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Chronic heart failure

**Management of chronic heart failure in
adults in primary and secondary care**

**This updates and replaces NICE clinical
guideline 5**

NICE clinical guideline 108 Chronic heart failure: management of chronic heart failure in adults in primary and secondary care

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Appendix D is in a separate file.



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This guidance updates and replaces NICE clinical guideline 5 (published July 2003). It was produced by the National Clinical Guideline Centre for Acute and Chronic Conditions.

New and updated recommendations are included on diagnosis, pharmacological treatment, monitoring and rehabilitation.

Recommendations are marked as **[2003]**, **[2003, amended 2010]**, **[2006]**, **[2007]**, **[2010]** or **[new 2010]**.

[2003] indicates that the evidence has not been updated and reviewed since 2003

[2003, amended 2010] indicates that the evidence has not been updated and reviewed since 2003 but a small amendment has been made to the recommendation

[2006] applies to guidance from NICE technology appraisal 95, published in 2006

[2007] applies to two recommendations from 'MI: secondary prevention' (NICE clinical guideline 48) and guidance from NICE technology appraisal 120, both published in 2007

[2010] indicates that the evidence has been reviewed but no changes have been made to the recommendation

[new 2010] indicates that the evidence has been reviewed and the recommendation has been updated or added

Introduction

Heart failure is a complex clinical syndrome of symptoms and signs that suggest the efficiency of the heart as a pump is impaired. It is caused by structural or functional abnormalities of the heart. Some patients have heart failure due to left ventricular systolic dysfunction (LVSD) which is associated with a reduced left ventricular ejection fraction. Others have heart failure with a preserved ejection fraction (HFPEF). Most of the evidence on treatment is for heart failure due to LVSD. The most common cause of heart failure in the UK is coronary artery disease, and many patients have had a myocardial infarction in the past¹.

Around 900,000 people in the UK have heart failure. Almost as many have damaged hearts but, as yet, no symptoms of heart failure¹. Both the incidence and prevalence of heart failure increase steeply with age, with the average age at first diagnosis being 76 years². The prevalence of heart failure is expected to rise in future as a result of an ageing population, improved survival of people with ischaemic heart disease and more effective treatments for heart failure³.

Heart failure has a poor prognosis: 30–40% of patients diagnosed with heart failure die within a year – but thereafter the mortality is less than 10% per year^{4,5}. There is evidence of a trend of improved prognosis in the past

¹ Petersen S, Rayner M, Wolstenholme J (2002) Coronary heart disease statistics: heart failure supplement. London: British Heart Foundation

² Cowie MR, Wood DA, Coats AJ et al. (1999) Incidence and aetiology of heart failure; a population-based study. *European Heart Journal* 20: 421–8

³ Owan TE, Hodge DO, Herges RM et al. (2006) Trends in prevalence and outcome of heart failure with preserved ejection fraction. *New England Journal of Medicine* 355: 251–9

⁴ Cowie MR, Wood DA, Coats AJ et al. (2000) Survival of patients with a new diagnosis of heart failure: a population based study. *Heart* 83: 505–10

⁵ Hobbs FD, Roalfe AK, Davis RC et al. (2007) Prognosis of all-cause heart failure and borderline left ventricular systolic dysfunction: 5 year mortality follow-up of the Echocardiographic Heart of England Screening Study (ECHOES). *European Heart Journal* 28: 1128–34

10 years. The 6-month mortality rate decreased from 26% in 1995 to 14% in 2005⁶.

Patients on GP heart failure registers, representing prevalent cases of heart failure, have a 5-year survival rate of 58% compared with 93% in the age- and sex-matched general population⁷. On average, a GP will look after 30 patients with heart failure, and suspect a new diagnosis of heart failure in perhaps ten patients annually⁸. Heart failure accounts for a total of 1 million inpatient bed-days – 2% of all NHS inpatient bed-days – and 5% of all emergency medical admissions to hospital. Hospital admissions because of heart failure are projected to rise by 50% over the next 25 years – largely as a result of the ageing population^{8,9}. This is despite a progressive decline of the age-adjusted hospitalisation rate at 1–1.5% per annum since 1992/93¹⁰.

For both patients and their carers heart failure can be a financial burden and have adverse effects on their quality of life.

Since we published 'Chronic heart failure: management of chronic heart failure in adults in primary and secondary care' (NICE clinical guideline 5) in 2003, new high-quality evidence from randomised controlled trials in diagnosis, treatment, rehabilitation and monitoring has been published. This guideline is an update of NICE clinical guideline 5 and replaces it. New recommendations have been made in line with the new evidence.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

⁶ Mehta PA, Dubrey SW, McIntyre HF, Walker DM et al. (2009) Improving survival in the 6 months after diagnosis of heart failure in the past decade: population-based data from the UK. *Heart* 95: 1851–6

⁷ Hobbs FD, Roalfe AK, Davis RC et al. (2007) Prognosis of all-cause heart failure and borderline left ventricular systolic dysfunction: 5 year mortality follow-up of the Echocardiographic Heart of England Screening Study (ECHOES). *European Heart Journal* 28: 1128–34

⁸ Stewart S, Horowitz JD (2002) Home-based intervention in congestive heart failure: long-term implications on readmission and survival. *Circulation* 105: 2861–6

⁹ Petersen S, Rayner M, Wolstenholme J (2002) Coronary heart disease statistics: heart failure supplement. London: British Heart Foundation

¹⁰ Mosterd A, Reitsma JB, Grobbee DE (2002) Angiotensin converting enzyme inhibition and hospitalisation rates for heart failure in the Netherlands, 1980 to 1999: the end of an epidemic? *Heart* 87: 75–6

Patient-centred care

This guideline offers best practice advice on the care of adults with chronic heart failure.

