Risk of Cardiovascular Comorbidities in Patients with Idiopathic Pulmonary Fibrosis: Analysis of Medicare Data

Michael S. Broder, MD, MSHS[1]; Eunice Chang, PhD[1]; Elya Papoyan, MPH[1]; Ioana Popescu, MD[2]; Sheila R. Reddy, PhD, RPh[1]; Karina Raimundo, MS[3]; Will Chou, MD[3]

[1]Partnership for Health Analytic Research, LLC, Beverly Hills, CA, USA; [2]David Geffen School of Medicine at UCLA, Los Angeles, CA, USA; [3]Genentech, Inc., South San Francisco, CA, USA

INTRODUCTION

- Idiopathic pulmonary fibrosis (IPF):
  - Chronic, progressive, interstitial lung disease of unknown cause that occurs predominantly in older adults[1]
  - Median survival from diagnosis is approximately 3-5 years[2]
- IPF is associated with an increased risk of cardiovascular (CV) comorbidities.[3] However, little is known about CV risk in the IPF Medicare population.

AIM

- To determine the risk of CV comorbidities among Medicare patients with IPF.

METHODS

Study Design

- Retrospective cohort study using Medicare claims data to examine CV and other characteristics among beneficiaries who were newly diagnosed with IPF compared to patients without IPF.

Patient Selection

- IPF Patient Selection Criteria
  - Patients newly diagnosed with IPF were identified in the Medicare Research Identifiable Files (100% of beneficiaries) between 1/1/2010 and 12/31/2010 (identification [ID] period). An IPF patient was defined as meeting the following 3 criteria:
    - ≥ 1 inpatient claim or ≥ 2 outpatient claims (within 12 months) with IPF as a listed diagnosis (ICD-9-CM: 516.3) in the ID period. The date of the first qualifying IPF claim during the ID period was defined as the index date; AND
    - had no claim with codes for "other interstitial lung diseases" (ICD-9-CM: 500-505, 506.x-508.x, 516.0, 516.1, 516.2, 516.8, 516.9, 517.2, 517.8, 518.3, 495.x, 714.81) after the last IPF claim up to 12/31/2013; AND
    - had no claims with IPF as a listed diagnosis within 1 year before the index date (baseline period).
  - Age ≥ 66 on the index date
  - Continuous enrollment in fee-for-service (FFS) Medicare and eligible for Medicare Parts A and B during the baseline period
  - Did not disenroll from Medicare (except for reason of death) in the first year after the index date

METHODS (cont.)

- Disease-Free Control (DFC) Selection
  - For each IPF patient, 1 beneficiary with the same age, gender, and region, but with no claims of IPF during the study timeframe (2009-2013), was selected using the Medicare Limited Data Set (5% random sample).
  - DFC patients were assigned the same index date as the IPF patient to whom they were matched.
  - The same continuous enrollment criterion was applied to the DFC group as the IPF group.

Study Measures

- Demographic variables were identified from Medicare beneficiary summary files, and cardiovascular comorbidities (primary outcome) and general comorbidities were measured using inpatient, outpatient, and carrier (physician) claims files during the baseline period.
  - CV comorbidities included pulmonary hypertension, ischemic heart disease (IHD; includes acute and prior myocardial infarctions, other acute and subacute forms of IHD, angina, and other chronic IHD), congestive heart failure, venous thromboembolism, stroke, and atrial fibrillation.
  - General comorbidities were measured using the Charlson Comorbidity Index and the number of chronic conditions (Healthcare Cost and Utilization Project Chronic Condition Indicator).
  - Patient demographic variables included age, gender, and region.

Statistical Analysis

- Descriptive statistics were generated for all measures. Absolute risk differences (RD) were reported to compare proportions of CV comorbidities between the matched IPF and DFC cohorts.

