ESC Chronic HF Guideline 2012

What is new and relevant to South Africa

Heart Failure Society of South Africa [HeFSSA]

HeFSSA is a special interest group within the SA Heart Association

SA Heart

INDEX

HEART FAILURE SOCIETY OF SOUTH AFRICA (HeFSSA) PERSPECTIVE ON THE EUROPEAN SOCIETY OF CARDIOLOGY (ESC) 2012 CHRONIC HEART FAILURE GUIDELINES

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Issued - July 2013
www. hefssa.org
In Press - SAMJ VOL 103, No 9 (2013)

1. INTRODUCTION

You are encouraged to read the complete guideline: European Society of Cardiology Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012, European Heart Journal 2012:33; 1787-1847.

The principal changes from the ESC Chronic Heart Failure 2008 guidelines relate to:

(i) New definition of Heart Failure with Reduced Ejection Fraction (HF-REF);
(ii) Expanded indication for mineralocorticoid (aldosterone) receptor antagonists (MRAs);
(iii) Indication for the sinus node inhibitor, ivabradine;
(iv) Expanded indication for cardiac resynchronization therapy (CRT);
(v) New information on the role of coronary revascularisation;
(vi) Role of ventricular assist devices.

2. DOCUMENT AIM

The aim of this document is to highlight new changes with particular emphasis on areas that are relevant to South Africa. These guidelines do not override the health professional's responsibility to make appropriate decisions according to the circumstances of the patient. It is also the health professional's responsibility to verify the locally approved indications for the drugs and devices mentioned in this guideline.

3. DEFINITION AND DIAGNOSIS

This guideline will focus on HF-REF. The old reference "left ventricular (LV) systolic dysfunction" is to be replaced with the term HF-REF. The new cut-off ejection fraction for HF-REF is a LV ejection fraction (EF) ≤ 50%.

Randomised HF-REF trials have used an entry LVEF <35%. Most of the medications indicated in HF-REF, have been studied in trials where the EF was <35%. The definition of HF-REF, however, is an EF < 50%. To avoid confusion between the inclusivity of the definition and the exclusivity of the randomized trials, we have taken a different approach to that of the ESC guideline. We have recommended the use of these agents in symptomatic patients with HF-REF in general. The ESC guideline states that those patients with an EF between 35-50% are in a "grey area", but taking into account the way clinical medicine is practiced, the inherent variability in EF assessments, and the need to treat symptomatic patients with an EF in the abnormal range, this document recognises the clinical need for more definitive recommendations. Randomised clinical trials are a crucial, but not the only guide in treating HF-REF patients. There always remain questions that are unanswered and groups of patients not studied, so prudent clinical decisions are required.

3.1. Clinical definition of heart failure

HF-REF is hereby defined as a syndrome in which patients have typical symptoms and signs resulting from an abnormality of LV systolic function.

It needs to be emphasised that heart failure is a syndrome and not a final diagnosis. Once the diagnosis of HF-REF has been made, it is important to establish the cause, in particular a reversible cause as well as a possible precipitating factor.

3.2. Diagnosis of HF-REF

1. The patient's medical history is important. The index of suspicion for HF-REF is increased in patients with suggestive symptoms and prior history of hypertension, coronary artery disease, chemotherapy and in peri-partum women. Importantly, HF-REF can present in patients with no prior relevant history.

2. Symptoms:
    1. Typical symptoms are breathlessness at rest or on exercise, fatigue, ankle and body swelling, orthopnoea, paroxysmal nocturnal dyspnoea and palpitations.
    2. Classifying severity of heart failure.

Symptoms are used to classify the severity of effort intolerance in CHF. The NYHA classification is recommended. (Table 1)

Table I: New York Heart Association classification

Class I	Patient with cardiac disease, but no limitation on ordinary physical activity.
Class II	Comfortable at rest, ordinary activity results in symptoms (slight limitation).
Class III	Comfortable at rest, less than ordinary activity results in symptoms (marked limitation).
Class IV	Symptomatic at rest, increased discomfort with any physical activity.

