FDA approves new treatment for heart failure

On May 5th, 2020, the FDA announced the approval of Farxiga (dapagliflozin) oral tablets to reduce the risk of cardiovascular death and hospitalization for adults with heart failure with reduced rejection fraction (HFrEF). Farxiga, a sodium-glucose co-transporter 2 (SGLT2) inhibitor typically used for the treatment of Type II diabetes, is the first in its class to be approved for New York Heart Association's functional class II-IV heart failure with reduced ejection fraction despite a patient's diabetes status. It has been proposed that in addition the SGLT2's effects on antidiuretic hormone, it has effects on myocardial metabolism, ion transporters, fibrosis, adipokines, and vascular function, but the mechanism of their cardiac effects are not fully known. A randomized, double-blind, placebo-controlled study of 4,744 participants with New York Heart Association class II, III, or IV heart failure and an ejection fraction of 40% or less evaluating 10 mg Farxiga compared to placebo showed the Farxiga group experienced less cardiovascular deaths, hospitalizations, and urgent heart failure visits.

HFrEF is initiated by an index event that impairs the heart's ability to contract and relax leading to a decrease in cardiac output. This results in the activation of several compensatory mechanisms the body employs to maintain circulation: sympathetic nervous system activation leading to tachycardia and increased contractility, increases in preload, vasoconstriction, and ventricular hypertrophy and remodeling. When activated over long periods of time, these mechanisms result in detrimental effects including increased myocardial volume oxygen $(MVO)_2$, increased afterload, systemic congestion and pulmonary edema, decreased B1 sensitivity, diastolic/systolic dysfunction, risk of arrythmias, and risk of myocardial cell death. Patients with heart failure can present with a myriad of symptoms ranging from asymptomatic to cardiogenic shock. Patients typically present with fatigue and dyspnea which leads to exercise intolerance and pulmonary edema. There is no test to confirm the diagnosis of heart failure but rather identification of a clinical syndrome with specific signs and symptoms. The echocardiogram is the most useful evaluation tool to assess cardiac abnormalities. A thorough history, physical examination, and laboratory testing can also provide useful insight on the underlying cause. As heart failure contributed to 1 out of 8 deaths in the US in 2017, researchers are looking for more ways to treat the disease and prevent disease progression. Farxiga offers another option in treating heart failure.

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