Treatment and care should take into account patients' needs and preferences. People with chronic heart failure should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If patients do not have the capacity to make decisions, healthcare professionals should follow the Department of Health's advice on consent (available from www.dh.gov.uk/consent) and the code of practice that accompanies the Mental Capacity Act (summary available from www.publicguardian.gov.uk). In Wales, healthcare professionals should follow advice on consent from the Welsh Assembly Government (available from www.wales.nhs.uk/consent).

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient's needs. Treatment and care, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

If the patient agrees, families and carers should have the opportunity to be involved in decisions about treatment and care.

Families and carers should also be given the information and support they need.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation.

Diagnosis

- Refer patients with suspected heart failure and previous myocardial infarction (MI) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks. **[new 2010]**
- Measure serum natriuretic peptides (B-type natriuretic peptide [BNP] or N-terminal pro-B-type natriuretic peptide [NTproBNP]) in patients with suspected heart failure without previous MI. **[new 2010]**
- Because very high levels of serum natriuretic peptides carry a poor prognosis, refer patients with suspected heart failure and a BNP level above 400 pg/ml (116 pmol/litre) or an NTproBNP level above 2000 pg/ml (236 pmol/litre) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks. **[new 2010]**

Treatment

- Offer both angiotensin-converting enzyme (ACE) inhibitors and beta-blockers licensed for heart failure to all patients with heart failure due to left ventricular systolic dysfunction. Use clinical judgement when deciding which drug to start first. **[new 2010]**
- Offer beta-blockers licensed for heart failure to all patients with heart failure due to left ventricular systolic dysfunction, including:
 - older adults **and**
 - patients with:
 - ◇ peripheral vascular disease
 - ◇ erectile dysfunction
 - ◇ diabetes mellitus
 - ◇ interstitial pulmonary disease and
 - ◇ chronic obstructive pulmonary disease (COPD) without reversibility.**[new 2010]**

- Seek specialist advice and consider adding one of the following if a patient remains symptomatic despite optimal therapy with an ACE inhibitor and a beta-blocker:
 - an aldosterone antagonist licensed for heart failure (especially if the patient has moderate to severe heart failure [NYHA¹¹ class III–IV] or has had an MI within the past month) or
 - an angiotensin II receptor antagonist (ARB) licensed for heart failure¹² (especially if the patient has mild to moderate heart failure [NYHA class II–III]) or
 - hydralazine in combination with nitrate (especially if the patient is of African or Caribbean origin¹³ and has moderate to severe heart failure [NYHA class III–IV]) **[new 2010]**

Rehabilitation

- Offer a supervised group exercise-based rehabilitation programme designed for patients with heart failure.
 - Ensure the patient is stable and does not have a condition or device that would preclude an exercise-based rehabilitation programme¹⁴.
 - Include a psychological and educational component in the programme.
 - The programme may be incorporated within an existing cardiac rehabilitation programme. **[new 2010]**

Monitoring

- All patients with chronic heart failure require monitoring. This monitoring should include:
 - a clinical assessment of functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status
 - a review of medication, including need for changes and possible side effects

¹¹ The New York Heart Association classification of heart failure.

¹² Not all ARBs are licensed for use in heart failure in combination with ACE inhibitors.

¹³ This does not include mixed race. For more information see the full guideline at www.nice.org.uk/guidance/CG108/Guidance

¹⁴ The conditions and devices that may preclude an exercise-based rehabilitation programme include: uncontrolled ventricular response to atrial fibrillation, uncontrolled hypertension, and high-energy pacing devices set to be activated at rates likely to be achieved during exercise.

- serum urea, electrolytes, creatinine and eGFR¹⁵. **[2003, amended 2010]**
- When a patient is admitted to hospital because of heart failure, seek advice on their management plan from a specialist in heart failure. **[new 2010]**

Discharge planning

- Patients with heart failure should generally be discharged from hospital only when their clinical condition is stable and the management plan is optimised. Timing of discharge should take into account patient and carer wishes, and the level of care and support that can be provided in the community. **[2003]**

¹⁵ This is a minimum. Patients with comorbidities or co-prescribed medications will require further monitoring. Monitoring serum potassium is particularly important if a patient is taking digoxin or an aldosterone antagonist.

1 Guidance

The following guidance is based on the best available evidence. The full guideline (www.nice.org.uk/guidance/CG108/Guidance) gives details of the methods and the evidence used to develop the guidance.

Heart failure due to left ventricular systolic dysfunction (LVSD)

This is caused by impaired left ventricular contraction, and is usually characterised by a reduced left ventricular ejection fraction.

Heart failure with preserved ejection fraction (HFPEF)

This is usually associated with impaired left ventricular relaxation, rather than left ventricular contraction, and is characterised by a normal or preserved left ventricular ejection fraction.

Specialist

Throughout this guideline, the term 'specialist' denotes a physician with subspecialty interest in heart failure (often a consultant cardiologist) who leads a specialist multidisciplinary heart failure team of professionals with appropriate competencies from primary and secondary care. The team will involve, where necessary, other services (such as rehabilitation, tertiary care and palliative care) in the care of individual patients.

Unless otherwise specified, within this guideline specialist assessment or management refers to assessment or management by this specialist multidisciplinary heart failure team. The team will decide who is the most appropriate team member to address a particular clinical problem.