For common daily activities use examples:

- Walking distance on level ground:
  Class II – walk > 2 blocks on the level.
  Class III – walk less than 1 – 2 blocks.
- Number of stairs climbed:
  Class 1 – cope without symptoms.
  Class II – climb 1 flight at normal pace.
  Class III – climb less than 1 flight.
- Tolerance of uphill:
  Class I – cope without symptoms.
  Class II – symptomatic on walking uphill.
  Class III – Symptomatic on any incline.

Limitations of the NYHA classification:

- Ordinary physical activity is difficult to define and varies between individual patients and at different ages.
- Mild symptoms do not imply minor cardiac dysfunctions, and vice versa.

The NYHA FC classification is useful to prognosticate, as functional capacity is a predictor of mortality. It also provides a guide to the patient's previous best functioning so that therapy can be targeted at returning the patient to that level and better.

3. Signs:
   Tachycardia, tachypnoea, raised jugular venous pressure, peripheral oedema, right sided pleural effusion and hepatomegaly. Objective evidence of a structural and/or functional abnormality of the LV at rest (displaced LV apex beat, left sided S3 gallop and cardiac murmurs).

4. Documentation of HF-REF:
   The echocardiogram provides immediate information on chamber size, ventricular function, LV wall thickness, valve structure and function, haemodynamics, pulmonary pressures and inferior vena caval congestion.

A patient presenting with heart failure requires an echocardiogram as part of the diagnostic assessment. While it is recognised that this depends on local availability, echocardiography should be arranged during the index hospital admission.

4. GENERAL DIAGNOSTIC TESTS IN PATIENTS WITH SUSPECTED HF-REF

4.1. Additional essential investigations: Electrocardiogram (ECG), Chest X-Ray and BNP/ProBNP assay

- Resting ECG:
  This may show sinus tachycardia (>100 bpm), bundle branch block patterns, heart block, previous myocardial infarction (MI), left ventricular hypertrophy (LVH), atrial fibrillation (AF) amongst other abnormalities. A normal ECG in all respects makes the diagnosis of HF-REF unlikely.

- Chest X-Ray:
  It should be considered to detect/exclude lung disease. It may also identify pulmonary congestion/ oedema and is more useful in patients with suspected HF in the acute setting. The important findings in chronic HF-REF are increased cardio-thoracic ratio (> 50%), right sided pleural effusion, fluid in the fissures and upper lobe venous blood diversion.

- Natriuretic Peptides:
  Where the availability of echocardiography is limited, an alternative approach to the diagnosis of heart failure is to measure the blood concentration of B-natriuretic peptides. Two different assays are currently available: B-type natriuretic peptide (BNP) and N-terminal pro B-type natriuretic peptide (NT-proBNP). A BNP < 100 pg/mL or NT-ProBNP < 300 pg/mL (in patients who present acutely) and BNP < 35 pg/mL or NT-ProBNP < 125 pg/mL in patients who present (with chronic symptoms) virtually excludes the diagnosis of HF-REF. These tests are also useful in the follow up of treated patients to clarify future presentations or persistence of symptoms.

Routine biochemical and haematological investigations are also important to determine renal function and potassium levels, to exclude anaemia (which can mimic or aggravate HF) and to assess thyroid dysfunction (TSH), which may aggravate HF. They may also provide other useful information related to the aetiology of HF, (e.g. elevated blood glucose levels suggesting the diagnosis of diabetes).

4.2. Patients with HF-REF that are referred to a cardiologist may be further evaluated with:

- Ambulatory electrocardiographic monitoring (Holter).
- Myocardial perfusion/ischaemia/viability imaging (echocardiography, CMR, SPECT, or PET).
- Coronary angiography.
- Left and right heart haemodynamic assessments.
- Exercise testing.
- Genetic testing.

