

Variation of Asthma Symptoms Perception

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Abstract

Background: Asthmatic patients may perceive their symptoms inadequately putting them at a risk of a fatal attack because the severity of an exacerbation may be underestimated. The present study is intended to detect if disease duration affects the perception of asthma symptoms. The relation between asthma activity and evaluation methods commonly used in clinical practice, like presence of symptoms and asthma control test (ACT), was evaluated.

Methods: The study involved 100 asthma patients with ages less than 40 years. Presence of symptoms, ACT score and spirometry were recorded to assess asthma activity at the time of examination. Cross tabulation of patients groups was used to screen for significant differences in the means using analysis of variance.

Results: ACT score was higher while National Asthma Education and Prevention Program (NAEPP) class was lower in symptoms free compared with symptomatic asthmatic patients ($P = 0.000$ and 0.005 respectively). ACT score correlated negatively, while NAEPP correlated positively with age implying that asthma severity increases with age ($CC = 0.41$, $P = 0.000$ and $CC = 0.28$, $P = 0.007$). Asthma duration was significantly higher in well controlled compared with both poorly controlled and uncontrolled asthmatic patients ($P = 0.000$ for both). 5.7% of asymptomatic patients were suffering from severe persistent asthma and 24.5% from moderate persistent asthma according to NAEPP classification.

Conclusion: Presence or absences of symptoms sometimes does not indicate asthma severity. Clinicians must therefore pay attention when comparing groups of asthma patients for whom severity categorization is largely based on symptomatology.

Keywords: spirometry, NAEPP, lung function.

It is well recognized that some patients perceive the severity of their asthma symptoms inadequately¹⁻³. Those patients can be subgrouped into underperceivers and overperceivers. According to Rubinfeld and Pain, 15% of the asthma patients were unable to sense the presence of marked airways obstruction ($FEV_1 < 50\%$ of the predicted normal value). These patients could not be characterized as a distinct group on the basis of their gender, age, or duration of their asthma⁴. This may put the patient at risk because it may lead to undertreatment and be potentially in danger of a severe attack because an exacerbation may be underestimated.

It can be hypothesized that asthmatics may develop a perception of tolerance to their symptoms, perceiving them less over time.

Symptoms may therefore become a less accurate measure of disease severity; however, this postulation needs further studies for confirmation. The present study was intended to detect:

The agreement between asthma activity and evaluation methods commonly used in clinical practice like presence of symptoms and asthma control test (ACT)⁵

If the disease duration affects the perception of asthma symptoms

Materials and Methods

The study involved 100 patients with past medical history of asthma (at least for two years) but no other respiratory diseases. All patients were less than 40 years old.

Following verbal consent, asthma history was recorded to assess asthma activity at the time of examination as well as over the last month prior to patients' evaluations using Asthma Control Test (ACT) score⁵⁻⁷ and National

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Asthma Education and Prevention Program (NAEPP) classification⁸. IQ TQ Spirometer (Version 5.18 - Clement Clarke International Limited – U. K) was used for assessing pulmonary function according to ATS/ERS⁹ standards. Absolute values of FEV1% was used in (NAEPP) classification¹⁰.

Cross tabulation of patients groups was used to examine the data. The variables were tested for significant differences in the means between the groups using analysis of variance. When significant differences were identified, individual groups were compared using the Student two-tailed, unpaired T-test. In all of

these statistical tests, only $P < 0.05$ was considered significant.

Results

ACT scores were higher while NAEPP class was lower in symptoms free compared with symptomatic asthmatic patients ($P = 0.000$ and 0.005 respectively). ACT score correlated negatively, while NAEPP correlated positively with age implying that asthma severity increases with age ($CC = 0.41, P = 0.000$ and $CC = 0.28, P = 0.007$). In spite of these observations, asthma duration was significantly higher in the well controlled patients compared with both poorly controlled

