

LETTER TO THE EDITOR

Dear Editor

Glaucoma associated with metered-dose bronchodilator therapy

The risk of exacerbating pre-existing or undiagnosed acute angle-closure glaucoma in patients receiving nebulized therapy with β -adrenergic agents and ipratropium bromide (IB) for chronic obstructive pulmonary disease (COPD) is well documented. Although glaucoma has been reported in association with IB alone, case reports suggest that an additive effect of combined therapy with nebulized salbutamol and IB is responsible for precipitating it (1–7). All the reports about this subject are case reports except for the double-blind cross-over study, in which the patients who already had glaucoma were assessed to determine if nebulized salbutamol and IB therapy had any effect on intraocular pressures (8). To our knowledge, there is only one case report about glaucoma associated with metered-dose bronchodilator therapy (1).

We therefore decided to determine whether metered-dose IB-salbutamol combination can cause glaucoma and to compare the results with the use of formoterol via metered-dose inhaler as a control group. Twenty stable COPD patients (M/F: 15/5, mean age 57.7 ± 12.0 years) who were admitted to our outpatient department during a period of 6 months, were divided into two groups: 10 of them were treated with IB 20 mcg–salbutamol 100 mcg combination given every 6 hours (group 1) and the others with formoterol 24 mcg bid (group 2). There was no difference between the two groups regarding the age, sex, duration and severity of COPD and previous use of bronchodilators (data shown in part in Table I). All the patients were using bronchodilators via a metered-

dose inhaler, not with a nebulizer, except for eight newly diagnosed COPD cases (three from group 1 and five from group 2).

We assessed visual acuity, slit-lamp examination, intraocular pressure (IOP) and iridocorneal angles at the initial visit, 1 and 4 weeks later and every 3 months each year in all patients. Visual fields were also evaluated in the first, sixth and twelfth months.

None of the patients had glaucoma at the initial visit and one of them had a family history of glaucoma. However, with ophthalmologic examination we observed bilateral rise in IOP and defects of the visual field in three patients (30%) in group 1 during the follow-up. Angle narrowing was detected in two of these three patients. In group 2, there were bilateral rise in IOP, angle narrowing and defects of the visual field in one patient (10%), whose mother also had glaucoma. There was no significant difference in IOP increase between the two groups.

The incidence of glaucoma has been estimated as 1.2% in patients older than 40 years old (9). However, in this study we determined that IB-salbutamol administration even by metered-dose inhaler can cause glaucoma in three of 10 patients (30%). In the control group with formoterol, glaucoma was also observed in one patient with a predisposing factor, namely family history. These predisposing factors include a family history of glaucoma, increasing age, female gender, congenitally small anterior segments as found in microcornea, nanophthalmos and hyperopia, shallow anterior chamber depth and increased lens thickness (2).

The raised intraocular pressures seem to be a topical effect of ipratropium bromide and salbutamol solution escaping from the face mask of the nebulizer, rather than a systemic effects of these drugs (8). The use of bronchodilator agents via metered-dose inhalers was also found

TABLE I. The demographic data of the study and control groups

	Group 1	Group 2	P
Mean age (yrs)	58.1 \pm 9.3	57.0 \pm 10.9	0.42
Sex (F:M) (n)	1:9	4:6	0.08
Duration of COPD (yrs)	13.7 \pm 11.4	13.4 \pm 8.6	0.48
Severity of COPD* (n)			0.11
Mild	5	6	
Moderate	2	3	
Severe	3	1	

*We used the American Thoracic Society criteria.

to cause glaucuma in this study. The most likely possibility to explain this is autoinoculation by a finger contaminated with the drug or systemic absorption via the respiratory tract (2). We conclude that when metered-dose bronchodilators, especially anti-cholinergic agents, are prescribed to the COPD patients who have risk factors for glaucuma, ophthalmologic examinations should be done periodically. But further studies are needed to determine whether they have an effect on intraocular pressures or not.

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