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Commentary

# New Pharmacological Intervention for Diabetic Cardiomyopathy

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## DESCRIPTION

Diabetes is one of the major health problems around the world. It is estimated that the number of diabetic patients will increase from 135 million in 1995 to 300 million by the year 2025. Diabetes can lead to severe macro and microvascular complications. Diabetes primarily affects the heart, blood vessels, eyes, kidney and nerves. Microvascular complications refer to those affecting small blood vessels in the retina, kidney and peripheral nerves and can lead to retinopathy, nephropathy and neuropathy. Macrovascular complications refer to diseases affecting large blood vessels in the heart, brain and peripheral circulation leading to cardiovascular diseases such as atherosclerosis, heart attack and stroke, which are responsible for 50% of deaths of diabetics.

The prevalence of HF in the general population ranges from 1 to 4%, but in diabetic patients it is 12%, rising to 22% in those over the age of 64 years. Up to a third of all patients admitted to hospital with Heart Failure (HF) have diabetes. Furthermore, diabetes has a prevalence of 30% in patients with cardiac failure and may be up to four times as prevalent in patients with newly diagnosed HF. Diabetes is also a powerful predictor of cardiovascular morbidity and mortality and is an independent risk factor for death in patients with established HF. Diabetic patients are also more likely than non-diabetic patients to develop HF following MI (Myocardial Infarction), despite comparable infarct sizes. The Framingham Heart Study reported a 2.4-fold increase in the incidence of HF in diabetic men and a 5.1-fold increase in diabetic women, when compared with age-matched controls.

Other large population-based studies have yielded similar results. The CHS (Cardiovascular Health Study) of patients aged over 65 years showed diabetes to be associated with an increase in incident HF. The strong heart study demonstrated associations between diabetes and higher (Left Ventricular Mass) LVM and wall thickness, increased arterial stiffness and systolic dysfunction, compared with matched controls. More recently, the MESA (Multi-Ethnic Study of Atherosclerosis) study used cardiac MR (Magnetic Resonance) to report inter-racial differences in LVM, LV volumes and LV function among diabetic patients. In a study over 43 months, the incidence of HF was vastly higher in diabetic (39%) compared with non-diabetic (23%) patients, with an RR (Relative Risk) of 1.3 for developing HF. An increased risk of HF in diabetic patients with retinopathy, supporting the concept of a microvascular etiology in diabetic heart disease.

Diabetic Cardiomyopathy (DCM) is defined as the ventricular dysfunction that occurs in diabetic patients independent of another cause, such as coronary artery disease or hypertension. The term "DCM" was initially introduced by Rubler in 1972 based upon post-mortem finding in diabetic adults who had HF in the absence of other co-morbid conditions.

## CONCLUSION

The term now also embraces diabetic individuals with diastolic dysfunction. Somaratne recently reported that 56% of diabetic patients had DCM. Although the etiology of DCM is poorly understood, the pathophysiology of DCM is believed to be multifactorial. Existing evidences suggests that persistent hyperglycemia-induced Reactive Oxygen Species (ROS). Cardiac fibrosis is a major feature of DCM an overproduction of Extra Cellular Matrix (ECM) protein leads to increased myocardial stiffness and consequent cardiac dysfunction, ultimately resulting in cardiac failure. Therefore, assessment of the balance between ECM synthesis and degradation is a good way to predict the development of diabetes-induced cardiac fibrosis. Elucidating the underlying mechanism and signaling pathways involved in ECM remodeling.

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