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Opinion
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Heart Failure in Diabetes: An Elephant in the Room?

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Abbreviations: LV: Left Ventricular; T2DM: Type 2 Diabetes Mellitus; Hb: Hemoglobin; AGEs: Advanced Glycation End Products

Opinion

Heart Failure is still a not so frequently diagnosed condition in diabetic population. With the increasing prevalence of diabetes in our country due to faulty lifestyle and increased consumption of junk food, there is also an increase in the underlying burden of Heart Failure, especially in the diabetic population. Prognosis of untreated or under-treated Heart Failure is poor, so we need to be aware of this not so common form of complication in general. In particular, the prevalence of T2DM, thereby its combination with HF is rapidly increasing, mainly due to the obesity epidemic.

We have talked much of cardiovascular and cerebrovascular complications in diabetes and their fatality, which led to much awareness generation. Diabetes can cause Heart Failure independently of Ischemic Heart Disease by causing a Diabetic Cardiomyopathy affecting the heart muscle that may manifest as normal or reduced left ventricular ejection fraction. The incidence of Heart Failure is 2- to 4-fold higher in diabetic population compared to others and, when present, occurs at a younger age. In elderly T2DM patients (>65yrs), the coexistence of HF in diabetes has a 10-fold higher death risk. While the association between mortality and HbA1c in diabetes mellitus patients with HF appears to be U-shaped, with the lowest risk of death in patients with HbA1c levels of ≈7.1%. Subclinical myocardial damage increased in a linear manner across the glycemic spectrum from no diabetes mellitus to prediabetes and diabetes mellitus. This correlated with increased risk for cardiovascular events, HF or death, being highest in those with T2DM.This result shows even a prediabetes state has an increased risk of heart failure which need to be prevented in our population.

Diabetic Cardiomyopathy

It is a condition of ischemia- and hypertension-independent cardiomyopathy, describing the direct effects of diabetes-associated metabolic effect on myocardial function. Patient with a history of long-standing and/or poorly controlled T2DM who are excluded of significant coronary, hypertensive, valvular and/or congenital heart disease as well as of familial, viral, toxic, or infiltrative and other cause of cardiomyopathy. In HF, the coexistence of T2DM mainly aggravates left ventricular (LV) diastolic dysfunction by increasing LV stiffness and mass, without much effect on global pump function. The restrictive phenotype is more commonly seen in patients with T2DM and obesity, while the dilated phenotype is more prevalent in type 1 diabetes patients. Interstitial and perivascular zone myocardial fibrosis and increased level of advanced glycation end products (AGEs) increase collagen stiffness of myocardium through cross-linking, enhancing diastolic dysfunction in patients of diabetic cardiomyopathy.

If we measure the plasma BNP and NT-pro-BNP, which are acutely released by ventricular myocytes of the patient when the myocardium is stretched due to increased filling pressures, may help make an indication of diagnosis where clinical uncertainty exists. While an increase in glycated hemoglobin (HbA1C) among individuals with diabetes, which is a marker of your glycaemic control, is a recognized risk factor for Heart Failure, no prospective study to date has demonstrated that improved glycaemic control significantly reduces the incidence of heart failure. Meaning, you need to have your glucose controlled from your early days of diabetes to avoid this complication.

The recent global guidelines for managing diabetes recognize the importance of diagnosing Heart Failure in diabetic patients, early in the course of the disease. Relationship between antihyperglycemic therapies and HF risk must also account for the impact of these agents on other potential mechanisms that could lead to cardiac injury. Thus, direct or indirect mechanisms that could link current antihyperglycemic therapies with LV remodeling and myocardial injury that are independent of their blood glucose-lowering effects may exist. Metformin which is most commonly used in diabetes, associated with reduced mortality in HF patients, Reduces cardiac hypertrophy by AMPK-mediated repression of mTOR. Occurrence of fluid retention and weight gain is a reproducible side-effect of TZD therapy, which precludes pioglitazone use in NYHA III and IV HF. They recommend a new class of medicine, SGLT2i/gliflozin (Sodium-glucose co-transporter 2 inhibitor) in such patients as data shows reduction in CV mortality and hospitalization from HF following the benefits shown by these drugs in the clinical trials. However, these drugs are not yet approved for any Heart Failure related indications, and relevant clinical trials are ongoing for such beneficial outcome.

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