RESULTS

- We identified 13,615 IPF patients and their matched controls **(Figure 1)**.
- Mean age (SD) in the groups was 78.9 years (7.1), and 50.3% were male **(Table 1)**.
- Compared to controls, IPF patients had **(Table 1)**:
  - greater number of chronic conditions (mean [SD] 6.3 [2.2] vs 4.7 [2.4]; P<.001)
  - higher Charlson Comorbidity Index (3.6 [2.9] vs 2.3 [2.7]; P<.001)
- Rates of CV comorbidities were consistently higher in IPF patients, overall (RD: 23.4%) and by condition **(Table 2)**:
  - congestive heart failure (RD: 19.8%)
  - ischemic heart disease (RD: 17.6%)
  - atrial fibrillation (RD: 8.7%)
  - pulmonary hypertension (RD: 5.6%)
  - venous thromboembolism (RD: 4.7%)
  - stroke (RD: 0.9%)

Figure 1: IPF Patient Identification and Matching Flowchart

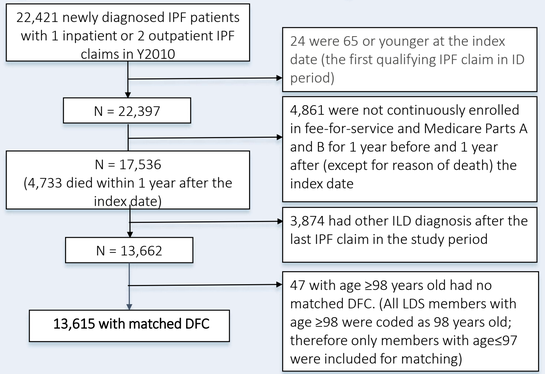

Table 1: Demographic and General Comorbidity Characteristics of Matched IPF and DFC Patients

	Matched IPF Patients N = 13,615	Matched DFC Patients N = 13,615	All N =27,230
Age, year, mean (SD)	78.9 (7.1)	78.9 (7.1)	78.9 (7.1)
Female, no. (%)	6,768 (49.7)	6,768 (49.7)	13,536 (49.7)
Region, no. (%)			
Midwest	3,499 (25.7)	3,499 (25.7)	6,998 (25.7)
Northeast	2,559 (18.8)	2,559 (18.8)	5,118 (18.8)
South	5,238 (38.5)	5,238 (38.5)	10,476 (38.5)
West	2,311 (17.0)	2,311 (17.0)	4,622 (17.0)
Other/Unknown	8 (0.1)	8 (0.1)	16 (0.1)
Charlson comorbidity index, mean (SD)	3.6 (2.9)	2.3 (2.7)	2.9 (2.9)
No. of chronic conditions, mean (SD)	6.3 (2.2)	4.7 (2.4)	5.5 (2.4)

Table 2: Association between Cardiovascular Comorbidities and Idiopathic Pulmonary Fibrosis

	Matched IPF Patients N = 13,615	Matched DFC Patients N = 13,615	Risk Difference (%)	P Value
Cardiovascular conditions, no. (%)	9,205 (67.6)	6,019 (44.2)	23.4	<.001
Pulmonary hypertension	903 (6.6)	135 (1.0)	5.6	<.001
Ischemic heart disease[a]	6,600 (48.5)	4,206 (30.9)	17.6	<.001
Congestive heart failure	4,708 (34.6)	2,021 (14.8)	19.8	<.001
Venous thromboembolism	1,216 (8.9)	569 (4.2)	4.7	<.001
Stroke	1,047 (7.7)	925 (6.8)	0.9	0.004
Atrial fibrillation	3,444 (25.3)	2,266 (16.6)	8.7	<.001

[a]Includes acute and prior myocardial infarctions, other acute and subacute forms of IHD, angina, and other chronic IHD.

CONCLUSION

- Newly diagnosed IPF patients are typically sicker than non-IPF patients and have significantly higher rates of CV conditions prior to diagnosis.
- The higher rate of CV conditions needs to be taken into consideration for the management and treatment of patients with IPF.

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