Heart failure - management
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Heart failure - management

1 Care map information

Quick info:

Scope:
- assessment and emergency management of acute heart failure (HF) in adults age 18 years and older
- diagnosis, assessment, and management of chronic HF in adults age 18 years and older

Out of scope:
- assessment and management of HF in:
  - children and adolescents under age 18 years
  - pregnant women
- management of specific causes of HF

Definition [3]:
- HF is a complex clinical syndrome of symptoms and signs that suggest impairment of the heart as a pump supporting physiological circulation
- caused by structural or functional abnormalities of the heart

Classification (NYHA):
New York Heart Association (NYHA) class used in pathway (see classification node)

Potential causes include:
- conditions that damage heart muscle or limit its ability to function normally, such as:
  - coronary artery disease (CAD) – accounts for about two-thirds of all systolic HF cases [4]
  - hypertension [4]
  - cardiomyopathies [4]
- endocrine conditions, eg:
  - diabetes mellitus
  - hypothyroidism
  - hyperthyroidism
  - Cushing's syndrome
  - adrenal insufficiency
  - excessive growth hormone
  - phaeochromocytoma
- infiltrative conditions, eg:
  - sarcoidosis
  - amyloidosis
  - haemochromatosis
  - connective tissue disease
  - HIV infection
  - end-stage renal failure
- conditions that reduce cardiac output, such as:
  - increased vascular resistance with hypertension
  - abnormal heart rhythm, eg atrial fibrillation (AF)
  - aortic stenosis (severe)
  - severe mitral regurgitation pericardial disease [4]
  - obstructive sleep apnoea (OSA)
- conditions that result in a high cardiac output, such as:
  - anaemia [4,5]
  - thyrotoxicosis [4,5]
  - septicaemia [4,5]
  - liver failure
• arteriovenous shunts [4,5]
• Paget's disease of the bone [4,5]
• thiamine (vitamin B1) deficiency [4,5]
• medications that may exacerbate heart failure, such as:
  • agents that can adversely affect conduction, eg anti-arrhythmic agents, heart-rate slowing calcium-channel blockers, and beta-blockers
  • some calcium-channel blockers that are negatively inotropic, eg nifedipine, verapamil, diltiazem
• toxins, eg:
  • alcohol
  • mercury
  • cobalt
  • arsenic
  • cocaine

Incidence and prevalence:
• around 300,000 (1.5-2%) Australians are living with HF, with around 30,000 diagnosed each year [1,2].
• both incidence and prevalence of HF increase steeply with age [3]. Prevalence is expected to rise through a combination of:
  • improved survival of people with ischaemic heart disease (IHD)
  • more effective treatments for HF
  • an ageing population
• among Aboriginal and Torres Strait Islander people, chronic heart failure is 1.7 times more common, occurs at a younger age, and rate of preventable CHF related hospitalisations is three times higher than among non-indigenous Australians [2]
• more than 45,000 Australians were hospitalised with heart failure between 2009-2010, equating to more than 360,000 bed-days [1]
• two thirds of CHF hospitalisations in Australia are considered to be preventable
• between 20-27% people with HF will be readmitted to hospital within one month of being discharged [1,2]
• CHF and complications arising are in the top five ambulatory care sensitive conditions in the Frankston Mornington Peninsula catchment
• HF currently accounts for
  • 2% of all hospitalised bed-days
  • 5% of all medical emergency admissions (check aust data)

Prognosis (Australian Heart Foundation statistics):
• 20-30% of patients diagnosed with mild-moderate HF, and 50% of people diagnosed with severe HF die within one year [1]
• prognosis for people with HF and preserved left ventricular ejection fraction (LVEF) is a little better than for people with HF and reduced ejection fraction
• younger patients tend to do better, as do patients with no co-morbidities [3]
• HF has a major impact on quality of life (QoL) and is associated with mood disorders [3]

References:
1. National Heart Foundation media release 2014 (archived)

2 Information resources for patients and carers
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Quick info:
The National Heart Foundation is generally the best source for evidence-based information resources for clinicians and patients.

**Recommended Australian Consumer resources:**
- **Living well** with Chronic Heart Failure (24 pgs, available in multiple languages) includes "Chronic heart failure action plan" for patients
- **Heart online** (extensive range of resources incl videos, documents and online calculators)
- **Aboriginal health** resources for heart disease

**International Resources**
- **Heart Failure matters** - European website with patient education materials
- **American Heart Association** - patient education materials
- UK Recommended resources for patients and carers, produced by organisations certified by [The Information Standard](URL)
  - ‘Heart failure’ (URL) from Bupa at [http://www.bupa.co.uk](http://www.bupa.co.uk)
  - ‘Heart failure’ (PDF) from Patient UK at [http://www.patient.co.uk](http://www.patient.co.uk)
  - ‘Chronic heart failure: management of chronic heart failure in adults’ from National Institute for Health and Care Excellence (NICE) at [http://www.nice.org.uk](http://www.nice.org.uk)

For details on how these international resources are identified, please see Map of Medicine's document on [Information Resources for Patients and Carers](URL).

**Clinician Guidelines for heart failure - National Heart Foundation Guidelines and Resources;**
- **Guidelines for the prevention, detection and management of heart failure in Australia** National Heart Foundation 2011
- **Quick Reference Guide**: Diagnosis and Management of Chronic Heart Failure
- **MJA journal article** summarising National Heart Foundation guidelines for CHF
- **Multidisciplinary Care for people with CHF**
- **Heart Online** website
- **Additional clinical guidelines for cardiac rehab:**
  - **Recommended framework** for Cardiac Rehabilitation
  - **Reducing risk in Heart Disease**
  - Practitioners guide to Cardiac Rehabilitation - ACHRA (requires membership)

### 3 Key Messages

**Quick info:**
Best management of CHF reduces mortality & morbidity with reduced hospitalisation and better quality of life.

Echocardiography is the best test for diagnosis and assessment of heart failure.

Classification into systolic vs diastolic, and severity of heart failure, guides management and prognosis.

Treatment of comorbidities such as anaemia improves CHF symptoms.

Lifestyle education- exercise; salt reduction, fluid monitoring & weight management improves outcomes- consider HF rehabilitation services and Chronic disease management medicare items.

Avoid/cease drugs that worsen CHF.

**Prescribe**
- diuretics for fluid overload
- ACEI for all SHF-“start low go slow”
- specific beta blockers titrated to highest doses for moderate/severe CHF
- then titrate ACEI to effective doses
- digoxin & nitrates & fish oil may help symptoms
- spironolactone may be added for severe SHF

Refer to specialists early for severe, complicated or non responsive CHF, or where comorbidities affect management.

The quick reference guide derived from the Heart Foundation guidelines for management of heart failure summarises the key messages for heart failure management; [CHF guide](URL).

The Heart Foundation [fact sheet](URL) summarises the evidence supporting the need for optimal management of heart failure in Primary Care.
5 Systolic Heart Failure (SHF) (= Left Ventricular Systolic Dysfunction - LVSD)

Quick info:
Systolic Heart Failure (also called Left ventricular systolic dysfunction - LVSD) may be symptomatic or asymptomatic [3].

SHF:
• just over half of all heart failure (HF) patients are found to have LVSD on echocardiography, i.e. reduced left ventricular ejection fraction (LVEF)
• there is no agreement on what level should be used to separate normal from abnormal LVEF – the usual cut-off is approximately 40–50%
• most people with reduced LVEF also have diastolic dysfunction

Management of SHF:
• aims of treatment are to [3]:
  • relieve symptoms and signs and improve quality of life (QoL)
  • prevent hospital admission
  • improve survival
• the three principle treatment approaches involve:
  • lifestyle modifications [1]
  • targeted pharmacological treatment [1]
  • treatment of co-morbidities [3]
• non-pharmacological intervention may need to be considered depending on response to treatment and co-morbidities [1]

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

6 Diastolic Heart Failure (= Heart Failure with Preserved Systolic Function - HFPSF)

Quick info:
Diastolic Heart Failure (heart failure with preserved systolic function - HFPSF) is the failure of the left ventricle to relax sufficiently to fill during diastole, or increased myocardial stiffness resulting in higher filling pressures.

It is important to distinguish this from systolic heart failure as management and prognosis are distinctly different.

Associated with
• hypertension,
• ischaemic heart disease,
• diabetes mellitus,
• valvular disease,
• hypertrophic and restrictive cardiomyopathies and
• more commonly in older females possibly with age related fibrosis.

