Evaluating the Bronchodilator Response in Elderly Who Have Asthma

To the Editor:

We read with interest the article by Connolly and coworkers concerning the impaired bronchodilator response to albuterol in the elderly (CHEST 1995; 108:401-06).

The authors demonstrated that the airway β2-adrenergic responsiveness was diminished in old age. The study is meticulous and thorough, and the results are very impressive; however, we are not in agreement with the authors' conclusion that airway adrenoceptor dysfunction may be implicated in late-onset asthma in the elderly. First, several investigators1-3 have reported that there are no differences in bronchodilator responses to β2-adrenergic inhalational drugs or anticholinergic inhalational drugs between younger and older patients with asthma or obstructive lung disease. Second, the physiologic aging and pathologic aging are not the same. The current study showed the age-dependent decline in the airway β2-adrenergic responsiveness in healthy elderly persons, but not in elderly patients with asthma. Although the nonspecific airway responsiveness during aging may predispose to the development of asthma in later life, it is difficult to separate the true "age effect" from the cumulative environmental effects, including cigarette smoking. The certain relationship between age and airway hyperreactivity is also a matter of debate.4 Furthermore, inflammatory mechanisms involving the basophil are implicated in the development of increasing nonspecific airway responsiveness during aging.5 Therefore, the results from the normal elderly subjects may not always predict the pathophysiology in elderly asthma. Third, it is suggested that long-standing asthma may lead to chronic persistent airflow obstruction in the elderly.6 The influences of airway epithelial damage, chronic inflammation, and duration of asthma on the function of β2-adrenergic receptor should be considered for the elderly patients with asthma. A recent animal study revealed that the down-regulation and recovery of β2-adrenergic receptor in heart and lung was not influenced by age in mRNA levels.7 Because the asthmatic patients need to use the β2-adrenergic inhalational drug over a long time, the study concerning the down-regulation of adrenoceptor function in elderly patients with asthma may be of clinical significance.

Although the data from the authors are important for the understanding of the age-related alterations in the airway adrenoceptor function, a direct comparison between healthy elderly and asthmatic elderly regarding bronchodilator response to β2-adrenergic agonist or a longitudinal study of airway β2-adrenergic responsiveness in both asthmatic and healthy subjects may be necessary to address their hypothesis.

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REFERENCES

To the Editor:

We thank Dr. Teramoto and colleagues for their comments and appreciate the opportunity to respond. Their letter makes several interesting points, and for the most part, we are in agreement.

While it is true that, in the three studies quoted by Teramoto et al (CHEST 1992; 101:1545-51, Am Rev Respir Dis 1992; 146:555-59, and Age Ageing 1995; 24:278-82), there were no significant differences in bronchodilator response to β2-adrenergic agonists between young and older patients with asthma, these studies involved pharmacologic doses of β-agonist, which may have masked any subtle differences. Our study used very small doses of albuterol; and in fact, the geometric mean total doses needed to return forced expiratory flow at 50% vital capacity to its baseline value were less than 50 ng.

We also agree that our current study only showed an age dependent decline in airway β2-adrenergic responses in healthy elderly people, not asthmatics. However, our previous work has suggested that the mononuclear leukocyte β2-adrenoceptor dysfunction seen in late onset asthma in the elderly is similar to that seen in normal aging.1 Although these latter results need to be confirmed by others, they suggest that late onset asthma in part may be the end of a spectrum of age-dependent β2-adrenoceptor "decline" and that airway receptor studies in the normal elderly may be extrapolated to elderly asthmatics, albeit tentatively.

With regard to downregulation or tachyphylaxis of the β2-adrenoceptor system, this is clearly an important variable, but probably is not the whole answer even in young patients.5 Nevertheless, we do agree that a study to evaluate this factor in elderly asthmatics would provide important information. The symptoms of asthma are likely to be multifactorial in etiology, and a decrease in β-agonist responsiveness may contribute to these symptoms regardless of the specific cause.

Finally, we agree entirely that the relationship between age and