooted in the inherent difficulties in predicting the trajectory to death. There is an existing knowledge gap about which changes in defined variables over time predict 12-month mortality, a window considered appropriate for referral to palliative care.[7]

Forced expiratory volume in one second, the most used marker of disease in COPD, does not change significantly to predict survival once the patient is in the very severe stage (<35%). Although a decrease in the modified BODE (body mass index, airflow obstruction, dyspnea, and exercise capacity) score by more than one point has been reported as predictive of increased mortality in severe COPD, its value for daily clinical use and to initiate palliative care is limited. The BODE score is not routinely measured; furthermore, the time frame for the increased mortality was not specified by the investigators.[8]

The goal of this study was to demonstrate how the trajectory (change over time) of simple variables can predict 12-month mortality. We hypothesized that there are simple clinically measurable variables not previously defined whose change over time is meaningful and associated with short-term mortality in COPD. We envisioned that such results would be timely and critical for bridging the gap between patient and provider for initiating communications about end-of-life and palliative care interventions. From this, collaborative exchange and decisions can be made to redirect the focus of treatment.

Methods

The clinical data used for this analysis were collected as part of the National Emphysema Treatment Trial (NETT).[9] Between January 1998 and July 2002, 1218 patients enrolled in the NETT. Clinical assessments and patient self-reports were collected at baseline, six months, 12 months, and each subsequent year through 2003; mortality was ascertained as of September 30, 2008. This study was