Diagnosis and treatment of asthma in children: usefulness of a review of medical records

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SUMMARY. In order to tackle the problems of underdiagnosis and undertreatment of asthma in childhood general practitioners need to be aware of which children in their practices have or might have asthma. In an effort to identify a cohort of asthmatic or potentially asthmatic children a trained audit facilitator studied all the medical records of children aged between one year and 15 years who were registered with 12 Tayside general practices. From a total of 10 685 medical records the frequency of 'key items' sometimes associated with asthma were as follows: one or more episodes of bronchospasm or wheeze 23.7% of children, persistent cough 23.2%, treatment with anti-asthma therapy in the past 20.0%, exercise induced cough or wheeze 5.2% and history of 'wheezy bronchitis' 4.6%. However, in only 896 children (8.4%) had a formal diagnosis of asthma been made. Of all the children, 5.4% had received a prescription for anti-asthma medication within the past three months. Only 1.2% were taking an inhaled corticosteroid and 1.0% sodium cromoglycate, but many more were taking inhaled bronchodilators (3.1%) and oral bronchodilators (1.7%).

The findings suggest that a systematic review of medical records by a trained facilitator can identify those children who could benefit from clinical review. Practices who wish to know which of their children have or might have asthma should consider using medical record review to search for key items associated with asthma.

Keywords: asthma; morbidity; missed diagnosis; prescribing.

Introduction

ASTHMA is one of the commonest chronic diseases of childhood.[1] Morbidity resulting from asthma, in the form of school absence,[2,3] general practice consultation[1] and hospital admission,[4] represents a major health problem in the 1990s.[5] In addition, mortality from asthma remains unacceptably high.[6,7] The incidence and prevalence of asthma appear to be rising. This is in part due to raised medical awareness but a true rise in incidence, perhaps to as high as 10% in childhood, appears to have taken place in the 1980s.[8,9]

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Recent general practice based studies suggest that a structured active approach to the management of asthma within the community can reduce morbidity.[10,11] The work of Toop,[12] Levy and colleagues,[13] Bak,[14] and Gellert and colleagues[15] has suggested that review of medical records may be the best method of identifying cases of asthma. Small scale studies have shown that case finding of asthma may be worthwhile,[16] but to establish whether systematic case finding of asthma in childhood can be recommended for widespread use a large scale data set is required.

The childhood asthma project, based in 12 practices in Tayside has among its aims the systematic evaluation of a large data set of asthma related respiratory morbidity. This paper describes a review of medical records carried out by a trained audit facilitator. The aims of the study were to assess the frequency of occurrence in the records of key items associated with asthma and to evaluate medical record review as a means of preventing the underdiagnosis and undertreatment of childhood asthma.

Method

The study was based in 12 practices in Tayside, which were invited to take part, and were representative of the mix of urban and rural, and training and non-training practices in the area. All 12 practices use A4 records. According to the Tayside health board age–sex registers there were 10 725 children aged between one year and 15 years inclusive, registered with the practices.

A trained audit facilitator (F B) read through every entry on every page of the medical records of the children registered with the practices. Approximately 100 records per day were studied and the following 'key items' associated with asthma, determined during a pilot study,[16] were noted: current use of anti-asthma medication (a prescription for a drug classified in the *British national formulary* as a bronchodilator, corticosteroid or for the prophylaxis of asthma within the past three months); diagnosis of asthma by any doctor; history of 'wheezy bronchitis'; one or more episodes of bronchospasm or wheeze; past use of anti-asthma medication (a prescription at any time for a drug in the categories defined above); exercise induced cough or wheeze; persistent cough; five or more consultations within the past year for respiratory 'infection'; three or more prescriptions for antibiotics within the past year for respiratory 'infection'; two or more prescriptions for cough linctus within the past year; the word 'chesty'; history of bronchiolitis, bronchitis, seasonal respiratory symptoms, hay fever, eczema or 'allergy'; and family history of asthma.

Ethical approval for the study was granted by the Tayside ethics committee.

Results

Medical records for 10 685 children were available (99.6% of the children registered with the 12 practices).

Key items

The commonest key item was one or more episodes of bronchospasm or wheeze which was recorded in 23.7% of notes (Table 1). Persistent cough and past anti-asthma treatment were the next commonest recorded items. In contrast a formal diagnosis of asthma was recorded in only 8.4% of cases (896 children). A history of 'wheezy bronchitis' had been recorded

Table 1. Key items recorded in the medical records.

Key item	% of medical records ($n = 10685$)
One or more episodes of bronchospasm or wheeze	23.7
Persistent cough	23.2
Past use of anti-asthma medication	20.0
History of eczema	15.0
Diagnosis of asthma	8.4
History of bronchitis	7.1
The word 'chesty'	6.5
Family history of asthma	5.5
Current use of anti-asthma medication	5.4
Exercise induced cough or wheeze	5.2
History of 'wheezy bronchitis'	4.6
History of hay fever	3.0
History of bronchiolitis	2.6
Three or more prescriptions for antibiotics within the past year for respiratory 'infection'	2.5
Five or more consultations within the past year for respiratory 'infection'	2.4
History of 'allergy'	1.7
Two or more prescriptions for cough linctus within the past year	1.4
History of seasonal respiratory symptoms	0.7

n = total number of medical records examined.

in 4.6% of notes, 5.4% of children had received a prescription for anti-asthma therapy in the past three months and an exercise induced cough or wheeze was noted for 5.2%.