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5. MANAGEMENT OF HEART FAILURE

5.1. Objectives in the management of heart failure

The objectives in the management of heart failure are to make patients feel better, reduce hospitalisations (new and recurrent) and to prolong survival. It is now recognised that preventing HF hospitalisation is important for patients and healthcare systems.

5.2. Pharmacological therapy of HF-REF

5.2.1. Symptomatic relief

a. Diuretics

Diuretics are recommended to relieve dyspnoea and oedema in patients with signs and symptoms of congestion. Their effects on mortality and morbidity have however not been studied.

Loop diuretics produce a more intense and shorter diuresis than thiazides, which cause a more gentle and prolonged diuresis. Loop diuretics are usually preferred to thiazides in HF-REF.

The aim of using diuretics is to achieve and maintain euvolaemia (the patient's 'dry weight') with the lowest dose possible. This means that the dose must be adjusted, particularly after restoration of dry body weight, to avoid the risk of dehydration leading to hypotension and renal dysfunction. The diuretic dose may have to be reduced after Angiotensin-Converting Enzyme Inhibitors (ACEIs) are introduced. It is important to replace serum KĐ accordingly (1200mg potassium salt per 40 mg furosemide). Potassium supplementation needs to be reduced in patients on concomitant mineralocortocoid antagonists (MRAs). Intravenous diuretic should be used when there is marked volume overload and/or pulmonary oedema.

Many patients can be trained to self-adjust their diuretic dose, based on monitoring of symptoms/signs of congestion and daily weight measurements. Patients should be encouraged to restrict fluid intake (<1.5 L per day).

Diuretic resistance

If a patient does develop resistance to a high dose of loop diuretic, the addition of a thiazide (hydrochlorothiazide) or thiazide-like (metolazone) diuretic (1 hour before administration of the loop diuretic) often results in a remarkable synergistic effect. These patients should ideally be referred, as large fluid shifts occur together with electrolyte changes. Careful patient and laboratory monitoring is necessary.

Refer to Table 2 for the recommended diuretics and their doses. Please note that metolazone is available in South Africa on Section 21.

Table 2: Doses of diuretics commonly used to treat heart failure (with and without a preserved ejection fraction, chronic and acute)

Diuretics	**Initial dose (mg)**		**Usual daily dose (mg)**	
Loop diuretics[a]				
Furosemide	20-40		40-240	
Bumentanide	0.5-1.0		1-5	
Torasemide	5-10		10-20	
Thiazides[b]				
Bendroflumethiazide	2.5		2.5-10	
Hydrochlorothiazide	25		12.5-100	
Metolazone	2.5		2.5-10	
Indapamide[c]	2.5		2.5-5	
Potassium-sparing diuretics[d]				
	+ACEi/ARB	**-ACEi/ARB**	**+ACEi/ARB**	**-ACEi/ARB**
Spironolactone/eperenone	12.5-25	50	50	100-200
Amiloride	2.5	5	5-10	10-20
Triamterene	25	50	100	200

ACEi = angiontesin-coverting enzyme inhibitor; ARB = angiotensin receptor blocker.

[a] Oral or intracenous; dose might need to be adjusted according to volume status/weight; excessive doses may cause renal impairment and ototoxicity.
[b] Do not use thiazides if estimated glomerular filtration rate <30mL/min, except when prescribed synergistically with loop diuretics.
[c] Indapamide is a non-thiazide sulfonamide.
[d] A Mineralocorticoid antagonist (MRA) i.e. spironolactone/eplerenone is always preferred. Amiloride and triamterene should not be combined with an MRA.