1.1 *Diagnosing heart failure*

1.1.1 Symptoms, signs and investigations

- 1.1.1.1 Take a careful and detailed history, and perform a clinical examination and tests to confirm the presence of heart failure.
[2010]

- 1.1.1.2 Refer patients with suspected heart failure and previous myocardial infarction (MI) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks.
[new 2010]
- 1.1.1.3 Measure serum natriuretic peptides (B-type natriuretic peptide [BNP] or N-terminal pro-B-type natriuretic peptide [NTproBNP]) in patients with suspected heart failure without previous MI.
[new 2010]
- 1.1.1.4 Because very high levels of serum natriuretic peptides carry a poor prognosis, refer patients with suspected heart failure and a BNP level above 400 pg/ml (116 pmol/litre) or an NTproBNP level above 2000 pg/ml (236 pmol/litre) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks.
[new 2010]
- 1.1.1.5 Refer patients with suspected heart failure and a BNP level between 100 and 400 pg/ml (29–116 pmol/litre) or an NTproBNP level between 400 and 2000 pg/ml (47–236 pmol/litre) to have transthoracic Doppler 2D echocardiography and specialist assessment within 6 weeks. **[new 2010]**
- 1.1.1.6 Be aware that:
- obesity or treatment with diuretics, angiotensin-converting enzyme (ACE) inhibitors, beta-blockers, angiotensin II receptor antagonists (ARBs) and aldosterone antagonists can reduce levels of serum natriuretic peptides
 - high levels of serum natriuretic peptides can have causes other than heart failure (for example, left ventricular hypertrophy, ischaemia, tachycardia, right ventricular overload, hypoxaemia [including pulmonary embolism], renal dysfunction [GFR < 60 ml/minute], sepsis, chronic obstructive pulmonary disease

[COPD], diabetes, age > 70 years and cirrhosis of the liver).

[new 2010]

- 1.1.1.7 Perform transthoracic Doppler 2D echocardiography to exclude important valve disease, assess the systolic (and diastolic) function of the (left) ventricle, and detect intracardiac shunts. **[2003]**
- 1.1.1.8 Transthoracic Doppler 2D echocardiography should be performed on high-resolution equipment, by experienced operators trained to the relevant professional standards. Need and demand for these studies should not compromise quality. **[2003]**
- 1.1.1.9 Ensure that those reporting echocardiography are experienced in doing so. **[2003]**
- 1.1.1.10 Consider alternative methods of imaging the heart (for example, radionuclide angiography, cardiac magnetic resonance imaging or transoesophageal Doppler 2D echocardiography) when a poor image is produced by transthoracic Doppler 2D echocardiography. **[2003]**
- 1.1.1.11 Consider a serum natriuretic peptide test (if not already performed) when heart failure is still suspected after transthoracic Doppler 2D echocardiography has shown a preserved left ventricular ejection fraction. **[new 2010]**
- 1.1.1.12 Be aware that:
 - a serum BNP level less than 100 pg/ml (29 pmol/litre) or an NTproBNP level less than 400 pg/ml (47 pmol/litre) in an untreated patient makes a diagnosis of heart failure unlikely
 - the level of serum natriuretic peptide does not differentiate between heart failure due to left ventricular systolic dysfunction and heart failure with preserved left ventricular ejection fraction.**[new 2010]**

1.1.1.13 Perform an ECG and consider the following tests to evaluate possible aggravating factors and/or alternative diagnoses:

- chest X-ray
- blood tests:
 - electrolytes, urea and creatinine
 - eGFR (estimated glomerular filtration rate)
 - thyroid function tests
 - liver function tests
 - fasting lipids
 - fasting glucose
 - full blood count
- urinalysis
- peak flow or spirometry. **[2003, amended 2010]**

1.1.1.14 Try to exclude other disorders that may present in a similar manner. **[2003]**

1.1.1.15 When a diagnosis of heart failure has been made, assess severity, aetiology, precipitating factors, type of cardiac dysfunction and correctable causes. **[new 2010]**

1.1.2 Review of existing diagnoses

1.1.2.1 The basis for historical diagnosis of heart failure should be reviewed, and only patients whose diagnosis is confirmed should be managed in accordance with this guideline. **[2003]**

1.1.2.2 If the diagnosis of heart failure is still suspected, but confirmation of the underlying cardiac abnormality has not occurred, then the patient should have appropriate further investigation. **[2003]**

1.2 *Treating heart failure*

1.2.1 Lifestyle

Exercise

See [section 1.3](#), 'Rehabilitation'.

Smoking

- 1.2.1.1 Patients should be strongly advised not to smoke. Referral to smoking cessation services should be considered. **[2003]**

Alcohol

- 1.2.1.2 Patients with alcohol-related heart failure should abstain from drinking alcohol. **[2003]**
- 1.2.1.3 Healthcare professionals should discuss alcohol consumption with the patient and tailor their advice appropriately to the clinical circumstances. **[2003]**

Sexual activity

- 1.2.1.4 Healthcare professionals should be prepared to broach sensitive issues with patients, such as sexual activity, as these are unlikely to be raised by the patient. **[2003]**

Vaccination

- 1.2.1.5 Patients with heart failure should be offered an annual vaccination against influenza. **[2003]**
- 1.2.1.6 Patients with heart failure should be offered vaccination against pneumococcal disease (only required once). **[2003]**

Air travel

- 1.2.1.7 Air travel will be possible for the majority of patients with heart failure, depending on their clinical condition at the time of travel. **[2003]**

Driving regulations

- 1.2.1.8 Large Goods Vehicle and Passenger Carrying Vehicle licence: physicians should be up to date with the latest Driver and Vehicle Licensing Agency guidelines. Check the website for regular updates: www.dft.gov.uk/dvla [2003]

1.2.2 Pharmacological treatment of heart failure

Medicines adherence

For more information refer to 'Medicines adherence: involving patients in decisions about prescribed medicines and supporting adherence', NICE clinical guideline 76 (2009). Available from www.nice.org.uk/guidance/CG76

- 1.2.2.1 Dosing regimens should be kept as simple as possible, and the healthcare professional should ensure that the patient and carer are fully informed about their medication. [2003]

Heart failure due to left ventricular systolic dysfunction

First-line treatment

See also recommendations [1.2.2.5](#), [1.2.2.6](#), [1.2.2.7](#), [1.2.2.8](#) and [1.2.2.9](#) on the use of ACE inhibitors and beta-blockers for first-line treatment. See recommendations [1.2.2.14](#) and [1.2.2.15](#) for alternative first-line treatment for patients who are intolerant of ACE inhibitors. See recommendation [1.2.2.13](#) for alternative first-line treatment for patients who are intolerant of ACE inhibitors and ARBs.

