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CORRESPONDENCE

Assessment of bronchoreversibility in severe emphysema

To the Editors:

The extensive analysis by HAN *et al*. [1] of the National Emphysema Treatment Trial (NETT) research group concerning bronchoreversibility is important for clinicians. They repeatedly assessed 544 patients with severe emphysema for up to 5 yrs noting changes in their forced expiratory volume in 1 s (FEV_1) before and after administration of two inhalations of albuterol.

To define bronchoreversibility they unfortunately followed the American Thoracic Society/European Respiratory Society (ATS/ERS) guideline recommendations for FEV_1 responses [2]. These guidelines require both a 12% increase in FEV_1 and a 200-mL increase in FEV_1 to indicate a positive test, levels which are based on expert opinions rather than statistical analysis of individual patients. Consequently, they found that, on average, ATS/ERS guideline-defined bronchoreversibility was found in only 8.5% of tests. The 544 NETT patients had a FEV_1 of 700 ± 220 mL. Thus, on average, to increase their FEV_1 by 200 mL would require a sizeable increase of 28.5%, much more than 12%.

Examining other available data, TWEEDDALE *et al.* [3] divided obstructive airway disease patients into three groups based on severity of baseline FEV_1: lowest ~800 mL, medium ~1,600 mL and highest ~3,200 mL. When using absolute changes in FEV_1 to define responsiveness to inhaled β-agonists, the percentage of responders increased from 24% to 45% to 66% as group baseline FEV_1 increased. When using percentage changes in FEV_1 of 15% or 10% as criteria, the responders decreased from 31–50% to 29–43% to 7–41% as group baseline FEV_1 increased. We found, in separate studies of different patients, that absolute variability of baseline FEV_1 increased and percentage variability decreased as baseline FEV_1 increased [4]. Further, after albuterol inhalation absolute increases were greater and percentage changes lesser in patients with higher FEV_1 [5], similar to the findings of TWEEDDALE *et al*. [3].

For this letter, I re-analysed data in our series [4] of all 47 patients who had best baseline $FEV_1 \leqslant 1{,}000$ mL, received aerosolised albuterol and had spirometric measures meeting ATS standards [6] before and after albuterol. Their severity of obstruction approximated that of the HAN *et al.* [1] series. Using ATS/ERS guidelines, only 6 out of the 47 (13%) exhibited FEV_1 bronchoreversibility [2]. 17 more of the remaining 41 (42%) increased their best FEV_1 by $\geqslant 12\%$ but did not increase their FEV_1 by $\geqslant 200$ mL. However, the absolute FEV_1 of these 17 increased from 726 ± 187 mL to 862 ± 212 mL (136 mL difference) and a percentage increase of $19.1 \pm 4.4\%$ ($p=0.05$ by rank order and $p=0.015$–0.00003 by unpaired t-testing). Thus, it seems likely that the NETT population evaluated in this study was also likely to have much more FEV_1 bronchoreversibility than yet identified [1].

Requiring an absolute FEV_1 criteria to diagnose bronchoreversibility favours finding more reversibility in males and in patients with less severe emphysema and larger baseline FEV_1 values (which the study found). Appropriately, in their discussion, the authors emphasise that many patients with severe emphysema do have some bronchoreversibility [1]. Consequently, a re-analysis of the raw data of acceptable forced exhalations of three pre-albuterol and three post-albuterol tests for FEV_1 (and hopefully FEV_3 and/or FEV_6) values would be theoretically and clinically useful. If a portion or all of the spirometric values are available, I would be pleased to help.

J.E. Hansen
Medicine, Harbor-UCLA Medical Center, Box 405, 1000 W. Carson Street, Torrance, CA 90509, USA.

Correspondence: J.E. Hansen, Medicine, Harbor-UCLA Medical Center, Box 405, 1000 W. Carson Street, Torrance, CA 90509, USA. E-mail: jimandbev@cox.net

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