A Better Way to Assess Bronchoreversibility

To the Editor:

The well-written article by Hanania et al1 in CHEST (October 2011) stresses the importance and usefulness of measuring the short- and long-term effects of drugs that affect bronchoreversibility in patients with obstructive lung disease. The authors carefully compare several criteria for a positive response1 after aerosol drug administration in the laboratory. All of these criteria are based on population-based “clinical” limits rather than the variability of the individual being tested. All criteria compare only the “best of three” predrug and postdrug FEV1 and/or FVC spirometry values that meet American Thoracic Society standards2 and ignore data from other forced exhalations.

It is surprising that these authors (as well as many others) did not use more of the data available from bronchodilator testing by considering all six spirometric maneuvers so that each patient’s response could be analyzed statistically. As reported previously, a Student t test or rank-order test allows determination of when changes in FEV1, FEV1/FVC, and/or FVC are statistically significant and markedly changes the detection of responsiveness.3,4 As pointed out recently by Dolmage et al5 in evaluating the 6-min walk test, it is the consistency of change that determines whether a response to an intervention is statistically significant. For example, as the result of an intervention, a vehicle mileage change from 13, 12, and 11 miles per gallon to 16, 15, and 14 miles per gallon (25% average increase) would be statistically significant and usually important.

Among the current American Thoracic Society guidelines,6 the guideline requiring a > 200 mL response in those with a low FEV1 to identify bronchoreversibility is the most troublesome. An intervention changing FEV1 from 560, 600, and 640 mL to 750, 700, and 800 mL (25% average increase) may well improve dyspnea and the quality of life in a patient with COPD. Despite any added disclaimer, to report such a patient as nonresponsive is misleading. Whenever possible, should not we, who see the raw spirometric data, report the consistency, statistical significance, and percentage of the patient’s change when we are asked to measure bronchoreversibility?

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Financial/nonfinancial disclosures: The author has reported to CHEST that no potential conflicts of interest exist with any companies/organizations whose products or services may be discussed in this article.
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References

Response

To the Editor:

We thank Dr Hansen for his thoughtful review of our review article.1 Dr Hansen suggests that bronchodilator response would be better evaluated using the variability of the individual being tested rather than using population-based limits. He further suggests that it should include data from tests other than “the best of three,” as has been traditionally used in most studies. We believe that these comments are interesting and appropriate. However, the intent of our work was to critically review the literature using the existing thresholds accepted by most professional societies, including the American Thoracic Society,2 and, thus, our analyses were limited to the published data on hand.

We agree with Dr Hansen that on occasion, such as the case of patients with very low FEV1, a statistically significant change in FEV1 from baseline based on the individual’s variability may indeed be clinically important even if the mean change is lower than the agreed-upon threshold of 200 mL. However, careful interpretation of such a response should always be undertaken to avoid the overestimation of a significant clinical response, especially if the absolute change is below the normal variability of the test or below the minimal clinically important difference, which for the FEV1 is suggested to be around 100 mL.3 The use of the approach proposed by Hansen, although interesting, needs to be further explored in future studies.

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