Progressive TLC loss after unilateral lung transplantation in IPF: Functional Respiratory Imaging (FRI) differentiates between transplanted and native lung

Francisca Ferreira1; Veronique Verplancke2, MD; Cedric Van Holstebeke1, PhD; Jan De Backer1, PhD; Wilfried De Backer2, MD, PhD; Peter Van Hal2, MD, PhD
1FLUIIDDA, Kontich, Belgium 2Department of Respiratory Medicine, Antwerp University Hospital, Edegem, Belgium

Background
After unilateral lung transplantation (ULT) changes in lung function may be difficult to attribute to either the transplanted or native lung. Differentiation may be extremely important when lung function suggests bronchiolitis obliterans syndrome (BOS) or restrictive airway syndrome (RAS). Previous work from our group using functional respiratory imaging (FRI) demonstrated that disease progression in IPF is characterized by an increase in fibrosis (lung tissue density), decrease in lung volume and increased airway caliber.

Methods

- Inspiratory CT scans were collected at 6 years (Y6), 8 years (Y8) and 10 years (Y10) after ULT.
- Using FRI, the relative volume of each lung and the fibrosis score were measured for both the transplanted and native lung.

Results

- TLC was 4.98 (75%) and 3.93 (59%) at Y6 and Y10 after ULT, respectively.
- VC was 3.46 (82%) and 2.77 (68%) at Y6 and Y10 after ULT, respectively.
- FRI demonstrated that reduction in lung volumes was attributed to reduction in the native lung volume (41% and 34% of total at Y6 and Y10, respectively).
- FRI also demonstrated an increase in airway dimension (+65% increase in specific airway volume) in the native lung volume.
- These physiologic changes in the native lung are caused by a significant increase in fibrotic tissue (+23%).
- No signs of IPF disease progression were found in the transplanted lung.

Conclusions
FRI enables to differentiate between characteristics of left and right lung, in contrast to measurements of TLC and VC.
FRI allowed to conclude that the progressive decrease in TLC after ULT was mainly caused by progressive fibrosis in the native lung.

The FRI based description of disease progression is completely in line with previously published data from our group.

Aim
This case aims to investigate whether FRI can help to find the cause of progressive decrease in TLC and VC after left ULT in IPF.

Case subject
A 63-year-old male patient with IPF diagnosed in 2003 and disease progression under AZA and CS that underwent left ULT in 2004.

Knowledge / Experience / Care

Increase in fibrosis of 23% for the native lung (in red)