Disparities in lung transplantation among patients with idiopathic pulmonary fibrosis: data from the IPF-PRO Registry

IPF-PRO™ ILD-PRO™

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INTRODUCTION

- Although IPF is one of the leading indications for lung transplantation, only a small proportion of patients with IPF undergo a lung transplant.[1,2] The influence of medical and non-medical characteristics of patients with IPF on the likelihood of receiving a lung transplant is largely unexplored.
- The Idiopathic Pulmonary Fibrosis Prospective Outcomes (IPF-PRO) Registry (NCT01915511) is a prospective observational US registry of patients with IPF.[3]

AIM

- To identify clinical and socioeconomic characteristics that differentially predicted lung transplant compared with death in the IPF-PRO Registry.

METHODS

- Between June 2014 and October 2018, patients with IPF that was diagnosed or confirmed at the enrolling center in the previous 6 months were enrolled into the IPF-PRO Registry.
- Patients who were wait-listed for lung transplant were not eligible for enrollment in the registry, but patients could be listed for transplant after enrollment.
- A time-to-event analysis incorporating competing risks methodology was performed to examine differential associations between covariates related to demographic/clinical characteristics and social determinants of health and the likelihood of lung transplant versus death.
  - Covariates were modeled as time-independent or time-dependent as appropriate.
  - We first examined whether there was an association between each covariate and lung transplant and death, and then tested whether the strength and/or direction of the association was different between lung transplant and death.

CONCLUSIONS

- Among patients in the IPF-PRO Registry, median ZIP code income and care at a center that has a lung transplant program differentially impacted the likelihood of lung transplantation compared with death, irrespective of disease severity.
- Additional interventions are needed to mitigate inequalities based on patients' socioeconomic status and location.

RESULTS

Patients

- Of the 1002 patients enrolled in the IPF-PRO Registry, 47 had no follow-up data. Thus, the analysis cohort comprised 955 patients. Maximum follow-up was 5 years.
- Over the follow-up period, there were:

96 lung transplants | **221 deaths**

Event rates of lung transplant and death

	Lung transplant, % (95% CI)	Death, % (95% CI)	Lung transplant or death, % (95% CI)
1 year	3.7 (2.7, 5.1)	6.3 (4.8, 7.9)	10.0 (8.1, 11.9)
2 years	7.4 (5.8, 9.2)	16.3 (13.9, 18.9)	23.7 (20.8, 26.5)

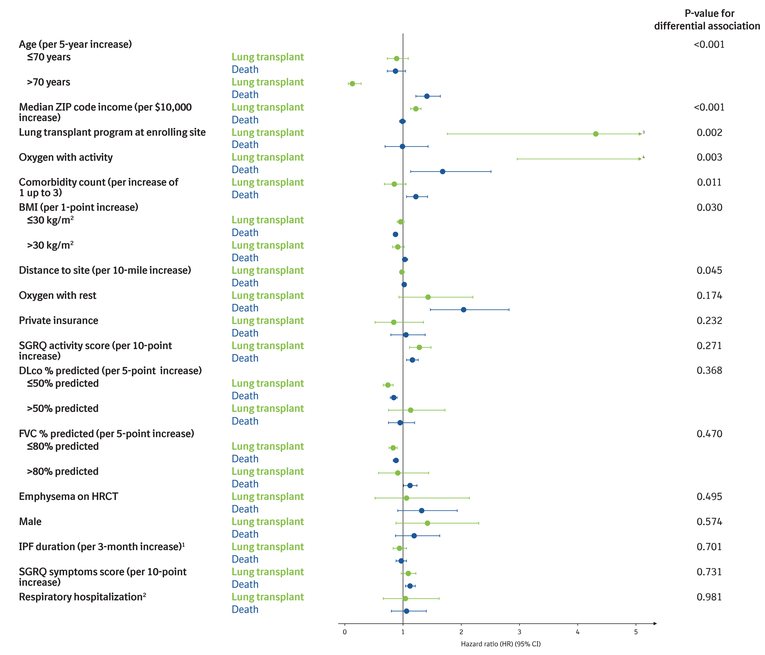
Patient characteristics at enrollment by lung transplant or death during follow-up

