

Heart Failure

Epidemiology, Pathophysiology, and Management of Heart Failure in Diabetes Mellitus

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KEYWORDS

- Cardiac function • Cardiovascular events • Glucose lowering therapy • Glycemia
- Heart failure • Type 2 diabetes mellitus

KEY POINTS

- Heart failure is a common comorbidity in diabetes and patients with both conditions have a particularly poor prognosis.
- Most clinical outcome trials investigating the effects of glucose-lowering agents have excluded patients with heart failure.
- Glitazones and, possibly, some dipeptidyl peptidase-4 inhibitors, cause an increased risk of developing heart failure and deterioration in existing heart failure.
- One class of drugs, the sodium glucose cotransporter 2 inhibitors, reduce the risk of developing heart failure.

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HEART FAILURE SYNDROME

Heart failure is a clinical syndrome characterized by symptoms and signs caused by structural or functional abnormalities of the heart. Typical symptoms are breathlessness, ankle swelling, and fatigue. Typical signs are increased jugular venous pressure, third heart sound, peripheral edema, and pulmonary crackles; however, the condition can be present in the absence of these findings. It is important to address the underlying cause of heart failure, because the specific etiology determines the choice of treatment. Common causes of heart failure are ischemic heart disease, dilated cardiomyopathies, valvular lesions, atrial fibrillation, and hypertension. The toxic impact of chemotherapy and high levels of alcohol consumption can also lead to systolic left ventricular failure.^{1,2} Diabetes accelerates atherosclerosis and often leads to hypertension, but it is still debated whether diabetes causes a specific cardiomyopathy. Some data suggest that type 2 diabetes and hyperinsulinemia promote a “diabetic cardiomyopathy.”³

The management of cardiovascular disease has undergone much change in recent years in general; notably, recent advances in the management of acute coronary syndromes have significantly reduced both short-term and long-term mortality.⁴ This factor has led to increased survival, and thus, it could be argued, an increasing number of individuals with myocardial damage at risk of developing heart failure. The medical and device treatment of patients with established heart failure has also improved considerably, reducing both morbidity and mortality.^{5–8} Both changes are thought to have led to an increase in prevalence of heart failure. Thus, heart failure has become one of the most common cardiovascular diseases in the Western world. Epidemiologic data show a prevalence of heart failure of 2%; among individuals older than 75 years, nearly 10% suffer from heart failure.⁹ Notably, the prevalence is even higher in patients with diabetes.^{10,11} Conversely, the prevalence of diabetes is very high in patients with heart failure with estimates of up to 40% in patients hospitalized with worsening symptoms.^{12,13}

EPIDEMIOLOGY OF HEART FAILURE AND DIABETES

Compared with other cardiovascular events, observational data reveal a frequent occurrence of heart failure in patients with diabetes.^{14,15} The *incidence* of hospital admission for heart failure in 65,619 patients with type 2 diabetes treated with insulin exceeded both myocardial infarction and stroke.¹⁶ Heart failure also seems to be the most common complication in several clinical outcome trials, especially in patients with diabetes and nephropathy.^{17,18} This circumstance is emphasized by the Irbesartan Diabetic Nephropathy Trial, in which hospitalization for heart failure was the most frequent cardiovascular event, despite exclusion of patients with heart failure at baseline.¹⁷ The *prevalence* of heart failure in individuals with diabetes is also high, with 1 estimate of approximately 12%.¹⁰ Furthermore, heart failure in diabetes is associated with very poor outcomes and very high health care expenses.^{11,19} Once heart failure develops in individuals with diabetes mellitus, the outlook is grim, with as much as a 10-fold higher mortality, compared with people with diabetes without heart failure, and a 5-year survival rate of only 12.5%.¹¹ Although more recent data have shown a better prognosis with a 3-year mortality of 40%,²⁰ these findings highlight the clinical importance of the combination of heart failure and diabetes. Fortunately, the response to therapy for heart failure is similar in patients with and without diabetes,^{21,22} and is standardized in evidence-based international guidelines.^{1,2}

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