Letter to the Editor

β-Blocker prescription in elderly patients with asthma

To the Editor:

Asthma in the elderly is often overlooked, underdiagnosed, and poorly monitored.[1,2] Elderly patients have many conditions for which β-blocker therapy is quite effective, most notably patients with coronary artery disease (CAD) after myocardial infarction. In a landmark retrospective study, Gottlieb et al[3] demonstrated a 40% risk reduction for mortality in those patients discharged from the hospital with a β-blocker prescription. The overall β-blocker prescription rate during the study period was 34% in all patients and 18% in those with an asthma diagnosis. Interestingly, the subset with asthma also enjoyed a risk reduction of 40% for mortality. In a later publication analyzing a subset of patients with severe asthma, the mortality benefit of β-blockers for CAD was not found.[4] A third retrospective study found no differences among those patients with asthma and chronic obstructive pulmonary disease prescribed β-blockers in relation to hospital admission, length of hospital stay, and outpatient clinic visits.[5] These retrospective studies taken together suggest that β-blockers reduce mortality in patients with asthma, although they may have a limited effect on mortality for patients with severe asthma and little effect on health care visit frequency.

Prospective data on the role of cardioselective β-blockers in asthma were synthesized in a meta-analysis that showed no significant harm for β-blocker treatment.[6] The meta-analysis grouped 29 randomized control trials to demonstrate no significant change in FEV_1, respiratory symptoms, or use of β-agonist after cardioselective β-blockers were administered. The selected trials, however, were brief in duration (19/29 were single-dose studies, and the 10 involving continued treatment ranged from 3 days to 4 weeks), did not include those with moderate-severe reactive airway disease, and did not include many elderly patients (average ages for single-dose studies and continued treatment studies were 40 and 51 years, respectively) or females (21% and 23% for the single-dose and continued treatment groupings, respectively).

It remains unknown whether elderly patients with asthma have adverse respiratory sequelae attributable to β-blockers. We completed a retrospective chart review to answer the following questions. Are β-blockers prescribed less frequently for elderly patients with asthma (compared with subjects without asthma)? Has the rate of β-blocker prescription for elderly patients with asthma increased? Are elderly patients with asthma prescribed lower doses of β-blockers than subjects without asthma? Does asthma severity as documented by FEV_1 influence β-blocker prescription?

We reviewed the charts from 350 randomly selected patients aged 65 to 85 years who listed the diagnosis of asthma and CAD between the years 2004 and 2006 at a single institution. CAD was defined on the basis of its inclusion in the patients' final diagnosis list. Two hundred additional patients without asthma aged 65 to 85 years with CAD served as a control group. Patients were excluded if they carried a diagnosis of chronic obstructive pulmonary disease, if their medication record was incomplete, or if they died during the study period. β-Blocker prescription rate and dose were collected. We calculated β-blocker prescription rate for a subset a patients that had documentation of reversibility (>200 mL and 12% increase in FEV_1% or positive methacholine challenge) and a normal diffusing capacity (in addition to the listed diagnosis of asthma). We estimated asthma severity solely on FEV_1 (mild, >80% predicted; moderate, 60% to 79% predicted; severe, <59% predicted). Fisher exact test was used to compare differences in β-blocker prescription rates between severity groups. The study was approved by our institution's Institutional Review Board.

Elderly patients with CAD and asthma were significantly less likely to be prescribed a β-blocker than an elderly patient with CAD and no asthma (odds ratio, 0.26; 95% CI, 0.18-0.39; Table I). There were no significant differences between sexes for β-blocker prescription rates (46% of male subjects with asthma vs 43% of female subjects with asthma). Subset analysis in those aged 65 to 75 years and 76 to 85 years revealed prescription rates of 42% and 48%, respectively ($P = .28$). These data suggest that the overall β-blocker prescription rate for patients with CAD has dramatically increased since the landmark study by Gottlieb et al[3] but also suggests that elderly patients with asthma continue to be prescribed β-blockers at a significantly lower rate than subjects without asthma.

Nearly all of the patients in our study were prescribed cardioselective β-blockers, which bind β1 receptor but at higher doses may also bind β2 receptor. For this reason, we hypothesized that patients with asthma would be prescribed lower doses of β-blockers than subjects without asthma. Comparisons of β-blocker dose between patients with asthma and subjects without asthma revealed average doses of 84 mg versus 83 mg for metoprolol and 39 mg versus 49 mg for atenolol (NS). Thus, β-blockers were prescribed at similar doses for patients with and without asthma. There were no significant differences within sex subsets.

We further hypothesized that β-blocker prescription would increase as asthma severity decreased. The subset analysis suggesting a limited mortality benefit in the patients with the most severe asthma supports this hypothesis.[4] In a subset of elderly patients with asthma with documented reversibility and normal diffusing capacity, there were no differences in β-blocker prescription rates across asthma severity groups (β-blocker prescription rates of 28% for mild, 39% for moderate, and 39% for severe; Table II). Those elderly patients with asthma who have documented reversibility and a normal diffusing capacity were prescribed β-blocker at a slightly lower rate than those without this documentation (37% vs 45%; NS).

Limitations of our study include its retrospective design and that it was performed at a single institution. Adherence to the prescribed β-blocker medications is an imperfect assumption. The diagnosis of asthma and CAD relied on physician diagnosis rather than strict clinical criteria. The benefits of β-blocker medication after myocardial infarction cannot necessarily be extrapolated to the patients selected in our study with a clinical diagnosis of CAD. Our definition of asthma severity in our subset analysis was based solely on FEV_1 and did not incorporate any clinical criteria. In addition, the number of patients in each severity subset was small because of our strict selection criteria.

Clinical decisions regarding β-blocker prescription and asthma affect a large patient population. We have identified a significant difference in β-blocker prescription rates in elderly patients with

TABLE I. β-Blocker prescription in elderly patients (aged 65-85 years) with CAD

	Asthma	No asthma
Males	81/175 (46%)	73/100 (73%)
Females	76/175 (43%)	78/100 (78%)
Totals	157/350 (45%)*	151/200 (75%)

*Odds ratio for asthma compared with no asthma, 0.26; 95% CI, 0.18-0.39.

TABLE II. β-Blocker prescription in asthmatic severity subsets

	Males	Females	Total
Severe asthma	5/13 (38%)	2/5 (40%)	7/18 (39%)
Moderate asthma	3/10 (30%)	6/13 (46%)	9/23 (39%)
Mild asthma	0/2 (0%)	2/5 (40%)	2/7 (28%)
Totals	8/25 (32%)	10/23 (43%)	18/48 (38%)

asthma but could not find variation in dosing between patients with asthma and subjects without asthma nor between different levels of asthma severity. It is possible that more elderly patients with asthma may tolerate β-blockers than are currently receiving them. Prospective study will help settle this important clinical question for those of us caring for the elderly population with asthma.

Matthew A. Rank, MD
James T. Li, MD, PhD

From the Division of Allergic Diseases, Mayo Clinic, Rochester, Minn. E-mail: rank.matthew@mayo.edu.

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