

# Diabetes and heart failure – a challenging combination



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**D**iabetes mellitus and heart failure (HF) often coexist, and together, their effects on clinical outcomes are compounded. On the one hand, diabetes is an independent risk factor for developing heart failure, with a twofold increased risk in men, and a fivefold increased risk in women. On the other hand, in patients with heart failure, diabetes mellitus is highly prevalent, being present in 25% of chronic heart failure cases, and 40% of acute heart failure cases. The latter is especially so in heart failure with preserved ejection fraction. Individually, heart failure has a poorer prognosis than diabetes mellitus, and should therefore be the priority in terms of treatment. In this issue of *Heart & Metabolism*, the intimate relationship between diabetes and heart failure is explored, with a special focus on their changing epidemiology, the mechanisms underlying diabetes with concomitant heart failure, the effect of antidiabetic drugs on heart failure risk and other cardiovascular outcomes, and the diagnosis and management of patients with diabetes and HF.

Gierula and Kearney (p 4) open the issue with a description of the changing epidemiology of diabetes and HF, highlighting the epidemic of diabetes which is sweeping the world, especially in developing countries. Concurrent with this is an increased prevalence of HF, given that diabetes is the major risk factor for developing HF, either as a complication of coronary artery disease, or as the clinical entity of diabetic cardiomyopathy. Chandramouli and Lam (p 8) highlight

the changing epidemiology and increased prevalence and burden of diabetes, obesity, and HF, which has taken place in Asia over the past few decades, in parallel with the significant economic growth and urbanization in this part of the world. Emerging data has shown that over half of Asian patients with HF have concomitant diabetes, and of special interest is that diabetic Asian patients with HF have a lower BMI, more comorbidities, earlier onset of HF, worse quality of life and clinical outcomes, when compared with their Western counterparts. This difference in clinical phenotype is likely to impact on the patient response to therapies, which may therefore need to be tailored to the unique Asian phenotype of diabetes and HF.

Diabetic cardiomyopathy refers to the presence of structural or functional abnormalities of the myocardium in diabetic patients which are not fully explained by other factors such as coronary artery disease or hypertension. As a clinical entity, it is often challenging to diagnose and manage. Wheatcroft (p 13) reviews the role of cardiac imaging modalities, echocardiography, and cardiovascular magnetic resonance for diagnosing diabetic cardiomyopathy, and Gollmer and Bugger (p 37) provide an overview of the mechanisms underlying diabetic cardiomyopathy. The metabolic perturbations underlying diabetes and HF and their interplay are reviewed by Karwi and Lopaschuk (p 32). They propose targeting myocardial energy metabolism by optimizing cardiac energy substrate reference, as a potential therapeutic approach to im-

prove patient outcomes. The challenges with managing diabetic patients with ischemic HF are highlighted in a case report by Magaña Serrano (p 28), who proposes a personalized approach to treating patients with concomitant diabetes and HF.

In recent times, several landmark clinical outcome studies have been published reporting beneficial effects of new antidiabetic drugs on cardiovascular outcomes in diabetic and more recently nondiabetic patients at risk of cardiovascular disease. These trials are reviewed in the next article, by Bell (p 18) who highlights the cardiovascular benefits of sodium/glucose linked transporter-2 inhibitors (SGLT2is) and glucagon-like peptide-1 receptor analogues (GLP-1RA). Particularly interesting are the beneficial effects of the SGLT2i, dapagliflozin, which was recently shown to reduce HF hospitalization in both diabetic and nondiabetic pa-

tients with HF with reduced ejection fraction. Further studies are needed to understand the mechanisms underlying the beneficial effects of these antihyperglycaemic agents on cardiovascular outcomes. Finally, the cardiovascular, kidney, and retinal complications of diabetes are well known. Kovalik (p 23) provides an overview of less well-known musculoskeletal, neuropathic, and skin complications of diabetes, which are often difficult to manage and treat.

In summary, in this issue of *Heart & Metabolism*, we aim to highlight the increasingly important and global problem of diabetes with concomitant heart failure, and we discuss the challenges of diagnosing and managing these two common medical conditions when they occur in combination. ■

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