	Underwent lung transplant (n=96)	Did not undergo lung transplant and died (n=221)	Did not undergo lung transplant and alive (n=638)
Male	80.2	78.7	72.3
White	95.7	93.1	94.4
Age, years	65 (61, 69)	72 (67, 77)	70 (65, 75)
BMI, kg/m²	29.3 (26.7, 32.1)	27.8 (24.9, 32.4)	29.0 (26.3, 32.4)
Private insurance	70.8	62.0	59.6
Family history of ILD	26.9	11.6	21.1
FVC % predicted	61.1 (49.5, 72.4)	64.2 (55.8, 74.9)	72.4 (62.7, 84.1)
DLco % predicted	34.2 (27.7, 43.2)	35.1 (26.3, 43.8)	46.3 (37.7, 55.4)
Oxygen use at rest	31.5	38.4	10.3
Oxygen use with activity	54.3	52.8	22.8
Distance to enrolling center, miles	35 (15, 113)	40 (14, 110)	30 (13, 85)
Lung transplant program at enrolling site	93.8	82.8	73.2
Median ZIP code income, $1000	66.4 (53.3, 85.4)	55.8 (44.2, 73.0)	60.8 (47.9, 80.5)

Data are median (Q1, Q3) or % of patients without missing data.

Differential associations between covariates and lung transplant and death

- The covariates with the strongest differential associations with lung transplant and death were age, median ZIP code income, and enrollment at a center with a lung transplant program.
  - Lung transplant was less likely, and death was more likely, with older age among patients aged >70 years.
  - Higher median ZIP code income was associated with lung transplant, but not with death.
  - Enrollment at a site with a lung transplant program was associated with lung transplant, but not with death.
  - Oxygen use with activity was associated with both lung transplant and death, but more strongly with lung transplant.



Variables are shown in order of greatest to least differential association.
[1]Time since first imaging evidence of pulmonary fibrosis. [2]From which the patient was discharged alive without a lung transplant. [3]Upper limit of 95% CI was 10.54. [4]HR 7.95 (95% CI: 2.96, 21.34).

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IPF-PRO™ Registry enrolling centers: Albany Medical Center, Albany, NY; Baylor College of Medicine, Houston, TX; Baylor University Medical Center at Dallas, Dallas, TX; Cleveland Clinic, Cleveland, OH; Columbia University Medical Center/New York Presbyterian Hospital, New York, NY; Duke University Medical Center, Durham, NC; Froedtert & The Medical College of Wisconsin Community Physicians, Milwaukee, WI; Houston Methodist Lung Center, Houston, TX; Lahey Clinic, Burlington, MA; Loyola University Health System, Maywood, IL; Lynchburg Pulmonary Associates, Lynchburg, VA; Medical University of South Carolina, Charleston, SC; National Jewish Health, Denver, CO; NYU Medical Center, New York, NY; Piedmont Healthcare, Austell, GA; Pulmonary Associates of Stamford, Stamford, CT; PulmonIx LLC, Greensboro, NC; Renovatio Clinical, The Woodlands, TX; Salem Chest and Southeastern Clinical Research Center, Winston Salem, NC; South Miami Hospital, South Miami, FL; St. Joseph's Hospital, Phoenix, AZ; Stanford University, Stanford, CA; Temple University, Philadelphia, PA; The Oregon Clinic, Portland, OR; Tulane University, New Orleans, LA; UNC Chapel Hill, Chapel Hill, NC; University of Alabama at Birmingham, Birmingham, AL; University of California, Davis, Sacramento, CA; University of California Los Angeles, Los Angeles, CA; University of Chicago, Chicago, IL; University of Cincinnati Medical Center, Cincinnati, OH; University of Louisville, Louisville, KY; University of Miami, Miami, FL; University of Michigan, Ann Arbor, MI; University of Minnesota, Minneapolis, MN; University of Pennsylvania, Philadelphia, PA; University of Pittsburgh, Pittsburgh, PA; University of Virginia, Charlottesville, VA; UT Southwestern Medical Center, Dallas, TX; Vanderbilt University Medical Center, Nashville, TN; Vermont Lung Center, Colchester, VT; Wake Forest University, Winston Salem, NC; Washington University, St. Louis, MO; Weill Cornell Medical College, New York, NY; Wilmington Health and PMG Research, Wilmington, NC; Yale School of Medicine, New Haven, CT.

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