Diagnosis is with echocardiography with LVEF of >45%. Gated pool scanning or direct left ventriculography may also show this. This, combined with symptoms & signs of CHF, make the diagnosis probable. There is no current role for BNP in diagnosis or management.

Prognosis is for lower short term mortality than for SHF, but mortality is still high, with hospitalisation rates similar to SHF.

Reference:
7 Indications for specialist referral

Quick info:
Refer patients to the heart failure specialist [1]:
- if the initial diagnosis of HF is uncertain;
- for HF that does not respond to treatment
- for HF not tolerating medical management eg hypotension
- for HF that can no longer be managed effectively in the home setting
- patients who are planning a pregnancy, or who are pregnant

Consider referral to a specialist for patients with HF and a co-morbidity that is:
- severe
- contributing significantly to HF in the patient
- complicating the management of HF

Specialist advice may be appropriate for some patients with HF and a co-morbidity, such as:
- angina
- atrial fibrillation or other symptomatic arrhythmia
- renal impairment, eg serum creatinine level greater than 200micromol/L, high doses of diuretic required, or hypokalaemia occurs
- cardiomyopathy is suspected: viral; alcoholic or toxic
- anaemia
- thyroid disease
- severe peripheral arterial disease
- asthma or chronic obstructive pulmonary disease (COPD)
- gout
- valvular disease

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: the task force for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Eur Heart J 2012; 33: 1787-847.

8 Indications for specialist referral

Quick info:
Refer patients to the heart failure specialist [1]:
- if the initial diagnosis of HF is uncertain;
- for management of severe HF – New York Heart Association (NYHA) class IV
- for HF that does not respond to treatment
- for HF not tolerating medical management eg hypotension
- for HF that can no longer be managed effectively in the home setting
- patients who are planning a pregnancy, or who are pregnant

Consider referral for assessment for cardiac resynchronisation therapy (CRT) and an implantable cardioverter defibrillator (ICD), for patients who meet either of the following criteria:
- left ventricular (LV) ejection fraction 35% or less, and previous myocardial infarction (MI); or

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- NYHA class III or IV symptoms, and left bundle branch block (LBBB)

Consider referral to a specialist for patients with HF and a co-morbidity that is:
- severe
- contributing significantly to HF in the patient
- complicating the management of HF

Specialist advice may be appropriate for some patients with HF and a co-morbidity, such as:
- angina
- atrial fibrillation or other symptomatic arrhythmia
- renal impairment, eg serum creatinine level greater than 200 micromol/L, high doses of diuretic required, or hypokalaemia occurs
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9 REFER to specialist

Quick info:
Cardiologist referral options

Peninsula Health Cardiac Failure Clinic
Referral: ph; 9784 7650, Fax 97847319
Referral should be to a named cardiologist- Dr Phillip Carillo. (For listing of cardiologists, view the specialist directory)
Eligibility: Left Ventricular Ejection Fraction (LVEF) <40, or LV moderate to severe impairment/ dysfunction.
Hours: Wednesday 1-5pm
Costs: Public health
Address: Frankston Integrated Health Centre, 2 Hastings Rd, Frankston (part of Frankston Hospital)

Peninsula Health Cardiology Review Clinic
Referral: ph; 9784 7050, Fax 97847479
Referral should be to a named cardiologist- Dr Jamie Layland. (For listing of cardiologists, view the specialist directory)
Eligibility: General cardiology review (includes diastolic CHF)
Hours: Wednesday & Friday mornings
Costs: Public health
Address: Cardiology Review Clinic, 3 North, Frankston Hospital

Peninsula Private Cardiac Services

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Referral: For urgent admissions, call Direct Emergency Coronary Care Admission Service 24hrs/day; 03 9788 3490/91 or admit via ambulance.

For elective admissions, call cardiologist direct (information on link below).

Service Description: Peninsula Private Cardiac Services

Hours: varying consultation times dependant on cardiologist

Costs: Private consultations

Contact: As per cardiologists list

Agency: Monash Health

Name: Monash Heart

Referral:

Referrals are accepted on letterhead with referring GP details;

Referral guidelines

e-mail to: monashheartprivaterooms@monashhealth.org or fax to 9554 1930.

Service Description:

Refer to Monash Heart for full description and referral process

Hours: varying consultation times dependant on cardiologist

Costs: Private Consultations

Agency: The Valley

Referral:

Refer via ED department or by contacting a consultant cardiologists

Service Description: For full details of the services, see The Valley Cardiology

Hours: varying consultation times dependant on cardiologist

Costs: Private consultations

Details of relevant service providers are listed as a service for clinicians. Listing in this pathway is not an endorsement of the provider. If any relevant providers have been missed or if information is incorrect, please use the feedback button on the bottom right of the page to alert us.

10 REFER to specialist

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Cardiologist referral options

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Service Description: Peninsula Private Cardiac Services

Hours: varying consultation times dependant on cardiologist

Costs: Private consultations

Contact: As per cardiologists list
12 Management

Quick info:

There are still no conclusive data regarding the efficacy of any drug class in treating diastolic heart failure (HFPSF):

- **diuretics, and salt & fluid restriction** are used to treat acute symptoms of pulmonary congestion and peripheral oedema with care to avoid hypovolaemia due to this group’s sensitivity to change in blood volume due to reduced LV compliance.
- **cease exacerbating drugs**: NSAIDS, Calcium Channel Blockers and B Blockers - other than bisoprolol, carvedilol & metoprolol extended release (i.e. succinate) *(see extensive list in node under Severe HF)*

Suggested treatments for diastolic heart failure:

- aggressive risk-factor modification, including:
  - blood pressure reduction, particularly using ACEI or ARB to reduce LV hypertrophy and
  - glycaemic control [2]
  - there may be no direct reversal of diastolic dysfunction with this management
- AF-Ventricular rate needs control to maximise LV filling time.
- coronary heart disease is common in this group and should be sought and managed.

A study evaluating the effects of perindopril (an ACEI) in patients with HFPSF, reported in 2006, had insufficient power to determine its effects on long-term morbidity and mortality [3]. A later study found that angiotensin II receptor blockade with irbesartan did not improve outcomes for patients with HFPSF [4].

Arrange Domiciliary or Residential **Medicine Review**

Regular physical activity is strongly advised for people with CHF, with benefits including a reduction in physical deconditioning, symptoms and neurohormonal abnormalities, as well as improvements in functional capacity, however it is not clear if this benefit extends to patients with Diastolic Heart Failure.

References:


13 Pharmacological management & monitoring according to severity

Quick info:

**Severity classification guides pharmacological management and monitoring.**

**Systolic heart failure classification (NYHA):**

- **New York Heart Association (NYHA) class I:**
  - includes asymptomatic left ventricular dysfunction
  - ordinary physical activity does not cause fatigue, breathlessness, or palpitations
- **NYHA class II:**
  - symptomatically 'mild' heart failure
  - slight limitation of physical activity
  - ordinary physical activity may result in fatigue, palpitations, breathlessness, or angina pectoris
- **NYHA class III:**
  - symptomatically 'moderate' HF
  - marked limitation with physical activity
  - patient is comfortable at rest, but ordinary physical activity will lead to symptoms
- **NYHA class IV:**
  - symptomatically 'severe' HF
  - inability to carry out physical activity without discomfort
  - symptoms of cardiac failure are present even at rest

**Reference:**


14 Essential non pharmacological management (all classes)

Quick info:

For presentation, diagnosis, investigation and differential diagnosis see "Heart Failure Suspected " page

15 Severe / Moderate / Mild heart failure (HF) NYHA class IV, III, II

Quick info:

**Severe heart failure** (HF) characterised by;

- symptomatically severe HF inability to carry out physical activity without discomfort
- symptoms of cardiac failure present at rest

Echocardiogram may report ejection fraction <40%

**Mild-moderate HF** presents as;

- mild to marked limitation with physical activity
- comfortable at rest but ordinary physical activity may result in fatigue, palpitations, breathlessness or angina

**Systolic heart failure classification (NYHA):**
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- New York Heart Association (NYHA) class I:
  - includes asymptomatic left ventricular dysfunction
  - ordinary physical activity does not cause fatigue, breathlessness, or palpitations
- NYHA class II:
  - symptomatically 'mild' heart failure
  - slight limitation of physical activity
  - ordinary physical activity may result in fatigue, palpitations, breathlessness, or angina pectoris
- NYHA class III:
  - symptomatically 'moderate' HF
  - marked limitation with physical activity
  - patient is comfortable at rest, but ordinary physical activity will lead to symptoms
- NYHA class IV:
  - symptomatically 'severe' HF
  - inability to carry out physical activity without discomfort
  - symptoms of cardiac failure are present even at rest

