Managing patients with HEART FAILURE in primary care
Once heart failure has been diagnosed, the goal of treatment is to improve symptoms and signs and avoid or reduce hospital admissions. In the majority of patients with symptomatic heart failure, a diuretic is used first-line to reduce fluid overload. An ACE inhibitor and beta-blocker are then added, followed by spironolactone if the patient is still symptomatic. An angiotensin-II receptor blocker, digoxin and anticoagulants can be added as appropriate. Surgical interventions may be considered for some patients.

**The general principles of management**

The goal of pharmacological treatment in patients with heart failure is to improve symptoms and signs, decrease hospital admission (particularly for patients with established heart failure) and improve longevity. The initial aim of pharmacological treatment is to relieve symptoms. Medicines should then be up-titrated to doses that will improve long-term clinical outcomes by slowing or preventing progressive deterioration of heart failure.1

**Management of patients with suspected heart failure**

Patients who present with an acute onset of significant symptoms suggestive of a new diagnosis of heart failure usually require referral for hospital admission, especially if the patient has a history of ischaemic heart disease (IHD). Some people may present with a more gradual onset of symptoms and the findings from the history, examination, and in some cases brain natriuretic peptide (BNP) test results, will help guide the need for community or hospital management.

**Management of patients with known chronic heart failure**

Patients with known heart failure who present with symptoms reflecting a gradual deterioration of a previously stable situation are generally able to be managed in the community. Patients who have an established diagnosis of heart failure may also present acutely due to decompensation (see "Decompensation in a previously stable, compensated patient", over page). Although many of these patients are admitted to hospital, primarily for intravenous diuretics, there is increasing agreement among clinicians that community management may be appropriate for some patients who are at lower risk, determined by their clinical features, the results of investigations, e.g. BNP, the presence of co-morbidities and their social circumstances.2,3 Repeated hospitalisations in a patient with heart failure are associated with a poorer prognosis.4

**Treatment of patients with heart failure with reduced ejection fraction: HF-REF**

1. **Start with a diuretic**

In the majority of patients with symptomatic heart failure, the first-line medicine used is a diuretic, which will work to reduce fluid overload to improve the patient’s symptoms, however, there is no evidence that diuretics improve mortality.1

A loop diuretic such as furosemide is recommended as these are usually more effective than thiazide diuretics. A reasonable starting dose of oral furosemide for a patient in a community setting is 20 – 40 mg, once daily. Subsequent doses are then determined by the response to treatment – an improvement in symptoms and a weight loss of approximately 1.0 kg/day. Bumetanide (fully subsidised) is an alternative for patients who do not respond to adequate doses of furosemide. The recommended starting dose for oedema is 0.5 – 1 mg, once daily. In severe cases, the dose may be increased up to 5 mg per day.7
Doses of diuretic that are too low will not clear the fluid overload effectively, and may reduce the patient’s response to an ACE inhibitor when started and also can increase the risk of decompensation when a beta-blocker is initiated. Doses that are too high may lead to removal of too much fluid, which increases the risk of hypotension and renal impairment, particularly when an ACE inhibitor is started.

2. Add an ACE inhibitor and beta-blocker

The next step after the use of a diuretic is the addition of an ACE inhibitor (or an angiotensin-II receptor blocker – ARB) to reduce symptoms and a beta-blocker to improve ventricular function. There is good evidence that ACE inhibitors and beta-blockers improve both morbidity and mortality for patients with HF-REF.1

Guidelines vary as to which of these medicines should be initiated first as they are regarded as complementary.1, 8 If a patient has acute fluid overload, a beta-blocker may not be tolerated until the fluid is reduced, although an ACE inhibitor can be initiated. Ideally both should be started as soon as practical after a diagnosis of HF-REF is made, with an aim of achieving an ejection fraction of > 40% as this is associated with improved prognosis. ACE inhibitors assist with LV re-modelling and beta-blockers can markedly improve the ejection fraction.1

Any medicine from the ACE inhibitor class can be used, e.g. cilazapril. ACE inhibitors tend to give effective control of blood pressure and are generally well tolerated. If postural hypotension or other adverse effects occur, this is usually at low doses and increasing the dose does not tend to significantly change the incidence or severity of adverse effects. Initiation of an ACE inhibitor may result in an increase in potassium and creatinine. If the potassium is < 5.5 mmol/L and the increase in creatinine is no more than 50% above baseline, these changes are acceptable. If potassium or creatinine rises excessively, reduce the dose of the diuretic if there are no signs of congestion and stop nephrotoxic medicines such as NSAIDs. If potassium or creatinine remain raised, the dose of ACE inhibitor should be halved and the creatinine and electrolytes checked in one to two weeks. Discussion with a cardiologist is recommended as the ACE inhibitor may need to be stopped.1, 9

N.B. Guidelines for use of ACE inhibitors in people with chronic kidney disease take a more conservative approach and suggest altering the dose of ACE inhibitor if creatinine rises > 30%.10

If an ACE inhibitor is not tolerated, an ARB can be substituted. Losartan is the only fully subsidised ARB available. Candesartan

