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Title: Characteristics of inspiratory and expiratory reactance in interstitial lung disease

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Body: Forced oscillometry is a noninvasive method to measure respiratory impedance and widely used in obstructive lung diseases, but has not been well studied in restrictive lung diseases. This study was conducted to investigate the characteristics of measurements obtained by impulse oscillation system (IOS) in patients with interstitial lung disease (ILD). IOS and spirometry were performed in 64 ILD patients, 54 asthma patients, 49 chronic obstructive pulmonary disease (COPD) patients, and 29 controls. Respiratory resistance and reactance were assessed as measurements averaged over several tidal breaths (whole-breath analysis) and as measurements separately averaged during inspiration and expiration (inspiratory-expiratory analysis). Whole-breath analysis failed to distinguish between ILD and obstructive lung diseases. Inspiratory-expiratory analysis demonstrated no difference between inspiratory and expiratory reactance at 5 Hz (X5) in controls and asthma patients. Expiratory X5 was more negative than inspiratory X5 in COPD patients. In contrast, expiratory X5 was found to be less negative than inspiratory X5 in ILD patients. Furthermore, within-breath change in X5 was inversely correlated with vital capacity and diffusing capacity of carbon monoxide in ILD patients. These results suggest that increased magnitude of X5 during inspiration compared with that during expiration is a characteristic feature of IOS measurements in ILD patients.