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Limitations of questioning asthma to assess asthma control in general practice

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Summary

Background: The monitoring of children with asthma in primary care is based on the occurrence and frequency of asthma symptoms. We questioned whether the current approach is adequate to identify all children in whom a sufficient level of asthma control is not achieved.

Aim: The aim of this study is to illustrate that in some children asthma was incorrectly considered controlled, because the children failed to report current symptoms of asthma.

Patients and methods: One hundred and nineteen children were identified with recent wheezing plus moderate or severe airway hyperresponsiveness. We analyzed whether these children reported current symptoms of asthma (as normally questioned during a routine visit).

Results: In 20 children (18%) current asthma symptoms were absent despite moderately or severe airway hyperresponsiveness and wheezing in the last year. In addition, the usage of controller medication was very poor.

Abbreviations: AHR, airway hyperresponsiveness; FEV₁, forced expiratory volume in 1 s; GP, general practitioner; ICS, inhalation corticosteroids; PD₂₀, provocative doses methacholine which gives a 20% fall in FEV₁ compared to baseline.

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Conclusion: We conclude that the general practitioner has insufficient tools to adequately assess asthma control in all children. The assessment of airway hyperresponsiveness as an additional guide to manage asthma in children in general practice is recommended. In this way, better asthma control can be achieved.

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Introduction

In asthma, disease control refers to control of the clinical manifestations. Therefore, it is current practice to use a symptom-based approach for the monitoring of patients with asthma in primary care settings. However, recent studies have shown that treatment based on symptoms alone is inferior to treatment also based on an additional (inflammatory) marker. Two studies demonstrated that treatment based on airway hyperresponsiveness (AHR) and sputum eosinophils, respectively, resulted in a decrease of asthma exacerbations compared to treatment based on symptoms alone.^{1,2} Two other studies, one in adults and one in children, showed beneficial effects when information about the patients exhaled nitric oxide was used in addition to treatment based on symptoms only.^{3,4} AHR is one of the hallmarks of asthma. It is an objective parameter of asthma reflecting the severity of airway disease.¹ In our opinion, children with moderate or severe AHR should be treated with controller medication if AHR is part of the clinical manifestation of asthma. In an earlier paper we reported on a large group of children treated for their asthma in general practice. We showed that in most children the severity of AHR in these children could not be suspected by their general practitioner (GP), based on symptoms alone.⁵ In the present study, children with borderline to severe AHR were followed for one year to study prospectively the relationship between symptoms and AHR. In addition to the previous report we also questioned parents whether children had symptoms of wheezing during the study year. We hypothesized that in a substantial number of asthmatic children presenting with less pronounced, atypical or trivialised symptoms of asthma, the severity of their disease could be easily underestimated.

Methods

Patients

All children described in this paper participated in an intervention study that compared different methods to improve disease control in childhood asthma in general practice. GPs were subject to one to three cumulative strategies to improve control in childhood asthma: (1) distribution of an asthma guideline, (2) a single educational session and (3), a onetime individualized treatment advice based on symptoms and lung function including the degree of AHR. Children were eligible to participate in the original study if at least two prescriptions of β_2 -mimetics and/or an inhaled corticosteroid (ICS) were prescribed in the year before invitation. The flow sheet of participation selection is shown in Fig. 1. The patient selection is described in more detail elsewhere.^{5,6}

Study design and patient selection

At the end of the original one-year study, 362 asthmatic children were re-evaluated on asthma symptoms, Peak Expiratory Flow (PEF) variability, degree of AHR, and medication usage. Parents were asked to fill in a standard questionnaire on asthma symptoms of their child in the past year. AHR was assessed by means of a methacholine inhalation challenge test when the FEV₁ was $\geq 75\%$ of predicted. The method used is validated in children and described elsewhere.⁷ The degree of AHR was expressed as a PD₂₀, a provocation dose that induces a 20% fall in FEV₁ from baseline. Severe AHR was defined as a PD₂₀ below 75 μg methacholine, moderately severe AHR as a PD₂₀ below 300 μg , mild AHR as a PD₂₀ below 1000 μg and borderline to normal AHR as a PD₂₀ above 1000 μg according to the classification used by Sont and colleagues.¹ Children were challenged to a maximal cumulative dose of 3600 μg methacholine. Children with a baseline FEV₁ value below 75% of predicted were not challenged. These children were classified as having severe AHR.

We analyzed whether children scored current symptoms of asthma in their diary. The diary was filled in during two weeks prior to the inhalation challenge test. In the diary the frequency of asthma related symptoms, cough, wheeze and shortness of breath was scored ('0' (no complaints), '1' (once a day), '2' (more than once a day), and '3' (whole day)). Total day as well as total night scores could range from 0 to 9. Moreover, we calculated: (1) a total symptom score and (2) a symptom-free days score, defined as the total number of symptom-free days (range 0–14).

PEF variability was also assessed in the two-week diary. Children were provided with a 'Personal Best' peak flow meter. The best of three PEF measurements was used and the percentage of predicted was calculated.^{8,9} PEF variability was calculated as: evening PEF value minus the morning PEF value divided by their mean value.

The number of prescribed inhalers for ICS and β_2 -adrenergic drugs was obtained from electronic medication lists of the GPs.

Statistical analysis

Data analysis was performed with the statistical package SPSS (version 12.2) (SPSS, Inc., Chicago, IL). To compare groups with regard to continuous normally distributed data, independent samples *t*-tests were performed.

Results

Of 404 children who were included on the basis of AHR at the start of the study, 362 participants (90%) completed

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