

Monitoring Nitric Oxide Does Not Improve on Guidelines-Based Asthma Management

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DENVER — Exhaled nitric oxide serves as a biomarker of inflammation in the lungs, and proponents have suggested that monitoring nitric oxide levels could help improve management of asthma. However, new research, which will be published in the Sept. 20 issue of *The Lancet*, indicates that adolescent and young adult patients whose asthma is managed according to the latest NIH guidelines do not benefit from the addition of nitric-oxide monitoring.

“While nitric-oxide monitoring did not improve asthma management, the good news is that most patients can bring their asthma under control by following NIH guidelines which are based on relatively easy-to-measure symptoms and lung function,” said Stanley Szeffler, MD, lead author of the study and Head of Pediatric Clinical Pharmacology at National Jewish Health.

Asthma is a complex respiratory disorder in which airway inflammation and “twitchy” muscles surrounding the airways can make breathing difficult. Anti-inflammatory corticosteroids are the most effective controller medication for asthma. Nitric oxide is a biomarker of inflammation in the lungs. The researchers hypothesized that monitoring of nitric oxide might help detect patients with ongoing inflammation who needed additional medications to achieve full asthma control.

The researchers, from ten institutions in the National Institute of Allergy and Infectious Disease Inner City Asthma Consortium, evaluated two treatment regimens for 546 patients ages 12 -20 with persistent asthma. The patients all came from inner city neighborhoods with at least 20 percent of the population living below the federal poverty level.

All patients completed a three-week run-in period on a standard asthma treatment regimen based upon previous treatment, adherence to medications and asthma control. They were then randomized to either treatment based on NIH Guidelines for the Diagnosis and Management of Asthma or the guidelines plus nitric-oxide monitoring. The NIH guidelines recommended treatment levels based upon measures of days with symptoms in the preceding two weeks and lung-function testing. Nitric-oxide monitoring incorporated those guidelines but physicians could increase medications more than the guidelines called for if NO levels were high. Patients visited physicians every six to eight weeks at which time they were evaluated and treatment adjusted. The trial lasted 46 weeks.

The most significant improvements in asthma symptoms and levels of exhaled nitric oxide occurred during the three-week run in period. At enrollment 77 percent of patients did not have good control of their asthma. By the end of the run-in period 70 percent *did* have good control of their asthma. Those levels remained similar, ranging between 71 percent and 78 percent with good asthma control throughout the treatment period for all patients.

During the trial the mean number of days with asthma symptoms and pulmonary function were similar in the two groups. Admissions to the hospital, unscheduled use of healthcare, or asthma exacerbations also did not differ between groups. The nitric-oxide monitoring patients did have fewer bursts of oral steroids, a weeklong treatment for more severe asthma symptoms.

Although nitric-oxide monitoring did not make a difference in asthma management overall, post hoc analysis suggested that some subgroups may benefit from nitric-oxide monitoring. Obese patients and highly allergic patients had better control with nitric-oxide monitoring.

“Although nitric-oxide monitoring did not improve overall asthma management, we believe it may still be a useful tool for subsets of patients and in specific circumstances, such as asthma diagnosis, measuring response to inhaled corticosteroid therapy, assessing adherence to corticosteroid therapy, and the safe reduction of inhaled corticosteroid therapy,” said Dr. Szeffler.

National Jewish Health is the leading respiratory hospital in the nation. Founded 124 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit the [media resources page](#).

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