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Journal of Cardiology Research and Cardiovascular Diseases

Volume 1, Issue 1

Commentary | Open Access

Insights into Device-Based Interventions in Heart Failure with Preserved Ejection Fraction: A Commentary

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Received: May 09, 2023; **Accepted:** May 25, 2023; **Published:** June 03, 2023

Citation: Starling R. Insights into Device-Based Interventions in Heart Failure with Preserved Ejection Fraction: A Commentary. J Cardiol Res Cardiovasc Dis. 2023;1(1):27-29.

INTRODUCTION

The clinical syndrome of heart failure is characterized by common symptoms such as dyspnea, heel swelling, and fatigue, along with signs of structural or functional heart problems like elevated intravascular venous pressure, pulmonary edema, and peripheral edema. The prevalence of heart failure continues to rise globally each year, attributed to factors such as malnutrition, obesity, and the increasing incidence of diabetes mellitus. Other contributing factors include rising alcohol consumption, smoking, high blood pressure, and tobacco use [1].

The pathophysiology of chronic heart failure involves a complex interplay of circulatory and neurohormonal system abnormalities, leading to the onset of persistent symptoms. In healthy individuals, the vasodilator and vasoconstrictor neurohormonal systems are in balance. However, in chronic heart failure, various circulatory and neurohormonal system dysfunctions come into play, disrupting this balance. Natriuretic peptides, particularly B-type natriuretic peptide (BNP), exert significant effects on the heart and kidney. These effects include reduced arterial blood pressure, vasodilation, increased diuresis and natriuresis, enhanced soft tissue filtration, decreased secretion of renin and aldosterone, as well as antihypertensive and antifibrotic effects. Additionally, natriuretic peptides induce lipolysis and mitochondrial biogenesis, contributing to their diverse physiological impact on the organism [1].

DISCUSSION

The clinical understanding of heart failure has been significantly shaped by the study of natriuretic peptides, particularly Atrial Natriuretic Peptide (ANP) and B-type Natriuretic Peptide (BNP). ANP, stored in atrial pellets as a propeptide, is released into the bloodstream in response to atrial tension. BNP, found in atrial pellets and

ventricles, is elevated in patients with congestive cardiovascular failure, making it a crucial biomarker in the field of medicine [2].

Research emphasizes the pivotal role of BNP and NT-pro BNP tests in diagnosing heart failure. These biomarkers have become essential intermediaries of the cardiovascular system, influencing contemporary cardiology practices. Integrating BNP as a therapeutic target has the potential to revolutionize heart failure care. Studies also advocate combining natriuretic peptide measurements with echocardiography to assess clinical symptoms in dyspnea patients, enhancing the accuracy of heart failure diagnosis and prognosis [3].

Furthermore, understanding the link between heart failure and other health conditions, such as diabetes and obesity, is crucial. Studies have explored the impact of body mass index on BNP and pro-BNP levels, highlighting the connection between obesity and heart failure risk. Pre-diabetes, too, has been studied for its complications in heart failure patients, revealing the importance of glycemic control in managing the disease [3].

In the realm of heart failure treatment, device-based therapies have advanced significantly. Cardiac defibrillator implantations and cardiac resynchronization therapy are gaining popularity. Implantable Cardioverter Defibrillators (ICDs) effectively address bradycardia and ventricular arrhythmias, preventing sudden death. Cardiac resynchronization therapy improves heart function, symptoms, and overall patient condition, lowering mortality and relapse rates. However, the decision to implant an ICD should be made after considering the patient's prognosis and potential complications, ensuring the treatment aligns with the patient's goals and quality of life [5].

CONCLUSION

Treating patients with Heart Failure with Reduced Ejection Fraction (HFrEF) involves extensive research into various approaches, including device therapy and complex conservative treatments like sacubitril/valsartan (SAS) that target the renin-angiotensin-aldosterone system and natriuretic peptides. Despite the wealth of research, there's a scarcity of studies comparing these treatment methods.

Patients undergoing Cardiac Resynchronization Therapy (CRT) face potential trauma and surgery-related complications, necessitating careful consideration and informed decision-making. CRT recipients often need to take time off work, adding another layer of complexity. Additionally, CRTs come with a significant financial burden compared to standard treatments. In contrast, sacubitril/valsartan-based complex pharmaceutical therapy appears to be a more cost-effective option. Not only does it potentially enhance functional performance without compromising patient well-being, but it also offers economic advantages, benefiting both healthcare systems and patients alike.

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