

Chronic heart failure

Clinical case scenarios for primary care

Implementing NICE guidance

August 2010

NICE clinical guideline 108



These clinical case scenarios accompany the clinical guideline: 'Chronic heart failure: management of chronic heart failure in adults in primary and secondary care' (available online at www.nice.org.uk/guidance/CG108).

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Introduction

Heart failure is a complex syndrome of symptoms and signs. Untreated it has a poor prognosis, but this can be improved considerably by early diagnosis and optimal treatment. These clinical case scenarios illustrate the application of the recommendations in 'Chronic heart failure' (NICE clinical guideline 108) to the care of patients presenting to primary care with symptoms of heart failure.

'Chronic heart failure' (NICE clinical guideline 108) does not make recommendations about the use of specific drugs or dosing. However, for the purpose of creating realistic case scenarios and based upon expert opinion, drug names and dosages have been included.

Clinical case scenarios for primary care

Case scenario 1

Presentation

A 73-year-old female has shortness of breath when lying down. She has found that using a couple of pillows at night makes it easier to breathe.

Past medical history

Hypertension was diagnosed 3 years ago and is being treated with atenolol.

On examination

You find bilateral basal crepitations and a laterally displaced apical impulse.

Next steps for diagnosis

1.1 Question:

You suspect heart failure, what tests would you order?

1.1 Answer:

Because there is no past history of myocardial infarction (MI) you measure serum natriuretic peptides in line with recommendation 1.1.1.3 of the NICE guideline.

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. **[1.1.1.3]**

1.2 Question:

The BNP level is 350 pg/ml, what would you do next?

1.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 6 weeks in line with recommendation 1.1.1.5 of the NICE guideline.

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. [1.1.1.5]

Next steps for management

1.3 Question:

The echocardiogram shows dilated and moderately impaired left ventricular contraction, and mild mitral regurgitation. The specialist advises the introduction of an ACE inhibitor and a beta-blocker. What medications would you start, how would you manage the introduction of these medications?

1.3 Answer:

Start the patient on an ACE inhibitor such as ramipril 1.25 mg twice daily and then change the atenolol to a beta-blocker licensed for heart failure such as carvedilol 3.125 mg twice daily. This is in line with recommendations 1.2.2.2 and 1.2.2.9 of the NICE guideline.

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. **[1.2.2.2]**

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.

[1.2.2.9]

You uptitrate both the ramipril and carvedilol to the maximum tolerated doses in line with recommendations 1.2.2.5 and 1.2.2.8 of the NICE guideline.

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. **[1.2.2.5]**

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

You monitor renal function at initiation of ramipril and after each dose increment, in line with recommendation 1.2.2.6 of the NICE guideline.

Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment. **[1.2.2.6]**

Case scenario 2

Presentation

A 71-year-old male has breathlessness and fatigue.

Past medical history

He has type 1 diabetes and angina.

On examination

You find an irregular pulse (possibly due to atrial fibrillation) and a low pulse volume.

Next steps for diagnosis

2.1 Question:

You suspect heart failure, what tests would you order?

2.1 Answer:

Because there is no past history of myocardial infarction (MI) you measure serum natriuretic peptides.

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. [1.1.1.3]

2.2 Question:

The BNP level is 500 pg/ml, what would you do next?

2.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 2 weeks in line with recommendation 1.1.1.4 of the NICE guideline.

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. **[1.1.1.4]**

Case scenario 3

Presentation

A 68-year-old female has exertional breathlessness, ankle swelling and a cough.

Past medical history

She has type 2 diabetes.

On examination

You find ankle oedema, hypertension and 2 cm hepatomegaly

Next steps for diagnosis

3.1 Question:

You suspect heart failure, what test would you order?

3.1 Answer:

Because there is no past history of myocardial infarction (MI) you measure serum natriuretic peptides.

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. [1.1.1.3]

3.2 Question:

The BNP level is 350 pg/ml, what would you do next?

3.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 6 weeks.