Chronic Heart Failure: Diagn

adapted from ESC

Algorithm for the diagnosis of Heart Failure with

General Assessment

- Risk factor profile (hypertension etc.)
- Family History
- Recent pregnancy < 1 year

Symptoms

- Shortness of breath
  - on effort
  - lying flat
  - during the night
- New cough
- Ankle swelling
- Irregular or fast palpitation
- Effort fatigue
- More frequent nocturia

Signs

Signs of congestion:

- raised JVP
- peripheral oedema
- (tender) hepatomegaly
- ascites

Chest signs:

- inspiratory crackles
- pleural effusion

Signs of heart disease:

- tachycardia
- presence of S3
- displaced apex beat
- cool peripheries
- presence of cardiac murmur

HF-REF unlikely

HF-REF excluded

Referral to specialist for e.g. cardiac catheterisation, MRI, endomyocardial biopsy

Additi

Holistic Care

- Salt restriction (in hypertensives only)
- Exercise (once stabilised)
- Heart failure management programme
- Avoid : NSAID, glitazones, CCB (except amlodipine, felodipine)
- Palliative care

Management

(Trial data applica

Therapy that reduce

Mortality	Hospitalisation
ACE-I	ARB
B Blocker	Ivabradine
Aldosterone Antagonist (MRA)	Digoxin
Hydralazine + Nitrate	
Biventricular pacing ± ICD (CRT-P / CRT-D)	

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osis and Treatment Algorithm

HF guideline 2012[1]

Reduced Ejection Fraction (HF-REF) or LVEF<50%

Suspected **Heart Failure / LV Dysfunction** because of signs and symptoms

Assess presence of cardiac disease by ECG, CXR and/or NTproBNP / BNP

Normal

Any abnormalities

Imaging by Echocardiography

Normal

LVEF<50%

Assess aetiology, precipitating factor/s and NYHA functional class

onal diagnostic tests
n selected cases

*Choose **THERAPY***

t of HF-REF
able to EF<40%)

s:

Symptoms

Diuretic

Surgical

Heart transplant

Valvular intervention

LV assist device

Precipitating Factors

Mandatory: U & E, Glucose, TSH

Possible: LFT, Ferritin, Calcium, hsTroponin T, Trop I (Table 6 [1])

Special consideration

Digoxin (AF, resistant symptomatic heart failure)

Warfarin (AF, LV clot)

Amiodarone (sustain sinus rhythm and reduce VT in ICD patients)

Aldosterone antagonist (Early post-MI heart failure)

ACE-I + ARB if Aldosterone antagonist (MRA) cannot be used

Reference 1: ESC Guideline for the diagnosis and treatment of acute and chronic heart failure 2012, European Heart Journal 2012:33;1787-1847

b Digoxin

Digoxin is recommended in patients on conventional therapy with symptomatic HF and rapid AF to slow the ventricular response rate.

Digoxin may be used in HF-REF and sinus rhythm if patients are still symptomatic on full tolerated background therapy to reduce the risk of HF hospitalisation.

Toxic drug levels can occur especially in the elderly, patients with poor renal function, in the presence of hypokalaemia, active coronary ischaemia and low body weight (recommended dose is 0.125 mg at night). Always be aware on introducing other drugs, their possible interaction with digoxin metabolism. Digoxin levels should be monitored carefully and one should aim for a therapeutic blood level of 0.5 – 0.8 ng/ml taken 12 hours after the last dose.

5.2.2. Symptomatic relief and mortality benefit

Three neurohumoral antagonists, an ACEI, [or angiotensin receptor blocker (ARB)], a beta-blocker (BB), and MRAs are fundamentally important in modifying the course of HF-REF and should be considered in every patient. The order of initiation between an ACEI and BB is not crucial and either can be started first.

a. Angiotensin-Converting Enzyme Inhibitors

An ACEI is recommended for all patients with HF-REF to reduce the risk of HF hospitalisation and premature death.

ACEIs occasionally cause worsening of renal function, hyperkalaemia, symptomatic hypotension, cough, and, rarely, angioedema. An ACEI should be used with caution in patients with inadequate renal function (serum creatinine ≥221 mmol/L or eGFR ≤30 mL/min/1.73 m2). An ACEI should not be used in patients with an abnormal serum potassium level >5.2 mmol/L.

