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New Modalities in Diagnosis and Management of Heart Failure

Essay

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By

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Abstract

Introduction: Heart failure (HF) was classically viewed as synonymous with left ventricular pump dysfunction, usually progressive, resulting in a common end-stage cardiac phenotype of dilation, thinned walls, and poor contractility**.**

New modalities in management of are promising as Angiotensin receptor-neprilysin inhibition with LCZ696, new aldosterone receptor blockers, serelaxin, ularitide, etc

Aims: The aim of the essay is to throw a light on new modalities used for diagnosis and management of heart failure.

Summary: Heart failure (HF) is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood. The cardinal manifestations of HF are dyspnea and fatigue, which may limit exercise tolerance, and fluid retention, which may lead to pulmonary and/ or splanchnic congestion and/or peripheral edema.

Keywords: New Modalities, Diagnosis, Management, Heart Failure

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List of Abbreviations

ACC : American College of Cardiology

ACE : Angiotensin converting enzyme

ACE-I : Angiotensin converting enzyme inhibitor

ACS : Acute coronary syndrome

ADHF : Acute decompensated heart failure

AF : Atrial fibrillation

AHF : Acute heart failure

ANG : Angiotensin

ANP : Atrial natriuretic peptide

ARB-II : Angiotensin II receptors blockers

ARNI : Angiotensin receptors-neprylisin inhibitor

AT1 : Angiotensin type 1

BMI : Body mass index

BNP : Brain natriuretic peptide

b.p.m : Beat per minute

BUN : Blood urea nitrogen

CABG : Coronary artery bypass graft

CAD : Coronary artery disease

CBC : Complete blood count

CCB : Calcium-channel blocker

c GMP : Cyclic guanosine monophosphate

CHF : Chronic heart failure

CLI : Critical limb ischemia

CNP : c-type natriuretic peptide

CO : Cardiac output

COMET : Carvedilol or Metoprolol European Trial

COPD : Chronic obstructive pulmonary disease

CRP : C-reactive protein

CRT : Cardiac resynchronization therapy

CV : Cardiovascular

DC : Dentritic cells

ECG : Electrocardiogram

EF : Ejection fraction

ESC : European Society of Cardiology

GFR : Glomerular filtration rate

GTP : Guanisine triphosphate

HF : Heart failure

HFNEF : Heart failure with normal ejection fraction

HFpEF : Heart failure with preserved ejection fraction

HFrEF : Heart failure with reduced ejection fraction

HFSA : Heart Failure Society of America

HIV : Human immunodeficiency virus

HMG COA : Hydroxymethylglutaryl-CoA

HR : Heart rate

hs-CRP : High-sensitivity C-reactive protein

ICD : Implantable cardioverter-defibrillator

IV : Intravenous

JVD : Jugular venous distension

LFTs : Liver function tests

LV : Left ventricular

LVEDP : LV End-Diastolic Pressure

LVEF : Left ventricular ejection fraction

MAP : Mean arterial pressure

MI : Myocardial infarction

MRA : Mineralocorticoid receptor antagonist

NO : Nitric oxide

NP : Natriuretic peptide

NPR-A : Neprylisin receptor-A

NSAIDs : Non steroidal anti inflamatory drugs

NT-pro BNP: N-terminal pro-B-type natriuretic peptide

NYHA : New York Heart Association

PTX3 : Pentraxins

PUFA : Polyunsaturated fatty acids

RAAS : Renin–angiotensin– aldosterone system

RALES : Randomized aldactone evaluation study

RV : Right ventricular

SAP : Serum amyloid P component

SCD-HeFT : Sudden Cardiac Death in Heart Failure Trial

SDF-1 : Stromal cell-derived factor-1

SNS : Sympathetic nervous system

SV : Stroke volume

TNF- α : Tumor necrosis factor α

TPR : Total peripheral resistance

TSH : Thyroid stimulating hormone

UA : Urine analysis

U.S. : United States

VEGF : Vascular endothelial growth factor

VT : Ventricular tachycardia

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Introduction

Heart failure (HF) was classically viewed as synonymous with left ventricular pump dysfunction, usually progressive, resulting in a common end-stage cardiac phenotype of dilation, thinned walls, and poor contractility **(Mann and Bristow, 2005).**

The prevalence of HF follows an exponential pattern, and it rises with age. Heart failure affects 6% to 10% of people over the age of 65 years. Although the relative incidence is lower in women than in men, women constitute at least half of the cases of HF because of their longer life expectancy. In the United States (U.S.), the treatment of HF has a direct cost of over $34 billion per year, most of which results from hospitalization **(Fang et al., 2008)**.

Heart failure may be caused by myocardial failure but may also occur in the presence of near-normal cardiac function under conditions of high demand. Heart failure always causes circulatory failure, but the converse is not necessarily the case, because various noncardiac conditions (eg, hypovolemic shock, septic shock) can produce circulatory failure in the presence of normal, modestly

impaired, or even supranormal cardiac function. To maintain the pumping function of the heart, compensatory mechanisms increase blood volume, cardiac filling pressure, heart rate, and cardiac muscle mass. However, despite these mechanisms, there is progressive decline in the ability of the heart to contract and relax, resulting in worsening heart failure **(O'Riordan, 2014)**.

Most patients admitted to the hospital with HF have a worsening of chronic HF, although 15% to 20% of HF hospitalizations represent new diagnoses of HF. Patients with a new diagnosis of HF are much more likely to present with pulmonary edema or cardiogenic shock, while decompensation of chronic HF usually presents with other signs of congestion and fluid retention, such as weight gain, exertional dyspnea, or orthopnea. These symptoms can begin days or weeks before presentation. A history of coronary artery disease (CAD) is present in 60% of patients, hypertension in 70%, diabetes in 40%, and renal impairment in 20% to 30%. At presentation, most HF patients are relatively normotensive. Patients admitted with HF having a relatively preserved left ventricular ejection fraction (LVEF) tend to be older, female, and more likely to present with severe hypertension **(Fonarow et al., 2007)**.

Evidence-based treatment of heart failure includes Angiotensin-Converting Enzyme Inhibitors (ACE-I), Angiotensin II Receptor Blockers (ARB-II's), β-blockers, diuretics, aldosterone antagonists,and digitalis. They have shown their efficacy in improving the symptoms and natural history of heart failure independently of its cause. Diuretic therapy is certainly effective in improving symptoms in heart failure patients **(Flather et al., 2000)**.

New modalities in management of are promising as Angiotensin receptor-neprilysin inhibition with LCZ696, new aldosterone receptor blockers, serelaxin, ularitide, etc **(McMurray, 2013).**

Aim of the Work

The aim of the essay is to throw a light on new modalities used for diagnosis and management of heart failure.