

Introduction

HF is a complex syndrome associated with a high rate of hospitalization and short-term mortality, especially in elderly patients with comorbidities. Its prevalence continues to grow and places a large burden on health care facilities and cost. Early diagnosis and treatment can prevent complications.

Successful HF management begins with an accurate diagnosis. All patients should have an objective determination of left ventricular ejection fraction (LVEF) by echocardiogram, or radionuclide ventriculogram (RNV) if echocardiogram is unavailable. Underlying vascular risk factors, comorbidities and other chronic diseases should be identified and appropriately treated. Education of the patient and caregivers should be tailored, performed and periodically repeated. Encourage the patient to accept responsibility for their HF care through an individualized management plan with self-care objectives, including salt restriction, weight monitoring and medication adherence strategies. Reinforce the importance of healthy lifestyle modifications, including healthy eating, regular exercise, weight management, social support and smoking cessation.

Treatment requires combination drug therapy. All systolic HF Patients should receive an ACE-I and a BB at target dose unless contraindicated. These therapies should be considered in all patients with HF with PSF. Additional therapy should be guided by clinical situation. As polypharmacy remains a concern - matching drugs to goals of treatment should be the aim. Care should be individualized based on symptoms, underlying cause, disease severity and goals of care. Plan effective systems to ensure follow-up and patient education to improve outcomes. Engage patients in open discussions on the prognosis of HF at the earliest appropriate time.

Aim of the Heart Failure Clinic

To implement a University Hospital lead heart failure service that will improve the quality of life and longevity of the patients. To provide a model that will eventually be applied to other major hospitals in the island and possibly the Caribbean region.

Objectives:

- Empower patients through education and support
- Early follow-up after hospitalization
- Intensified patient education
- Prolong event free survival
- Decrease the number of hospital admissions
- Improve compliance and self-care behaviour
- Improve quality of life

Diagnosis of Heart Failure

Heart Failure is a clinical syndrome that is diagnosed based on the associated symptoms and signs. For the purpose of identifying the patients eligible for entry into the Heart Failure clinic the Framingham Criteria for Diagnosis. This is to assist in the standardization of the diagnosis and comparison of the various patients should analysis be necessary for future research. The criteria is described in the table below.

Criteria for diagnosis of heart failure (Framingham CHF Criteria)

- Major (requires 1 or more criteria positive)
 - Acute pulmonary edema
 - Cardiomegaly
 - Hepatojugular reflux
 - Neck vein distention
 - PND or orthopnea
 - Third heart sound
- Minor (requires 2 or more criteria positive)
 - Ankle edema
 - Dyspnea on exertion
 - Hepatomegaly
 - Nocturnal cough
 - Pleural effusion
 - Tachycardia (HR >120/min)
- Heart failure diagnosis requires 1 major and 2 minor criteria
- This criteria has a sensitivity 97% and a specificity 79%

Evaluation of HF should include:

A thorough history and physical exam focusing on: Current and past symptoms of HF (i.e. fatigue, shortness of breath, diminished exercise capacity and fluid retention/weight gain), Functional limitation by New York Heart Association (NYHA) Class, Cardiovascular risk factors, cardiovascular disease, and other comorbid conditions. Assessment of a patient's endurance, cognition, and ability to perform activities of self-management and daily living. Assessment of volume status (e.g. peripheral edema, rales, hepatomegaly, ascites, weight, jugular venous pressure, and postural hypotension).

Initial investigations in all patients (where available):

Complete blood count, serum electrolytes, creatinine (Cr), eGFR, urinalysis, microalbuminuria, fasting blood glucose, fasting lipid profile, AST, albumin and thyroid-stimulating hormone (TSH), 12-lead electrocardiogram and chest radiograph. All patients should have an objective determination of LVEF by transthoracic echocardiogram (preferred as it also provides information on cardiac dimensions, valvular function and may suggest the underlying etiology of HF) or RNV if echocardiogram is unavailable. BNP has high diagnostic value for both types of HF and is recommended where available, when diagnosis is

unclear. The use of BNP in non-acute heart failure and community outpatient practice remains to be clarified. In cases where there is doubt, or an objective determination of LVEF is not immediately available, response to a therapeutic trial may increase the diagnostic accuracy. When the etiology of HF is uncertain, consider referral for more specialized cardiac testing as clinically indicated.

Criteria for admission to the Heart Failure Clinic

There are different pathways for referral to the Heart Failure Clinic and this will depend on whether the patient is being referred as an inpatient or if they are being referred from a physician outside of the hospital system. The following pathways are as outlined below.