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. **[1.1.1.5]**

Next steps for management

3.3 Question:

The echocardiogram shows no evidence of left ventricular systolic dysfunction, but the specialist suggests that the patient has heart failure with preserved ejection fraction. The specialist advises the introduction of a diuretic. Which diuretic would you start the patient on?

3.3 Answer:

You start the patient on furosemide 40 mg daily, in line with recommendations 1.2.2.17 and 1.2.2.18 of the NICE guideline.

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. **[1.2.2.17]**

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 80 mg furosemide per day). Patients who do not respond to this treatment will require further specialist advice. **[1.2.2.18]**

3.4 Question:

The specialist also advises the introduction of an ACE inhibitor for the management of hypertension, particularly given the patient is diabetic. Which ACE inhibitor would you choose and how would you manage the introduction of this medication?

3.4 Answer:

You would start the patient on ramipril 1.25 mg twice daily and uptitrate to the maximum tolerated dose.

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. **[1.2.2.5]**

You monitor renal function at initiation of ramipril and after each dose increment.

Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment. **[1.2.2.6]**

Case scenario 4

Presentation

An 80-year-old female has fatigue and weight loss, although she feels like her stomach is always bloated.

Past medical history

She has chronic bronchitis.

On examination

You find raised jugular venous pressure, pan-systolic murmur in the lower sternal edge suggestive of tricuspid regurgitation and a third heart sound. You also find ascites

Next steps for diagnosis

4.1 Question:

You suspect heart failure, what test would you order?

4.1 Answer:

Because there is no past history of myocardial infarction (MI) you measure serum natriuretic peptides.

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. [1.1.1.3]

4.2 Question:

The BNP level is 750 pg/ml, what would you do next?

4.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 2 weeks.

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. **[1.1.1.4]**

Case scenario 5

Presentation

A 62-year-old male has breathlessness and orthopnoea.

Past medical history

He has COPD.

On examination

You find bilateral basal crepitations and tachycardia.

Next steps for diagnosis

5.1 Question:

You suspect exacerbation of COPD or possibly heart failure. What tests would you order?

5.1 Answer:

Test for exacerbation of COPD in line with 'Chronic obstructive pulmonary disease' (NICE clinical guideline 101) and measure serum natriuretic peptides.

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. [1.1.1.3]

5.2 Question:

The BNP level is 150 pg/ml, what should you do next?

5.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 6 weeks.

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. [1.1.1.5]

The specialist finds no evidence of heart failure and suggests that the raised levels of BNP are due to COPD, in line with recommendation 1.1.1.6 of the NICE guideline.

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). [1.1.1.6]

Case scenario 6

Presentation

A 65-year-old female of African–Caribbean ethnicity has a 3-week history of exertional breathlessness.

Past medical history

She has hypertension and obesity.

On examination

You find bilateral basal crepitations and a laterally displaced apical impulse.

Next steps for diagnosis

6.1 Question:

You suspect heart failure, what tests would you order?

6.1 Answer:

Because there is no past history of myocardial infarction (MI) you measure serum natriuretic peptides.

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. [1.1.1.3]

6.2 Question:

The BNP level is 900 pg/ml, what would you do next?

6.2 Answer:

You would refer the patient to have specialist assessment and echocardiography within 2 weeks.

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. [1.1.1.4]

Next steps for management**6.3 Question:**

The echocardiogram shows severely impaired left ventricular contraction with mild left ventricular hypertrophy. The specialist advises the introduction of an ACE inhibitor and a beta blocker licensed for heart failure. Which ACE inhibitor and beta blocker would you commence and how would you manage the introduction of these medications?

6.3 Answer:

Start the patient on an ACE inhibitor such as ramipril 1.25 mg twice daily, and a beta-blocker licensed for heart failure, such as bisoprolol 1.25 mg daily.

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. **[1.2.2.2]**

You uptitrate both the ramipril and bisoprolol to the maximum tolerated doses in line.

