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Title: Can intra-breath variations of reactance predict dyspnea

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Body: Rationale: Reduced lung tissue elasticity in COPD allows small airways to collapse during exhalation. An oscillatory pressure signal applied at the mouth no longer reaches the distal airways, and the corresponding reactance measured during expiration becomes more negative. We used forced impulse oscillation technique (IOS) to measure inspiratory-expiratory reactance difference at 5 Hz (DX5) to determine if DX5 relates to the severity of dyspnea. Methods: 426 COPD patients and 232 controls performed spirometry and IOS measurements. The Modified Medical Research Dyspnea scale (mMRC) was used to define dyspnea. ROC analysis was performed to examine DX5's ability to identify mMRC≥2.

Anthropometric data and pulmonary function tests

	Controls	GOLD 2	GOLD 3	GOLD 4
N	232	180	186	60
Age(yrs)	54(9)	62(7)	64(7)	64(6)
Height(cm)	172(9)	171(8)	170(9)	171(8)
mMRC	.2(.5)	1.1(.9)	1.7(1.0)	2.3(1.2)
Spirometri/IOS				
FEV1(L)	3.4(0.7)	1.9(0.4)	1.3(0.3)	.8(0.2)
FVC(L)	4.3(0.9)	3.6(0.9)	3.2(0.9)	2.6(0.8)
DX5(kPa/L/s)	-.01(.04)	.04(.37)	.11(.51)	.26(.66)

Data presented as mean(SD), for DX5 median(95th percentile)

Results Mean mMRC and DX5 was close to zero in controls and increase with increasing severity of COPD, see table. ROC-analysis: At the DX5 cutoff .06 kPa/L/s a sensitivity of 75% and a specificity of 72% was found for mMRC≥2. Cutoff .26kPa/L/s rendered 95% specificity for mMRC≥2.

Conclusion Non-invasively measured DX5 tracks mMRC and is a potential marker for the presence of significant dyspnea.