

## Pepsin as a biomarker of airway reflux in idiopathic pulmonary fibrosis - An observational study

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### Introduction and Objectives

Current understanding of IPF proposes repetitive pulmonary epithelial injury with aberrant healing as a principal mechanism. Gastro-oesophageal reflux (GOR) and micro-aspiration of gastric contents may cause lung injury with subsequent fibrosis. GOR is known to be prevalent in IPF patients. We assessed the feasibility of salivary pepsin measurement in IPF patients and investigated the temporal variability and relationship between salivary pepsin and symptoms.

### Methods

IPF patients collected saliva samples at multiple time points over the course of one day. Early morning, lunch- and dinner-time samples were analysed and compared with results from a historical control group of 100 healthy volunteers. Samples were analysed for the presence of pepsin using Peptest™ (RD Biomed Ltd). Patients were defined as pepsin positive if they had pepsin detectable in at least 1 saliva sample. The St George's Respiratory Questionnaire (SQRQ), Hull Airways Reflux Questionnaire (HARQ), and the REFLUX Questionnaire were used to assess the relationship between pepsin positivity and symptoms.

### Results

All 21 subjects successfully provided saliva samples 17 out of 21 IPF patients (81%) were pepsin positive compared with 36 of 100 healthy volunteers (36%),  $p=0.0004$ . The proportion of subjects with 1, 2 and 3 positive samples during a 24 hour period were 52%, 14% and 14% respectively in IPF patients and 20%, 12% and 4% in control subjects. There was no significant difference in reflux-related quality of life or respiratory quality of life between pepsin positive and pepsin negative patients measured using the REFLUX questionnaire ( $93.6 \pm 2.6$  SEM vs  $97.8 \pm 2.3$  SEM,  $p=0.47$ ) and SGRQ ( $49.5 \pm 3.5$  SEM vs  $34 \pm 11.9$  SEM,  $p=0.1$ ). The HARQ score was significantly higher in pepsin positive patients ( $23.8 \pm 3.3$  SEM vs  $7.5 \pm 3.3$  SEM,  $p=0.03$ ).

### Conclusion

Salivary pepsin measurement is simple, convenient and acceptable to patients. Our results confirm an increased prevalence of GOR in IPF patients compared to healthy volunteers but demonstrate a marked temporal variability in salivary pepsin level. Therefore, more than one sample or repeated sample collection is required for optimal sensitivity.

The mean HARQ score in IPF patients with negative salivary pepsin was  $7.5 \pm 3.3$  SEM compared with  $23.8 \pm 3.3$  SEM in 91 patients with at least 1 positive salivary pepsin sample,  $p = 0.03$

REFLUX Questionnaire QoL score (higher score reflects less impact on quality of life from reflux symptoms) was  $97.8 \pm 2.3$  SEM for patients with no positive salivary pepsin samples compared with  $93.6 \pm 2.6$  SEM for patients with at least 1 positive salivary pepsin sample,  $p = 0.47$ . two-tailed unpaired t-test.

SGRQ score was  $34 \pm 11.9$  SEM for patients with no positive salivary pepsin samples compared with  $49.5 \pm 3.5$  SEM for patients with at least 1 positive salivary pepsin sample,  $p = 0.1$

*Stats required – significance of increased prevalence, best time to predict positivity, predictive value of symptom/QoL scores*