Therapy with ACEI should always be initiated at a low dose see Table 3. If a patient develops symptomatic hypotension or prerenal azotaemia, then decreasing or temporarily withdrawing the diuretic (24 – 48 hours) is preferable to discontinuing the ACEI.

Dosage titration:
- Following 24 – 48 hours of therapy, the patient should be contacted to ask about possible side-effects.
- Within one week of initiation of therapy, the patient should have the following checked: BP, urea, creatinine and electrolytes.
- If side effects occur, treatment should be changed. Reduce diuretic dose if symptomatic hypotension or deteriorating renal function is found. Decrease potassium replacement if serum potassium is raised or decrease / stop potassium-sparing diuretics.
- An increase in serum creatinine need not require discontinuation of the ACEI.
- Dosage of ACEI should be up-titrated over 2 – 4 weeks in ambulatory patients to target doses.
- ACEI cough (cough related to heart failure having been excluded), if severe, usually requires withdrawal of the ACEI.

b. Beta-Blockers

A BB is recommended, in addition to an ACEI (or ARB if an ACEI is not tolerated), for all patients with HF-REF to reduce the risk of HF hospitalisation and the risk of premature death.

The ideal candidate should not be on intravenous medications, should have no signs of marked fluid retention and be on stable doses of standard medication.

Refer to Table 3 and note that only carvedilol and bisoprolol are widely available in South Africa.

c. Mineralocorticoid/Aldosterone Receptor Antagonists

Spironolactone and eplerenone block receptors that bind aldosterone and other corticosteroids, and are best characterised as MRAs. Both can cause hyperkalaemia and worsening renal function, especially in the elderly.

An MRA is recommended for all patients with persisting symptoms (NYHA class II–IV) despite treatment with an ACEI (or an ARB if an ACEI is not tolerated) and a BB, to reduce the risk of HF hospitalisation and the risk of premature death.

They should only be used in patients with adequate renal function (Creatinine ≤221 mmol/L or ≤2.5 mg/dL or eGFR ≥30 mL/min/1.73 m2) and a normal serum potassium concentration (K+ = 3.5 – 5.2 mmol/l); if either is used, serial monitoring of serum electrolytes and renal function is mandatory.

Potassium and creatinine should be monitored 5 days after starting treatment and be repeated 1 week later or on further titrations. The recommended dose for either spironolactone or eplerenone is: starting dose of 25 mg once daily and a target dose 25–50 mg once daily.

Although spironolactone is first choice based on cost, patients who develop gynaecomastia should be switched to eplerenone. The combination of spironolactone and digoxin is synergistic for this complication.

Table 3: Evidence-based doses of disease-modifying drugs used in key randomized trials in heart failure (or after myocardial infarction)

	Starting dose (mg)	**Target dose (mg)**
ACE inhibitor		
Captopril[a]	6.25 t.i.d.	50 t.i.d.
Enalapril	2.5 b.i.d.	10-20 b.i.d.
Lisinopril[b]	2.5-5.0 o.d.	20-35 o.d.
Ramipril	2.5 o.d.	5 b.i.d.
Trandolapril[a]	0.5 o.d.	4 o.d.
Beta-blocker		
Bisoprolol	1.25 o.d.	10 o.d.
Carvedilol	3.125 b.i.d.	25-50 b.i.d.
Metoprolol succinate (CR/XL)	12.5/25 o.d.	200 o.d.
Nebivolol[c]	1.25 o.d.	10 o.d.
ARB		
Candesartan	4 or 8 o.d.	32 o.d.
Valsartan	40 b.i.d.	160 b.i.d.
Losartan[b,c]	50 o.d.	150 o.d.
MRA		
Eplerenone	25 o.d.	50 o.d.
Spironolactone	25 o.d.	25-50 o.d.

