Title: Detection of bronchial asthma using impulse oscillation system (IOS) in patients with normal spirometry

Body: Background: The gold standard for the diagnosis of bronchial asthma in patients with a normal spirometry is currently the bronchial provocation test. IOS is a promising technique to assess airway function being simple to perform and able to quantify changes in peripheral airway resistance undetected by traditional spirometry. 

Aim & Methods: In order to assess whether IOS could be useful in detecting asthma in subjects with a normal spirometry, 23 (9 female, mean age 37 SD 17 years) non smoking patients referred for methacholine challenge testing (MCT) for chronic rhinitis or cough were studied by spirometry and IOS prior to MCT. All tests were performed on the same day in separate study rooms by different technicians blind to the results. Results: Mean baseline FEV1 was 87 SD 10% of predicted. Ten subjects had a positive MCT with a mean PD20 dose of 0,5 SD 0,4 mgl -1. IOS showed higher baseline R5-20Hz values in MCT+ subjects (0,86±0,71 vs 0,27±0,14 cmH2O/l/s; p<0,05) and higher baseline Peripheral Airway Resistance (Rp) (2,61±1,3 vs 1,43±0,85 cmH2O/l/s; p<0,05). The was a strong negative correlation between baseline Rp and PD20 (r=-0,77, p=0,009). The area under the Receiver Operatine Curve (ROC) showed a accuracy of 0,78 (C.I.=0,66-0,88) using a cut-off value of 3,01 cm H2O/l/s. Conclusion: We conclude that Rp may be a useful marker in predicting MCT response and provide a screening tool for detecting bronchial asthma.