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| <p><b>Is Methacholine Challenge Superior to Exhaled Nitric Oxide in the Evaluation of a Cough Variant Asthma? The Attitude Regarding its Management</b></p> |  | <p><b>Healthcare</b></p> <p><b>Keywords:</b> Asthma, methacholine, oxid nitric, cough, GERD.</p> |
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| <p><b>Abstract</b></p>   |
| <p>Background – The aim of our study was the follow up of a patient presented only with dry chronic cough: Which is the main diagnostic procedure and the most effective therapeutic approach available for such patients at the first medical visit and during his follow up?</p> <p>Methods - Seventy patients (21 males and 49 females) age of 40, 47 year, presented only with chronic non productive cough were studied. They did accomplish 3 medical controls for a period of 8 months with a distance of 4 months from each other. A detailed history was taken to evaluate the existence of other contributing factors to chronic cough such as: Asthma, GERD, PNDS, and any respiratory infections. Only 65.71% of them accepted to undergo the Methacholine challenge test and the measurement of Exhaled nitric oxid.</p> <p>Results – From 41 patients who at the first visit were considered to have Cough Variant Asthma (CVA), 47.14% resulted to have GERD as a cofactor to cough and 42.86% resulted to have PNDS as a cofactor. The methacholine challenge test resulted to be positive in 89.13% of the patients at the first visit toward 62.85% who resulted positive at the third visit (p&lt;0.05). The value of Exhaled nitric oxid was elevated at the first visit only in 51.28% of the patients toward 50% who had a high level of it at the third visit.</p> <p>Conclusion and discussion<br/>GERD remains still the most frequent cofactor of chronic productive cough as a variant of asthma.</p> |

**Introduction**

Methacholine challenge test is important in evaluating a patient with dry chronic cough associated with bronchial hyperreactivity whereas exhaled nitric oxid remains the most important non invasive test in the following the evolution of an airway inflammation.

The management of chronic cough presents a challenge for the clinician. Typically defined as a cough that persists for longer than 8 weeks, this is the most common presenting symptom in adults who seek medical treatment in an ambulatory setting.

1. Chronic cough is estimated to occur in up to 40% of the population.
2. Indeed, inflammatory mediators in the lower airways are elevated in patients with postnasal drip syndrome, cough variant asthma and GERD. Since the etiology of chronic cough can arise from anywhere in the tracheobronchial tree, a multidisciplinary approach is often needed.
3. Synonyms of methacholine challenge test is methocholyl challenge, bronchial provocation test.

**Indications of this test**

Diagnose asthma, confirm diagnosis of asthma, document severity of hyperresponsiveness and follow changes in hyperresponsiveness.

### Contraindications

Absolute contraindication include FEV1 less than 1.5l in adults, less than 1l in children, recent severe acute asthma, myocardial infarction or cerebral vascular accident within 3 months and arterial aneurism.

*Relative contraindication* include moderate baseline airway obstruction, spirometry-induced bronchoconstriction, URI, exacerbation of asthma, HTA, pregnancy, epilepsy.

The reporting of the PC20 (Provocative concentration in mg/ml causing a 20% fall in FEV1 from baseline) is the usual method of expressing the results of a positive test.

Measurement of exhaled nitric oxide offers an easy, noninvasive alternative to direct sampling of the lower airways by sputum induction, lavage, or biopsy. The fractional concentration of exhaled nitric oxide (FE<sub>NO</sub>) in asthma may have the utility of helping make diagnosis, monitoring the patients compliance with prescribed medications and predicting pending exacerbations. Clinical instruments for the measurement of exhaled NO typically measure 'online' (patient exhales directly into the measuring device) rather than 'offline' (exhaled breath is collected into a sample bag for later measurement). Offline measurements may have utility in epidemiology and research.

### Background

For many years it has been talking about the chronic non productive cough as the main manifestation of Asthma, Post – Nasal Drip Syndrome (PNDS), and Gastro – Esophageal Reflux Disease (GERD). The aim of our study was the follow up of a patient presented only with dry chronic cough: Which is the main diagnostic procedure and the most effective therapeutic approach available for such patients at the first medical visit and during his follow up?

### Methods

Seventy patients (21 males and 49 females) age of 40, 47 year, presented only with chronic non productive cough were studied. The exclusion criteria were: non – smoking for at least 1 year, not having diseases of immune system, not receiving any angiotensin converting enzyme. They did accomplish 3 medical controls for a period of 8 months with a distance of 4 months from each other. Atopic status was evaluated by measuring total IgE, specific IgE, Eosinophilic Cationic Protein (ECP) and Eosinophilic Protein X (EPX). A detailed history was taken to evaluate the existence of other contributing factors to chronic cough such as: Asthma, GERD, PNDS, and any respiratory infections. All the patients underwent the lung function tests. Only 65.71% of them accepted to undergo the Methacholine challenge test and the measurement of Exhaled nitric oxid, at the first second and at the third control. According to the medical history and to the examination results, specific therapeutic schemes were used.

### Results

From 41 patients who at the first visit were considered to have Cough Variant Asthma (CVA), 47.14% resulted to have GERD as a cofactor to cough and 42.86% resulted to have PNDS as a cofactor. Measurement of specific IgE resulted to be the most indicative method for the evaluation of atopic status. The methacholine challenge test resulted to be positive in 89.13% of the patients at the first visit toward 62.85% who resulted positive at the third visit ( $p < 0.05$ ). The value of Exhaled nitric oxid was elevated at the first visit only in 51.28% of the patients toward 50% who had a high level of it at the third visit. This value did not change very much from the first to the third visit which was related to the persistence of the respiratory mucosal inflammation and the need for the continuation of the therapy.

The antileucotriens were the most indicated drugs after the first visit (in 48.57% of the patients) which persisted in 37.14% after the third visit. The use of associations (Long acting B2Agonist (LABA)+Inhaled Corticoids (IC), together with antileucotriens, was the most effective therapeutic scheme indicated after the first visit. There was a significant reduction ( $p < 0.05$ ) in the need for the use of LABA, from 18.57% in the first visit to 2.86% after the third one.

### Conclusion and discussion

GERD remains still the most frequent cofactor of chronic productive cough as a variant of asthma.

Methacholine challenge test is important in evaluating a patient with dry chronic cough associated with bronchial hyperreactivity whereas exhaled nitric oxide remains the most important non invasive test in the following the evolution of an airway inflammation.

The long term use of antileucotriens may be a good opportunity for a better long – term of the chronic non productive cough as a variant of asthma.

Methacholine is used for identifying bronchial hyperresponsiveness and to guide treatment.(9,10)

In clinical practice, assessment of FeNO concentration can be used as a screening test for asthma in young adults who have chronic cough.(12)

The measurement of FENO is evolving to provide a complementary role alongside existing pulmonary function tests. Further work is required to establish reference values and possibly prediction equations in relation to age and height. Its role in determining optimum steroid requirements in chronic asthma and to identify steroid responsiveness in chronic obstructive pulmonary disease are two important areas for future research.(8)

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