

Beta-Blockers and Beta-Agonists: What Is the Risk?

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The potential interaction between beta-blockers and beta-agonists is a classic example of a pharmacodynamic drug interaction. It would appear that the administration of beta-blockers to patients taking beta-agonists should be avoided in all cases and some have recommended this action. However, differences in the activity of beta receptors and receptor selectivity of drugs binding to beta receptors add a level of complexity that precludes broad drug class-based interaction recommendations.

Beta-blockers and Beta-agonists in Asthma

Beta-agonists are commonly used in the treatment of asthma and chronic obstructive pulmonary disease (COPD). Beta-blocker use in asthma has been widely studied. In general, cardioselective beta-blockers (eg, acebutolol, atenolol, bisoprolol, celiprolol, metoprolol) appear to be effective for the

treatment of thyrotoxicosis, tachyarrhythmias, hypertension, heart failure, and acute coronary syndrome without increased risk of asthma exacerbation.^{1,2}

In an analysis of 10 studies on the effect of beta-blockers in patients with asthma where selective beta-blockers were administered for up to 14 weeks, there was no change compared with placebo in FEV₁, symptoms, or inhaler use.¹ Further, the use of selective beta-blockers following the administration of a beta-agonist produced a greater increase in FEV₁ than placebo. While there are few data on the use of non-cardioselective beta-blockers (eg, carvedilol, nadolol, pindolol, propranolol, timolol) in patients with asthma, it would seem prudent to avoid beta-blockers that inhibit the beta-2 receptor in patients using beta-2 agonists.

Beta-blockers and Beta-agonists in COPD

A number of studies have evaluated the use of beta-blockers in patients with COPD.^{1,3-7} As was observed in studies in patients with asthma, COPD patients being treated with beta-agonists showed no detrimental effects (reduced airway function or disease exacerbations) of cardioselective beta-blockers.^{1,4} A retrospective study of COPD patients reported that those taking beta-blockers were less likely to have an exacerbation of their disease and this result was independent of the cardioselectivity of the beta-blocker.⁵ However, more than 75% of the patients were receiving a cardioselective beta-blocker, limiting the ability of this study to assess the relative risk of beta-blockers based on cardioselectivity.

Other studies have noted a similar tol-

erance to nonselective beta-blockers in COPD patients.^{8,9} The effect of metoprolol 95 mg, propranolol 80 mg, and metoprolol 190 mg on the response to salbutamol was assessed in patients with COPD.⁶ There was no difference in FEV₁ at baseline or following methacholine challenge with any beta-blocker compared with placebo. Recovery of the FEV₁ after methacholine administration followed by salbutamol inhalation was reduced by both propranolol and the higher dose of metoprolol but not the low metoprolol dose. Similarly, the post-methacholine recovery of FEV₁ following formoterol inhalation was reduced by propranolol 80 mg but not by metoprolol 100 mg or celiprolol 200 mg.⁷

Summary and Recommendations

Non-cardioselective beta-blockers appear to pose the greatest risk in patients with asthma or COPD. A decreased response to beta-agonists seems to be the most commonly observed effect of non-cardioselective beta-blockers in these patients, although increased airway hyperresponsiveness was observed with both types of beta-blockers.

Cardioselective beta-blockers, administered at doses that maintain cardioselectivity, appear to present limited risk in patients with asthma or COPD, even if beta-agonists are administered. Since there is little benefit to administering a non-cardioselective beta-blocker, it would be prudent to select a cardioselective one for patients with pulmonary disease who require beta-blockade. ■

A number of studies have evaluated the use of beta-blockers in patients with COPD.

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