

### **NYHA Classification of Heart Failure (functional classification)**

**Class I:** No limitation of physical activity. No dyspnea, fatigue, or palpitations with ordinary physical activity.

- **Class II:** Slight limitation of physical activity. These patients have fatigue, palpitations, and dyspnea with ordinary physical activity but are comfortable at rest.

- **Class III:** Marked limitation of activity. Less than ordinary physical activity results in symptoms, but patients are comfortable at rest.

- **Class IV:** Symptoms are present at rest, and any physical exertion exacerbates the symptoms.

#### **Staging of heart failure:**

The American Heart Association/American College of Cardiology (AHA/ACC) classifies HF into four stages, reflecting the fact that HF is a progressive disease, whose outcome may be modified by early identification and treatment.

Stages A denote patients with risk factors that predispose to the development of HF, such as coronary artery disease, hypertension, and diabetes, and have neither cardiac changes nor symptoms of HF.

Stage B denote patients with risk factors that predispose to the development of HF, such as coronary artery disease, hypertension, and diabetes, but who do not have cardiac changes but not having symptoms of HF. Patient demonstrate left ventricular hypertrophy (LVH) or asymptomatic LV dysfunction

Stage C denotes patients with past or present symptoms of HF associated with underlying structural heart disease (the bulk of patients).

stage D designates patients with features of advance heart failure.

Management of heart failure include .

**A) Correction of underlying Reversible Causes.** Like: valvular lesions, myocardial ischemia, (surgical correction of the valve lesion, intracardiac shunts, correction of coronary lesion and controlling hypertension, withdrawal drug-induced myocardial depression, Calcium channel blockers (specifically verapamil or diltiazem) thiazolidinediones or drug causes fluid retention like NSAID which may be important contributors to worsening heart failure. Correction of anemia, thyrotoxicosis. Also it the treatment include : B) General measures C ) Pharmacological therapy. D) Other measures.

- **The general measures include:**

- Weight reduction.

- Avoid excessive salt no extra salt on the table.

- Smoking Cessation. Avoid alcohol.

- Exercise: regular moderate aerobic exercise within limits of symptoms

- Vaccination :Consideration of influenza and pneumococcal vaccination.

..the pharmacological therapy include

- **Diuretics.**

- **angiotensin converting enzyme inhibitor.**

- **Angiotensin receptor blocker.**

- **B blocker.**

- **vasodilators drugs.**



- Digitalis.

**Diuretics:** They are medications used to increase the amount of water and salt excretion from the body hence increase urine volume.

- These are the most effective means of providing symptomatic relief to patients with moderate to severe CHF, There are four types of diuretic medications are called:
- carbonic anhydrase inhibitor.
- Thiazide diuretic.
- loop diuretic.
- potassium-sparing diuretics.

Thiazide diuretics like (Chlorothiazide, hydrochlorothiazide, 25–100 mg, metolazone, 2.5–5 mg, chlorthalidone, 25–50 mg) these drugs often provide better control of hypertension than short-acting loop agents. They are generally ineffective when the GFR falls below 30–40 mL/min, which is not infrequent occurrence in patients with severe heart failure. Their side effects include hypovolemia with resulting prerenal azotemia, hypokalemia, hyperglycemia, hyperuricemia, skin rashes, neutropenia and thrombocytopenia, hepatic dysfunction.

**Loop diuretics:** like furosemide (20 – 320) Mg daily, Bumetanide Mg 1 -8 mg/daily and Torsemide (20–200 mg daily). These agents have a rapid onset and short duration of action. They are active in severe kidney disease. Very effective. In acute situations (pulmonary edema) can be given I.V particularly acute heart failure with pulmonary edema and when gastrointestinal absorption is in doubt. Their side effect include: volume depletion, dehydration, hypotension and prerenal azotemia, Hypokalemia, skin rashes, gastrointestinal distress and ototoxicity.

**Potassium sparing diuretics include** Spironolactone = Eplerenone, triamterene, Amiloride which act on the distal tubule to reduce potassium secretion. they may minimize the hypokalemia induced by more potent agents. They are mild potency diuretic and not adequate for most patients with heart failure that is why they are Often Useful In Combination With The Loop Diuretics And thiazides. Spironolactone improve survival of patients with heart failure. their side effects are hyperkalemia, gastrointestinal symptoms and gynecomastia.

**Angiotensin enzyme inhibitor (ACE inhibitor)** Like Captopril, enalapril, lisinopril, pindopril

ACE inhibitors should be considered as a part of the initial therapy in patient with symptomatic or asymptomatic LV systolic dysfunction this fact based on ACE inhibitors reduce mortality by 20% patients with HF also it reduce the rate of hospitalizations and increase exercise tolerance, with reduction of HF symptoms. their side effects include Hypotension, so start captopril (6.25) mg Impair renal function One should monitor renal function and serum K 2 weeks later, cough Neutropenia. And bitter taste.