- 1.2.2.2 Offer both angiotensin-converting enzyme (ACE) inhibitors and beta-blockers licensed for heart failure to all patients with heart failure due to left ventricular systolic dysfunction. Use clinical judgement when deciding which drug to start first. [new 2010]

Second-line treatment

See also recommendations [1.2.2.10](#), [1.2.2.11](#), [1.2.2.12](#) and [1.2.2.15](#) on second-line treatments.

1.2.2.3 Seek specialist advice before offering second-line treatment to patients with heart failure due to left ventricular systolic dysfunction. **[new 2010]**

1.2.2.4 Seek specialist advice and consider adding one of the following if a patient remains symptomatic despite optimal therapy with an ACE inhibitor and a beta-blocker:

- an aldosterone antagonist licensed for heart failure (especially if the patient has moderate to severe heart failure [NYHA¹⁶ class III–IV] or has had an MI within the past month) or
- an angiotensin II receptor antagonist (ARB) licensed for heart failure¹⁷ (especially if the patient has mild to moderate heart failure [NYHA class II–III]) or
- hydralazine in combination with nitrate (especially if the patient is of African or Caribbean origin¹⁸ and has moderate to severe heart failure [NYHA class III–IV]) **[new 2010]**

ACE inhibitors (first-line treatment)

See also recommendation [1.2.2.2](#).

1.2.2.5 Start ACE inhibitor therapy at a low dose and titrate upwards at short intervals (for example, every 2 weeks) until the optimal tolerated or target dose is achieved. **[2010]**

¹⁶ The New York Heart Association classification of heart failure.

¹⁷ Not all ARBs are licensed for use in heart failure in combination with ACE inhibitors.

¹⁸ This does not include mixed race. For more information see the full guideline at www.nice.org.uk/guidance/CG108/Guidance

- 1.2.2.6 Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment^{19,20}. **[2010]**

Beta-blockers (first-line treatment)

See also recommendation [1.2.2.2](#).

- 1.2.2.7 Offer beta-blockers licensed for heart failure to all patients with heart failure due to left ventricular systolic dysfunction, including:

- older adults **and**
- patients with:
 - peripheral vascular disease
 - erectile dysfunction
 - diabetes mellitus
 - interstitial pulmonary disease and
 - chronic obstructive pulmonary disease (COPD) without reversibility. **[new 2010]**

- 1.2.2.8 Introduce beta-blockers in a ‘start low, go slow’ manner, and assess heart rate, blood pressure, and clinical status after each titration. **[2010]**

- 1.2.2.9 Switch stable patients who are already taking a beta-blocker for a comorbidity (for example, angina or hypertension), and who develop heart failure due to left ventricular systolic dysfunction, to a beta-blocker licensed for heart failure. **[new 2010]**

¹⁹ For practical recommendations on treatment with ACE inhibitors see ‘Chronic kidney disease’ (NICE clinical guideline 73).

²⁰ For more information see appendix D.

Aldosterone antagonists (second-line treatment)

See also recommendations [1.2.2.3](#) and [1.2.2.4](#).

- 1.2.2.10 In patients with heart failure due to left ventricular systolic dysfunction who are taking aldosterone antagonists, closely monitor potassium and creatinine levels, and eGFR. Seek specialist advice if the patient develops hyperkalaemia or renal function deteriorates²¹. **[new 2010]**
- 1.2.2.11 For patients who have had an acute MI and who have symptoms and/or signs of heart failure and left ventricular systolic dysfunction, treatment with an aldosterone antagonist licensed for post-MI treatment should be initiated within 3–14 days of the MI, preferably after ACE inhibitor therapy. (This recommendation is from ‘MI: secondary prevention’, NICE clinical guideline 48.) **[2007]**
- 1.2.2.12 Patients who have recently had an acute MI and have clinical heart failure and left ventricular systolic dysfunction, but who are already being treated with an aldosterone antagonist for a concomitant condition (for example, chronic heart failure), should continue with the aldosterone antagonist or an alternative, licensed for early post-MI treatment. (This recommendation is from ‘MI: secondary prevention’, NICE clinical guideline 48.) **[2007]**

Hydralazine in combination with nitrate (alternative first-line treatment)

See recommendations [1.2.2.3](#) and [1.2.2.4](#) for the use of hydralazine in combination with nitrate as second-line treatment.

- 1.2.2.13 Seek specialist advice and consider hydralazine in combination with nitrate for patients with heart failure due to left ventricular systolic dysfunction who are intolerant of ACE inhibitors and ARBs. **[new 2010]**

²¹ For more information see appendix D.

Angiotensin II receptor antagonists (second-line or alternative first-line treatment)

See also recommendations [1.2.2.3](#) and [1.2.2.4](#) for the use of ARBs as second-line treatment.

1.2.2.14 Consider an ARB licensed for heart failure as an alternative to an ACE inhibitor for patients with heart failure due to left ventricular systolic dysfunction who have intolerable side effects with ACE inhibitors. **[new 2010]**

1.2.2.15 Monitor serum urea, electrolytes, creatinine and eGFR for signs of renal impairment or hyperkalaemia in patients with heart failure who are taking an ARB^{22,23}. **[new 2010]**

Digoxin

1.2.2.16 Digoxin is recommended for:

- worsening or severe heart failure due to left ventricular systolic dysfunction despite first- and second-line treatment for heart failure²⁴. **[2003, amended 2010]**

All types of heart failure

Diuretics

1.2.2.17 Diuretics should be routinely used for the relief of congestive symptoms and fluid retention in patients with heart failure, and titrated (up and down) according to need following the initiation of subsequent heart failure therapies. **[2003]**

1.2.2.18 The diagnosis and treatment of heart failure with preserved ejection fraction should be made by a specialist, and other conditions that present in a similar way may need to be considered. Patients in whom this diagnosis has been made should usually be treated with a low to medium dose of loop diuretics (for example, less than

²² For practical recommendations on treatment with ARBs see 'Chronic kidney disease' (NICE clinical guideline 73).