- Inpatient ward discharge
 - All patients diagnosed with heart failure , New York Heart Association class II- IV, that have been seen by the cardiologist on service is given an appointment to the clinic within 2-3 weeks post-discharge and a general cardiology clinic appointment as per usual protocol.
 - Patients thought to have heart failure by a non-cardiology team should be referred to the cardiology team
 - At the time of discharge the discharge checklist (document prepared by Dr. Edward Chung) should be completed.
 - 3 days after discharge from the ward the heart failure nurse to speak about any symptoms of worsening heart failure or medication concerns.
- Outpatient clinic referral
 - Patients referred from outside physicians or from other clinics with a possible diagnosis of heart failure have to be seen
- All patients should have or be given a referral for the investigations listed below prior to their first visit to the heart failure clinic
 - CBC, U&E, Uric acid
 - ECG
 - Echocardiogram
 - Chest X-ray
 - Pro-BNP

New Patient Workflow

For the patients who come to the clinic for the first time they will require registration so that their visit can be logged and a docket may be made if one was not done prior to this. After registration the patient then goes to the heart failure nurse who will measure their vital signs and weight. For all the first time patients there is a group education session lasting approximately 30 minutes. Following this will be a short group discussion with the nurse on an overview of heart failure and the patient's understanding of same. This is to ensure that there is a baseline understanding by the patients of their condition. The next

step would be individual meeting with the heart failure nurse. The role of the heart failure nurse is outlined below. The next appointment should be given by the heart failure nurse at the conclusion of the interview. After the visit with the nurse has concluded the patient will then move on to speak with the pharmacist. The role of the pharmacist is outline below.

Old patient workflow

The workflow of the old clinic patients is similar to the new patient visit minus the group session. The workflow is outlined below.

- Registration
- Vital signs- pulse rate, blood pressure
- Nurse encounter
- Pharmacist encounter

Role of the Heart Failure Clinic Nurse

- Patient education on compliance, dietary or symptom monitoring
- A complete list of medication the patient is currently taking should be documented
- Ensure patient has been referred for cardiac rehab and to the dietician
- Documentation of NYHA status should be done.
- Evaluate heart failure status- observation of JVP, inspection of edema, auscultation of heart and lungs.
- Evaluate optimization of therapy
- Give education on heart failure
- If treatment needs to be optimized the cardiologist with responsibility for the clinic is to be consulted and the treatment changed as per current guidelines
- Encourage exercise, smoking cessation and vaccination
- If the patient is unstable or not fully optimized medically then they are given another appointment to return to the heart failure clinic.

Role of the Pharmacist

Education on the types of medication the patient is taking and what effect/side effects they may have

Observe for any potential drug interactions

Pharmacological Treatment of Heart Failure

ACE inhibitors

All patients with symptomatic heart failure and/or evidence of LVSD (EF <40%) should be treated with an ACE inhibitor [ACEI]. ACEIs are associated with a 24% reduction in mortality in people with heart failure.

People with a recent myocardial infarction and evidence of LVSD should receive an ACEI

There is no evidence of any clinically important differences between ACEIs. However, not all ACEIs have a full 24-hour duration of action. People should be treated with the cheapest ACEI titrated to the recommended therapeutic dose [or the maximum dose that they can tolerate]:

ACEIs can delay the development of symptomatic heart failure and reduce cardiovascular events in patients with asymptomatic LVSD. Around 74 patients with heart failure need to be treated for one year with an ACEI [in the recommended dose] to prevent one death.

DRUG	STARTING DOSE	TARGET DOSE
Captopril	6.25mg po tds	50mg po tds
Enalapril	2.5mg po bd	20mg po bd
Lisinopril	2.5mg po od	80mg po od
Perindopril	2.5mg po od	10mg po od
Ramipril	1.25mg po od	10mg po bd

Angiotensin 2 receptor blockers

Evidence exists of similar benefit [reduced mortality] to ACE inhibitors. ARBs should be used in patients who are truly intolerant of ACEIs and not as first line therapy if an ACEI can be used. Combination with an ACEI is strongly discouraged and should only be used where the specialist has determined that the benefits outweigh the risk.