Reference;

16 Asymptomatic heart failure (HF) NYHA class I

Quick info:
**New York Heart Association (NYHA) class I:**
- includes asymptomatic left ventricular dysfunction
- Ordinary physical activity does not cause fatigue, breathlessness, or palpitations
- prevalence of asymptomatic LVSD is 3% of the general population [4]
- the mean age of patients with asymptomatic LVSD is lower than that of symptomatic patients [4]
- patients are at increased risk of having a cardiovascular event [4]
- patients with untreated asymptomatic LVSD have an 8% risk of developing HF symptoms annually [3]

**Management of asymptomatic LVSD:**
- lifestyle modifications
- vigorous management of risk factors, eg ischaemic heart disease (IHD) and hypertension
- pharmacological treatment targeted towards preventing disease progression

References:
2. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

17 HF rehabilitation significantly improves morbidity & mortality

Quick info:
Heart Failure Rehabilitation and regular physical activity is strongly advised for people with CHF, with benefits including a reduction in physical deconditioning, symptoms and neurohormonal abnormalities, as well as improvements in functional capacity [2,3,4]. The recommendation in the 2006 guidelines [2] that all patients be referred to a specifically designed physical activity or heart failure rehabilitation program, if available, stands (Grade A recommendation).

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A Heart Failure Rehabilitation program provides:

- multidisciplinary nursing and allied health support
- supervised and supported physical activity program
- education on lifestyle modifications
- self-management support

References


18 Management of co-morbidity with HF

Quick info:

Specialist referral is recommended where co-morbidities exist with heart failure.

Co-morbidities are important in patients with heart failure (HF) because [2]:

- existing co-morbidities may affect treatments for HF
- medications used to treat co-morbidities may cause worsening of HF:
  - such as non-steroidal anti-inflammatory drugs (NSAIDs) used to treat arthritis
- medications used to treat HF and those used to treat co-morbidities may interact with one another:
  - such as beta-blockers and beta-agonists for chronic obstructive pulmonary disease (COPD) and asthma
  - can reduce patient adherence
- most co-morbidities are associated with worse clinical status and are predictors of poor prognosis in HF eg. diabetes, anaemia

Common co-morbidities that may influence the treatment of HF and may require specialist advice include:

- angina
- renal impairment, eg serum creatinine level greater than 200micromol/L
- anaemia
- thyroid disease
- severe peripheral arterial disease
- asthma or COPD
- gout
- valve disease
- sleep apnoea

Consider referral to a specialist for patients with HF and a co-morbidity if:

- the co-morbidity is:
  - severe
  - contributing significantly to HF in the patient
  - complicating the management of HF
- the GP does not have a special interest in the co-morbidity present

References:


2. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.
19 REFER to specialist

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Service Description: Peninsula Private Cardiac Services
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Costs: Private consultations
Contact: As per cardiologists list

Agency: Monash Health
Name: Monash Heart
Referral:
Referrals are accepted on letterhead with referring GP details;
Referral guidelines
email to; monashheartprivaterooms@monashhealth.org or fax to 9554 1930.
Service Description:
Refer to Monash Heart for full description and referral process
Hours: varying consultation times dependant on cardiologist
Costs: Private Consultations

Agency: The Valley
Referral:
Refer via ED department or by contacting a consultant cardiologists
Service Description: For full details of the services, see The Valley Cardiology
Hours: varying consultation times dependant on cardiologist
Costs: Private consultations

National Health Services Directory listings for Cardiology (Frankston, Mornington, Rosebud, Hastings)

Details of relevant service providers are listed as a service for clinicians. Listing in this pathway is not an endorsement of the provider. If any relevant providers have been missed or if information is incorrect, please use the feedback button on the bottom right of the page to alert us.
20 Pharmacological management

Quick info:

Summary:
- if possible, cease exacerbating drugs: NSAIDS, Calcium Channel Blockers and B Blockers - other than bisoprolol, carvedilol & metoprolol extended release (i.e.succinate)
- consider a loop diuretic (monitor)
- consider starting an ACE inhibitor
- add a specific beta blocker if ejection fraction (EF)<40%
- refer to cardiac rehabilitation
- Arrange Domiciliary or Residential Medicine Review

A suggested regime:
- Start Ramipril 1.25mg daily
- Add the lowest dose of any of the HF beta-blockers
- Double the beta-blocker dose every 4 weeks as tolerated until the maximum single pill dose is achieved
  - Bisoprolol 10mg daily
  - Carvedilol 25mg twice daily
  - Metoprolol succinate 190mg daily
  - Nebivolol 10mg daily
- Then increase the dose of Ramipril until systolic blood pressure is between 90 and 120mmHg
- Add Spironolactone initially 12.5mg mane, increasing to 25mg twice daily as needed/tolerated
- Digoxin only for rate control in AF

Detailed management recommendations:
If possible, cease medications that may be affecting the patient's heart failure (HF):
- See node below

Consider prescribing a loop diuretic:
- early, if symptoms are sufficiently severe to warrant treatment while waiting for echocardiography and further assessment
- frusemide and bumetanide are the preferred choices of diuretic
- usually administered once daily in the morning but may be given twice daily for additional diuresis
- titrate the dose to control symptoms & signs of fluid overload

Consider starting a low dose of ACE inhibitor such as Ramipril. An angiotensin II receptor antagonist is an alternative for patients with ACEI cough or other side effects.

Commence Beta blockers such as bisoprolol, carvedilol or metoprolol extended release (i.e.succinate), if ejection fraction (EF)<40%. Start low and increase to target doses if tolerated. Increase slowly to minimise hypotension; worsening of symptoms due to decreased sympathetic drive; and bradycardia. Side effects are often transitory and rarely need cessation of the B-blocker.

Further increase the ACE inhibitor after the B-blocker has been maximised
Aldosterone antagonists - spironolactone (average dose 25mg/day) reduce all cause mortality and symptoms in advanced CHF. Beware hyperkalaemia and warn of gynaecomastia. Use earlier if persistent oedema.
Polyunsaturated fatty acids such as fish oil, added to management of symptomatic CHF, reduce mortality and hospital admissions. Recommend consuming 1gm eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). This can be achieved by eating two to three serves of 150 grams of oily fish every week and supplementing intake with fish oil and omega-3 enriched foods.
Iron replacement with intravenous ferric carboxymaltose iron, improves symptoms & exercise tolerance in iron deficient patients.

Further therapies that may be considered, usually at specialist care level, if HF is unresponsive – include [1]:
- aldosterone antagonist- eplerenone[1]
- angiotensin II receptor blockers (ARBs), eg candesartan (in addition to ACEI) [1]
- ivabradine [6]
- digoxin [1]

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21 Pharmacological management

Quick info: If possible, **cease medications** that may be affecting the patient's heart failure (HF), eg:

- **non-steroidal anti-inflammatory drugs (NSAIDS)** & COX-2 inhibitors
- calcium-channel blockers: verapamil & diltiazem (non dihydropyridine)
- beta blockers other than bisoprolol, carvedilol & metoprolol extended release (i.e. succinate)
- Tricyclic antidepressants
- Clozapine
- Thiazolidinedione: pioglitazone, rosiglitazone
- Corticosteroids
- Tumour necrosis factor antagonist biologicals
- Dronedarone, Trastuzumab, Tyrosine Kinase inhibitors eg sunitinib, Moxonidine.

Arrange Domiciliary or Residential [Medicine Review](#)

**ACEI's:**

- should be used indefinitely in all patients with asymptomatic HF, unless intolerant
- reduce or prevent progression to symptomatic HF
- reduce hospitalisation and death from CHF.
- effective in reducing heart failure development in patients with coronary artery disease particularly post MI.
- Ramipril 10mg daily, enalapril (10mg twice daily) and perindopril have strong evidence.
- Start low and increase slowly as tolerated.

See node in adjacent Symptomatic HF path for further detail regarding dosing and monitoring.

**Beta-blockers:**

- limited evidence of reducing progression from asymptomatic to symptomatic HF.
- for post MI patients with CHF reduces all-cause and cardiovascular mortality, and recurrent non-fatal MI.
- See node in adjacent Symptomatic HF path for further detail regarding dosing and monitoring.

**Disease specific treatment** (see comorbidities nodes)
• Hypertension- is a major risk factor, and its control is more important than the agent used. Add a second or third agent if needed
• Statins to prevent ischaemic events and subsequent CHF in patients who fulfil criteria for lipid lowering.
• Aspirin should be considered in patients with Coronary Heart Disease.

