



## Mortality Reduction Associated With $\beta$ -Adrenoceptor Inhibition in Chronic Heart Failure Is Greater in Patients With Diabetes

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### Abstract

**OBJECTIVE** Diabetes increases mortality in patients with chronic heart failure (CHF) and reduced left ventricular ejection fraction. Studies have questioned the safety of  $\beta$ -adrenoceptor blockers ( $\beta$ -blockers) in some patients with diabetes and reduced left ventricular ejection fraction. We examined whether  $\beta$ -blockers and ACE inhibitors (ACEI) are associated with differential effects on mortality in CHF patients with and without diabetes.

**RESEARCH DESIGN AND METHODS** We conducted a prospective cohort study of 1,797 patients with CHF recruited between 2006 and 2014, with mean follow-up of 4 years.  $\beta$ -Blocker dose was expressed as the equivalent dose of bisoprolol (mg/day) and ACEI dose as the equivalent dose of ramipril (mg/day). Cox regression analysis was used to examine the interaction between diabetes and drug dose on all-cause mortality.

**RESULTS** Patients with diabetes were prescribed larger doses of  $\beta$ -blocker and ACEI than were patients without diabetes. Increasing  $\beta$ -blocker dose was associated with lower mortality in patients with diabetes (8.9% per mg/day; 95% CI 5–12.6) and without diabetes (3.5% per mg/day; 95% CI 0.7–6.3), although the effect was larger in people with diabetes (interaction  $P = 0.027$ ). Increasing ACEI dose was associated with lower mortality in patients with diabetes (5.9% per mg/day; 95% CI 2.5–9.2) and without diabetes (5.1% per mg/day; 95% CI 2.6–7.6), with similar effect size in these groups (interaction  $P = 0.76$ ).

**CONCLUSIONS** Increasing  $\beta$ -blocker dose is associated with a greater prognostic advantage in CHF patients with diabetes than without diabetes.

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### Footnotes

- K.K.W. and M.D. are joint first authors.
- This article contains Supplementary Data online at <http://care.diabetesjournals.org/lookup/suppl/doi:10.2337/dc17-1406/-/DC1>.

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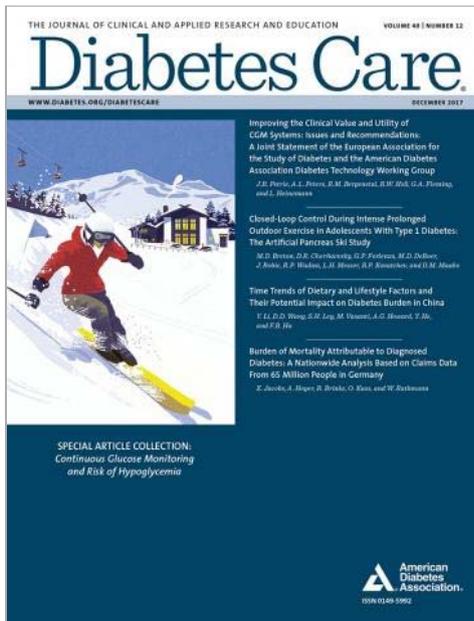
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