An Overview on Heart Failure

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Introduction:

Heart failure is a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood. The cardinal manifestations of heart failure are, dyspnea and fatigue limiting exercise tolerance and fluid retention. This may lead to pulmonary and/or splanchnic congestion and/or peripheral edema.[1]

As some patients present with sign and symptom of volume overload, the term "Heart Failure" is preferred over "Congestive Heart Failure". There is no single diagnostic test used for diagnosis of heart failure. It is largely a clinical diagnosis based on a careful history taking and physical examination. However, ECG, chest X-Ray, echocardiography and natriuretic peptides are supportive investigation tools used in the flowchart for diagnosis of heart failure.[1]

Heart failure may be associated with a wide spectrum of left ventricular functional abnormalities. In most patients's abnormalities like systolic and diastolic dysfunction coexist. Ejection Fraction (EF) is considered important in classification of patients with heart failure. EF values are dependent on imaging techniques. Normally it is more than 60%. Heart failure according to guideline is referred as with preserved EF (HF_pEF) i.e. EF > 40% and heart failure with reduced EF (HF_rEF) i.e. EF ≤40% respectively.[1]

Indexing words: Heart failure, HF_pEF, HF_rEF, Overview

Epidemiology:

The lifetime risk of developing heart failure is 20% in Americans ≥40 years of age. In US 6.5 million cases of heart failure are diagnosed annually. Heart failure incidence increases with age and raises from approximately 20 per thousands in individuals of 65-69 years to > 80 per thousands in individual ≥85 years of age.[1]

In Europe, prevalence of asymptomatic ventricular dysfunction is evident in about 4% of the population. Prevalence is 70-80 years old people are in between 10-20 %. Overall 50% of the patients are dead at 4 years. Heart failure in overall population is between 2-3%. 40% patients admitted in hospital are dead or readmitted within 1 year.[2]

In Bangladesh due to lack of national surveillance and registry such data are lacking. However, data published from National Institute of Cardiovascular Disease (NICVD) in a manual showed that approximately 1-2 % of the adult population has heart failure with prevalence risen to more than 10% annually in persons of 70 years of age and older. The picture is almost identical in other developed countries.[3]

Other than hypertension and coronary artery disease, Bangladesh has still to face the burden of Rheumatic Heart disease as a cause of heart failure.[3]

Blacks have highest risk of heart failure. In the ARIC (Atherosclerotic Risk In Community) study,[4] incidence is highest among the black men than among the white women. Blacks have a greater 5- year mortality than whites.

ARIC and Multi Ethnic Study of Atherosclerosis (MESA)[5] also showed that HF incidence was higher in blacks than in the whites. In both studies the difference between blacks and whites were attempted and overall the greater HF incidence in blacks was observed to be related to their greater burden of atherosclerotic risk factors as well as to socioeconomic status.

Etiology:

For LV systolic dysfunction, common causes are damage or loss of heart muscle due to acute or chronic ischemia, increased ventricular resistance as in hypertension, the development of tachyarrhythmia such as atrial fibrillation (AF). Coronary heart disease (CAD) by far the commonest cause (70%), valve disease accounts for 10% and cardiomyopathy 10% and others 10%.[2]

Diastolic dysfunction (HFpEF) in general population is are usually due to hypertension,

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obesity, coronary artery disease (CAD), Diabetes mellitus (DM), renal disease, atrial fibrillation (AF) and hyperlipidemia. Age and sex (common in female sex) are also important independent predictors in both HFrEF and HFpEF.[1]

Classification & Presentation of heart failure[1]:

	EF	Description
HFrEF	≤40%	Referred as systolic HF
HFpEF	≥40%	Referred as diastolic HF
HFpEF Borderline	41-49%	Borderline or intermediate group
HFpEF Improved	>40%	Subset of patients who has improved and previously had HFrEF

Several criteria have been proposed to define the syndrome of HFpEF. This includes,[1]

a. clinical signs symptoms of heart failure
b. evidence of preserved or normal LVEF (variably classified as EF>40%, EF>45%, EF>50%, and ≥55%) and,
c. evidence of LV diastolic dysfunction that can be determined by Doppler echocardiogram or cardiac catheterization.

Asymptomatic LV dysfunction:
The prevalence of asymptomatic LV systolic and diastolic dysfunction ranges from 6-21% and increases with age. In community based population in US asymptomatic mild diastolic LV dysfunction was seen 21% and moderate to severe diastolic LV dysfunction in 7% and both were associated with increased risk of symptomatic heart failure and mortality.

Its synonym "Pre-clinical Diastolic Dysfunction (PDD)" have a significantly higher risk of progression to heart failure and death compared with patient without PDD.[6]

Heart failure significantly decreases Health Related Quality of Life (HRQOL). Lack of improvement of HRQOL after discharge from hospital is a powerful predictor of re-hospitalization and mortality.

Women with HF are found to have poorer HRQOL than men. Other determinants include- depression, older age, higher body mass index (BMI), lower systolic blood pressure and sleep apnea. Angiotensin converting enzyme inhibitors (ACE inhibitors) and angiotensin receptor blockers (ARB) improves HRQOL only modestly and delay the progressive worsening of HRQOL in heart failure.

Only therapy shown to improve HRQOL is cardiac resynchronization therapy (ACRT). Self-care exercise may also improve HRQOL.[1]

Risk factors:
Important risk factors of HF are,[1]
Hypertension- Long term treatment of both systolic and diastolic hypertension reduces the risk of heart failure by approximately 50%.

DM- Obesity and insulin resistance are important risk factors for development of heart failure.
Metabolic syndrome- Includes any three of the following- abdominal adiposity, hyper triglyceridaemia, low High density lipoprotein (HDL), HTN and fasting hyperglycemia.

Atherosclerotic disease- Patient with known atherosclerotic disease of coronary, cerebral or peripheral blood vessels are likely to develop heart failure.

Hospitalization: HF is the primary diagnosis in >1 million hospitalization annually. Patients hospitalized for HF are at high risk for 1-month readmission rate of 25%. The total cost of HF care in the United States exceeds $40 billion annually.[1]

Mortality: Although survival has improved, the absolute mortality rates for HF remains approximately 50% within 5 years of diagnosis. In the ARIC study, the 30-day, 1-year and 5-year case fatality rates after hospitalization for HF were 10.4%, 22% and 42.3% respectively.[1]

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