ACE = angiotensin-converting enzyme; ARB = angiotensin receptor bocker; b.i.d. = bis in die (twice daily); MRA = mineralocorticoid receptor antagonist; o.d. = omni die (once every day); t.i.d = ter in die (three times daily).

[a] Indicates an ACE inhibitor where the dosing target is derived from post-myocardial infarction trials.
[b] Indicates drugs where a higher dose has been shown to reduce morbidity-mortality compared with a lower dose of the same drug, but there is no substantive placebo-controlled randomized controlled trial and the optimum dose is uncertain.
[c] Indicates a treatment not shown to reduce cardiovascular or all-cause mortality in patients with heart failure or after acute mycocardial infarction (or shown to be non-inferior to a treatment that does).

5.2.3. Symptom relief and uncertain mortality benefit

a. Angiotensin receptor blocker

- Recommended to reduce the risk of HF hospitalisation and the risk of premature death in patients with HF-REF and unable to tolerate an ACEI because of cough (patients should also receive a BB and an MRA).

- Recommended to reduce the risk of HF hospitalisation in patients with HF-REF and persisting symptoms (NYHA class II–IV) despite treatment with an ACEI and a BB who are unable to tolerate an MRA.

b. Ivabradine

Ivabradine is a drug that inhibits the If channel in the sinus node. Its' only known pharmacological effect is to slow the heart rate in patients in sinus rhythm (it does not slow the ventricular rate in AF).

Ivabradine should be considered to reduce the risk of HF hospitalisation in patients in sinus rhythm with an EF ≤35%, a heart rate remaining ≥70 b.p.m., and persisting symptoms (NYHA class II–IV) despite treatment with an evidence-based dose of beta-blocker (or maximum tolerated dose below that), ACEI (or ARB), and an MRA (or ARB).

It may be considered to reduce the risk of HF hospitalisation in patients in sinus rhythm with an EF ≤35% and a heart rate ≥70 b.p.m. who are unable to tolerate a beta-blocker. Patients should also receive an ACEI (or ARB) and an MRA (or ARB).

The South African MCC labelling however states that; "Ivabradine is indicated in adults in sinus rhythm with mild to moderate (NYHA II and III class) symptomatic heart failure whose heart rate is ≥ 77 b.p.m. to reduce cardiovascular events (cardiovascular mortality or hospitalisation for worsening heart failure), in combination with standard therapy including beta-blockers or when beta-blockers are contra-indicated or not tolerated".

c. Combination of hydralazine and nitrates

It may be considered as an alternative to an ACEI or ARB, if neither is tolerated, to reduce the risk of HF hospitalisation and risk of premature death in patients with HF-REF. Patients should also receive a BB and an MRA.

It should be considered to reduce the risk of HF hospitalisation and risk of premature death in patients with HF-REF and persisting symptoms (NYHA class II–IV) despite treatment with a BB, ACEI (or ARB), and an MRA (or ARB).

Recommended dosages of the combinations:
- Hydralazine 10 – 25 mg 3 times daily, increased to 75 mg 3 times a day;
- Isosorbide dinitrate 10 mg 3 times a day, increased to 40 mg 3 times a day;
- Isosorbide mononitrate 10 mg twice a day, increased to 20 – 40 mg twice a day.

5.3. Ventricular rate control in atrial fibrillation

For ventricular rate control in patients with HF-REF and AF, a BB is preferred over digoxin as the latter does not provide adequate rate control during exercise. The combination of digoxin and a BB is more effective than a BB alone in controlling the ventricular rate at rest.

Non-dihydropyridine calcium channel blockers (CCBs) verapamil and diltiazem are not recommended in patients with HF-REF as they increase mortality.

5.4. Oral anticoagulants

Warfarin is not routinely required in patients with HF-REF unless they have AF or LV mural thrombus.

6. NON-PHARMACOLOGICAL THERAPIES OF HF-REF

6.1. Implantable cardioverter-defibrillator (ICD)

Approximately half of the deaths in patients with HF, especially in those with milder symptoms, occur suddenly and many, if not most, of these are related to ventricular arrhythmias.