Reference
NHF Australia

22 Physical activity and rehabilitation

Quick info:
Regular physical activity is strongly advised for people with CHF, with benefits including a reduction in physical deconditioning, symptoms and neurohormonal abnormalities, as well as improvements in functional capacity.3

The evidence supporting the benefits of regular physical activity in people with CHF, particularly among middle-aged patients with systolic heart failure, has strengthened in recent years.

• Heart Failure: A Controlled Trial Investigating Outcomes of Exercise Training (HF-ACTION) showed that aerobic exercise, in addition to usual care, resulted in improvements in self-reported health status, including quality of life, in patients with heart failure and a left-ventricular ejection fraction (LVEF) \(\leq 35\%\).10
• A retrospective analysis of the study (adjusted for prognostic factors) showed that patients who exercised as instructed achieved modest but significant benefits in terms of clinical outcomes (including all-cause mortality or hospitalisation and cardiovascular mortality or hospitalisation for CHF).11

The recommendation in the 2006 guidelines that all patients be referred to a specifically designed physical activity program, if available, stands (Grade A recommendation).

Uncertainty remains about the benefit of physical activity in older patients and those with CHF associated with preserved left-ventricular systolic function.

References-

23 Ischaemic heart disease (IHD) with SHF

Quick info:
Ischaemic heart disease (IHD) with systolic heart failure:
• is best managed in conjunction with a cardiologist
• IHD is a common cause of HF, and people with HF often have IHD

Pharmacological management considerations:
• beta-blockers [3]:
  • recommended for angina as well as an essential treatment for systolic HF
• nitrates:
  • have a good safety profile for use in HF
  • should be initiated by a specialist
  • contraindicated in unstable or acute HF [4]
• ivabradine [3]:
  • considered to be a safe anti-anginal treatment for patients with HF
  • calcium-channel blockers:
Heart failure - management

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• are effective at controlling angina symptoms, but some may aggravate HF
• consider amlodipine [1]
• do not use verapamil, diltiazem, and short-acting dihydropyridine [1]
• aldosterone antagonists [5]:
  • eplerenone has been demonstrated to significantly improve outcomes when combined with an ACEI and beta-blocker in patients with LVSD following myocardial infarction (MI)
• aspirin [1]:
  • for patients with HF and atherosclerotic arterial disease (including coronary heart disease)
• statins:
  • should be commenced according to normal practice in IHD,
  • use in HF and asymptomatic coronary artery disease remains controversial
• The safety of other anti-anginal drugs such as nicorandil and ranolazine is uncertain [3].

Coronary revascularisation [3]:
• percutaneous and surgical revascularisation are alternative approaches to the treatment of angina
• coronary artery bypass grafting is recommended for patients with
  • significant left main stenosis
  • two or three vessel coronary disease
• percutaneous coronary intervention (PCI) may be considered for patients considered unsuitable for surgery

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

24 Cease medications exacerbating HF

Quick info:
If possible, cease medications that may be affecting the patient’s heart failure (HF), eg:
• non-steroidal anti-inflammatory drugs (NSAIDS) & COX-2 inhibitors
• calcium-channel blockers: verapamil & diltiazem (non dihydropyridine)
• beta blockers other than bisoprolol, carvedilol & metoprolol extended release (i.e.succinate)
• Tricyclic antidepressants
• Clozapine
• Thiazolidinedione( pioglitazone, rosiglitazone)
• Corticosteroids
• Tumour necrosis factor antagonist biologicals: etanercept; certolizumab pegol; infliximab; adalimumab; golimumab
• Dronedarone, Trastuzumab, Tyrosine Kinase inhibitors eg sunitinib, Moxonidine.

25 Patient communication education and multidisciplinary care

Quick info:
Summary:
• clear information and time spent on clarification is essential
• patient understanding and engagement is essential for successful management
Heart failure - management

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- heart failure (HF) rehab and multidisciplinary care is highly beneficial

  - key areas to explain;
  - pathogenesis/prognosis
  - medication effects, titration, side effects and interactions
  - self-management

Effective communication is key to successful HF management and is likely to increase patient compliance with therapy [1].

All management decisions should be discussed with the patient and viewed as shared decisions between both the patient and the GP [1].

When communicating with the patient [1]:

  - provide explanations in a manner appropriate to the individual
  - account for the patient's level of understanding – consider written information, diagrams, key words, etc
  - understand and respect patient's views and beliefs
  - involve family members or carers in discussions

Provide clear information on [1]:

  - the pathogenesis and prognosis of HF
  - medication, including:
    - all pharmacological treatment used and the role of each medication
    - the need for dose titration and adjusting the dose according to changes in weight and fluid retention
    - the potential effects of therapy on symptoms, including the initial detrimental effect of beta-blockers
    - potential adverse effects
    - possible medication interactions and medication combinations that are best avoided
  - when to seek immediate medical advice
  - local support groups

Self-management advice:

  - patients should be encouraged to self-manage their condition where appropriate
  - some patients, with appropriate education, can monitor their own volume status by regular weighing and adjusting their diuretic therapy accordingly [1]:
    - this requires easy access to the HF rehabilitation team [1]
  - ensure that the patient or their carer knows:
    - how to adjust the dose in response to symptoms
    - when to seek help if their symptoms deteriorate or fail to respond to dose adjustment
  - inform the patient that they can adjust the times that they take the diuretic to suit social needs, eg if they are going out, they can delay a dose until they return

Multidisciplinary care:

  - the approach to management should be multidisciplinary, involving primary, secondary, and community care professionals [1]
  - should target high-risk symptomatic patients [3]

References:

3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

26  Prescribe diuretics for congestion and fluid retention

Quick info:

Summary

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• types of diuretics and indicators for choice
• commencing treatment
• adverse effects

Diuretics:
• should be routinely used for the relief of congestive symptoms and fluid retention in patients with heart failure (HF) [1]
• effect depends on good renal function, i.e., creatinine clearance greater than 40mL/minute
• aim for an increase in urine production & weight loss of 0.5-1kg daily

Loop diuretics:
• preferred diuretics in HF as they have a more powerful effect than thiazides
• include frusemide, bumetanide
• the most beneficial of the diuretics as they:
  • increase sodium and free water excretion
  • maintain this effect even when there is slight renal impairment

Thiazide-type diuretics:
• cause more gentle and prolonged diuresis than loop diuretics [3]
• include hydrochlorothiazide, bendrofluazide, chlorthalidone or indapamide
• consider prescribing if patient:
  • is hypertensive with only mild symptoms [4]
  • has resistant edema:
    • may be added (with caution) to treatment with a loop diuretic
    • may be given in primary care under specialist supervision
• use with caution when prescribing a thiazide and loop diuretic as the combination can cause severe diuresis and dehydration, hyponatraemia, hypovolaemia, and hypokalaemia

Potassium-sparing diuretics (eg spironolactone):
• not generally recommended due to the risk of severe hyperkalaemia in combination with other drugs used in HF
• may be used in secondline treatment of HF
• seek specialist advice before initiating in primary care [1]
• see later node "Consider Spironolactone"

Commencing treatment:
• loop diuretics are usually given once a day in the morning, but can be given twice a day (morning and lunchtime) for additional diuresis
• the patient can adjust the timing of the doses to suit their social needs
• use the lowest dose possible to control symptoms
• review and adjust the dose according to:
  • symptoms
  • signs of congestion
  • weight loss
  • after subsequent treatment for HF has been introduced
• provide education regarding self-adjustment of the dose based on regular weight measurements and other signs and symptoms of fluid retention

Refer for specialist advice if doses of more than 80mg frusemide daily are necessary [1].

Adverse effects of excessive diuresis may include:
• orthostatic hypotension
• dehydration
• renal dysfunction
• electrolyte imbalances, e.g., hyponatraemia, hypokalaemia
• hyperuricaemia
• gout

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

27 Atrial fibrillation with SHF

Quick info:
Atrial fibrillation (AF) with systolic heart failure:
• is best managed in conjunction with a cardiologist
• AF is the most common arrhythmia in people with heart failure (HF)
• a rapid and irregular rhythm is associated with impaired ventricular filling, and compromised cardiac output
• consider early specialist referral for assessment for possible cardioversion or rhythm control
• consider the following issues in patients with HF and AF, especially a first episode of AF or paroxysmal AF [2]:
  • identification of correctable causes
  • identification of potential precipitating factors – this may determine whether a rhythm-control strategy is preferred to a rate-control strategy
  • assessment for thromboembolism prophylaxis
To control heart rate [2]:
• beta-blockers are preferred over digoxin because:
  • digoxin does not provide rate control during exercise
  • beta-blockers have favourable effects on mortality and morbidity in systolic HF
• if ventricular rate remains uncontrolled, the addition of digoxin can be considered
• digoxin is recommended in patients unable to tolerate a beta-blocker
• other treatment options include amiodarone and AV node ablation and pacing
Thromboembolic prophylaxis should be based on the CHA_2DS_2-VASc score and bleeding risk[2].