²³ For more information see appendix D.

²⁴ See 'Atrial fibrillation' (NICE clinical guideline 36) for recommendations on the use of digoxin in patients with atrial fibrillation.

80 mg furosemide per day). Patients who do not respond to this treatment will require further specialist advice. **[2003]**

Calcium channel blockers

- 1.2.2.19 Amlodipine should be considered for the treatment of comorbid hypertension and/or angina in patients with heart failure, but verapamil, diltiazem or short-acting dihydropyridine agents should be avoided. **[2003]**

Amiodarone

- 1.2.2.20 The decision to prescribe amiodarone should be made in consultation with a specialist. **[2003]**
- 1.2.2.21 The need to continue the amiodarone prescription should be reviewed regularly. **[2003]**
- 1.2.2.22 Patients taking amiodarone should have a routine 6-monthly clinical review, including liver and thyroid function test, and including a review of side effects. **[2003]**

Anticoagulants²⁵

- 1.2.2.23 In patients with heart failure in sinus rhythm, anticoagulation should be considered for those with a history of thromboembolism, left ventricular aneurysm, or intracardiac thrombus. **[2003]**

Aspirin

- 1.2.2.24 Aspirin (75–150 mg once daily) should be prescribed for patients with the combination of heart failure and atherosclerotic arterial disease (including coronary heart disease). **[2003]**

Inotropic agents

- 1.2.2.25 Intravenous inotropic agents (such as dobutamine, milrinone or enoximone) should only be considered for the short-term treatment of acute decompensation of chronic heart failure. This will require specialist advice. **[2003]**

²⁵ See also 'Atrial fibrillation' (NICE clinical guideline 36) for recommendations on the use of anticoagulants in patients with atrial fibrillation.

Heart failure due to valve disease

- 1.2.2.26 Patients with heart failure due to valve disease should be referred for specialist assessment and advice regarding follow-up. **[2003]**
- 1.2.2.27 ACE inhibitor therapy should not be initiated in a patient with a clinical suspicion of haemodynamically significant valve disease, until the valve disease has been assessed by a specialist. **[2003]**

General

Age

- 1.2.2.28 The management of heart failure should be determined by clinical criteria, irrespective of the age of the patient. **[2003]**
- 1.2.2.29 Tolerance of drugs may be lower and side effects require closer and more frequent monitoring in older patients. **[2003]**

Gender

- 1.2.2.30 The principles of pharmacological management of heart failure should be the same for men and women. **[2003]**
- 1.2.2.31 In women of reproductive age who have heart failure, contraception and pregnancy should be discussed. If pregnancy is being considered or occurs, specialist advice should be sought. Subsequently, specialist care should be shared between the cardiologist and obstetrician. **[2003]**
- 1.2.2.32 The potential teratogenic effects of drugs should be considered. **[2003]**

Comorbidities

- 1.2.2.33 Manage comorbidities according to:
- 'Hypertension', NICE clinical guideline 34
 - 'MI: secondary prevention', NICE clinical guideline 48
 - 'Type 2 diabetes', NICE clinical guideline 87

and other relevant NICE guidance. This is particularly important in heart failure with preserved ejection fraction. **[new 2010]**

1.2.3 Invasive procedures

Coronary revascularisation

- 1.2.3.1 Coronary revascularisation should not be routinely considered in patients with heart failure due to systolic left ventricular impairment, unless they have refractory angina. **[2003]**

Cardiac transplantation

- 1.2.3.2 Specialist referral for transplantation should be considered in patients with severe refractory symptoms or refractory cardiogenic shock. **[2003]**

Cardiac resynchronisation therapy

Refer to 'Cardiac resynchronisation therapy for the treatment of heart failure'. (NICE technology appraisal guidance 120 **[2007]**). Please refer to the NICE website for updates on the review status of this appraisal.

Implantable cardioverter defibrillators

Refer to 'Implantable cardioverter defibrillators for arrhythmias' (NICE technology appraisal guidance 95 **[2006]**). Please refer to the NICE website for updates on the review status of this appraisal.

1.3 Rehabilitation

- 1.3.1.1 Offer a supervised group exercise-based rehabilitation programme designed for patients with heart failure.
- Ensure the patient is stable and does not have a condition or device that would preclude an exercise-based rehabilitation programme²⁶.
 - Include a psychological and educational component in the programme.

²⁶ The conditions and devices that may preclude an exercise-based rehabilitation programme include: uncontrolled ventricular response to atrial fibrillation, uncontrolled hypertension, and high-energy pacing devices set to be activated at rates likely to be achieved during exercise.

- The programme may be incorporated within an existing cardiac rehabilitation programme. **[new 2010]**

1.4 *Monitoring*

1.4.1 Clinical review

- 1.4.1.1 All patients with chronic heart failure require monitoring. This monitoring should include:
- a clinical assessment of functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status
 - a review of medication, including need for changes and possible side effects
 - serum urea, electrolytes, creatinine and eGFR²⁷. **[2003, amended 2010]**
- 1.4.1.2 More detailed monitoring will be required if the patient has significant comorbidity or if their condition has deteriorated since the previous review. **[2003]**
- 1.4.1.3 The frequency of monitoring should depend on the clinical status and stability of the patient. The monitoring interval should be short (days to 2 weeks) if the clinical condition or medication has changed, but is required at least 6-monthly for stable patients with proven heart failure. **[2003]**
- 1.4.1.4 Patients who wish to be involved in monitoring of their condition should be provided with sufficient education and support from their healthcare professional to do this, with clear guidelines as to what to do in the event of deterioration. **[2003]**

²⁷ This is a minimum. Patients with comorbidities or co-prescribed medications will require further monitoring. Monitoring serum potassium is particularly important if a patient is taking digoxin or an aldosterone antagonist.

