EFFECT OF AIR POLLUTION ON IDIOPATHIC PULMONARY FIBROSIS

Seed Grant Project

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Idiopathic pulmonary fibrosis (IPF)

- A chronic, progressive form of interstitial lung disease of unclear etiology
- No FDA approved therapies
- Progresses with episodic “acute exacerbations”
- Triggers and mechanisms are unknown
Environmental exposures and IPF

- Development of IPF is associated with several environmental exposures: ie fumes, chemicals, and residence in polluted urban areas
- Association between acute exacerbations and ozone air pollution
- Air pollution influences symptoms, lung function, and exacerbations in many other pulmonary diseases

Iwai 1994; Harris 2001; Taskar 2006; Baumgartner 2000; Johannson 2013; Olson 2009
Hypothesis

• Increased short term levels of indoor and outdoor air pollution are associated with increased respiratory symptoms, decreased quality of life and decreased lung function in patients with IPF
Study procedures

• Pilot observational study measuring daily respiratory symptoms, lung function, quality of life, and biomarkers in association with measurements of indoor and outdoor air pollution exposure
• 20 patients with IPF
• 2 months during summer ozone pollution (June-August 2014) and 2 months during winter particulate pollution (Dec 2014- Feb 2015)
Study procedures

- Measurements of indoor air pollution
  - Modified Dylos particulate monitor, NIH 6 sensor Air Quality Monitor
- Measurements of outdoor air pollution
  - Modeling based on measurements from UT Division of Air Quality
- Home environmental exposure assessment
- Primary endpoint: Daily respiratory symptoms
  - EXACT-PRO daily symptom questionnaire
- Secondary endpoints:
  - On 2 good air quality days and 2 poor air quality days in each season, home visits to measure:
    - Quality of life (ATAQ-IPF)
    - Lung function with portable spirometer
    - Blood and exhaled breath condensate samples for biomarkers

Jones 2011; Mackay 2013
Goals and potential impact

• Explore impact of air pollution on IPF
• Identify features of indoor or outdoor air pollution that can lead to targeted interventions, potentially alter the course of the disease
• Use biospecimens to identify biomarkers which may offer insight into the pathophysiology of disease
• Novel monitoring techniques for measuring detailed indoor and outdoor air pollution exposure and daily symptoms ➔ platform for future studies.
References


