**Relative Risk of All-Cause Mortality Associated With Incident Cohorts of Bronchiectasis and Chronic Obstructive Pulmonary Disease in a National US Managed Care Insurance Plan**

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**INTRODUCTION**

Bronchiectasis (BE) is a chronic, progressive, structural lung condition characterized by abnormal dilation of bronchi. Patients with BE often experience reduced quality of life, progressive decline in lung function, hospitalizations, and an increased risk of mortality, posing significant burdens on both patients and healthcare systems.1-3 Few formal studies have been undertaken to explore risk factors associated with mortality in BE.4

**METHODS**

**Patient Sampling**

- Individuals with ≥2 medical claims for BE or COPD between 2008 and 2015 were identified in a large US managed care insurance plan, with cohorts defined as follows:

  **Incident BE cohort:** Individuals were included with ≥2 medical claims for BE (ICD-9 codes: 494, 495, 496, 497, 498, 499, 518.0, or 522) if they had 12 months of continuous medical insurance coverage (baseline) before the first claim and were diagnosed with bronchiectasis between 2008 and 2015 and had 12 months (baseline) of continuous medical insurance coverage (baseline) before the first claim of BE.

  **Comparison COPD cohort:** Individuals were claims for BE or NTMLD during this baseline period.

- Mortality data originated from the Social Security Death Master File. Note that the numbers of mortality records after 2011 were reduced by about 30% following local court decisions that may have led to changes in reporting practices and/or underreporting in certain states. These decisions were not expected to specifically relate to BE or COPD disease states.

- This study aimed to estimate relative rather than absolute risk for all-cause mortality between the incident patient cohorts of BE and COPD.

**Analyses**

- Characteristics of incident BE and COPD cohort populations were tabulated.

- The relative mortality rate ratio was estimated using Poisson regression without adjustment.

- A Cox proportional hazards model was used to compare all-cause mortality between BE and COPD, with adjustments for demographic factors and baseline medications.

- Statistically significant risk adjusters are reported in the Results section.

**RESULTS**

**Study Sample**

- Incident cohorts of BE (n=15,230) and COPD (n=62,192) were extracted from a merged panel of 5,348,809 individuals from a US national managed care claims database between January 2008 and June 2016 (Figure 1).

**Figure 1: Flowchart summarizing the process to generate randomly selected samples of BE and COPD incident cohorts**

**Patient Baseline Characteristics**

- In the BE and COPD cohorts, mean patient ages were 64 years and 65 years, respectively, and a higher proportion of female patients were 62.9% and 54.6%, respectively (Table 1).

- Examination of patient baseline characteristics revealed a greater number, and higher proportions, of morbidities in the BE cohort compared with the COPD cohort (Table 1).

**Table 1: Baseline characteristics and morbidities (based on medical claims between 2008 and 2016) for BE and COPD cohorts**

<table>
<thead>
<tr>
<th>Morbidity</th>
<th>BE (n=15,230)</th>
<th>COPD (n=62,192)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>65.0</td>
<td>34.7</td>
</tr>
<tr>
<td>CHF</td>
<td>11.0</td>
<td>5.4</td>
</tr>
<tr>
<td>COPD</td>
<td>13.5</td>
<td>9.2</td>
</tr>
<tr>
<td>Diabetes</td>
<td>33.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Depression</td>
<td>4.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Dementia</td>
<td>3.0</td>
<td>0.9</td>
</tr>
<tr>
<td>COPD: Diabetes</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>COPD: Depression</td>
<td>0.9</td>
<td>0.3</td>
</tr>
<tr>
<td>COPD: Dementia</td>
<td>0.9</td>
<td>0.3</td>
</tr>
<tr>
<td>COPD: CHF</td>
<td>1.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Obesity</td>
<td>9.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

**Adjusted Relative Risk of All-Cause Mortality Between BE and COPD**

- After adjusting for demographic factors and baseline morbidities, the relative risk of all-cause mortality was attenuated from 1.4 to 1.09 between the BE and COPD cohorts (hazard ratio [HR]=1.09; 95% CI, 1.02-1.17; P=0.0012, Figure 3).

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**Interaction Effect of Age Group at Diagnosis and Incident BE vs COPD**

- Risk of all-cause mortality increased in different slopes with age at diagnosis within both incident BE and COPD cohorts (Figures 4).

- In the BE cohort, risk of all-cause mortality increased by 94% with every additional 20 years of age (HR=1.94; 95% CI, 1.39-2.72).

- In the COPD cohort, risk of all-cause mortality increased by 10% with every additional 20 years of age (HR=1.10; 95% CI, 1.01-1.20).

**DISCUSSION**

Our results expand the limited data available concerning risk factors associated with mortality in the patient populations with BE and COPD. Mortality at baseline was frequently experienced by patients who were subsequently diagnosed with BE compared with COPD.

The observed unadjusted incident BE cohort was associated with a 40% higher risk for all-cause mortality relative to the COPD cohort; however, the incremental mortality risk was attenuated to 9% after multivariable adjustment for demographic factors and baseline variables.

The statistical significance between BE and COPD after adjustment was likely due to the large sample size, and the relative risk of all-cause mortality in COPD does not seem to be clinically meaningful.

The induction in relative risk of all-cause mortality after the multivariable adjustment may suggest:

- Risks of all-cause mortality in BE and COPD appeared comparable medically.

- The observed incremental mortality risk associated with BE was explained, in part, by baseline morbidities, implying the need for the effective management of comorbid conditions with BE.

- Prior data show that, despite several clinical similarities between BE and COPD, there are notable differences.

- Major risk factors for COPD are known to be primarily behavioral and environmental (e.g., smoking or pollutants), whereas, BE has more complex pathophysiologic analogies (e.g., genetics, infections, chronicity).

- In our study, specific patient characteristics such as CHF, immune system diseases, and neoplastic carcinoma increased the risk of mortality independent of BE and COPD.

- Limitations

- The mortality data may have been affected by changes in reporting practices and/or underreporting, however, as these decisions were not expected to specifically relate to BE and COPD, our estimates of relative risk of all-cause mortality are expected to be unbiased.

- Healthcare claims data-based studies may be affected by accuracy of medical coding.

**CONCLUSIONS**

- Patients with BE, compared with COPD, have a broader range of morbidities.

- Common prescribing morbidities in BE include pneumonia, need for immunosuppressant drug use, diabetes, cardiac ischemia, and arthritis.

- After multivariable adjustment, the risk of all-cause mortality with BE was likely not clinically meaningful compared with COPD.

- Effective interventions for preserving morbidities in patients with BE may help reduce mortality risk in this patient population.

**REFERENCES**


7. Redondo M, et al. MedTech Media for these services. This research was funded by Insmed Incorporated. Kenneth Olivier is an employee of MedTech Media. Other authors have received grant funding from and are consultants to Insmed Incorporated. Quanwu Zhang, Engels Chou, and Carlos Fernandez are employees of Insmed Incorporated. Raymond Zhang is employed by Ortiz Data Solutions, Woburn, MA, which provides consulting services to Insmed Incorporated.

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