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ATS GUIDELINE ON F_ENO

Better Control of Airway Inflammation

On September 1, 2011, the American Thoracic Society (ATS) released an Official Clinical Practice Guideline that provides recommendations as to how fractional exhaled nitric oxide (F_ENO) measurements should be used and interpreted in treating patients with airways disease, notably asthma. Developed by a multidisciplinary committee, this Guideline provides a strong evidence-based interpretation of F_ENO measurements, incorporating data that have been gathered over the past decade. Among its findings the committee concluded that the measurement of F_ENO, "Offers added advantages for patient care including, but not limited to (1) detecting of eosinophilic airway inflammation; (2) determining the likelihood of corticosteroid responsiveness; (3) monitoring of airway inflammation to determine the potential need for corticosteroid; and (4) unmasking of otherwise unsuspected non-adherence to corticosteroid therapy."[1]

NIOX MINO® F_ENO device by Aerocrine.

Dr. Kaiser G. Lim, of the Division of Pulmonary and Critical Care at the Mayo Clinic (Rochester, MN), believes that the Guideline is a very important step forward in the assessment and management of patients with asthma. "The methodology of how to measure F_ENO has been standardized for some time, and the data upon which the Guideline is based is not new. There has not previously been a formalized guideline for physicians to use in interpreting F_ENO measurements in practice—what is a normal measurement versus what is abnormal—and how to use those important measurements to determine the correct course of therapy."

Measuring F_ENO is easy to do and it provides an objective value immediately. Dr. Lim remarks that both high and low values are clinically significant and the information will help fine-tune treatment. "Not only does the F_ENO value tell you whether there is inflammation that would be compatible with asthma, it also helps you identify those patients who will (or will not) respond to inhaled steroids or, if already on inhaled steroids, to recognize if a patient's dose needs to be adjusted. If a patient comes in with complaints of frequent asthma attacks and it turns out that the F_ENO measurement is still high in spite of treatment, I can see that the patient is not receiving enough of the inhaled steroid and adjust the dose accordingly. We don't want to give our patients too high a dose of inhaled steroid if not necessary. The dose should be sufficient to control symptoms as well as reduce exacerbations, but should be as low as possible in order to prevent adverse effects."

Traditional tools for diagnosing and monitoring asthma – the history, physical examination, lung function tests, and quality of life instruments – are not appropriate proxies

for airway inflammation. Exhaled nitric oxide is such a proxy, and can be measured with simple to use, cost effective equipment. The F_ENO values independently reflect a perspective of the condition of the airway – the airway inflammation – that is otherwise unavailable to the clinician or patient. "Successful management of airway inflammation is a key factor in attaining and sustaining asthma control," says Peter B. Boggs, MD, a specialist is Allergy, Asthma, and Immunology (Shreveport, LA). "The ability to measure F_ENO and gain insight into the status of the underlying airway inflammation in a patient, in context with the history, physical, lung function tests, and the quality of life indicator, is a paradigm change in how we help people manage their asthma." Dr. Boggs goes on to say, "In the past, we've assumed that someone is in 'good control' when the traditional tools indicate such, but we now know this can be quite wrong.

A patient's airway inflammation can be decidedly uncontrolled even when the traditional tools suggest otherwise. That is one reason measuring F_ENO is important: you will know, rather than assume, and avoid making a misjudgment. A high F_ENO under such conditions generally reflects nonadherence to ICS treatment, but can also reflect several things including inadequate inhaled corticosteroid dosing, improper delivery due to technique or patient-device mismatch, or even a change in allergen exposure. Being able to have this insight and work-out the answers to the questions it invites enables physicians to provide better care." Dr. Boggs also says "It is important for physicians to keep in mind that measuring F_ENO is not a substitute for the traditional clinical tools, it complements them. Each of the tools has a place in the assessment of asthma or asthma like symptoms.

Exhaled nitric oxide measurements offer a unique perspective not otherwise available and should take its place amongst the traditional tools. "The proper assessment of asthma is a gestalt of the history, physical examination, pulmonary function testing, quality of life assessment, and assessment of airway inflammation. To paraphrase Buckminster Fuller: Exhaled nitric oxide (F_ENO) is a tool the use of which over time will change the way we think about and care for people with asthma."

Dr. D. Robin Taylor, Professor of Respiratory Medicine at the Dunedin School of Medicine (Dunedin, New Zealand), explains there are two types of patients for whom F_ENO has particular relevance for him. "The first is the patient with undiagnosed symptoms, such as ongoing cough, wheezing, or shortness of breath. If I want to determine whether these symptoms will respond to an inhaled steroid or not, the F_ENO is very helpful in this regard." Dr. Taylor also remarks that inhaled steroids are often prescribed empirically. "It's sometimes a guessing game. You can short-circuit the guessing by using a F_ENO measurement."

The second group of patients Dr. Taylor describes is those with complex asthma. "These patients typically have multiple reasons for what *seems* to be poorly controlled asthma. They may be overweight, suffer from gastro-esophageal reflux, become anxious, and the asthma symptoms worsen. In this situation, a physician might increase treatment for asthma, although it may actually be the patient's anxiety causing him or her to perceive the symptoms more acutely. Or perhaps the obesity is causing increased work of breathing, or gastro-esophageal reflux may be causing the cough at night. If I measure the F_ENO and it's very low, then I know it's unlikely that airway inflammation is causing the symptoms. If I measure the F_ENO and it's very high, then it's likely that the inhaled steroid dose has not been sufficient, or perhaps the patient has not been fully compliant."

The **NIOX MINO®** airway inflammation monitor pioneered and manufactured by **Aerocrine**, is the only FDA cleared F_ENO device currently marketed in the US. It is a maintenance-free device available for measuring F_ENO. The **NIOX MINO®**, a compact, handheld device**,** provides a non-invasive, quantitative, cost-effective and safe measurement of airway inflammation status and all values are quality assured. With more than 4 million successful tests performed worldwide, the **NIOX MINO®** is the most widely used device for measuring F_ENO in clinical practice and clinical research. Reliability has been documented extensively in numerous peer-reviewed clinical papers. The device provides immediate results and is easy to use for both physicians and their patients. Inflammation measurement with **NIOX MINO®**, offers personalized asthma management that can improve the treatment and care of patients.

For more information about the NIOX MINO®, please call 1-866-275-6469; visit our website at www.nioxmino.com.

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Reference:

1. Dweik, RA, Boggs, PB, Erzurum, SC, Irvin, CG, Leigh, MW, Lundberg JO, Olin, AC, Plummer, AL, Taylor, DR, on behalf of the American Thoracic Society, An Official ATS Clinical Practice Guideline: Interpretation of Exhaled Nitric Oxide Levels (F_ENO), for Clinical Applications, *Am. J. Respir. Crit. Care Med.* 2011 184: 602-615.