- 1.4.1.5 When a patient is admitted to hospital because of heart failure, seek advice on their management plan from a specialist in heart failure. **[new 2010]**

1.4.2 Serum digoxin

- 1.4.2.1 Routine monitoring of serum digoxin concentrations is not recommended. A digoxin concentration measured within 8–12 hours of the last dose may be useful to confirm a clinical impression of toxicity or non-adherence. **[2003]**
- 1.4.2.2 The serum digoxin concentration should be interpreted in the clinical context as toxicity may occur even when the concentration is within the ‘therapeutic range’. **[2003]**.

1.4.3 Serum natriuretic peptides

- 1.4.3.1 Consider specialist monitoring of serum natriuretic peptides in some patients (for example, those in whom up titration is problematic or those who have been admitted to hospital). **[new 2010]**

1.5 *Referral and approach to care*

1.5.1 Referral for more specialist advice

- 1.5.1.1 Refer patients to the specialist multidisciplinary heart failure team for:
- the initial diagnosis of heart failure and
 - the management of:
 - severe heart failure (NYHA class IV)
 - heart failure that does not respond to treatment
 - heart failure that can no longer be managed effectively in the home setting. **[new 2010]**

1.5.2 Discharge planning

- 1.5.2.1 Patients with heart failure should generally be discharged from hospital only when their clinical condition is stable and the management plan is optimised. Timing of discharge should take into account patient and carer wishes, and the level of care and support that can be provided in the community. **[2003]**
- 1.5.2.2 The primary care team, patient and carer must be aware of the management plan. **[2003]**
- 1.5.2.3 Clear instructions should be given as to how the patient/carers can access advice, particularly in the high-risk period immediately following discharge. **[2003]**

1.5.3 Multidisciplinary team approach to heart failure management

- 1.5.3.1 Heart failure care should be delivered by a multidisciplinary team with an integrated approach across the healthcare community. **[2003]**

1.5.4 Non-NHS agencies

- 1.5.4.1 Standard one of the 'National service framework for older people' states: 'social care services will not use age in their eligibility criteria or policies to restrict access to available services'. This applies to patients with heart failure. (See www.dh.gov.uk) **[2003]**
- 1.5.4.2 Management plans for patients with heart failure should be discussed with non-NHS agencies where they are involved in or responsible for the care of a person with heart failure. **[2003]**
- 1.5.4.3 The principles of pharmacological management for a patient cared for in a non-NHS institution should be similar to those for any other patient with heart failure. **[2003]**
- 1.5.4.4 The education needs of non-NHS agency carers should be considered. **[2003]**

1.5.5 Communication

1.5.5.1 Good communication between healthcare professionals and patients and carers is essential for the best management of heart failure. **[2003]**

1.5.5.2 Guidelines for good communication:

- Listen to patients and respect their views and beliefs.
- Give patients the information they ask for or need about their condition, its treatment and prognosis, in a way they can understand including information about any serious side effects of drugs to be prescribed.
- Provide the most important information first.
- Explain how each item will affect patients personally.
- Present information in separate categories.
- Make advice specific, detailed and concrete.
- Use words the patients will understand; confirm understanding by questions; define unfamiliar words; write down key words; draw diagrams and keep a copy in the medical notes.
- Repeat the information using the same words each time.
- Prepare material, written or taped, to back up handwritten notes.
- Share information with patients' partners, close relatives or carers if they ask you to do so. When patients cannot indicate their consent for such sharing of information, it is advisable to share the information that those close to the patient need or want to know, except where you have reason to believe that the patient would object if able to do so. **[2003]**

1.5.5.3 The content, style and timing of information provision should be tailored to the needs of the individual patient. **[2003]**

1.5.5.4 Healthcare professionals should assess cognitive ability when sharing information. **[2003]**

1.5.5.5 Carers and relatives of patients who are cognitively impaired should be made aware of treatment regimes for the patients they care for and be encouraged to identify any need for clinical support. **[2003]**

1.5.5.6 Management of heart failure should be seen as a shared responsibility between patient and healthcare professional. **[2003]**

1.5.5.7 Unless specifically excluded by the patient, carers and relatives should be involved in the management of the patient, particularly where the patient cannot look after him- or herself. **[2003]**

1.5.6 Prognosis

1.5.6.1 Prognosis should be discussed with patients and carers in a sensitive, open and honest manner. **[2003]**

1.5.7 Support groups

1.5.7.1 Healthcare professionals should be aware of local cardiac support networks and provide this information to patients and carers. **[2003]**

1.5.8 Anxiety and depression

1.5.8.1 The diagnosis of depression should be considered in all patients with heart failure. **[2003]**

1.5.8.2 Where depression is likely to have been precipitated by heart failure symptoms then reassessment of psychological status should be undertaken once the physical condition has stabilised following treatment for heart failure. If the symptoms have improved no further specific treatment for depression is required. **[2003]**

1.5.8.3 Where it is apparent that depression is co-existing with heart failure, then the patient should be treated for depression in line with 'Depression: the treatment and management of depression in adults' (NICE clinical guideline 90) and 'Depression in adults with a chronic physical health problem: treatment and management' (NICE clinical guideline 91). **[2003]**

- 1.5.8.4 For patients with heart failure, the potential risks and benefits of drug therapies for depression should be considered carefully. **[2003]**
- 1.5.8.5 Patients with heart failure should consult a healthcare professional before using over-the-counter therapies for depression such as St John's wort (*Hypericum perforatum*). Healthcare professionals should be aware of the potential interaction with prescribed medication, and always ask about self-medication, including the use of herbal products. **[2003]**
- 1.5.9 End of life**
- 1.5.9.1 Issues of sudden death and living with uncertainty are pertinent to all patients with heart failure. The opportunity to discuss these issues should be available at all stages of care. **[2003]**
- 1.5.9.2 The palliative needs of patients and carers should be identified, assessed and managed at the earliest opportunity. **[2003]**
- 1.5.9.3 Patients with heart failure and their carers should have access to professionals with palliative care skills within the heart failure team. **[2003]**

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available from www.nice.org.uk/guidance/CG108 – click on 'How this guidance was produced'.

