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FAST FACTS AND CONCEPTS #141

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Background Prognostic variables in COPD patients are not well described, thus decision making regarding when to move away from aggressive life-sustaining treatments is challenging. This Fast Fact will review prognostication in patients with advanced COPD.

Ambulatory COPD Patients The forced expiratory volume in one second (FEV1) has traditionally been used to assess COPD severity. A FEV1 of less than 35% of the predicted value represents severe disease; 25% of these patients will die within two years and 55% by four years. A number of other studies have shown that age, low body mass index (BMI), and low PaO₂ were independent predictors that correlated to reduced survival time. The BODE scale, consisting of BMI, exercise capacity, and subjective estimates of dyspnea, has been shown to help predict survival over 1-3 years (Celli 2004):

| Variable | Points on BODE Index | | | |
|-----------------------------------|----------------------|---------|---------|------|
| | 0 | 1 | 2 | 3 |
| FEV1 (% predicted) | ≥65 | 50-64 | 36-49 | ≤35 |
| Distance walked in 6 min (meters) | >350 | 250-349 | 150-249 | ≤149 |
| MMRC dyspnea scale* | 0-1 | 2 | 3 | 4 |
| Body-mass index (BMI) | >21 | ≤21 | | |

*MMRC dyspnea scale range from 0 (none) to 4 (4 dyspnea when dressing or undressing).

| BODE Index Score | One year mortality | Two year mortality | 52 month mortality |
|------------------|--------------------|--------------------|--------------------|
| 0-2 | 2% | 6% | 19% |
| 3-4 | 2% | 8% | 32% |
| 4-6 | 2% | 14% | 40% |
| 7-10 | 5% | 31% | 80% |

Note: these variables do not appear to help predict prognosis within six months of death.

Hospitalized COPD Patients Mortality statistics vary for patients admitted with COPD exacerbations depending on age, functional status, co-morbidities, and physiological variables such as hypoxia and hypercarbia. Roughly 10% of patients admitted with a PaCO₂ >50 mmHg will die during the index hospitalization, 33% will die within six months, and 43% die within one-year (Connors 1996). Patients with less severe COPD have lower in-hospital mortality rates (Patil 2003). COPD patients who require mechanical ventilation have an-hospital mortality of ~25% (Seneff 1995, Nevins 2001). Poor prognostic factors include: co-morbid illnesses, severity of illness (APACHE II score), low serum albumin, and/or low hemoglobin. Previous mechanical ventilation, failed extubation, or intubation for greater than 72 hours all increase mortality (Nevins 2001). In one study, patients ventilated more than 48 hours had a 50% one year survival; functional status and severity of illness were associated with short term mortality while age and co-morbidities were associated with one year mortality (Celli 2004).

National Hospice and Palliative Care Organization Criteria NHPCO guidelines for hospice admission in COPD include factors such as cor pulmonale and pO₂ <55 mmHg while on oxygen, albumin < 2.5 gm/dl, weight loss of > 10%, progression of disease, and poor functional status. However, a study showed when using these factors, 50% of the patients were still alive at six months, implying that the NHPCO criteria have a limited role in predicting six month mortality and thus should be used with caution in determining hospice eligibility under the Medicare Hospice Benefit (Fox 1999).

Summary COPD is a heterogeneous disease without a simple prognostic trajectory. For ambulatory patients, age, degree of dyspnea, weight loss (BMI), functional status and FEV1 are relevant prognostic factors for predicting 1-3 year survival. For hospitalized patients, the same factors are relevant. In addition, the need for prolonged or recurrent mechanical ventilation is predictive of shorter prognosis.

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