



Just a Breath Away

Case Study: Measurement of exhaled nitric oxide

By Neal Jain, MD, FAAP

The measurement of nitric oxide in exhaled breath (eNO) is the first easy to perform, widely available noninvasive technology that measures the inflammatory status of the airways.

eNO levels correlate with other measures of eosinophilic inflammation in the airways.¹⁻³ Elevated eNO levels are of significant clinical value in predicting patients who are likely to benefit from anti-inflammatory therapy with inhaled corticosteroids (ICS).⁴⁻⁷

Although the cost for measuring eNO has decreased significantly, use of the technology is not widespread. Reports in the literature suggest that measurement of eNO may not be helpful in the management of patients diagnosed with asthma.⁸⁻¹⁰

Despite these caveats, many clinicians currently use this technology and find it to be an important tool in the evaluation of patients who present with non-specific respiratory symptoms such as cough, whether or not they have already been diagnosed with asthma.

Case study

A 37-year-old woman presents with a two-year history of chronic and recurrent cough. She describes her cough as being non-productive of sputum, but it is associated with some dyspnea. Her cough is present day and night, and it worsens with exertion. Use of a short-acting beta-agonist before exertion seems to lessen her cough's severity, but it does not alleviate the symptoms.

She has a history of intermittent sinus infections and some mild allergic rhinitis symptoms in the summer months. She is not exposed to tobacco smoke and has never used tobacco products.

She denies hoarseness or signs and symptoms of gastroesophageal reflux disease. A physical exam reveals only mild nasal turbinate edema and posterior pharyngeal erythema. Chest X-ray is normal as are spirometric indices: FEV₁ 81 percent predicted, FEV₁/FVC 0.77, normal flow volume loop; 8 percent improvement in FEV₁ after administration of albuterol. Exhaled nitric oxide measurement is performed.

Scenario 1

An elevated eNO (54 ppb) predicts that this patient's symptoms are likely to improve with ICS. This information also provides evidence that assists the clinician in confirming a diagnosis of asthma and may prompt further evaluation such as skin testing or IgE testing for allergies.

Scenario 2

The patient has a low or normal eNO (14 ppb), which predicts that the patient is unlikely to have improvement with ICS. It is unlikely that this patient's chronic cough is related to asthma, and evaluation for other causes of her cough should be undertaken.

In summary

Measurement of eNO differs from other commonly available tests in that both an elevated level and a normal level are helpful to the clinician. Although there are many experts who have suggested that more definitive trials in patients with asthma are necessary before this technology is used on a widespread basis, sufficient evidence exists now for the appropriate use in determining response to therapy when patients present with non-specific respiratory symptoms.

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