Decompensation in a previously stable, compensated patient

Episodes of decompensation leading to acute heart failure can occur in patients with known heart failure who have been well and stable on treatment. Some patients, despite treatment, are prone to recurrent episodes of decompensation. A number of factors can result in decompensation including:1

- Alterations to the patient’s medicine regimen, e.g. reduction in dose of diuretic, addition of a new medicine – including over-the-counter items
- Poor adherence to medicines
- Uncontrolled hypertension
- Cardiac arrhythmia (most often atrial fibrillation)
- Changes in diet (primarily affecting sodium) and fluid intake
- Changes in exercise levels
- Cardiac ischaemia
- Systemic infection (secondary to increased haemodynamic demand on the heart)
- Cardiac infection or inflammation
- Conditions that result in a high-output state, e.g. severe anaemia, thyrotoxicosis, multiple myeloma, pregnancy, cor pulmonale
- Physical or mental exhaustion, e.g. from prolonged travel, an emotional crisis

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is available under Special Authority (criteria are persistent ACE-inhibitor induced cough, history of angioedema or inadequate control on maximum tolerated dose of ACE inhibitor). Adverse effects from ARBs are usually mild and transient but may include headache, dizziness and gastrointestinal effects.

Beta-blockers approved for use in New Zealand for heart failure include metoprolol, carvedilol, and bisoprolol (see “Bisoprolol – newly funded beta-blocker”). There is no clear evidence that any one of these medicines is superior to another, but specific patient factors may guide the choice. For example, bisoprolol and metoprolol CR are once daily dosing, which may be more convenient for some patients. Bisoprolol may be preferable in patients with atrial fibrillation as it reduces heart rate more than other beta-blockers, but it also increases susceptibility to bradycardia. Bisoprolol may be preferable in people with COPD compared to carvedilol as it is more cardio-selective.

When initiating a beta-blocker the recommendation is to start at a low dose, increase slowly and aim for the highest tolerated dose (“go slow, aim high”). If a beta-blocker is initiated before an ACE inhibitor, e.g. in a patient with arrhythmia or angina but without acute fluid overload, the dose should be increased to mid-range and then an ACE inhibitor started.

3. Add spironolactone if still symptomatic

The use of spironolactone (the only subsidised aldosterone receptor antagonist), is recommended for patients who remain symptomatic, or who have an ejection fraction < 35%, despite maximal doses of an ACE inhibitor and a beta-blocker. If the patient’s LV function has improved somewhat with the use of an ACE inhibitor and beta-blocker, spironolactone may not be required, however, consultation with a cardiologist and referral for echocardiography is recommended. Spironolactone has been shown to reduce both morbidity and mortality in patients with heart failure. Spironolactone should be used with caution in patients with impaired renal function and may cause hyperkalaemia. Renal function and electrolytes should therefore be monitored regularly. Other adverse effects may include gastrointestinal symptoms such as nausea and diarrhoea.


4. Add ARB, digoxin and anticoagulants as appropriate

If the patient has failed to respond to treatment with maximal doses of all these medicines, an ARB may be considered. However, spironolactone would not usually be continued if

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**Bisoprolol – newly funded beta-blocker**

Bisoprolol, a beta-blocker that is a highly selective for beta-1 receptor sites, has been fully subsidised in New Zealand since 1 May, 2012. Tablet strengths are 2.5 mg, 5 mg and 10 mg. An initial starting dose is 1.25 mg, once daily, gradually increasing weekly by 1.25 mg, aiming for a maintenance dose of 10 mg once daily.

**Factors associated with a worsening prognosis**

Factors that are independently associated with a worsening prognosis in people with heart failure include:

- Age > 70 years
- Ejection fraction ≤ 30%
- Higher NYHA functional class (see Page 11)
- Anaemia
- Renal impairment
- Hypotension
- Hyponatraemia
- High levels of BNP
- Co-morbidities including IHD, arrhythmias, diabetes, COPD, stroke
- Recurrent hospitalisation
The role of BNP in monitoring treatment for patients with heart failure

A single measurement of BNP can give prognostic information in patients with heart failure – a higher level is associated with a worse prognosis. There is good evidence that many of the medicines used in patients with heart failure lower the concentration of BNP.\(^1\) Serial BNP measurement after initiation of treatment for heart failure may therefore be useful to guide further management, with falling levels an indication of optimal treatment.\(^2\) In a patient whose medical treatment is being adjusted, it is suggested that BNP is requested monthly or two-monthly to monitor progress. Under acute circumstances, BNP may decrease significantly in two – three days, however, research suggests that the most reliable change in the results is seen approximately two weeks after a change in medicine dose and that benefits for the patient are greater if a lower BNP target is sought.\(^2\)

an ARB is added as this combination (ACE inhibitor, ARB and spironolactone) can worsen renal function (Page 6). Discussion with a cardiologist is recommended.

Digoxin can be used to slow the ventricular rate and therefore improve symptoms in patients who have symptomatic heart failure and atrial fibrillation. There is some evidence that digoxin may improve symptoms and reduce the rate of hospitalisation, however, it does not improve mortality.\(^1\)

N.B. All patients with heart failure and atrial fibrillation should be assessed using stroke risk assessment tools, e.g. CHA\(_2\)DS\(_2\)-VASc to determine their need for anticoagulation.


