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Title: The role of forced partial expiratory flows to test the bronchodilator response in COPD

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Body: Lung distension (↑FRC) and air trapping (↑RV) are associated with airflow obstruction in COPD patients. Distal obstruction can be assessed by the measurement of forced expiratory partial flows (PF) at low lung volume, 800ml above residual volume, RV, (PF800). The acute effects of salbutamol were evaluated using the Peripheral Obstruction Index (POI), the ratio of RV to PF800. POI can be regarded as a time constant for emptying the lung periphery and has a unit of second. Methods: Eighty nine COPD subjects underwent measurement of FVC,FRC, RV, PF800 and FEV1 before and after inhalation of 400mcg of salbutamol (BD). PF800 was acquired in a body plethysmograph: after 30 seconds of steady tidal breathing, the patient expired maximally to RV starting from a normal inspiratory tidal volume. (Exp'Air Medisoft Be). Full maximal expiratory manoeuvres were performed after PF800. Results: Prebronchodilator POI values ranged from 2-60s. POI decreased in 69/89 patients including 19 patients with increases in PF800 but no decrease in RV. The mean decrease in POI was 21%. Of the 50 subjects with decreases in POI and RV, only 26 had increases in FEV1 (>0.2L) and only 35 increases in FVC (>0.2L). Among the 31 patients who increased their RV (mean +/- SE : 0,35 +/- 0,33 l) after the challenge, only 2 increased their FEV1 whereas 12 increased POI. This suggests a release of pneumoconstriction (Dautrebande 1948) associated with peripheral bronchodilation. Conclusion: POI appears to be more sensitive than FEV1 for reflecting air trapping and peripheral obstruction. The manoeuvre is less tiring than the maximal forced expiration. The clinical significance of changes in POI remains to be studied.