References:
2. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

28 Lifestyle modifications and immunisation

Quick info:
Summary;
Lifestyle modifications to encourage or discuss;
• attendance at heart failure (HF) rehab
• physical activity within ability
• healthy weight and dietary restrictions
• excess fluid intake: aim <1.5 litre /day
• cease smoking
Heart failure - management

- minimum alcohol intake
- address psychosocial factors (anxiety and depression)
- travel and leisure
- driving regulations
- sexual activity
- consider pneumococcal and annual influenza vaccination

Lifestyle modifications may contribute to improved outcome – educate and advise all patients with chronic HF on the following:

- HF rehab programmes have been shown to improve exercise capacity and quality of life for people with heart failure
- physical activity within ability:
  - encourage regular aerobic exercise to improve functional capacity and symptoms [2]
  - reduces thromboembolic risk and other consequences of prolonged bed rest
- healthy weight and dietary restrictions:
  - limit salt intake
  - inform about the salt content of common food
  - advise patients not to replace salt with salt substitutes that are high in potassium
  - specific dietary advice may be indicated in certain patients, eg those with diabetes
  - refer to a dietitian if:
    - cachectic
    - overweight
- advise patients to avoid excessive fluid intake:
  - consider restricting to 1.5-2.0L per day in those with severe symptoms
  - although experienced clinicians suggest restricting fluid intake to less than approximately 2.0L a day in patients with mild/moderate symptoms, some International guidelines state that routine fluid restriction is probably not of benefit with these patients[2]
  - restriction of hypotonic fluids may improve hyponatraemia [2]
  - weight-based fluid restriction may cause less thirst [2]:
    - 30mL/kg body weight; or
    - 35mL/kg if body weight greater than 85 kg
- smoking:
  - all smokers should be encouraged to stop and offered assistance in smoking cessation
  - an individual programme based on motivational assessment may include referral to smoking cessation services and nicotine replacement therapy [1] – see 'Smoking cessation' pathway
- alcohol:
  - discuss alcohol consumption with the patient and tailor advice appropriately to the clinical circumstances [1]
  - alcohol is contraindicated in those with alcohol related cardiomyopathy [1]
- psychosocial aspects:
  - depression and anxiety:
    - the diagnosis of depression should be considered in all patients with HF [1]
    - where depression is likely to have been precipitated by HF symptoms, reassess the patient's psychosocial status once the physical condition has stabilised [1]
    - where it is apparent that depression is co-existing with HF, treat the patient for depression [1]
    - carefully consider the potential risks and benefits of medication treatment [1] (see adjacent depression with LV dysfunction node)
    - a recent review of the evidence suggests a significant overall improvement in quality of life (QoL) after conducting psychosocial interventions [3]
  - travel and leisure:
    - air travel – no restrictions are necessary in stable patients [1]
• advise to carry a written report of medical history and current medication regimen, and carry extra medication [2]
• monitor and adapt fluid intake, particularly during flights and in hot climates [2]
• beware of adverse reactions to sun exposure with certain medications, eg amiodarone [2]

• driving regulations:
  • direct the patient to VicRoads guidelines including obligation of notifying VicRoads of a medical condition
  • medical standards for assessing fitness to drive are on the AustRoads website

• sexual activity – there are no specific restrictions; broach the subject in a sensitive manner as necessary and target advice towards the individual [1]

Consider immunisation in all patients to minimise the risk of exacerbating chronic HF with respiratory infection [1]:
• advise an annual influenza vaccination
• offer pneumococcal vaccination, a second dose may be recommended

References:
2. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

29 ACEI & diuretics- monitor/ manage renal function

Quick info:
Angiotensin converting enzyme inhibitors (ACEI) - monitoring during treatment:
• monitor renal function and serum electrolytes:
  • before starting an ACEI [20] & 1-2 weeks after each dose increase [4]
  • earlier monitoring (after 5-7 days) may be required for patients with existing renal impairment or those taking a combination of an ACEI or an angiotensin-II receptor blocker (ARB) plus a diuretic or an aldosterone antagonist [2]
  • at regular intervals every 3-6 months if stable[20]

ACEI-managing abnormal results:
Some increase in serum creatinine and potassium levels is expected after starting or increasing the dose of an ACE or an ARB [4]
If estimated glomerular filtration rate (eGFR) decreases by 25%, or the serum creatinine level increases by up to 30% [4]:
• do not modify the ACEI/ARB dose
• re-check eGFR in a further 1-2 weeks
If the renal function reduction is greater than this:
• investigate other causes of deteriorating renal function, such as volume depletion
• stop or reduce the dose of the following drugs (where appropriate) if the person is taking them:
  • nephrotoxic drugs, eg non-steroidal anti-inflammatory drugs (NSAIDs)
  • vasodilators, eg calcium-channel blockers, nitrates
  • potassium supplements or potassium-sparing diuretics
• diuretics - consider dose reduction if the patient is hypovolaemic
If the decrease in eGFR or the increase in serum creatinine level persists despite these measures:
• stop the ACEI or ARB; or
• reduce the dose to a previously tolerated lower dose and re-check levels in 5-7 days; and
• add an alternative antihypertensive medication if required
If the serum potassium level is 5.0mmol/L or above, re-check the level [4]:
If the potassium level remains at 5.0mmol/L or above [4]:
• investigate other causes of hyperkalaemia and treat accordingly
• stop or reduce the dose of potassium-sparing diuretics, eg amiloride, triamterene, spironolactone
• stop or reduce the dose of nephrotoxic medications, eg NSAIDs
If the serum potassium level persists between 5.0 and 5.9mmol/L despite these measures [4]:
• consider reducing the dose of ACEI or ARB to a previously tolerated lower dose
• recheck levels in 5-7 days
If serum potassium persists above 6mmol/L despite these measures [4]
• stop ACEI or ARBs
• consider referral to a dietitian [4]:
• a low-potassium diet (up to 2g daily) or dietary advice may help resolve hyperkalaemia

Diuretics - monitoring during treatment:
is the same as for ACEI above.
Additionally for patients receiving a combination of a loop diuretic and a thiazide [4]:
• check renal function within 5 days of starting combination treatment and recheck every 5-14 days, depending on the patient’s stability
• monitor weight and hydration status – if diuresis is extensive, consider earlier testing of renal function

Diuretics - managing abnormal results:
If serum creatinine level increases by more than 20% or eGFR decreases by more than 15%, of baseline, re-measure renal function within 2 weeks [4]
If serum creatinine increases by 30-50% (or to greater than 200micromol/L) or the eGFR is less than 30mL/min/1.73m2 [4]:
• review volume status
• reduce or stop diuretics (if the patient is hypovolaemic)
• re-measure renal function within 1 week
If serum creatinine level increases by more than 50% or to greater than 256micromol/L (eGFR is approximately 20-25mL/min/1.73m2) [4]:
• assess volume status
• check blood pressure (BP)
• review other renal function tests, including electrolytes and proteinuria
• if the patient is hypovolaemic, stop the diuretic; otherwise, manage accordingly
• seek specialist advice urgently if there is any uncertainty

Diuretics - managing hypokalaemia:
Patients at high risk of cardiac arrhythmias with even mild hypokalaemia include those [4]:
• taking digoxin or drugs that prolong the QT interval, eg amiodarone
• with paroxysmal arrhythmias, unstable angina, or chronic liver disease
Potassium below 3mmol/L (or 4mmol/L in high-risk patients) [3,4]:
• seek urgent specialist advice or consider admission [3]
• review diuretic treatment [4]
Potassium less than 2.5mmol/L (or 3.5mmol/L in high-risk patients)
• expert opinion suggests considering the use of potassium supplements or spironolactone [3,26]

30 Hypertension or diabetes with SHF

Quick info:

Hypertension and systolic heart failure:
• all patients with systolic heart failure should be prescribed an ACEI and beta-blocker
• consider adding an aldosterone antagonist:
  • if the patient remains symptomatic
  • if the patient is no longer symptomatic but still requires treatment of hypertension
Heart failure - management