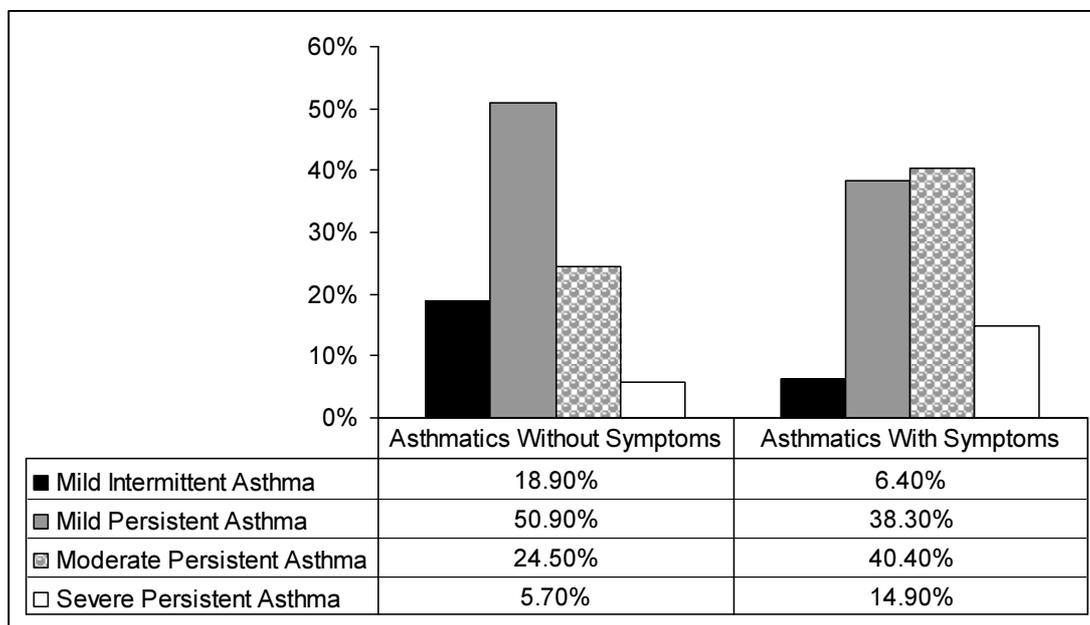


Fig 1: Distribution of NAEPP classes in symptomatic and asymptomatic asthmatic.

and uncontrolled patients ($P = 0.000$ for both). However, all asthmatics, whether well controlled, poorly controlled or uncontrolled, had long-standing history of asthma (mean \pm SD = $17.88 \pm 10.55, 8.93 \pm 6.97$ and 10.93 ± 8.14 years respectively).

Interestingly, 5.7% of patients who claimed that they have no symptoms at the time of examination were actually suffering from severe persistent asthma according to NAEPP. This is important because NAEPP consider spirometry in the classification. In addition, 24.5% of asymptomatic patients are suffering from moderate persistent asthma (figure 1). Assessment of asthma activity using ACT gives better estimation of asthma

severity, for example there were no patients with severe or moderate persistent forms in well controlled asthmatics (figure 2).

Discussion

Self-reported symptoms of asthma seem to be an attractive measure of disease severity, and have been used to define severity in a variety of settings⁴. However, several studies have looked at the correlation between asthma symptoms and measures of lung function^{4,11} and failed to demonstrate complete correlation. Current symptoms are known to closely reflect the current level of control and compliance with medical treatment than the underlying severity of the disease^{11, 12}.

