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Acute bronchodilator responsiveness in subjects with and without airflow obstruction in five Latin American cities: The PLATINO study☆

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ABSTRACT

Background: Acute bronchodilator responsiveness is an area of discussion in COPD. No information exists regarding this aspect of the disease from an unselected COPD population. We assessed acute bronchodilator responsiveness and factors influencing it in subjects with and without airway obstruction in an epidemiologic sample.

Methods: COPD was defined by GOLD criteria (post-bronchodilator $FEV_1/FVC < 0.70$). In this analysis, subjects with pre-bronchodilator FEV_1/FVC <0.70 but ≥0.70 post-bronchodilator were considered to have reversible obstruction. Bronchodilator responsiveness after albuterol 200 μg was assessed using three definitions: a) FVC and/or FEV_1 increment ≥12% plus ≥200 mL over baseline; b) FEV_1 ≥15% increase over baseline; and c) FEV_1 increase ≥10% of predicted value.

Results: There were 756 healthy respiratory subjects, 481 subjects with reversible obstruction and 759 COPD subjects. Depending on the criterion used the proportion of person with acute bronchodilator responsiveness ranged between 15.0–28.2% in COPD, 11.4–21.6% in reversible obstructed and 2.7–7.2% in respiratory healthy. FEV_1 changes were lower (110.6 ± 7.40 vs. 164.7 ± 11.8 mL) and FVC higher (146.5 ± 14.2 mL vs. -131.0 ± 19.6 mL) in COPD subjects compared with reversible obstructed. Substantial overlap in FEV_1 and FVC changes was observed among the groups. Acute bronchodilator responsiveness in COPD persons was associated with less obstruction and never smoking.

Conclusions: Over two-thirds of persons with COPD did not demonstrate acute bronchodilator responsiveness. The overall response was small and less than that considered as significant by ATS criteria. The overlap in FEV_1 and FVC changes after bronchodilator among the groups makes it difficult to determine a threshold for separating them.

Abbreviations: GOLD, Global Initiative for Chronic Obstructive Lung Disease; COPD, Chronic obstructive pulmonary disease; FEV_1, Forced expiratory volume in the first second; FVC, Forced vital capacity; ATS, American Thoracic Society; PLATINO, Proyecto Latinoamericano de Investigación en Obstrucción Pulmonar; LHS, Lung Health Study; ALAT, Asociación Latinoamericana de Tórax; PI, Principal investigator.

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1. Introduction

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD), spirometry is essential for the diagnosis of chronic obstructive pulmonary disease (COPD). A post-bronchodilator forced expiratory volume in 1 s/forced vital capacity (FEV_1/FVC) below 0.70 confirms the presence of airflow limitation that is not fully reversible [1]. GOLD also indicates that, despite earlier hopes, neither bronchodilator nor oral glucocorticosteroid reversibility testing predicts disease progression, whether judged by decline in FEV_1, deterioration of health status, or exacerbation frequency in patients with a clinical diagnosis of COPD and abnormal spirometry [1].

Several criteria have been proposed to define a significant bronchodilator response [2–8]. However, the criterion of the American Thoracic Society (ATS) is probably the most widely accepted [3,4].

In a selected COPD population, Calverley et al. assessed whether routine bronchodilator testing was a robust measurement in individual patients already classified as having "poorly reversible" COPD [9]. That study reported that more than three-quarters of COPD patients had an improvement in expiratory airflow that exceeded the generally accepted minimum clinically important difference of 100 mL [10]. They also found a large within-subject variability of bronchodilator reversibility, where ~50% of the patients changed responder status between study visits. Tashkin et al. reported in a large cohort of moderate to very severe COPD patients that the majority of patients demonstrated increases in lung function following the administration of inhaled anticholinergic plus sympathomimetic bronchodilators [2].

Although acute bronchodilator responsiveness has been widely assessed in selected COPD populations, no information exists regarding this aspect of the disease from unselected COPD sample. Population-based studies are important because they more accurately represent the entire population, help to explain the frequency and distribution of the disease characteristics, and allow making inferences about the general population of patients with the disease.

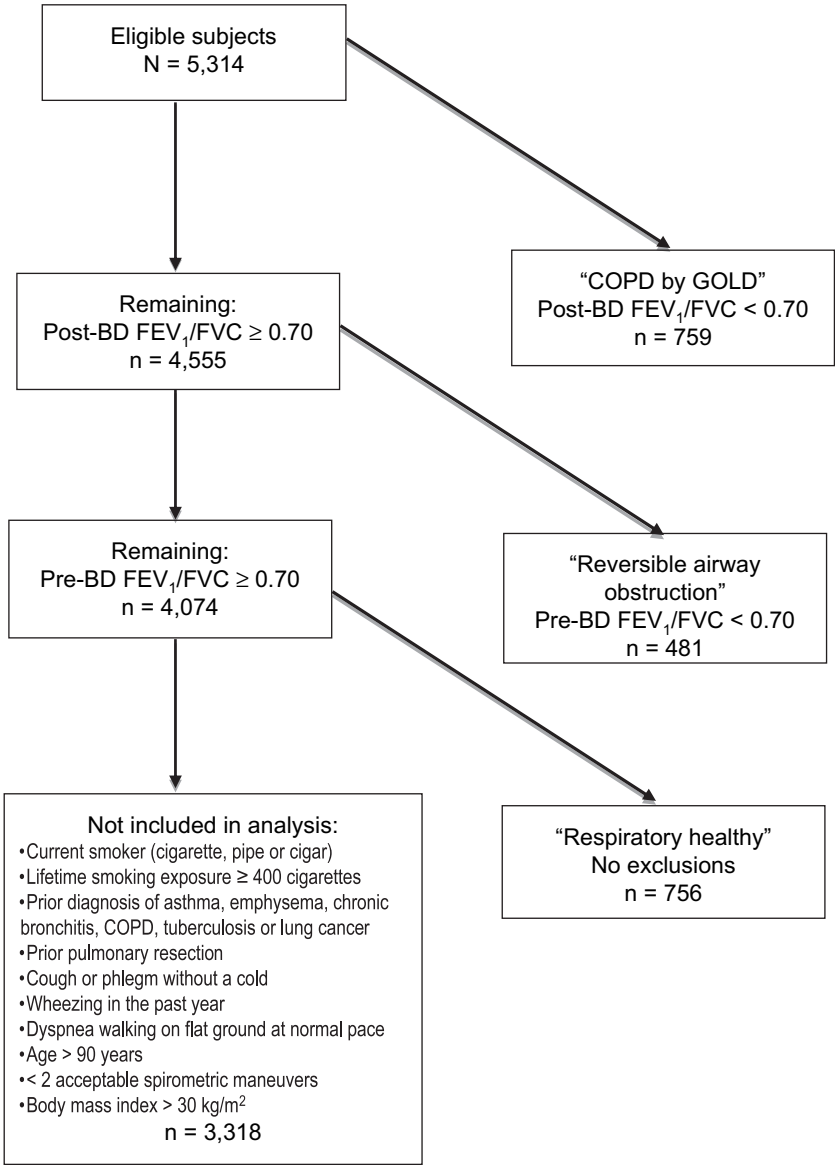

Fig. 1. Study population diagram. Definition of abbreviations: FVC, forced vital capacity; FEV_1, forced expiratory volume in one second; BD, bronchodilator.