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- consider a thiazide diuretic, or switch to a loop diuretic if the patient is already being treated with a thiazide diuretic [2]
- consider amloidipine, hydralazine, or felodipine if hypertension persists [2]
- other calcium channel blockers should be avoided, particularly verapamil and diltiazem [3]
- moxonidine and alpha-adrenoceptor antagonists are not recommended [2]

**Diabetes and systolic heart failure:**
- may increase the progression of heart failure (HF)
- diabetic nephropathy may be prevented by treatment with angiotensin II receptor blockers (ARBs) and possibly ACEI [2]
- eplerenone reduces morbidity and mortality in patients with diabetes 3-14 days post myocardial infarction (MI) with LV dysfunction
- medication management:
  - good glycaemic control should be maintained
  - avoid metformin as it increases risk of lactic acidosis in severe or decompensated CHF
  - if using metformin:
    - monitor renal function
    - review the use of metformin if the serum creatinine level is greater than 130micromol/L, or the estimated glomerular filtration rate (eGFR) is less than 45mL/min/1.73m²
    - use as a first-line agent in overweight patients with type 2 diabetes mellitus without significant renal dysfunction
  - thiazolidinediones are contraindicated
  - non-selective beta-blockers can mask warning signs of hypoglycaemia – a cardioselective beta-blocker is preferred
  - some concern has existed over the adverse metabolic effects of beta-blockers in those with diabetes:
    - however, cardioselective beta-blockers are not contraindicated in diabetes and are as effective in improving outcome in diabetic patients as in non-diabetic individuals, although different beta-blockers may have different effects on glycaemic indices [2]
- refer to [diabetes clinic](#), Peninsula Health
- or private Diabetes educator [Frankston, Mornington, Rosebud, Hastings](#)

References:
2. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

31 REFER to heart failure rehabilitation

Quick info:
Heart Failure rehab programs offer a structured, supervised group exercise-based rehabilitation programme designed for patients with heart failure (HF) [1]:
- ensure patient is stable and does not have a condition or device that would preclude an exercise-based rehabilitation programme
- include a psychosocial and educational component in the programme
- the programme may be incorporated within an existing cardiac rehabilitation programme

**Heart Failure (or cardiac) Rehab programs**
Peninsula Health- Chronic Heart Failure Service and CHF Rehabilitation Program

Referral: [Community Health Access](#)
- referral information requested;
  - detailed history
  - results of investigations
  - medications
Heart failure - management

Service Description

- classification
- clients will be contacted within 3-5 days of referral to determine needs and arrange assessment

Service Description:

- 1:1 assessment - can be provided at home if housebound
- referral to group program if appropriate
- and/or clients can be seen 1:1 by dietician/ exercise physiology etc
- referred for HARP care coordination if eligible and requiring additional support
- group program held 4x/yr, 3 hrs per week on Wednesday ams for 10 weeks
  - provides self-management support and lifestyle advice + supervised exercise

Eligibility: Refer to referral and eligibility information

Hours: Wednesday mornings, groups of 10 wk duration 4x/yr

Costs: Public - small client contribution

Estimated wait: Community Health Waiting List

St John of God Cardiac Rehabilitation

Referral:

- medical (GP or specialist) referral required
- Referral to rehab physician
- referral information requested;
  - detailed history
  - results of investigations
  - medications
  - classification

Service Description: cardiac rehab

- multidisciplinary outpatient program for people who have experienced a cardiac event - ACS or HF
- rolling five week program individualised to people's needs
- 2x weekly sessions combining exercise with education
- no waiting list - aim to have client commence program within 2/52

Costs: private - covered under health insurance

Peninsula Private- Healthy Heart Program

Referral:

- referrals through Pen. Private admissions or direct from GP
- refer by fax to Healthy Heart Program on 9789 4124 or via specialist referral

Service Description:

- multi-disciplinary cardiac rehab program coordinated by coronary care nurse and exercise physiologist

Eligibility: heart failure or acute cardiac event or surgery

Hours:

- rolling 8 week program - no waiting list
- held in Mornington and Frankston, 2 hr sessions, 1x/wk
- 5 wk evening program held in Frankston

Costs: private - funded through health insurance

Monash Heart and Monash Health Cardiac Rehabilitation

Referral: GPs can refer on CRP referral form

Service Description:

Cardiac rehabilitation programs held at Clayton, Dandenong, Springvale, Kingston & Pakenham

Eligibility: heart failure or post acute cardiac event or surgery

Hours: variable

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Costs: $50 for 4 week program through Monash Heart (private) or small client contribution for public health programs.

Details of relevant service providers are listed as a service for clinicians. Listing in this pathway is not an endorsement of the provider. If any relevant providers have been missed or if information is incorrect, please use the feedback button on the bottom right of the page to alert us.

Reference

32 Prescribe ACE inhibitors

Quick info:
Summary (scroll down for details);
• commencing treatment
• indicators for seeking specialist advice
• adverse effects
• contraindications

Angiotensin converting enzyme inhibitors (ACEI) have widely demonstrated efficacy for patients with heart failure (HF):
• recommended for all patients with HF with systolic heart failure (SHF) [1]
• also benefits patients with asymptomatic SHF [7]
• slows disease progression, improves exercise capacity, increases ejection fraction, and decreases hospitalisations and mortality [4]
• discontinue medications that compromise renal function, ie NSAIDs, calcium-channel blockers, and potassium supplements (see pharmacological management node above)

Commencing treatment:
• initiate therapy at a low dose [1]
• introduce a beta-blocker if possible and appropriate, increasing to the maximum tolerated therapeutic dose before increasing the ACEI
• then titrate the ACEI dose upwards at no more than 2-weekly intervals until a target dose for management, or highest tolerated dose, is achieved [1]
• no clinically important differences in efficacy have been demonstrated between ACEI: however, clinical experience recommends the following for use in primary care:
  • enalapril- start 2.5mg daily, target 10-20mg twice daily
  • lisinopril- start 2.5mg daily, target 20-40mg daily
  • ramipril- start 1.25mg daily, target 5-10mg daily
  • trandolapril- start 0.5mg daily target 2-4mg daily

Consider seeking specialist advice prior to commencing treatment if:
• baseline creatinine is greater than 221micromol/L [5,7] or estimated glomerular filtration rate (eGFR) of less than 30mL/min/1.73m² [7]
• potassium is greater than 5mmol/L [5,7]
• urea is greater than 12mmol/L
• sodium is 130mmol/L or less
• the patient is taking high-dose diuretics (more than 80mg frusemide daily)
• there are concerns about low blood pressure (BP) [6]
• the patient is frail and elderly

Adverse effects:
• hypotension may occur with concomitant therapy – if symptomatic:
  • discontinue calcium channel blockers and nitrates if at all possible
  • reduce the diuretic dose if there are no signs of congestion
  • consider seeking specialist advice
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- dry cough:
  - may be a symptom of pulmonary oedema
  - if the cough is persistent and troubling the patient, an angiotensin II receptor blocker (ARB) may be substituted for the ACE inhibitor
- worsening of renal function [3]
- hyperkalaemia [3]
- angioedema (rarely) [3]

Contraindications:
- pregnancy and breastfeeding
- previous angioedema with use
- hereditary or idiopathic angioedema
- renal artery stenosis
- high pre-treatment serum potassium level (greater than 5 mmol/L)
- concomitant use of perindopril with aliskiren (a renin inhibitor) – in people with diabetes or renal impairment

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.
7. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012: Addenda: the task force for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33.

