COMMENTARY

Improving outcomes in patients with type 2 diabetes mellitus and chronic heart failure: New hope

Type 2 diabetes mellitus worsens heart failure mortality and morbidity

Type 2 diabetes mellitus (T2DM) is increasing in prevalence, and changes in lifestyles and the world we live in mean that the current estimated 400 million adults living with T2DM worldwide is likely to increase substantially as the 21st century unfolds. Patients with T2DM are at high risk of developing chronic heart failure (CHF) secondary to left ventricular (LV) systolic dysfunction.

Mortality in patients with CHF secondary to LV systolic dysfunction who do not suffer from T2DM has declined over the past 3 decades. A decline in annual mortality rates from 12.5% to 7.8% has been demonstrated in ambulant outpatients with CHF free of T2DM between 1995 and 2010. However, if a patient with CHF also suffers from T2DM, the outlook has been bleak. In addition, patients with CHF and T2DM have a risk of all-cause mortality double that of similar patients without diabetes; the risk of progressive heart failure death is also doubled, whereas the risk of sudden cardiac death (due to cardiac arrhythmia) is threefold greater in patients with CHF suffering from T2DM. To put this in context, if a patient with CHF suffers from T2DM, their risk of death at 3 years is approaching 40%. Studying approximately 2000 patients over a 10-year period has demonstrated that at least 25% of patients with CHF secondary to LV systolic dysfunction have coexisting T2DM. In a further study, it was shown that diabetes imparts a risk of hospitalization due to decompensated heart failure threefold that of a patient without diabetes. In addition, a study examining the characteristics of patients with CHF and T2DM demonstrated that diabetes has deleterious effects on renal function, hemoglobin, and symptoms, as assessed by New York Heart Association functional class.

Improved understandings of disease mechanisms: New hope

Over the past 20 years, our understanding of the pathophysiology of CHF has advanced substantially (Fig. 1). An initial insult to LV function leading to...
reduced cardiac output, such as a myocardial infarction, is thought to be followed by compensatory changes in LV size and shape (LV remodeling), and activation of the renin–angiotensin–aldosterone system (RAAS) and sympathetic nervous system (SNS). This “neurohumoral activation” may initially be beneficial, but in the longer term becomes detrimental. The use of angiotensin-converting enzyme (ACE) inhibitors, β-adrenoceptor antagonists, aldosterone antagonists and, more recently, complex device therapies that address these maladaptions (Fig. 1) has led to a significant improvement in life expectancy in patients with CHF. Moreover, previous doubt about use of β-adrenoceptor antagonists in patients with CHF and T2DM was recently dispelled by our paper demonstrating that each 1-mg increment in bisoprolol (or its equivalent) led to an associated 9% reduction in mortality in patients with diabetes, compared with 3% in patients with CHF and no diabetes.6

Using contemporary therapies to improve outcomes in patients with CHF and T2DM

We advocate a rationalized approach to treating patients with CHF and T2DM. At first assessment, loop diuretics should be used to control symptoms, carefully titrating the dose up and down according to fluid status. This should be accompanied by careful but aggressive use of disease-modifying agents (β-adrenoceptor antagonists and ACE inhibitors). If the patient has evidence of electrical dyssynchrony on their 12-lead electrocardiograph (QRS >120 ms) one should consider resynchronization therapy and, if at high risk of sudden death, an implantable defibrillator. On top of this, metformin7 and possibly sodium–glucose cotransporter 2 (SGLT2) inhibitors8 should be used to control glycemia as part of a holistic cardiometabolic treatment strategy.

Conclusions

An understanding of disease mechanisms is pivotal to effective treatment of T2DM and CHF. The combination of the two requires an integrated rational approach. Delivery of optimal current therapeutic options offers hope while we wait for new therapies and ways of thinking to emerge.

Disclosure

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