Topics covered by the partial update are:

- Diagnosing heart failure: symptoms and signs, use of serum natriuretic peptides (BNP and NTproBNP).
- Pharmacological treatment of heart failure including: aldosterone antagonists, angiotensin II receptor antagonists, angiotensin-converting

enzyme inhibitors, beta-blockers, and hydralazine in combination with nitrate.

- Disease monitoring in chronic heart failure: serial measurement of circulating natriuretic peptide concentrations, monitoring at home.
- Cardiac rehabilitation for heart failure.

How this guideline was developed

NICE commissioned the National Clinical Guideline Centre for Acute and Chronic Conditions to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information about how NICE clinical guidelines are developed on the NICE website (www.nice.org.uk/HowWeWork). A booklet, 'How NICE clinical guidelines are developed: an overview for stakeholders, the public and the NHS' (fourth edition, published 2009), is available from NICE publications (phone 0845 003 7783 or email publications@nice.org.uk and quote reference N1739).

3 Implementation

NICE has developed tools to help organisations implement this guidance (see www.nice.org.uk/guidance/CG108).

4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future.

4.1 *Beta-blockers and angiotensin-converting enzyme inhibitors for heart failure with preserved left ventricular ejection fraction*

What is the effectiveness of angiotensin-converting enzyme (ACE) inhibitors and beta-blockers (given either alone or in combination) compared with placebo in patients with heart failure and preserved left ventricular ejection fraction?

Why this is important

At least half of people with heart failure in the community have preserved left ventricular ejection fraction. Research has focused on heart failure with left ventricular systolic dysfunction and found several agents to be beneficial (notably ACE inhibitors, beta-blockers and aldosterone antagonists). To date, studies of treatment in patients with preserved left ventricular ejection fraction have found no significant benefit. However, there is limited evidence that suggests potential benefit of both beta-blockers and ACE inhibitors in this population. The equivocal evidence base for beta-blockers and ACE inhibitors needs to be explored in greater depth to establish whether there is definite benefit or not. This is particularly important because of the extent of heart failure with preserved left ventricular ejection fraction in the general population.

4.2 *Home telemonitoring, natriuretic peptide-guided therapy and formal follow-up by a heart failure team*

What is the effectiveness and cost effectiveness of home telemonitoring, monitoring of serum natriuretic peptides and formal follow-up by a heart failure team for patients with heart failure due to left ventricular systolic dysfunction?

Why this is important

Heart failure is characterised by repeated hospitalisation. For people with left ventricular systolic dysfunction, hospitalisation can be reduced by appropriate treatment and organised nursing care. Recent studies of ways to prevent hospitalisation have focused on telemonitoring (the patient's status is assessed in the patient's own home) and the use of serum natriuretic peptide

levels (to guide up-titration of drugs) compared with 'usual' care. The studies used various research methods and differing levels of 'usual' care, which makes it difficult to compare the results. It has been suggested that, when care is delivered by an organised heart failure team under consultant supervision, additional strategies such as telemonitoring and monitoring of serum natriuretic peptides may not confer advantage. Further research is important to ascertain whether monitoring and supervision techniques afford advantage over formal, organised care by a specialist multidisciplinary heart failure team.

4.3 *The role of natriuretic peptides in the management and prognosis of heart failure*

What is the optimal use of natriuretic peptides in the management and prognostic stratification of patients with heart failure?

Why this is important

Heart failure is characterised by repeated hospitalisation, high mortality in the period immediately following hospitalisation and an unpredictable course in the later stages. In people with heart failure, natriuretic peptide levels have been shown to correlate with poor prognosis. Studies of the use of natriuretic peptides to guide drug titration have suggested a potential reduction in mortality in some groups, although the overall utility of this remains uncertain in the broader population with heart failure. Research is needed in three areas:

- Whether elevated natriuretic peptides despite maximum tolerated therapy could be used to predict prognosis and to guide an 'end-of-life' strategy for late-stage heart failure.
- Whether the level of natriuretic peptides at the time of discharge could be used to prioritise routine follow-up after discharge.
- Whether routine monitoring of natriuretic peptides in people with heart failure in the community might allow optimal use of community nursing resources.

4.4 *Aldosterone antagonists and angiotensin II receptor antagonists in heart failure*

What is the comparative effectiveness of aldosterone antagonists and angiotensin II receptor antagonists (ARBs) in symptomatic patients with heart failure due to left ventricular systolic dysfunction who are:

- on optimal therapy with a beta-blocker and an ACE inhibitor, or
- on a beta-blocker but are intolerant of ACE inhibitors?

Why this is important

Inhibition of the renin-angiotensin-aldosterone system with an ACE inhibitor in combination with a beta-blocker is currently the cornerstone of the management of heart failure with left ventricular systolic dysfunction.

The first question is which antagonist of the renin-angiotensin-aldosterone system should be added if the patient remains symptomatic despite being on optimal therapy with a beta-blocker and an ACE inhibitor?

