The effect of beta-blocker therapy on quality of life in heart failure patients: a systematic review and meta-analysis

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CRD summary
This review concluded that beta-blocker therapy does not impair quality of life for patients with chronic heart failure who are receiving optimal standard medication. The conclusions appear to be supported by the data, but poor reporting of review methods and uncertain study quality make it difficult to assess their reliability.

Authors' objectives
To evaluate the impact of beta-blocker therapy on quality of life (QoL) in patients with chronic heart failure (CHF) who are receiving optimal standard medication.

Searching
MEDLINE, EMBASE, Pascal and the Cochrane CENTRAL Register were searched from 1985 to 2002; the search terms were reported. The reference lists of all retrieved studies were screened for relevant studies. No language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were eligible for inclusion. It appears that studies were only included if QoL data (either actual values or values carried forward) were available for at least 70% of the sample.

Specific interventions included in the review
Studies assessing beta-blocker therapy in addition to standard therapy in comparison with standard therapy alone were eligible for inclusion. Standard therapy consisted of angiotensin-converting enzyme (ACE) inhibitor or angiotensin-receptor blocker together with diuretics and/or digitalis. In the included studies, beta-blocker therapy included bucindolol, carvedilol and metoprolol. The duration of treatment ranged from 3 to 20 months. Approximately 90% of patients were treated with an ACE inhibitor.

Participants included in the review
Studies of patients with CHF were eligible for inclusion. In the included studies, cause of heart failure included idiopathic dilated cardiomyopathy and coronary artery disease with New York Heart Association class I to IV. The patients had a mean age of 60 years and approximately 75% were men.

Outcomes assessed in the review
Studies assessing QoL using a generic or disease-specific QoL questionnaire were eligible for inclusion. In all but one of the included studies QoL was assessed using the Minnesota Living with Heart Failure questionnaire; one study used the Quality of Life Heart Failure questionnaire.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Two reviewers independently assessed methodological quality using Delphi list criteria. Reviewers made judgements taking into account the context of studies, rather than assigning quality scores.

Data extraction
The authors did not state how many reviewers performed the data extraction. Data were extracted for the QoL effect from an optimal dose of beta-blocker therapy, while the QoL outcome at the end point of the study was used for
Methods of synthesis
How were the studies combined?
A measure of effect size was calculated as the standardised mean difference (SMD), along with 95% confidence intervals (CIs), using fixed-effect and random-effect models. The results of the random-effects model were reported.

How were differences between studies investigated?
Subgroup analyses on type of beta-blocker, duration of treatment and disease severity were also conducted. Heterogeneity was assessed using the chi-squared test.

Results of the review
Nine RCTs (n=1,039) were included.

There was no statistically significant improvement in QoL in the beta-blocker group compared with control for overall QoL (SMD -0.07, 95% CI: -0.16, 0.02, p=0.13).

The subgroup analysis by type of beta-blocker also showed no statistically significant effect on QoL. The SMD was -0.07 (95% CI: -0.18, 0.04, p=0.20) for the metoprolol group (5 studies) and -0.07 (95% CI: -0.22, 0.09, p=0.40) for carvedilol, celiprolol and bucindolol group (5 studies). Use of short-term medication (3 months) was associated with an improvement in QoL of borderline significance (SMD -0.61, 95% CI: -1.22, 0.00, p=0.05), but there were no statistically significant effects on QoL for medium- (6 to 8 months) or long-term (12 months) therapy. There were no statistically significant effects on QoL within different classes of disease severity. There was no evidence of statistical heterogeneity for any of the subgroup analyses.

Authors' conclusions
Beta-blocker therapy, together with standard medication, does not impair QoL in patients with CHF.

CRD commentary
Inclusion criteria were defined for the participants, interventions, outcomes and study design. Several relevant sources were searched and authors made attempts to reduce language bias. No specific attempts to locate unpublished studies were reported, which raises the potential for publication bias. The methods used to select the studies, assess validity and extract the data were not described, so it is not known whether any efforts were made to reduce reviewer error and bias. Validity was assessed using specified Delphi criteria, but the authors did not report how they applied the criteria or the results of the assessment; the results from these studies and any synthesis may not, therefore, be reliable. The results were pooled in a meta-analysis, there was no evidence of statistical heterogeneity, and the influence of various relevant factors was examined. The conclusions appear to be supported by the data, but a lack of reporting of review methods and uncertain study quality make it difficult to assess their reliability.

Implications of the review for practice and research
Practice: The authors stated that beta-blockers may be added to standard therapy for patients with CHF without concerns of impairment of QoL.

Research: The authors stated that further studies with long-term follow-up are required. Due to ethical issues surrounding enrolment in new RCTs, a meta-analysis which includes RCTs and cohort studies may be appropriate. In addition, a more sensitive QoL questionnaire may be required for accurate analysis.

Funding
University of Groningen, The Netherlands.

Bibliographic details

PubMedID
16555368

DOI
10.1002/pds.1234

Indexing Status
Subject indexing assigned by NLM

MeSH
Adrenergic beta-Antagonists /administration & dosage /therapeutic use; Chronic Disease; Drug Administration Schedule; Drug Therapy, Combination; Heart Failure /drug therapy; Humans; Quality of Life; Severity of Illness Index; Treatment Outcome

AccessionNumber
12007000999

Date bibliographic record published
06/12/2007

Date abstract record published
09/08/2008

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.