Prevention of sudden death is therefore an important goal in HF. While the key disease-modifying neurohumoral antagonists mentioned earlier reduce the risk of sudden death, they do not abort it. Specific antiarrhythmic drugs do not decrease this risk (and may even increase it). For this reason, ICDs have an important role to play in reducing the risk of death from ventricular arrhythmias and bradyarrhythmias.

a Primary prevention of sudden cardiac death

An ICD is recommended in a patient with symptomatic HF (NYHA class II–III) and an EF ≤35% despite ≥3 months of treatment with optimal pharmacological therapy, who is expected to survive for >1 year with good functional status, to reduce the risk of sudden death. ICD implantation should be delayed for >40 days following myocardial infarction, since LV function / EF may improve during this interval.

b Secondary prevention of sudden cardiac death

ICDs reduce mortality in survivors of cardiac arrest and in patients with sustained symptomatic ventricular arrhythmias. Consequently, an ICD is recommended in such patients, irrespective of EF, with good functional status, a life expectancy of >1 year, and where the intent is to increase survival.

6.2. Cardiac resynchronisation therapy (CRT)

The indications for the use of CRT are summarised in the Table 4 below:

Table 4:

Recommendations for use of CRT where the evidence is strong - patients in sinus rhythm with NYHA functional class III and ambulatory class IV heart failure and a persistently reduced ejection fraction, despite optimal pharmacological therapy.

Recommendations	Class	Level
CRT-P/CRT-D is recommended in patients in sinus rhythm with a QRS duration of ≥ 120 ms, LBBB QRS morphology, and a EF ≤ 35%, who are expected to survive with good functional status for > 1 year, to reduce the risk of HF hospitalization and risk of premature death.	I	A
CRT-P/CRT-D should be considered in patients in sinus rhythm with a QRS duration of ≥ 150 ms, irrespective of QRS morphology, and an EF ≤ 35%, who are expected to survive with good functional status for > 1 year, to reduce the risk of HF hospitalization and the risk of a premature death.	IIa	A

Recommendations for use of CRT where the evidence is strong - patients in sinus rhythm with NYHA functional class II heart failure and a persistently reduced ejection fraction, despite optimal pharmacological therapy.

Recommendations	Class	Level
LBBB QRS morphology CRT, preferably CRT-D is recommended in patients in sinus rhythm with a QRS duration of ≥ 130 ms, LBBB QRS morphology, and an EF ≤ 30%, who are expected to survive for > 1 year with good functional status, to reduce the risk of HF hospitalization and the risk of premature death.	I	A
Non-LBBB QRS morphology CRT, preferably CRT-D should be considered in patients in sinus rhythm with a QRS duration of ≥ 150 ms, irrespective of QRS morphology, and an EF ≤ 30%, who are expected to survive for > 1 year with good functional status, to reduce the risk of HF hospitalization and the risk of premature death.	IIa	A

6.3. Patients in permanent AF

a) CRT-P/CRT-D may be considered in patients in NYHA functional class III or ambulatory class IV with a QRS duration ≥120 ms and an EF ≤35%, who are expected to survive with good functional status for >1 year, to reduce the risk of HF worsening if:

- The patient requires pacing because of an intrinsically slow ventricular rate
- The patient is pacemaker dependent as a result of AV nodal ablation

b) Patients with an indication for conventional pacing and no other indication for CRT
In patients who are expected to survive with good functional status for >1 year:
CRT should be considered in those in NYHA functional class II - IV with an EF ≤35%, irrespective of QRS duration, to reduce the risk of worsening of HF

7. HYPERTENSION

Hypertension is associated with an increased risk of developing HF; antihypertensive therapy markedly reduces the incidence of HF (with an exception of alpha-adrenoceptor blockers, which are less effective than other antihypertensives in preventing HF).

