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## Diabetes outcomes in people with low and preserved ejection fraction heart failure

In individuals with heart failure, the prevalence of diabetes is high and is associated with a worse prognosis (Thrainsdottir et al, 2005). Previous major studies have evaluated the prognostic importance of diabetes in people with heart failure in populations with low left-ventricular ejection fraction. In such individuals, diabetes is associated with significantly more symptoms, greater morbidity and increased mortality (Suskin et al, 2000). It is, however, well recognised now that approximately half of those with heart failure will have a preserved ejection fraction (Hogg et al, 2000). In such individuals there is little data available for the prevalence and prognostic associations of diabetes.

This has recently been evaluated in re-analysis of the CHARM (Candesartan in Heart Failure: Assessment of Reduction of Mortality and morbidity) programme (MacDonald et al, see page 264). The programme had previously assessed the efficacy of candesartan in the broad range of people with heart failure. In the overall study, the prevalence of diabetes was 28.3% in individuals with preserved ejection fraction (that greater than 40%) and 28.5% in those with a low ejection fraction (that less than 40%). The risk for all-cause mortality conferred by diabetes was similar in both low and preserved ejection fraction groups. Diabetes was, however, associated with a greater relative risk of cardiovascular death and hospitalisation in people with preserved ejection fraction than in those with low ejection fraction.

This analysis extends previous studies by demonstrating that the presence of diabetes is an important independent predictor of mortality and morbidity in people with a low ejection fraction and heart failure, but also in those with preserved ejection fraction. The increase in absolute risk with the presence of diabetes was large, to the point of doubling. The increase in events in the population with preserved ejection fraction and diabetes was primarily due to an increased risk of hospitalisation due to heart failure: 27% for those with diabetes compared with 13% for those without diabetes. The increase in hospitalisation risk may reflect primary cardiac dysfunction; myocardial abnormalities due to, for example, advanced glycosylation end products; and impairment of diastolic filling of the heart. Additionally, other non-vascular events may affect the cardiac function, such as autonomic dysfunction.

This analysis demonstrates the significant contribution of diabetes to the increase in risk of cardiovascular morbidity and mortality in all individuals with heart failure. Consequently, emphasis on the management of diabetes should not only predate the development of heart failure, but we now require further trials to evaluate the effect of aggressive management of metabolic risk factors such as poor glycaemic control on the outcomes of those with preserved or reduced ejection fraction heart failure.

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