33 Add angiotensin II receptor blocker (ARB) if intolerant to ACEI

Quick info:
Angiotensin II receptor blockers (ARBs):
- primarily recommended as an alternative treatment for patients intolerant to angiotensin converting enzyme inhibitors (ACEI) [2]
- reduce morbidity, mortality, and hospitalisations in patients with heart failure (HF) [3]
- do not cause cough

Monitoring and commencing treatment:
- start low & increase slow-see 'Prescribe ACE inhibitors' and 'Review and monitor' for further information
- include
  - candesartan- start 4mg, aim 32mg daily,
  - valsartan- start 40mg, aim 160mg twice daily
  - telmisartan & irbesarten

Adverse effects:
- similar to those seen with ACE inhibitors, although they tend to be milder, and include:
  - dizziness, hypotension, and headaches
  - hyperkalaemia
  - renal dysfunction

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34 Depression with HF

Quick info:
Depression frequently co-exists in patients with heart failure (HF) [1]:

- the diagnosis of depression should be considered in all patients with HF [1]
- routine screening using a validated questionnaire is good practice [3]
- where depression is likely to have been precipitated by HF symptoms, reassess the patient's psychosocial status once the physical condition has stabilised [1]
- where it is apparent that depression is co-existing with HF, treat the patient for depression [1]

Psychotropic medication - consider the potential risks and benefits [1]:
- tricyclic antidepressants (TCA) are contraindicated in patients with HF [3]
- lithium should be avoided (it has a high risk of toxicity when used in conjunction with thiazide diuretics)
- patients should consult a healthcare professional before using over-the-counter therapies for depression such St John's wort (Hypericum perforatum), due to potential interactions [1]

Counselling and cognitive behavioural therapy (CBT) where appropriate:
- a recent review of the evidence suggests a significant overall improvement in quality of life (QoL) after conducting psychosocial interventions [4]
- consider referral to psychologist or psychiatrist

Exercise has a beneficial effect on depression and HF.
- Consider referral to a cardiac rehabilitation program (see adjacent node)

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.
Indications for use of beta-blockers
All patients with HF due to left ventricular systolic dysfunction (LVSD), ejection fraction (EF)<40%, should be prescribed beta-blockers licensed for heart failure:
Contrary to previous practice, current evidence indicates beta-blockers should not be withheld from:
- older adults
- patients with:
  - peripheral vascular disease
  - erectile dysfunction
  - diabetes mellitus
  - interstitial pulmonary disease
  - chronic obstructive pulmonary disease (COPD) without reversibility
Beta-blockers may be considered in asymptomatic LVSD as may be preventative in patients with IHD [3]

Contraindications:
- severe bradycardia
- second- or third-degree heart block [4]
- a history of asthma or bronchospasm
- reversible chronic obstructive pulmonary disease (COPD)
- sick sinus syndrome, unless pacemaker in place [4]
- severe hypotension
- severe peripheral vascular disease
- cardiogenic shock [4] or phaeochromocytoma (without concomitant alpha-blocker)
- decompensated heart failure [4]
- known allergic reaction [4]

Considerations when commencing beta-blockers:
- Consider specialist referral before starting in patient with current or recent exacerbation of HF
- only start once the patient is stable (without fluid overload or hypotension)
- switch stable patients who are already taking a beta-blocker for a co-morbidity and who develop systolic heart failure to a beta-blocker licensed for heart failure [1]
- start low and, if tolerated, increase to target doses slowly, doubling approximately fortnightly
- further increase the ACE inhibitor after the B blocker has been maximised

Dosages:
- bisoprolol- start 1.25mg daily, aim 10mg daily
- carvedilol- start 3.125mg twice daily, aim 25mg twice daily
- metoprolol extended release (i.e.succinate)- start 23.75 daily, aim up to 190mg daily
- nebivolol- start 1.25mg daily, aim 10mg daily

Medication interactions:
- beta-blocker and a class I antiarrhythmic, eg quinidine or flecainide, combination is not recommended
- beta-blocker plus amiodarone with caution – monitor pulse and BP and worsening HF
- beta-blocker with digoxin:
  - monitor pulse carefully
  - carvedilol may increase serum digoxin levels
Adverse effects:
- hypotension; worsening of symptoms due to decreased sympathetic drive; and bradycardia with decompensation [5].
- Seek specialist advice if serious deterioration (fatigue, oedema, weight gain, and dyspnoea) occurs [6].
- are often transitory and rarely need cessation of the B-blocker.

Management of adverse effects:
- temporary deterioration during the initiation or up-titration of beta-blockers:
  - diuretic dose may need to be increased briefly [6]
- congestion:
  - increase diuretics and consider reducing the dose of beta-blocker (but not discontinuing) [6]
- hypotension:
  - if symptomatic, reconsider the need for vasodilator drugs if possible, eg nitrates and calcium channel blockers [6]
  - consider reducing the dose of diuretic, if there are no congestive signs or symptoms [6]
  - seek specialist advice if there is no improvement [5]
  - in asymptomatic hypotension, do not alter the dose of beta-blocker [6]
- bradycardia (less than 50 beats per minute) or extreme fatigue:
  - review the need for contributory medications, eg digoxin or amiodarone
  - consider reducing the dose [6] or, if complications are severe, stopping the beta-blocker (seek specialist advice)
  - seek specialist advice if there is no improvement [5]
- cold extremeties, paraesthesia, and numbness:
  - if troublesome, seek specialist advice as beta-blockers may need to be stopped
- sexual dysfunction
  - loss of libido can occur
  - review the patient in 1-2 weeks and seek specialist advice if there is no improvement

References:

36 Anaemia with HF

Quick info:
CHF is associated with normochromic normocytic anaemia.

Anaemia of CHF:
- rigorous exclusion of other causes is required so that they are appropriately managed if found
- aetiology includes concomitant chronic renal impairment, pro inflammatory cytokines,haemodilution and drugs such as ACEI's.
- severity correlates with symptom severity & prognosis
- erythropoietin reversal improves exercise tolerance and cardiac function ( further trials pending)

Anaemia of other causation:
- management improves prognosis of CHF, reducing symptoms & signs
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- iron supplements- oral or infusion, may be appropriate

37 Beta blockers- monitor/ manage side effects.

Quick info:

**Monitoring during treatment with beta-blockers:**

*Increase dose slowly* (ie at least 2-weekly intervals) until the target effective dose, or maximum dose tolerated, is attained [4]

*Continue* treatment at the target or highest tolerated dose indefinitely unless complications occur [4]

*Assess* heart rate, blood pressure (BP), and clinical status after each titration [1,4]

If hypotension persists and is not tolerated, consider ceasing other vasodilating drugs, and ensure a lower dose of ACEi or ARB has been prescribed.

**Abrupt withdrawal** of beta-blockers should be avoided [2]:

- may precipitate a myocardial event or arrhythmias
- expert opinion should be sought before stopping a beta-blocker

**Switch** stable patients who are already taking a beta-blocker for a co-morbidity and who develop heart failure due to SHF, to a beta-blocker licensed for heart failure [1]

38 Medication cautions and interactions

Quick info:

**Summary:**

The following medications may have an adverse effect upon heart failure (HF), or in some way interact with other administered medications;

- class I & III anti-arrhythmics
- digoxin
- calcium-channel blockers
- tricyclic antidepressants (TCAs)
- lithium
- ARB + ACE + aldosterone antagonist combination
- NSAIDs + cyclo-oxygenase-2 (COX 2) inhibitors
- oral corticosteroids
- meds that prolong QT interval
- thiazolidinediones
- chemotherapy agents
- alpha-adrenoceptor antagonists

**Arrange Domiciliary or Residential Medicine Review**

**Class I anti-arrhythmics, eg quinidine, flecainide, propafenone:**

- contraindicated as increases risk of premature death [3]
- not recommended in combination with beta-blockers as bradycardia and myocardial depression can occur

**Class III anti-arrhythmics:**

- amiodarone is the only anti-arrhythmic that should be used in patients with systolic HF [3]
- the combination of a beta-blocker and amiodarone should be prescribed with caution:
  - monitor heart rate and blood pressure (BP)
  - check for signs of worsening HF, as risk of bradycardia, atrioventricular (AV) block, and myocardial depression is increased

**Digoxin:**

- concomitant administration of a beta-blocker and digoxin can reduce heart rate and prolong AV conduction time, increasing the risk of AV block and bradycardia – monitor pulse carefully
- an increase in plasma digoxin levels has been noted with carvedilol:
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- monitor for signs of digoxin toxicity (confusion, anorexia, nausea, disturbance of colour vision) when starting, adjusting, or stopping carvedilol

Calcium-channel blockers:
- most calcium channel blockers (except amlodipine and felodipine) should not be used as they have a negative inotropic effect and can cause worsening heart failure [3]
- avoid other dihydropyridine derivatives and avoid verapamil and diltiazem
- NB: calcium-channel blockers (with the exception of amlodipine) have been found to exacerbate symptoms of HF or increase mortality after MI in patients who have pulmonary congestion or LV dysfunction [4]

Tricyclic antidepressants (TCA) [3,4]:
- are not recommended as they may cause hypotension, worsening HF, and arrhythmias [3]

Lithium:
- there is an increased risk of toxicity if loop and thiazide diuretics are used in combination with lithium

The addition of an angiotensin receptor blocker (ARB) (or renin inhibitor) to the combination of an angiotensin converting enzyme (ACE) inhibitor and an aldosterone antagonist is not recommended because of the risk of renal dysfunction and hyperkalaemia [3].

