

Letters

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

The February 2003 issue of RESPIRATORY CARE¹ 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 al² 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 (FEV₁), 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 bronchodila-

tors that can occur without any change in breath sounds or FEV₁ 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

FEV₁ = forced expiratory volume in the first second

FEF_{25–75} = forced expiratory flow during the middle half of the FVC

FEF₅₀ = forced expiratory flow at 50% of the FVC

FEF_{max} = maximum forced expiratory flow

TET = total expiratory time

NA = not applicable

The authors respond:

We appreciate and agree with Mr Haynes's comment that bronchodilator responsiveness and air flow obstruction may exist in the absence of wheezing. Indeed, as pointed out in 1974 by Loke and Anthonisen¹ and as observed in a cohort of 1,129 individuals with alpha-1 antitrypsin deficiency who underwent serial spirometry with bronchodilator testing² the prevalence of reversible air flow obstruction in patients with emphysema is high (approximately 60–70% on serial testing). Further confounding the relationship between wheezing and lung function is the fact that wheezing can occur in the absence of air flow obstruction, as in forced maneuvers,^{2,3} and in individuals with vocal cord dysfunction syndromes.⁴

Foregoing bronchodilator treatment in an asthma or COPD patient because he or she is not wheezing at the time of assessment runs the risk of under-treating air flow obstruction, but a policy of administering bronchodilators whenever ordered overlooks the issue raised in our series: that many hospitalized patients are prescribed to receive bronchodilators in the absence of any evidence of asthma, COPD, or wheezing. Indeed, though beyond the scope of the discussion in the report that Mr Haynes cites, our protocols respect the consistent administration of bronchodilators to patients prescribed to receive these medications at home or who have a history of obstructive lung disease.^{5,6} In this regard, omitting a bronchodilator treatment with such a patient would be regarded in the reported series (and in our practice in general) as a missed treatment, regardless of whether wheezing was present. As we suspect Mr Haynes would

agree, bronchodilators may sometimes be prescribed in the absence of even the most liberal indication. Indeed, it could be argued that in such patients, prescribing bronchodilators represents *over-ordering* and demonstrates the widely observed phenomenon of *misallocation* of respiratory care treatments,⁷ which has been so amply demonstrated in available studies.^{8,9} To this extent, foregoing bronchodilators with patients lacking any indication could be regarded as appropriate care and might not be construed as a missed medication. In the context of this issue we examined the impact of not counting these patients as having missed medications and observed that the already low prevalence of missed medications decreased further, from 3.5% to 2.9%.¹⁰

Overall, while recognizing that missed medications can pose risk related to under-treating patients truly in need and likely to benefit from their administration, we emphasize that the frequency of missed medications was low in our series,¹⁰ even when we count missed therapies strictly as those deemed indicated by clinically attentive protocols. At the same time we wish not to lose sight of the fact that omitting bronchodilator treatments to patients who lack air flow obstruction or wheezing remains a reasonable, in fact laudable, clinical goal as we try to optimize the allocation of respiratory care services.

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