A Descriptive Analysis of Costs and Healthcare Resource Use in Patients with Bronchiolitis Obliterans Syndrome (BOS) Following LUNG Transplantation

Ajay Sheshadri1, Naomi C Sacks2,3, Bridget Healey2 , Sajjad Raza2, Phil Cyr2,4, Gerhard Boerner5,6, Howard J Huang7

1University of Texas MD Anderson Cancer Center, Department of Pulmonary Medicine, Houston, TX; 2Precision Health Economics and Outcomes Research, Boston, MA; 3Tufts University School of Medicine, Boston, MA; 4College of Health and Human Services, University of North Carolina, Charlotte, NC; 5Breath Therapeutics, GmbH, a Zambon company; Munich, Germany; 6Zambon Group, Bresso, Italy; 7Division of Pulmonary, Critical Care and Sleep Medicine, Houston Methodist Hospital, Houston, TX

Background

Bronchiolitis Obliterans Syndrome (BOS), a common complication after lung transplantation, is a rapidly progressive obstructive airway disease characterized by T-cell mediated inflammation and fibrosis, leading to respiratory failure and death. BOS typically manifests at least 1 year post-transplantation and affects an estimated 48% of patients within 5 years of transplant. The economic burden of BOS following lung transplantation is not well understood.

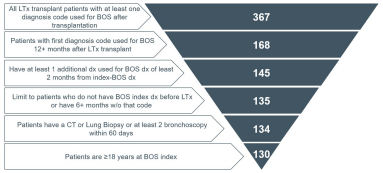
Methods

The data source for this retrospective longitudinal study was IQVIA PharMetricsPlus commercial claims database; study timeframe was 01/01/2006-09/30/2018. Study patients were lung transplant recipients age 18-64y with evidence of BOS 1+ years after transplantation. There is no BOS-specific diagnosis code; consequently, patients were identified as those with 2+ claims with a diagnosis for serious lung disease 2+ months apart and 1+ years after transplant. Hospitalizations were attributed to the admission month. Outcome measures were mean per-patient monthly costs paid by insurers and healthcare resource utilization (HRU) starting 1 year post-transplant. Monthly costs and HRU were summed to estimate per-patient costs and HRU in each year.

Results

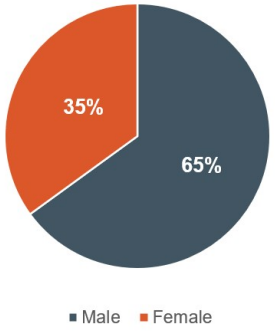
There were **130** patients that met the inclusion/exclusion criteria for patient who develop BOS following lung transplantation:

Figure 1. Patient Attrition



Among 130 patients who met study criteria, 65% were male

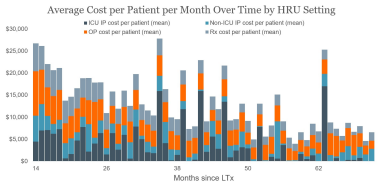
Figure 2. Patient Characterstics



Results

Mean per-patient monthly costs ranged from $3,951 (±6,758.11) to $403,270 (±330,175.24), with the highest rates of hospitalizations with ICU stays (1.09 ±0.47) in the most expensive month

Figure 3. Post-LTx PMPM Costs



(Note: Figure 3 excludes costs in the month 13 post-LTx due to outliers)

When annualized, per-patient costs ranged from $103,635 (year 4 post-transplant) to $633,375 (year 2). Inpatient admissions represented 77%, 47% and 52%, and 39% of costs in the second, third and fourth post-transplant years, respectively.

Methods

Because BOS doesn't have a specific diagnosis code, we identified BOS using a broad list of ICD9 and ICD10 diagnosis codes for serious respiratory illness. These are typically used for BOS following lung transplantation.

Table 1. BOS Diagnosis Codes

ICD9	ICD10	BOS Diagnosis Code List
1	0	491.8-Other chronic bronchitis
1	0	491.9-Unspecified chronic bronchitis
1	0	516.34-Respiratory bronchiolitis interstitial lung disease
0	1	J42-Unspecified chronic bronchitis
0	1	J84.115-Respiratory bronchiolitis interstitial lung disease
1	0	516.8-Other specified alveolar and parietoalveolar pneumonopathies
0	1	J84.09-Other aveolar and parieto-aveolar conditions
1	0	515-Post inflammatory pulmonary fibrosis
0	1	J84.89-Other specified interstitial lung disease

Conclusion

Lung transplantation patients who develop BOS incur healthcare costs that remain high over time. While lung transplantation is intended as curative, the economic burden of this common complication is substantial and in addition to the costs of transplant.

CONTACT AUTHOR