Non-steroidal anti-inflammatory drugs (NSAIDs) and cyclo-oxygenase-2 inhibitors [3]:
- should be avoided if possible as they may cause sodium and water retention, worsening renal function, and worsening HF [3]
- all NSAIDs are contraindicated in severe heart failure [5]
- diclofenac and inhibitors of selective cyclo-oxygenase-2 (eg celecoxib, etoricoxib, and parecoxib) are contraindicated in mild to severe heart failure [5]

Oral corticosteroids [3]:
- avoid in patients with chronic obstructive pulmonary disease (COPD) as they cause sodium and water retention, worsening HF:
- inhaled corticosteroids are safe

Medications that prolong QT interval and may precipitate ventricular arrhythmias[4]:
- certain antifungals [4]
- certain antihistamines, eg terfenadine [4]

Antihypertensives:
- an additive hypotensive effect may occur
- monitor for dizziness, light-headedness, and confusion

Thiazolidinediones (glitazones) [3]:
- cause worsening HF and increase risk of hospitalisation

Chemotherapy agents [3]:
- some cause or aggravate LV systolic dysfunction and heart failure
- include anthracyclines eg doxorubicin, and trastuzumab

Alpha-adrenoceptor antagonists [3]:
- not recommended due to safety concerns – neurohormonal activation, fluid retention, and worsening HF

Xanthine Oxidase Inhibitors eg Allopurinol
- OK for recurrent gout
- Colchicine is preferred for acute gout
- do not improve CHF prognosis

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

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39 Consider spironolactone

Quick info:

**Potassium-sparing diuretics:**
- may reduce aldosterone mediated fibrosis, hypertrophy & arrhythmogenesis
- improve prognosis in patients with LVSD
- seek specialist advice before initiating in primary care [1]

**Spironolactone:**
- average effective dose 25mg/ day
- reduces all cause mortality and symptoms in advanced CHF
- beware hyperkalaemia. especially with ACEI use and/or renal impairment
- warn of gynaecomastia
- use earlier if persistent oedema.

**Eplerenone:**
- generally used by specialists
- reduces mortality & hospitalisation in the immediate (3-14days) post-MI period in patients with symptomatic systolic HF
- no antiandrogenic effects so no association with gynaecomastia

High-dose spironolactone or eplerenone (more than 50mg once daily) is problematic if the patient is taking an ACEI or ARB. There is no evidence of benefit with amiloride or triamterene.

References:
3. McMurray JJ, Adamopoulos S, Anker SD et al. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association (HFA) of the ESC. Eur Heart J 2012; 33: 1787-847.

40 Review and monitor regularly

Quick info:

**Summary:**

**Regularly review & monitor:**
- symptoms - ask
- signs- examine
- medication adherence and SE's
- self management - fluid/ weight
- lifestyle issues- smoking, alcohol, exercise
- renal function/ potassium monitoring
- specialist/ rehab involvement & attendance

Heart failure (HF) patients require regular follow-up, monitoring, and review of medications to:
- assess any need for changes
- detect possible adverse effects

The frequency of monitoring depends on:
- clinical status and stability of the patient
- intensity of treatment
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- any co-morbidities

The monitoring interval [1,4]:
- should be short (days to 2 weeks) if the clinical condition or medication has changed
- is required at least 6-monthly for stable patients
- monitor patient response and re-check renal function 1 week after commencing treatment and following each dose increase

Patients who wish to be involved in titrating their own diuretics should be provided with sufficient education and support to do this, with clear guidelines as to what to do in the event of deterioration [1, 4]:
- refer to a cardiac nurse / heart failure rehab program (see adjacent nodes)

Assess and monitor:
- symptoms and signs of HF:
  - functional capacity, limitation of activity by fatigue and dyspnoea according to New York Heart Association (NYHA) classification
  - pulmonary and systemic congestion:
    - auscultate for crepitations
    - assess jugular venous pressure (JVP)
    - assess for peripheral oedema, body weight change, and hepatomegaly
  - haemodynamic status:
    - lying and standing blood pressure (BP)
    - heart rate and rhythm:
      - ask about syncopal and presyncopal symptoms
      - examine pulse
      - perform a 12-lead ECG if indicated
  - urea, creatinine, and electrolytes, estimated glomerular filtration rate (eGFR) [1] – frequency dependent on individual case, current medication, recent dose increase, instability [3]
  - psychosocial needs, including depression
- weight – patients should weigh themselves daily and report weight gain of more than 2 kg in 3 days

See 'Monitoring' nodes for further information about monitoring diuretics, ACE inhibitors, and beta-blockers.

Women who are planning a pregnancy or who are pregnant should be referred for specialist advice.

Follow-up
If the patient is clinically stable on treatment, continue to review as above at least 6-monthly [1]:
- doses of angiotensin converting enzyme (ACE) inhibitor and beta-blocker should be continued long-term at target doses (or maximum tolerated) once stabilised
- monitor for the development of signs and symptoms of congestion
- chronic heart failure (HF) often follows an unstable course with periods of stability compounded by decompensation, sometimes rapid and severe, that may considerably alter treatment plan and prognosis
- approximately half of all deaths related to HF occur suddenly
- HF care should be delivered by a multidisciplinary team with an integrated approach across the healthcare community

A recent review has found that specialist clinics for patients with HF can reduce the risk of unplanned admissions [3].

References:

41 REFER to specialist

Quick info:
Cardiologist referral options

Agency: Peninsula Health
Name: Cardiac Services
Referral: ph; 9784 7650, Fax 97847319
Referral should be to a named cardiologist.
For listing of cardiologists, view the specialist directory
Eligibility:
Left Ventricular Ejection Fraction (LVEF) <40, or moderate to severe presentation of LV dysfunction.
Refer to Heart Failure Clinic guide for more information on eligibility
Hours: Wednesday 1-5pm
Costs: Public health
Contact: as per referral info

Agency: Peninsula Private
Name: Cardiac Services
Referral:
For urgent admissions, call Direct Emergency Coronary Care Admission Service 24hrs/day ; 03 9788 3490/91 or admit via ambulance.
For elective admissions, call cardiologist direct (contact information on link below).
Service Description: Peninsula Private Cardiac Services
Hours: varying consultation times dependant on cardiologist
Costs: Private consultations
Contact: As per cardiologists list

Agency: Monash Health
Name: Monash Heart
Referral:
Referrals are accepted on letterhead with referring GP details;
Referral guidelines
email to; monashheartprivaterooms@monashhealth.org or fax to 9554 1930.
Service Description:
Refer to Monash Heart for full description and referral process
Hours: varying consultation times dependant on cardiologist
Costs: Private Consultations

Agency: The Valley
Referral:
Refer via ED department or by contacting a consultant cardiologists
Service Description: For full details of the services, see The Valley Cardiology
Hours: varying consultation times dependant on cardiologist
Costs: Private consultations

National Health Services Directory listings for Cardiology (Frankston, Mornington, Rosebud, Hastings)

Details of relevant service providers are listed as a service for clinicians. Listing in this pathway is not an endorsement of the provider. If any relevant providers have been missed or if information is incorrect, please use the feedback button on the bottom right of the page to alert us.
Overview

This document describes the provenance of the Peninsula Pathways, Heart Failure care map (pathway).

This pathway was last updated in February 2015.

The Peninsula Pathways Program aims to improve the continuity of patient care between primary, community and hospital care settings in the Frankston-Mornington Peninsula region. Work groups comprising of experienced health professionals (GPs, specialists, nurses, allied health professionals) were established to review and localise pathways.

The objective of this pathway is to improve outcomes for patients with heart failure.

To cite this pathway, use the following format:


Editorial methodology

This pathway is currently the first version localised to Frankston Mornington Peninsula.

This pathway has been developed according to the Map of Medicine editorial methodology, using the evidence and expert advice of the international heart failure pathway as a starting point. The content of this care map was further developed with reference to Australian National Heart Foundation guidelines and other current evidence-based guidelines and practice-based knowledge provided by local practitioners with front-line clinical experience (see contributors section of this document).

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Heart Failure

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Conflicts of interest: None declared

Disclaimer

It is not the function of the Pathways Program, Frankston-Mornington Peninsula Medicare Local to substitute for the role of the clinician, but to support the clinician in enabling access to know-how and knowledge. Users of the Map of Medicine are therefore urged to use their own professional judgement to ensure that the patient receives the best possible care. Whilst reasonable efforts have been made to ensure the accuracy of the information on this online clinical knowledge resource, we cannot guarantee its correctness and completeness. The information on the Map of Medicine is subject to change and we cannot guarantee that it is up-to-date.