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Nonspecific challenge test for the diagnosis of asthma in a general population sample

We have read the recent paper by BACKER and coworkers [1] in which they confirm findings of previous surveys that there is a considerable overlap in bronchial responsiveness between asthmatics and non-asthmatics. Most of these surveys have used a fixed threshold level as a positive test criterion, for instance $PC_{20}FEV_1 \leq 8$ g·l methacholine. However, several studies [2, 3] show that bronchial responsiveness is dependent on pretest level of lung function. We examined whether the sensitivity and specificity of methacholine challenge as a test for bronchial asthma would be improved by applying lung function specific normal ranges of $PC_{20}FEV_1$.

In a Norwegian general population sample (N=490) aged 18–73 yrs the prevalence of bronchial asthma was assessed using clinical and spirometric criteria [4]. Bronchial responsiveness to methacholine was performed after the clinical and spirometric examination [5]. Two criteria for a positive challenge test were compared. The first of these classified those with $PC_{20}FEV_1 \leq 8$ g·l methacholine as hyperresponsive. The second criterion was obtained as follows: the asymptomatic subjects (N=322) of the sample were divided into ten groups by sex and quintile of pretest percent predicted FEV_1 (%FEV_1) [6]. Within each group the lower fifth percentile of $PC_{20}FEV_1$ was calculated and used as the positive test criterion. These %FEV_1-specific normal values of bronchial responsiveness were higher in men than in women and increased with increasing pretest %FEV_1 [6].

In this community sample the prevalence of bronchial responsiveness in terms of $PC_{20}FEV_1 \leq 8$ g·l methacholine was 3% in men and 10% in women. The corresponding figures based on the %FEV_1-specific criteria were 5% and 7%. The prevalence of bronchial asthma in the sample was 2.4%. The sensitivity and specificity of $PC_{20} \leq 8$ g·l methacholine to bronchial asthma was 60% and 92%, respectively. The corresponding figures for the %FEV_1-specific criteria were 64%, 91%. Thus, the two methods of expressing abnormal bronchial responsiveness did not differ in their relationship to bronchial asthma. Similar findings were observed in the middle aged and elderly men of the Normative Ageing Study [3].

One explanation for the lack of diagnostic improvement of bronchial hyperresponsiveness to bronchial asthma using %FEV_1-specific criteria compared to a fixed threshold level of the test could be that the greater responsiveness associated with lower pretest FEV_1 may differ physiologically from the hyperresponsiveness found in bronchial asthma. In addition, bronchial responsiveness is not only dependent on pretest level of function. Also the airway caliber is important [5]. Hence, given the same %FEV_1 a young and tall person will have a greater airway caliber than an old and small person. Maybe normal values of bronchial responsiveness should be adjusted for both level of function and airway caliber.

Our findings should be interpreted cautiously because of the small sample examined. Further studies are needed to decide whether the clinical and epidemiological interpretation of bronchial challenge data should be influenced by pretest pulmonary function. However, the findings tend to reduce the significance of bronchial responsiveness as a diagnostic tool in epidemiological studies of bronchial asthma.

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