The diagnostic approach to suspected asthma in a Primary Care Center in Riyadh

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ABSTRACT

Background: Underdiagnosis of asthma is common in general practice. No studies to our knowledge have examined critically the General Practitioner’s (GP) approach to the diagnosis. Methods: A retrospective review of the medical records of 120 patients by: who were suspected to have asthma by GPs and referred to a pulmonary function laboratory for spirometry over a three year period. Results: The symptoms suggestive of asthma were present for 1 to 520 weeks (mean 72). Many pertinent data were missing from the records; for example, history of wheeze and family allergy were documented only in 32 (27%) and 16 (13%) respectively. Investigations requested on the initial visit, included: chest x-ray 89 (74%), eosinophil count 65 (54%), and serum IgE 7 (6%) with low diagnostic yields. Of 99 patients who continued follow up, asthma was confirmed in 44 (44%), another diagnosis in 10 (10%), and 45 (46%) remained undiagnosed. Of the latter, only 6 were referred later for bronchoprovocation test and 3 to the pulmonary clinic, leaving over a third of patients without a specific diagnosis or treatment over the study period. Conclusion: While careful history taking and documentation is important, most of the tests with the exception of spirometry are probably not helpful, at least initially. Pursuing the diagnosis with definitive tests such as bronchial or exercise challenge or referral to a pulmonary clinic may be necessary in some patients with unexplained chronic symptoms to confirm asthma or alert the GP to search for another disease.


Keywords: Asthma diagnosis, primary care, General practitioner, spirometry, chest radiograph.

Asthma is a common disease in Saudi Arabia and worldwide, with a rising incidence and significant mortality and morbidity.1,2 Most asthmatics are initially evaluated by general practitioners (GPs). Up to half or even more remain undiagnosed, and as a result not treated.3,5 Reasons suggested for this include the following: (i) the non-specific and variable nature of symptoms, (ii) the lack of simple sensitive and specific tests, (iii) failure of the patient to seek medical advice e.g. poor symptom perception, (iv) failure of physician to suspect and pursue the diagnosis because of atypical presentation of asthma, unawareness of the value of some of the tests, or inherent reluctance because of the prognostic implications.6 (v) the setting of the practice, availability of time and investigations.6 Despite many studies on this subject, none to our knowledge addressed how GPs pursue the diagnosis of asthma after clinical suspicion. We studied retrospectively the medical records of patients with suspected asthma referred for spirometry from a primary care center (PCC) in Riyadh, Saudi Arabia.

Methods. The study was performed at the PCC affiliated with King Khalid University Hospital in Riyadh. GPs have full access to pulmonary function laboratory (PFL). Medical records of patients with suspected asthma referred by GPs to PFL over a three year period starting August 1st 1992 were reviewed. All patients were referred for spirometry and the diagnosis on the requisition form and the patients' record was “query” or “rule out” asthma. Records were searched for documentation of pertinent symptoms, signs, investigations and follow up.

The diagnosis of asthma was based on clinical response to treatment and (or) spirometry. All patients with abnormal values had a repeat study after inhalation of salbutamol. The test was

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considered diagnostic if there was more than 15% improvement from baseline values of forced expiratory volume in one second (FEV1) or forced vital capacity (FVC), and (or) more than 30% improvement in forced expiratory flow at 25% to 75% of vital capacity (FEF 25-75) after salbutamol. Values that did not meet these criteria (obstructive and non-obstructive) were considered not diagnostic. A positive bronchial challenge test was defined as a drop in FEV1 of more than 20% of the baseline value after inhalation of methacholine in doses up to 8 mg/ml.

Results. A total of 120 patients with suspected asthma were referred to PFL for spirometry throughout the study period. Sixty-four were males and 56 were females with an age range between 12 and 78 years and a mean age of 34 years (SD ± 14 years). The duration of symptoms ranged between 1 to 520 weeks and a mean of 72 weeks.

Table 1 shows the frequency of some clinical features of this group of patients on presentation. The commonest presenting symptoms were cough and dyspnea. Wheeze and sputum production were less common, but these symptoms were poorly documented in most of the cases. Similarly, other characteristic features of the history such as if the periodicity of symptoms, triggering factors, and family history of atopy were poorly documented.

Table 2 show frequencies of other laboratory tests ordered by GPs during the initial visit and the results. Because of the way we conducted this study, all patients had spirometry. Of the other tests, the chest radiograph (CXR) was the most frequently requested test (74%), followed by the eosinophil blood count (54%) and immunoglobulin E (IgE) (6%).

Ninety-nine patients (83%) continued follow up. The diagnosis was confirmed to be asthma in 44 (44%); in 25 by clinical response and spirometry and in 19 by clinical response only. Other diagnoses (including bronchiectasis, chronic obstructive airway disease, lung cancer, and cardiac disease) were found in 10 (10%). Of the remaining 45 (46%), six were referred later for bronchoprovocation tests and three to the pulmonary clinic leaving 36 (36%) without a clear diagnosis and non-specific treatment.

Discussion. Over the last 150 years and until now, history (particularly of episodic dyspnea and wheeze) has remained consistently the cornerstone for the diagnosis of asthma. In this study we found inadequate documentation of relevant information. For instance, wheeze was not documented in 73% of patients' records, periodicity of symptoms in 62%, triggers in 70% and family history of allergy in 87%. It is possible that physician inquired but did not record the history if it turned to be negative. It is unlikely, however, for such information to be that uncommon in a group of patients many of whom proved later to have asthma. Thus, a degree of deficient inquiry by GPs must be present. Since certain features of the history e.g. wheeze, family allergy are known to lead to the diagnosis of asthma, poor inquiry will only add to the problem of underdiagnosis. Doctors in general practice may see too many patients with diverse complaints and a detailed history as taken by, for example, a pulmonary specialist is not expected. In this context, however, many important features are missing which may lead to some diagnostic pitfalls. Finally, it is worth stressing that good record keeping may help to pick up undiagnosed asthmatics, for example, through an audit facilitator.