Current treatment

The anti-asthma medication taken by the 574 children (5.4%) who had received prescriptions within the past three months was as follows: 329 children had received an inhaled bronchodilator (3.1% of all children), 178 an oral bronchodilator (1.7%), 133 an inhaled steroid (1.2%), 110 inhaled sodium cromoglycate (1.0%), 56 theophyllines (0.5%), four ipratropium bromide and 22 oral steroids (0.2%). Thirty nine children (0.4%) were known to possess a large volume spacer device and 13 (0.1%) had received nebulized medication within the past three months.

Correspondence between key items

The inter-relationship between key items was complex but several interesting themes emerged. Almost all children in whom a diagnosis of asthma had been made had received treatment for asthma in the past (880/896, 98.2%) and 45.6% were currently taking medication (409/896). In contrast, only 71.3% of those currently taking treatment (409/574) and 41.3% of those having been previously prescribed anti-asthma medication (880/2133) had a formal diagnosis of asthma. Of the 896 children with a formal diagnosis of asthma in their notes 758 (84.6%) had the key item one or more episodes of bronchospasm or wheeze and 656 (73.2%) had the item persistent cough.

In 758 of the 2534 children with one or more episode of bronchospasm or wheeze (29.9%) and 648 of the 1212 with two or more episodes (53.5%) a definitive diagnosis of asthma was recorded. The majority of the 1212 children with two or more episodes of bronchospasm or wheeze recorded in their notes (86.1%) had received anti-asthma treatment. Of the 2474 children with a persistent cough only 656 (26.5%) had been diagnosed as asthmatic, 416 (16.8%) were on current anti-asthma therapy and 1354 (54.7%) had received anti-asthma therapy in the past.

A close association was noted between diagnosis of asthma, current anti-asthma treatment, history of 'wheezy bronchitis', two or more episodes of bronchospasm or wheeze, exercise induced cough or wheeze and past anti-asthma treatment. In total 3373 of the 10 685 children (31.6%) had at least one of these 'major' key items, or two or more of the remaining key items. The male:female ratio of this cohort was 1.32:1 and was consistent throughout the one to four years, five to nine years and 10–15 years age bands, and through each key item.

Discussion

This study has demonstrated that review of medical records can identify considerable numbers of children who have or may have asthma. The respiratory morbidity data set reported here for 10 685 children is unique in its detail and size. The common occurrence of 'major' key items such as two or more episodes of bronchospasm or wheeze, history of 'wheezy bronchitis' and anti-asthma prescriptions suggests that childhood asthma is common and probably commoner than most published estimates.[5,17,18] In this study 32% of children were found to be potentially asthmatic and could therefore benefit from clinical review. It should be emphasized that a search for key items by a facilitator is not a means of diagnosis. It is a method of assisting general practitioners to select patients for clinical review, where a diagnosis may be made.

A charge of 'underdiagnosis and undertreatment' of asthma in children was made against general practice in the 1980s.[19] Case record review may be a useful approach for tackling this problem. Wheeze and persistent cough are the commonest presenting features of childhood asthma and the presence of either should prompt consideration of the diagnosis.[20] The common occurrence of these key items is thus important. In this study it was found that bronchospasm or wheeze was closely associated with a diagnosis of asthma and with receiving anti-asthma therapy. The corresponding association with persistent cough was less pronounced suggesting that practitioners are more ready to label a child as asthmatic and/or institute anti-asthma therapy if wheeze is present than if persistent cough is present. Case record review is thus a means of identifying those children with persistent cough who could be asthmatic but have not been diagnosed or treated. This could be done on an individual patient basis during a consultation where a child presents with a persistent cough or with any condition, if persistent cough is recorded in the medical notes.

The rate of past use of anti-asthma treatment was surprisingly high (20%) compared with previous published work.[21] Even allowing for this being a 'lifetime' figure the result emphasizes the extent of asthma associated morbidity in childhood. A case record review which identified this fifth of the childhood population could encourage general practitioners to review those children with a history suggestive of asthma and whose symptoms are likely to recur at various times throughout childhood.

Review of medical records has the advantage of a high yield of data and it can be reproduced within different practices. However, it is time consuming, requires skilled staff and is ultimately dependent on the standard of general practitioners' record keeping. The methodology presented here may be applicable to other conditions where recognition and diagnosis depend on accumulating evidence, such as ischaemic heart disease, alcohol overuse, depression and dementia.

In conclusion, the identification of key items associated with asthma in medical records gives a high yield of information on respiratory morbidity. This information can be used to assist the process of diagnosis during consultations, or can be used on a practice population basis to tackle the problem of under-

diagnosis and undertreatment of childhood asthma. If general practitioners wish to make progress in tackling the problem of underdiagnosis and undertreatment then case record review may represent the way forward.

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