In trials, both aldosterone antagonists and ARBs have been used in addition to ACE inhibitors for patients with heart failure who remain symptomatic. However, there are no trials comparing the effectiveness and safety of adding aldosterone antagonists or ARBs to otherwise optimal therapy.

The second question concerns the comparative effectiveness of aldosterone antagonists and ARBs in patients (at least 10%) who are intolerant of ACE inhibitors. An ARB may be less effective than an ACE inhibitor. Aldosterone antagonists have been shown to be beneficial in patients with heart failure due to left ventricular systolic dysfunction but most were taking an ACE inhibitor. It is important to know which is the most effective method for inhibition of the renin-angiotensin-aldosterone system when ACE inhibitors are not tolerated: an aldosterone antagonist in combination with a beta-blocker or an ARB in combination with a beta-blocker.

4.5 *Hydralazine in combination with nitrate for heart failure with preserved left ventricular ejection fraction*

What is the comparative effectiveness of vasodilator therapy with nitrates and hydralazine in patients with heart failure and preserved left ventricular ejection fraction?

Why this is important

More than half of people with heart failure in the community have preserved left ventricular ejection fraction. To date, studies have not shown that ARBs, ACE inhibitors or beta-blockers afford significant prognostic benefit for this population. In patients with heart failure due to left ventricular systolic dysfunction, studies have indicated that the combination of nitrate and hydralazine improves prognosis.

The pathophysiology of heart failure with preserved left ventricular ejection fraction is not clearly understood. However, hypertension is common, arterial compliance may play a major part and increased preload is a potential problem contributing to this form of heart failure. Hydralazine is an arterial vasodilator, and nitrates may reduce preload. Research is needed to investigate whether using these drugs in combination would benefit patients with heart failure and preserved left ventricular ejection fraction.

5 Other versions of this guideline

5.1 *Full guideline*

The full guideline, 'Chronic heart failure' contains details of the methods and evidence used to develop the guideline. It is published by the National Clinical Guideline Centre for Acute and Chronic Conditions, and is available from our website (www.nice.org.uk/guidance/CG108/Guidance).

5.2 *Quick reference guide*

A quick reference guide for healthcare professionals is available from www.nice.org.uk/guidance/CG108/QuickRefGuide

For printed copies, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk (quote reference number N2268)

5.3 ‘Understanding NICE guidance’

A summary for patients and carers (‘Understanding NICE guidance’) is available from www.nice.org.uk/guidance/CG108/PublicInfo

For printed copies, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk (quote reference number N2269).

We encourage NHS and voluntary sector organisations to use text from this booklet in their own information about chronic heart failure.

6 Related NICE guidance

- Prevention of cardiovascular disease. NICE public health guidance 25 (2010). Available from www.nice.org.uk/guidance/PH25
- Chest pain of recent onset. NICE clinical guideline 95 (2010). Available from www.nice.org.uk/guidance/CG95
- Unstable angina and NSTEMI. NICE clinical guideline 94 (2010). Available from www.nice.org.uk/guidance/CG94
- Depression in adults with a chronic physical health problem. NICE clinical guideline 91 (2009). Available from www.nice.org.uk/guidance/CG91
- Depression (partial update). NICE clinical guideline 90 (2009). Available from www.nice.org.uk/guidance/CG90
- Type 2 diabetes (partial update). NICE clinical guideline 87 (2009). Available from www.nice.org.uk/guidance/CG87
- Medicines adherence. NICE clinical guideline 76 (2009). Available from www.nice.org.uk/guidance/CG76
- Chronic kidney disease. NICE clinical guideline 73 (2008). Available from www.nice.org.uk/guidance/CG73
- Lipid modification. NICE clinical guideline 67 (2008). Available from www.nice.org.uk/guidance/CG67

- Identifying and supporting people most at risk of dying prematurely. NICE public health guidance 15 (2008). Available from www.nice.org.uk/guidance/PH15
- Smoking cessation services. NICE public health guidance 10 (2008). Available from www.nice.org.uk/guidance/PH10
- MI: secondary prevention. NICE clinical guideline 48 (2007). Available from www.nice.org.uk/guidance/CG48
- Varenicline for smoking cessation. NICE technology appraisal guidance 123 (2007). Available from www.nice.org.uk/guidance/TA123
- Cardiac resynchronisation therapy for the treatment of heart failure. NICE technology appraisal guidance 120 (2007). Available from www.nice.org.uk/guidance/TA120
- Atrial fibrillation. NICE clinical guideline 36 (2006). Available from www.nice.org.uk/guidance/CG36
- Hypertension. NICE clinical guideline 34 (2006). Available from www.nice.org.uk/guidance/CG34
- Brief interventions and referral for smoking cessation in primary care and other settings. NICE public health intervention guidance 1 (2006). Available from www.nice.org.uk/guidance/PH1
- Implantable cardioverter defibrillators for arrhythmias. NICE technology appraisal guidance 95 (2006). Available from www.nice.org.uk/guidance/TA95
- Short-term circulatory support with left ventricular assist devices as a bridge to cardiac transplantation or recovery. NICE interventional procedure guidance 177 (2006). Available from www.nice.org.uk/guidance/IPG177

7 Updating the guideline

NICE clinical guidelines are updated so that recommendations take into account important new information. New evidence is checked 3 years after publication, and healthcare professionals and patients are asked for their views; we use this information to decide whether all or part of a guideline

needs updating. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations.

Appendix A: The Guideline Development Group and NICE project team for the 2010 partial update

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Appendix B: The Guideline Review Panel for the 2010 partial update

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

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Appendix C: The algorithms

Algorithms for the diagnosis and treatment of heart failure can be found on pages 4 and 6 of the quick reference guide, available from

www.nice.org.uk/guidance/CG108QuickRefGuide

Appendix D: Practical notes

The practical notes are in a separate file.