Negatively inotropic CCBs (i.e. diltiazem and verapamil) should not be used to treat hypertension in patients with HF-REF, and moxonidine should also be avoided in patients with HF-REF as it is associated with increased mortality.

If blood pressure is not controlled with an ACEI (or ARB), a BB, MRA, and a diuretic then a choice from hydralazine/amlodipine/felodipine can be made. Short acting nifedipine is contra-indicated in HF-REF and no data are available on long acting nifedipine.

8. HEART TRANSPLANTATION

Heart transplantation is an accepted treatment for end-stage HF. Although controlled trials have never been conducted, there is consensus that transplantation—provided that proper selection criteria are applied - significantly increases survival, exercise capacity, quality of life, and return to work compared with conventional treatment.

Apart from the shortage of donor hearts, the main challenges in transplantation are the consequences of the limited effectiveness and complications of immunosuppressive therapy in the long term (i.e. antibody-mediated rejection, infection, hypertension, renal failure, malignancy, and coronary artery vasculopathy).

There are four Heart Transplantation centres in South Africa. There are two centres in Cape Town, Christiaan Barnard Memorial Hospital and Groote Schuur Hospital, one in Johannesburg, Milpark Hospital and one in Durban, Ethekwini Hospital and Heart Centre.

8.1. Indications for Heart Transplantation

Absolute Indications in Appropriate Patients

a) Haemodynamic compromise due to HF
   - Refractory cardiogenic shock.
   - Documented dependence on intravenous (IV) inotropic support to maintain adequate organ perfusion.
   - Peak oxygen consumption per unit time (VO2) less than 10 mL per kg per min with achievement of anaerobic metabolism.

b) Severe symptoms of ischemia that consistently limit routine activity and are not amenable to coronary artery bypass surgery or percutaneous coronary intervention.

c) Recurrent symptomatic ventricular arrhythmias refractory to all therapeutic modalities.

Relative Indications

- Peak VO2 11 to 14 mL per kg per min (or 55% predicted) and major limitation of the patient's daily activities.
- Recurrent unstable ischemia not amenable to other intervention.
- Recurrent instability of fluid balance/renal function not due to patient noncompliance with medical regimen.

Insufficient Indications

- Low left ventricular ejection fraction.
- History of functional class III or IV symptoms of HF.
- Peak VO2 greater than 15 mL per kg per min (and greater than 55% predicted) without other indications.

Hemodynamic Criteria for Evaluation of Candidates for Cardiac Transplantation

- Pulmonary artery hypertension and elevated pulmonary vascular resistance (PVR) should be considered as a relative contraindication to cardiac transplantation when the PVR is >5 Wood units or the PVRI is >6 or the transpulmonary gradient (TPG) exceeds 16 to 20 mm Hg.
- If the PAS exceeds 60 mm Hg in conjunction with any 1 of the preceding 3 variables, the risk of right heart failure and early death is increased.
- If the PVR can be reduced to <2.5 with a vasodilator but the systolic blood pressure falls <85 mm Hg, the patient remains at high risk of right heart failure and mortality after cardiac transplantation.

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9. EXERCISE TRAINING

Several systematic reviews and meta-analyses of small studies have shown that physical conditioning by exercise training improves exercise tolerance, health-related quality of life, and HF hospitalization rates in patients with HF.

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10. ORGANIZATION OF CARE AND MULTIDISCIPLINARY MANAGEMENT PROGRAMMES

The goal of management of HF is to provide a 'seamless' system of care, embracing both the community and hospital, to ensure that the management of every patient is optimal, from the beginning to the end of their healthcare journey.

To achieve this goal, other services, such as cardiac rehabilitation and palliative care, must be integrated into the overall provision for patients with HF.

Fundamental to the delivery of this complete package of care are multidisciplinary management programmes designed to improve outcomes through structured follow-up with patient education, optimization of medical treatment, psychosocial support, and improved access to care.

THANK YOU TO OUR CORPORATE SUPPORTERS