The diagnosis of asthma can be confirmed by objective evidence of reversible airway obstruction by spirometry or peak expiratory flow rate (PEFR). Spirometry, which was used by our GPs because it was readily available, provided such evidence in about a quarter of patients and obviated the need for further work up. The diagnostic value of a single spirometry or PEFR is limited, however, by the variability in airway obstruction that characterizes asthma; some patients may have normal values. In this situation the clinical diagnosis of asthma is unreliable without further objective testing. Adelroth et al. showed that pulmonary specialists were wrong in 39% of the cases. Other tests such as measurements of flow rates serially, before and after exercise or bronchoprovocation are indicated; a positive test would confirm the diagnosis, while a negative one should alert the physician to search for another diagnosis. It is surprising that such tests was ordered only for a few patients despite its availability to our GPs. We are not certain if this reflects poor awareness of the indication and value, or concern about safety amongst GPs. Pratter and Irwin indicated that GPs can order this test safely in patients with normal spirometry. At the same time, only few of these patients were referred to the

<table>
<thead>
<tr>
<th>History</th>
<th>Documented</th>
<th>Not Documented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>History</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough</td>
<td>71 (59%)</td>
<td>11 (9%)</td>
</tr>
<tr>
<td>Dyspnea</td>
<td>79 (66%)</td>
<td>3 (2%)</td>
</tr>
<tr>
<td>Wheeze</td>
<td>23 (19%)</td>
<td>9 (8%)</td>
</tr>
<tr>
<td>Sputum</td>
<td>29 (24%)</td>
<td>10 (8%)</td>
</tr>
<tr>
<td>Periodicity of symptoms</td>
<td>25 (21%)</td>
<td>20 (17%)</td>
</tr>
<tr>
<td>Triggers</td>
<td>31 (26%)</td>
<td>5 (4%)</td>
</tr>
<tr>
<td>Family history of allergy</td>
<td>8 (7%)</td>
<td>8 (7%)</td>
</tr>
</tbody>
</table>
Table 2 - Initial investigations for patients with suspected asthma.

<table>
<thead>
<tr>
<th>Test</th>
<th>Suggestive</th>
<th>Non-Diagnostic</th>
<th>Normal</th>
<th>Not Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spirometry</td>
<td>30 (25%)</td>
<td>25 (21%)</td>
<td>65 (54%)</td>
<td>0</td>
</tr>
<tr>
<td>Chest x-ray</td>
<td>7 (8%)</td>
<td>8 (9%)</td>
<td>74 (83%)</td>
<td>31 (26%)</td>
</tr>
<tr>
<td>Eosinophil count</td>
<td>15 (23%)</td>
<td>0</td>
<td>50 (77%)</td>
<td>55 (46%)</td>
</tr>
<tr>
<td>Immunoglobulin E</td>
<td>1 (14%)</td>
<td>0</td>
<td>6 (86%)</td>
<td>113 (94%)</td>
</tr>
</tbody>
</table>

pulmonary clinic for further evaluation.

Other tests were ordered to different extent by GPs, commonly the CXR. This test was normal in the majority (83%), showed suggestive evidence in 8% and non-diagnostic abnormalities in 9%. The yield is, therefore, lower and not as specific as spirometry. For confirmed asthma the yield is 16%, similar to an earlier study. In contrast, Rubenstein et al. found the CXR more sensitive than spirometry and concluded that it may help in the diagnosis of asthma in general practice. Their high rate of 58% may have been biased by prior knowledge of the diagnosis and was not seen in any other study to our knowledge. Based on this, we do not believe that CXR need to be done in the initial evaluation, but can be saved later if the diagnosis remains in doubt. Over half of the GPs requested full blood count with differential white cell count. Blood eosinophilia may be a useful predictor of reversibility and asthma severity when present, but its absence is of little value in ruling out this condition. Only a few GPs (6%) requested total serum IgE, elevation of which is a known association with asthma in epidemiological studies, but is again of little help in the individual patient.

A significant proportion of patients (39%) remained without a definite diagnosis. Some of those may have asthma not yet diagnosed; symptoms of asthma may be present for years before the diagnosis is made. In this study the follow up was relatively short and may be more time would have clarified the diagnosis. In addition, cough was much more common than wheeze in our patients, and asthma with this symptom as a main feature may be a more difficult to diagnose. Some of these patients may have diagnoses other than asthma. Regardless, studies have shown that chronic respiratory symptoms are associated with a decline in lung function and should be, therefore, carefully evaluated.

In conclusion, this study shows that deficiencies exist in the diagnostic approach to patients with suspected asthma, particularly in history taking and completing the work-up with further tests, or referring to a specialty clinic. Improvements in the practice setting can include, for example, use of a structured form for clinical assessment and more utilization of diagnostic tests. The study has several limitations; most importantly perhaps are those that stem from its retrospective nature. Also, it would have been more realistic to compare the practice of GPs with another group such as interns or pulmonologists. Spirometry was discussed more than PEFR, although the latter is more available to most GPs. Nonetheless, spirometric equipment is simple, inexpensive and can be incorporated in any general clinic. We are not aware of any previous local studies that addresses the diagnostic aspects of asthma and we hope it will stimulate more studies that overcome some of these limitations. While asthma management guidelines, which are now popular in many countries, put strong emphasis on the pharmacological aspects, the diagnostic approach is not to be forgotten.

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References