Treatment of patients with heart failure with preserved ejection fraction: HF-PEF

The treatment of patients with HF-PEF differs from that of patients with HF-REF, and the evidence for effective treatments to reduce morbidity and mortality in patients with HF-PEF is limited. Patients suspected or known to have HF-PEF should usually be referred to a cardiologist for initial management.

Patients with HR-PEF are usually more “brittle” and require careful control of fluid balance. As in patients with HF-REF, diuretics are used for symptomatic relief of dyspnoea and oedema. A beta-blocker can be used with the aim of prolonging diastole by slowing the heart rate to approximately 70 beats/minute. If blood pressure control is required, an ACE inhibitor can be added. Digoxin can be considered in patients with atrial fibrillation.

There is limited evidence from two small studies suggesting rate-limiting calcium channel blockers, e.g. diltazem, verapamil, can be used as an alternative to a beta-blocker and may improve symptoms and exercise tolerance in patients with HF-PEF. N.B. Rate-limiting calcium channel blockers should not be used in patients with HF-REF because they impair LV function and therefore worsen heart failure.\(^1\)

Non-pharmacological aspects of management of heart failure

Patient education and self-management are important aspects in the management of heart failure. Educate patients to be aware of their symptoms and how to manage them if their condition deteriorates. Many patients will be comfortable with modifying their doses of diuretic. Patients may also be
able to gradually increase the dose of other medicines such as beta-blockers, e.g. by increasing the dose by half a tablet at night and then waiting for a few weeks. A heart failure action plan (e.g. from the Heart Foundation) can assist patients with self-management.

Encourage patients to:

- Weigh themselves daily. It is useful to establish a “dry weight” so that changes in the patient’s condition are detected and managed early. If the patient’s weight increases rapidly and they become increasingly symptomatic, have a plan in place for the patient to increase their furosemide dose for a few days until the weight decreases again.
- Participate in regular exercise and if appropriate, suggest dietary measures to assist with fat weight loss (as opposed to fluid weight loss)
- Avoid an excessive intake of salt and alcohol
- Monitor their fluid intake – fluid should be restricted to between 1.5 and 2 L/day in patients with moderate or more severe symptoms of fluid overload. There is less evidence that fluid restriction is beneficial in patients with mild symptoms of heart failure.
- Maximise adherence to medicines
- Have an annual adherence to medicines

A new booklet “Staying well with heart failure” has been developed by the Heart Foundation. It contains information for patients on heart failure (e.g. on symptoms and management), lifestyle modification, daily checks and a heart failure action plan to assist with self-management. The booklet is available from [www.heartfoundation.org.nz](http://www.heartfoundation.org.nz) under the Programmes and Resources section.

**Device therapy**

Device therapy for heart failure includes implantation of a cardioverter defibrillator or cardiac resynchronisation therapy (CRT), using devices that provide biventricular pacing or may combine the ability for both pacing and defibrillation.

Device therapy may be considered for some patients with heart failure, e.g. those who remain symptomatic despite optimal use of medicines, those with an ejection fraction that remains low (<35%) or those with left bundle branch block (LBBB) on ECG. Device therapy can improve symptoms, quality of life and ventricular function and reduce the risk of sudden death.¹ Patients with co-morbidities that are likely to reduce their life expectancy (within one year) are generally considered not suitable for device therapy.

Referral to a cardiologist is recommended for patients with:

- Valvular heart disease
- Heart failure and syncope – insertion of a pacemaker may be required
- Heart failure and LBBB and a wide QRS on ECG associated with dyssynchrony – CRT may be indicated
- A history of cardiac arrest or ventricular tachycardia - defibrillator therapy may be indicated

**Implanted cardioverter defibrillators**

Implantation of a cardioverter defibrillator may be beneficial for selected patients with heart failure as this can reduce mortality in patients at risk of life-threatening ventricular tachyarrhythmias.

**Cardiac resynchronisation therapy**

A CRT device or biventricular pacemaker that provides simultaneous pacing of both ventricles may be beneficial for patients who have an ejection fraction <30– 35%, ongoing symptoms despite optimal medical management, LBBB on ECG and a prolonged QRS duration (>150 milliseconds).¹ Some CRT devices also include a defibrillator.

**Other surgical treatments**

Depending on the underlying cardiac pathology, some patients may benefit from other surgical treatments such as coronary artery bypass grafting, valve replacement or rarely in selected patients with end-stage heart failure, heart transplantation.

**Review regularly**

All patients with heart failure require regular review. If medicine doses are being gradually increased, monthly review is recommended. For patients who are stable on optimal doses of medicines, six monthly review may be appropriate. If doses of medicine are being decreased, regular monitoring remains important because of the risk that the ejection fraction may reduce again and the patient may redevelop symptoms.

The aim of long-term treatment is for the patient to be no longer taking a diuretic but to be maintained on maximal doses of an ACE inhibitor and a beta-blocker to ensure their ejection fraction remains > 40%.

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