Review: Cardioselective β-blockers did not reduce respiratory function in chronic obstructive pulmonary disease

Salpeter S, Ormiston T, Salpeter E, Poole P, Cates C. **Cardioselective beta-blockers for chronic obstructive pulmonary disease.** Cochrane Database Syst Rev. 2002(2):CD003566 (latest version 18 Oct 2001).

QUESTIONS

What are the effects of cardioselective β_1-blockers on the respiratory function of patients with chronic obstructive pulmonary disease (COPD)? How does treatment with β_1-blockers affect response to β_2-agonists?

DATA SOURCES

Clinical trials published in any language from 1966 to May 2001 were identified by searching MEDLINE, EMBASE/Excerpta Medica, and CINAHL and by scanning clinical symposia abstracts and references of identified studies and reviews.

STUDY SELECTION

Studies were selected if they were randomized, controlled, blinded trials that assessed the effects of intravenous or oral cardioselective β-blockers on airway function (FEV_1 at rest as liters or percentage of normal predicted value at baseline and follow-up) or symptoms in patients with COPD (baseline FEV_1 < 80% of normal predicted value or as defined by the American Thoracic Society guidelines).

DATA EXTRACTION

2 investigators independently extracted data on study design, patient characteristics, interventions, comparison groups, and outcomes (change in FEV_1; FEV_1 response to β_2-agonists given after study drug or placebo; and self-reported symptoms such as wheezing, dyspnea, or exacerbation). Only published data were included in the analysis.

MAIN RESULTS

19 crossover trials met the inclusion criteria ({*n* = 267}*; of these, {17}* trials {*n* = 226}* included a placebo-control group). Only the results of these placebo-controlled trials are reported here. β-blockers assessed were atenolol, metoprolol, bisoprolol, practolol, celiprolol, and acebutolol.

Meta-analysis of 2 trials (*n* = 50) showed that single-dose β-blockers did not differ from placebo for change in FEV_1 (Table). Meta-analysis of {9}* trials {*n* = 114}* found no differences for respiratory symptoms (risk difference [RD] 0, 95% CI −0.03 to 0.03). Meta-analysis of 2 trials (*n* = 50) showed that single-dose β-blockers had no effect on change in FEV_1 in patients receiving an inhaled β_2-agonist (weighted mean difference [WMD] −1.21, CI −10.97 to 8.56).

Meta-analysis of 4 trials (*n* = 140) showed that longer-term β-blocker therapy (duration of therapy ranged from 1 to 12 wk) did not differ from placebo for change in FEV_1 (Table). Meta-analysis of {7}* trials {*n* = 98}* showed no differences for respiratory symptoms (RD 0, CI −0.04 to 0.04). 1 trial (*n* = 30) found that longer-term β-blocker therapy had no effect on change in FEV_1 in patients receiving an inhaled β_2-agonist (WMD −2.0, CI −13.78 to 9.78).

CONCLUSION

In trials that enrolled a total of < 300 patients, cardioselective β-blockers did not reduce respiratory function in patients with chronic obstructive pulmonary disease and did not reduce FEV_1 response to β_2-agonists.

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*Information provided by author.

Percentage of change in FEV_1 for cardioselective β-blockers vs placebo in chronic obstructive pulmonary disease†

Type of therapy	Number of trials	Follow-up	WMD (95% CI)
Single dose	2 (*n* = 50)	{1 to 6 h}*	−2.05 (−6.05 to 1.96)
Longer duration	4 (*n* = 140)	1 to 8 wk	−2.55 (−5.94 to 0.84)

†WMD = weighted mean difference. Other abbreviations defined in Glossary. All analyses used a fixed-effects model.

COMMENTARY

The review by Salpeter and colleagues reinforces an important clinical message: β-blockers are not contraindicated in COPD (1). The issue is not trivial. About 20% of patients discharged after hospitalization for acute myocardial infarction have a diagnosis of COPD or asthma (2), whereas patients with COPD often have ischemic heart disease, and many have hypertension (3). In such conditions, β-blockers have been proven to save lives, with most patients with COPD having a mortality reduction equivalent to those without COPD on β-blockers after acute myocardial infarction (2).

At the same time, the review shows the scarcity of randomized-trial data regarding β-blockers in COPD. Salpeter and colleagues identified only a few trials of short duration and small numbers of patients; many lacked blinding or placebo controls. Consequently, this meta-analysis adds only a small increment to our existing clinical knowledge. Reassuringly, its results are concordant with those of a large epidemiologic study that found no increase in hospital admissions for COPD exacerbations with β-blocker therapy (2).

These data suggest that clinicians can consider a cardioselective β-blocker for patients with stable COPD, as they would for patients without chronic lung disease. However, neither this study nor any others to date have shown the long-term safety of β-blockers in COPD. Careful monitoring after drug administration remains prudent. Unexplained respiratory deterioration shortly after starting a β-blocker warrants discontinuation, and any unexplained exacerbations thereafter should prompt reevaluation of therapy.

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References

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