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NIOX MINO®- a boon for patients with asthma

Asthma is a reversible airway obstruction in the lungs. According to one report, between 1993 and 1995 it caused 174 deaths, 164000 hospitalizations, 570000 ER visits, over 3 million physician visits and required over 8 million prescriptions written for it. It also doubled in prevalence from 8.5 million total affected people in 1980 to 17 million in 1998. Obviously it is a common and significant health problem faced by people around the world.

Airway inflammation is the key

Asthma, also known as eosinophilic bronchitis is caused by airway inflammation. This inflammation is caused by allergies, infections and irritants (such as smoke, pollution, chemicals etc.)- Collectively known as asthma triggers. The inflammation results in swelling and excess mucus production in the airways. This causes bronchoconstriction and familiar symptoms of asthma- cough, wheeze, difficulty breathing and chest tightness. In asthma, the airway inflammation is present at all times even in patients with no symptoms. Following exposure to one or more of the asthma triggers, the inflammation gets worse and results in worsening of asthma.

When the inflammation is left untreated for several years, it leads to airway remodelling- a process similar to scarring but not identical with it. Ensuing airway destruction is permanent and can not be reversed. According to one estimate, a patient with uncontrolled asthma loses 3% of lung function (about 15 ml of lung volume) every year. It is obvious that airway inflammation is the key element to be controlled if we want good outcome from treating asthma. It is important to understand in this connection that inhaled steroids and not albuterol effectively reduce the airway inflammation!

Now we can measure the airway inflammation!

Unfortunately, until now there were no widely available tests to measure airway inflammation- the key element in asthma! This was a big handicap to physicians treating asthma. Traditionally used, office-based lung function tests measure airway obstruction and not inflammation. Measurement of eosinophils in sputum (important cells causing inflammation of the airways) and eosinophilic proteins in blood (traditionally used markers of inflammation) required doing difficult, invasive and not commercially available procedures.

Fortunately, the FDA has recently approved an office-based test system to measure airway inflammation in people (adults and children who are 7 years old and above) with asthma. It is easy to use, relatively inexpensive, and noninvasive and takes only minutes to get results. It is marketed by a Swedish company (Aerocrine Corporation) under the trade name NIOX MINO®. Medicare covers it if used appropriately and other insurance companies may soon follow suit.

How easy is it to do it?

In this system, the patient exhales and empties his or her lungs completely. Then he or she breathes in through a special disposable filter attached to the NIOX MINO® device and subsequently breathes out in the same way without removing the device from mouth. The device gives audible clues to indicate if the patient is doing the procedure right or not. At the end of exhalation the device shows how much Nitric Oxide (FENO) is present in the patient's exhaled breath. The amount of Nitric Oxide present in the patient's exhaled breath is directly proportional to the amount of inflammation in the lungs. Therefore by measuring the amount of Nitric Oxide in the exhaled breath, it is possible to predict how inflamed the airways are! Normal values are available to interpret the results. The test should not take more than 5-10 minutes to perform.

What are the potential uses of the system?

- Inhaled steroids are used to treat airway inflammation in asthma. Until now there are no tests available to check if the inhaled steroids are working. Often times, larger than required amount of steroids are used to treat. Now with the availability of Nitric Oxide measurement, steroid doses can be adjusted up or down according to individual patient's needs! Monitoring levels of FENO can significantly reduce required maintenance doses of inhaled steroids without compromising asthma control!
- Measurement of FENO levels makes it possible for doctors to tell if the patient is compliant with prescribed asthma medications. High FENO levels in patients on maintenance doses of inhaled corticosteroids means either they are not taking their medication as prescribed or that they are on too low a dose!
- Rapidly increasing FENO levels (60% from baseline) could indicate that a major asthma exacerbation is about to happen and this gives both patients and doctors enough time to put in place remedial measures to stop this from happening!

NIOX MINO® in combination with office-based lung function tests, no doubt will revolutionize the treatment of asthma. As we continue to know more about the technique, newer uses will be discovered which may help reduce asthma morbidity and mortality and help improve the quality of life for patients with asthma.

About the author:

Natarajan Asokan, M.D., F.A.A.P. is a board certified allergist and immunologist and a board certified pediatrician with over 25 years of experience as a physician and 7 years of experience as a practicing allergist & immunologist. He treats adults and children with various allergy & immunology problems. He can be reached at 1739, Beverly Ave, Suite 118, Kingman, AZ 86409, and Tel: 928-681-5800, Fax: 928-681-5801, or www.trinityallergy.com