**Angiotensin receptor blocker** include : valsartan, losartan, telmisartan, Irbesartan, candesartan.

Cough is rare side effect that is why they Can be used when patient can not tolerate ACEI.

**B blocker** as metoprolol, Bisoprolol, carvedilol. **Their uses in** chronic heart failure based on their life-saving benefits. chronic elevations of catecholamines and sympathetic nervous System Activity Cause Progressive Myocardial Damage Leading To Worsening LV Function And dilation. B blocker should be used with *stable* patients (defined as having no recent deterioration or evidence of volume overload) unless there is a noncardiac contraindication



**Digoxin** drug used to control heart rate in patient with rapid atrial fibrillation (AF) and it is used only in advance heart failure and rapid AF.

**Vasodilator drug** like Oral hydralazine is a potent arteriolar dilator and markedly increases cardiac output in patients with CHF. The combination of hydralazine and isosorbide Dinitrate Has Improved survival and they used in advance heart failure.

### C. Nonpharmacologic Treatment include :

- **Implantable cardioverter defibrillators:** these devices are indicated in patients with symptomatic ventricular arrhythmias and heart failure, since they improve prognosis and survival.
- **Biventricular pacing (resynchronization) CRT** In Patients with wide QRS complexes with marked intraventricular conduction delay, prolonged depolarisation (generally  $\geq 120$  milliseconds), reduced EFs, and moderate to severe symptoms and sinus rhythm. This is associated with improved symptoms and survival
- **Coronary revascularisation:** CABG, PTCA intervention may improve function
- **Cardiac transplantation** for patients with intractable heart failure.
- **Ventricular assistant device.**

The medical management of HF is applied with a graduated approach, depending on the stage of the disease. For stages **A and B**, management begins with risk reduction and includes the identification and treatment of underlying medical problems such as hypertension, atherosclerotic disease, diabetes, obesity, and metabolic syndrome (abdominal obesity, elevated blood glucose, dyslipidemia, hypertension). In addition, behavioral modification is promoted for smoking cessation, weight loss for the obese patient, reduction of risk factors for cardiovascular disease, mild aerobic exercise, adequate rest, and avoidance of alcohol. Drug therapy may be indicated for the treatment of patients with vascular disease or diabetes in stage A, as well as for those with ventricular dysfunction in stage B like Beta-blockers and ACE inhibitors or ARBs in appropriate patients.

For stage C Provide all measures for stage A, and B plus diuretics therapy including potassium sparing drugs, dietary salt restriction, plus Beta-blockers and ACE inhibitors (or ARBs) and, digitalis, hydralazine/nitrates.

Treatment of patient with **STAGE D (PATIENTS WITH REFRACTORY HF REQUIRING SPECIAL INTERVENTIONS)** Provide all measures for stage A, B and C with Devices in selected patients: biventricular pacing, implantable defibrillators Use heart transplant, chronic inotropes, permanent mechanical support, experimental drugs, or surgery.

**Dental Management of the Patient With Heart Failure** Evaluate patient for history, symptoms or signs, of heart failure (HF).

- For patients with symptoms of untreated or uncontrolled HF, deferral elective dental care and refer to physician For diagnosis, treatment of HF and to Confirm clinical status of the patient ( which class of New York Heart Association (NYHA) the patients will be) .ask about drug intake especially anticoagulant drug like warfarine dabigatran and revaroxiban. For **Class I and II** (asymptomatic)— class I & II after Obtaining medical consultation with physician one can provide routine dental care..after ensuring that controlling any risk factors the patient have..
- for patients with **NYHA class III and class IV** —Obtain consultation with physician; Consider treatment in hospital setting.
- Identify underlying cardiovascular disease (i.e., coronary artery disease, hypertension, cardiomyopathy, valvular disease), and manage appropriately in cooperation with physician.
- Schedule short, stress-free appointments

- Drug considerations: For patients taking digitalis, avoid use of vasoconstrictors in local anesthesia (avoid epinephrine) if considered essential, use cautiously (not more than 0.036 mg epinephrine or 0.20 mg levonordefrin). Avoid epinephrine-impregnated retraction cord avoid gag reflex.as much as possible Avoid erythromycin and clarithromycin, which may increase the absorption of digitalis and lead to toxicity and increase the risk of arrhythmias . Use semisupine or upright chair position. Watch for orthostatic hypotension, make position or chair changes slowly, and assist patient into and out of chair.Avoid the use of nonsteroidal antiinflammatory drugs (NSAIDs). Nitrous oxide/oxygen sedation may be used with a minimum of 30% oxygen.

Thank you