DRUG	STARTING DOSE	TARGET DOSE	TITRATION
Irbesartan	150mg po od	300mg po od	Double dose q2/52
Losartan	50mg po od	150mg po od	Increase by 50mg q2/52
Telmisartan	80mg po od	160mg po od	
Valsartan	40mg po bd	160mg po bd	Double dose q2/52

Loop diuretics

People with signs of sodium and water retention [raised JVP, peripheral oedema] should receive diuretic therapy. Adding an ACEI to diuretics results in:

- Improved symptoms and signs of all grades of heart failure
- Improved exercise tolerance
- Slowing of progression from mild to severe heart failure

- Reduced hospital admission rates
- Improved survival in all grades of heart failure

Aldosterone Antagonists

People already treated with a loop diuretic, ACEI and a Beta Blocker +/- digoxin who have moderate or severe heart failure [NYHA grade III or IV] and EF < 35% should be considered for low dose aldosterone antagonist. This can be spironolactone 12.5- 25mg od or eplerenone 25 - 50 mg od. This has been shown to reduce mortality and hospital admissions. Plasma U&Es should be monitored.

DRUG	DOSE
Spironolactone	25mg po od
Eplerenone	50mg po od

β-blockers

People already treated with diuretics, an ACEI and/or digoxin, who are clinically stable with mild to moderate heart failure [NYHA I-III], should be considered for a β-blocker licensed for this indication - currently Bisoprolol, Carvedilol and Metoprolol. In this clinical setting, β-blockers reduce the risk of death by 36%. This benefit is additional to that achieved by ACEIs alone.

β-blockers are most effective in people with mild symptoms and delay progression of their heart failure and reduce morbidity and mortality. In people with moderate heart failure, admission rates and mortality are reduced. Around 29 people treated with a recommended β-blocker for heart failure for one year will prevent one death – and only 21 people treated appropriately with both drugs.

β-blockers should be started at a low dose and titrated very slowly over weeks, if not months.

Transient worsening of symptoms and signs of heart failure, hypotension and/or fluid retention after commencing a β-blocker may be treated by adjusting doses of diuretics, reverting to the previous dose of β-blocker or temporarily discontinuing the treatment. If therapy has to be discontinued for more than 2 weeks, the starting dose should be tried again.

DRUG	STARTING DOSE	TARGET DOSE	TITRATION
Bisoprolol	1.25mg po od	10mg po od	Double dose q2/52
Carvedilol	3.125mg po bd	25mg po bd	Double dose q2/52
Metoprolol	12.5mg po bd	100mg po od	Double dose q2/52

Ivabradine

Should be considered in patients in sinus rhythm with a heart rate >70 bpm and EF < 35% and persistent symptoms, NYHA II-IV, despite treatment with evidence based therapy.

Dose adjustment for Ivabradine

- HR >60 bpm: Increase dose by 2.5 mg (given twice daily) up to a maximum dose of 7.5 mg BID
- HR 50-60 bpm: Maintain dose
- HR <50 bpm or signs and symptoms of bradycardia: Decrease dose by 2.5 mg (given twice daily); if current dose is 2.5 mg BID, discontinue therapy

DRUG	STARTING DOSE	TARGET DOSE	TITRATION
Ivabradine	5mg po bd	7.5mg po bd	q2/52 depending on heart rate

Digoxin

Digoxin may reduce admission rates for heart failure but has not been shown to reduce mortality. It is recommended for treating worsening heart failure in people already on a diuretic and ACEI. Digoxin is specifically indicated in the following clinical situations with heart failure:

- To control ventricular rate in the presence of atrial fibrillation [AF] when a β -blocker cannot be used;
- Moderate/severe symptoms [NYHA III-IV] and/or severe LVSD in addition to a diuretic and ACEI;
- Recurrent hospital admission for heart failure;
- Intolerance of ACEIs and ARBs [also consider Hydralazine and Isosorbide dinitrate combination].

Nitrates & Hydralazine

This combination should be considered for patients intolerant of ACE inhibitors and angiotensin 2 receptor blockers.

DRUG	STARTING DOSE	TARGET DOSE
H-ISDN	37.5/20mg po tds	75/40mg po tds

Oral Anticoagulation

Formal anticoagulation should be considered for all patients with heart failure who are in AF.

Criteria for discharge from the Heart Failure Clinic

Once patients achieve the ability to actively demonstrate self management plus;

- NYHA I/II HF (GP to optimise medication and review)
- NYHA III HF pharmacotherapy titrated to the maximum tolerated dose.

Clinical stability during the last 6 months

Discharge Route

Patients are discharged back to their original general practitioner or health centre with a standardized discharge letter.

Patients may be re-referred or self-referred back to the clinic if there have been any adverse change symptoms. (