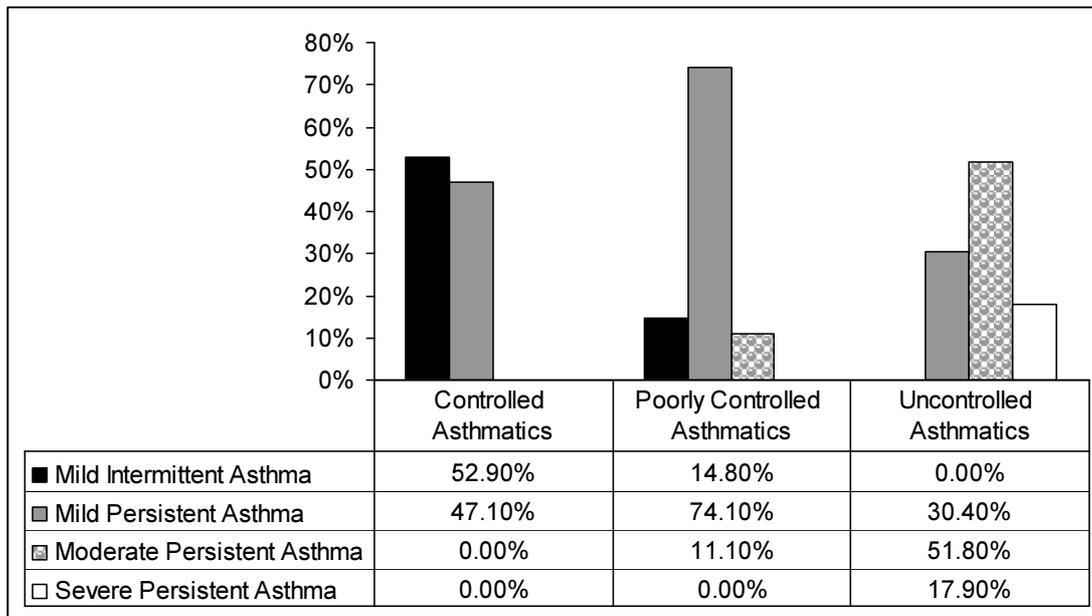


Fig 2: Distribution of NAEPP Classes in controlled, poorly controlled and uncontrolled asthmatics.

The disagreement of symptoms with NAEPP classes (figure 1) may be explained by the findings of Molly and others, who found no agreement between clinical or epidemiologic parameters that could be used to classify patients according to disease severity¹³. Asthma severity appears to be multidimensional rather than unidimensional, depending at least on three components, namely symptom intensity, airflow impairment, and management intensity¹⁴. The level of control may show weak correlation with the underlying severity of disease. As an example, a patient with severe asthma taking daily steroids and exercising appropriate allergen avoidance may be well-controlled, while a noncompliant patient with mild to moderate disease may have more severe, disruptive symptoms. Investigators must therefore use caution when comparing groups of patients for whom severity categorization is based largely on symptomatology. The observation that symptoms alone do not reflect disease severity becomes even more important as health-care delivery moves closer to protocols/practice guidelines and "best treatment" programs that rely heavily on symptoms to guide subsequent treatment decisions.

In this study ACT score correlated negatively,

while NAEPP correlated positively with age implying that asthma severity increases with age. In spite of this, asthma duration was significantly higher in well controlled compared with both poorly controlled and uncontrolled asthmatic patient. This seems to contradict the hypothesis that airway remodeling is related to duration of asthma i.e. even when matched for severity, the airways of older asthmatic patients should show greater alterations than the airways of younger asthmatics¹⁵. However, all studied asthmatics had long-standing history of asthma suggesting that there was enough time for airways remodeling to take place for all categories of asthma patients. This suggests that factors other than asthma duration contribute to the pathogenesis of severe asthma as proved by other studies¹⁶. Longer asthma duration in well controlled compared with poorly controlled and uncontrolled patients could also be explained by the fact that asthmatics with longer history of asthma became more knowledgeable in dealing with asthma and therefore experience less attacks. Another hypothesis is that longer asthma duration may be a risk factor for tolerance of symptoms and consequently the feeling of well being. The sense of well being may lead to misclassification because in patients

classified as well controlled, ACT depends on symptoms only without considering pulmonary function tests.

Connolly et al described reduced awareness of bronchoconstriction induced by methacholine in elderly asthmatic patients as well as normal individuals. This implies impaired perception which may be a feature of aging rather than of asthma¹⁷. However, all asthmatics in the present study were 40 years old or less suggesting that another cause(s) may be present to explain poor perception of asthma symptoms.

Kikuchi et al asked whether dyspnea and chemosensitivity to hypoxia and hypercapnia are risk factors in fatal asthma attacks¹⁸. Their results suggested that reduced chemosensitivity to hypoxia and blunted perception of dyspnea may predispose patients to fatal asthma attacks. Clinical investigators must therefore use caution when comparing groups of patients in whom severity categorization is largely based on symptoms without spirometric measurements.

Conclusions and recommendations

Presence or absence of symptoms may not faithfully reflect severity of asthma, which draws attention to asthma classification criteria. Clinicians must use caution when comparing groups of patients for whom severity is largely based on symptomatology. The observation, that symptoms alone do not reflect disease severity, becomes even more important as health-care delivery moves closer to protocols/practice guidelines and "best treatment" programs that rely heavily on symptoms to guide subsequent treatment decisions

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