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## Assessing the Need for Bronchodilator Therapy: Don't Believe Everything You Hear

The February 2003 issue of RESPIRATORY CARE[1] contains the latest in a series of investigations of respiratory therapy practice by Dr James Stoller's group at The Cleveland Clinic Foundation. In that latest contribution Dr Stoller et al examined the frequency and causes of missed bronchodilator treatments by a respiratory therapy service operating with respiratory therapy protocols. The investigators reported that 3.5% of ordered bronchodilator treatments were missed. The most common causes of missed treatments were patient refusal (24.6%) and patients being absent from their rooms (31.6%). Of interest to me is that 11.5% of missed treatments were due to the patient having clear breath sounds. Though I most sincerely do not question the skill of Cleveland Clinic respiratory therapists (RTs), the decision of an RT to give or withhold a bronchodilator treatment on the basis of auscultation findings is an important topic that deserves discussion.

I think it is a natural tendency of RTs, particularly inexperienced RTs, to depend perhaps too heavily on the stethoscope to assess a patient's need for bronchodilator treatment. We all learned that wheezing is a sign of air flow obstruction, so, unfortunately, it doesn't take a great leap for many to conclude that the absence of wheezing, even in patients with chronic air flow obstruction, negates the clinical need for bronchodilator treatment. Not too long ago I was discussing the treatment plan of a chronic obstructive pulmonary disease (COPD) patient with a colleague who didn't understand why the patient needed bronchodilator treatments when she wasn't wheezing. I think that is, regrettably, an attitude held by many RTs, and it is terribly shortsighted.

I think it is beneficial for RTs to have experience assessing patients both in acute care settings and in the pulmonary function laboratory. Once I started seeing patients in the pulmonary function laboratory, it didn't take long for me to realize that some patients with severely impaired lung function and impressive response to bronchodilators can have breath sounds that really don't sound all that bad. Indeed, King et al[2] found that wheezing heard by auscultation was present in only 57% of patients following a positive methacholine challenge (provocational concentration producing a 20% decrease in forced expiratory volume in the first second [PC20] $<$ 8 mg/mL). Table 1 illustrates an example of this phenomenon. This COPD patient had slightly decreased but clear breath sounds that didn't change after bronchodilator, as far as I could tell via auscultation, yet the spirometry clearly demonstrates improved pulmonary function after bronchodilator. The improved forced vital capacity after bronchodilator would increase the patient's inspiratory capacity (less dynamic hyperinflation), which increases exercise capacity and reduces dyspnea.[3] This benefit of bronchodilator can also occur without any substantial change in forced expiratory volume in the first second ($FEV_1$), another accepted standard for assessing air flow obstruction.[4]

Dr Stoller et al suggest that better interdisciplinary coordination and patient education could reduce the number of treatments missed because of lack of patient availability and patient refusal. I agree. I would add that better clinician education about the beneficial physiologic effects of bronchodilators that can occur without any change in breath sounds or $FEV_1$ could reduce the number of missed opportunities to improve functional capacity and reduce dyspnea in patients with chronic air flow obstruction.

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Table 1. Spirometry Before and After Bronchodilator in a Chronic Obstructive Pulmonary Disease Patient

| Test | Before | | | After | | |
|---|---|---|---|---|---|---|
| | Predicted | Actual | % Pred. | Actual | % Pred. | % Δ |
| FVC (L) | 4.80 | 1.80 | 38 | 2.58 | 54 | 42 |
| $FEV_1$ (L) | 3.38 | 0.65 | 19 | 0.90 | 27 | 39 |
| $FEV_1$/FVC | 0.70 | 0.36 | 51 | 0.35 | 50 | −2 |
| $FEF_{25–75}$ (L/s) | 3.19 | 0.25 | 8 | 0.33 | 10 | 29 |
| $FEF_{50}$ (L/s) | 5.24 | 0.26 | 5 | 0.37 | 7 | 41 |
| $FEF_{max}$ (L/s) | 9.03 | 2.49 | 28 | 2.95 | 33 | 18 |
| TET (s) | NA | 8.46 | NA | 9.81 | NA | 15 |

% pred. = percent of predicted
% Δ = percent change
FVC = forced vital capacity
$FEV_1$ = forced expiratory volume in the first second
$FEF_{25–75}$ = forced expiratory flow during the middle half of the FVC
$FEF_{50}$ = forced expiratory flow at 50% of the FVC
$FEF_{max}$ = maximum forced expiratory flow
TET = total expiratory time
NA = not applicable

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