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. **[1.2.2.5]**

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

You monitor renal function at initiation of ramipril and after each dose increment.

Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment. **[1.2.2.6]**

Further presentation

6.4 Question:

The patient comes back 6 months later with increased breathlessness despite being on the maximum tolerated doses of an ACE inhibitor and a beta-blocker. What would you do?

6.4 Answer:

You seek specialist advice. The specialist considers adding second-line treatment in line with recommendation 1.2.2.4 of the NICE guideline.

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 [NYHA class III–IV] or has had an MI within the past month) or
- an angiotensin II receptor antagonist (ARB) licensed for heart failure (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 origin and has moderate to severe heart failure [NYHA class III–IV])

[1.2.2.4]

Because of the patient's ethnicity and hypertension, hydralazine in combination with nitrate is the likely choice for second-line treatment.

Question 6.5

The patient returns again after further 4 months complaining of feeling breathless all of the time, particularly when he lies down to go to sleep. He has noticed his ankles to be swollen. You suspect worsening heart failure despite the patient receiving optimal medications. What would you do next?

Answer 6.5

You refer the patient to the multidisciplinary heart failure team in line with recommendation 1.5.1.1 of the NICE guideline.

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.

[1.5.1.1]

The patient is seen by a member of the heart failure multi-disciplinary team. His electrocardiogram does not show widening of the QRS complexes, and therefore, he was deemed not suitable for cardiac re-synchronisation therapy. However, his symptoms and signs improved following an increase of his diuretic dose and the addition of 125 micrograms of digoxin daily, by the heart failure specialist nurse.

Case scenario 7

Presentation

A 57-year-old male is a non-smoker and has a 3-week history of dry persistent cough. The cough is interfering with his ability to sleep at night and function during the day. He has not had any recent chest infection to account for the cough.

Past medical history

He has heart failure due to left ventricular systolic dysfunction, which is being treated with bisoprolol 10 mg daily and ramipril 7.5 mg daily.

On examination

You find his chest is clear and there are no signs of fluid overload.

Next steps for diagnosis

7.1 Question:

What would you do next?

7.1 Answer:

The patient has an existing diagnosis of heart failure so you review this diagnosis in line with recommendation 1.1.2.1 of the NICE guideline.

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 [1.1.2.1].

7.2 Question:

Chest X-ray shows clear lung fields and renal function is normal. There is no past history of myocardial infarction, what would you do next?

7.2 Answer:

You would measure serum natriuretic peptides.

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. [1.1.1.3]

7.3 Question:

The BNP level is 86 pg/ml, what does this indicate?

7.3 Answer:

The cough is not caused by uncontrolled heart failure.

Next steps for management

7.4 Question:

What would you do next to help ease the cough?

7.4 Answer:

You advise the patient to stop taking the ACE inhibitor (ramipril), and to start an angiotensin II receptor antagonist (ARB) licensed for heart failure (for example, candesartan 2 mg daily). This is in line with recommendation 1.2.2.14 of the NICE guideline.

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. [1.2.2.14]

You monitor for signs of renal impairment and hyperkalaemia, in line with recommendation 1.2.2.15 of the NICE guideline.

Monitor serum urea, electrolytes, creatinine and eGFR for signs of renal impairment or hyperkalaemia in patients with heart failure who are taking an ARB. [1.2.2.15]

Further presentation

7.5 Question:

The patient comes back 6 months later with increased breathlessness, despite being on the maximum tolerated doses of ARB and beta-blockers. What would you do next?

7.5 Answer:

You seek specialist advice. The specialist considers adding second-line treatment in line with recommendation 1.2.2.4 of the NICE guideline.

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 [NYHA class III–IV] or has had an MI within the past month) or
- an angiotensin II receptor antagonist (ARB) licensed for heart failure (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 origin and has moderate to severe heart failure [NYHA class III–IV])

[1.2.2.4]

An aldosterone antagonist (for example, spironolactone 25 mg daily) is the likely choice for second-line treatment. This is particularly appropriate since the patient is already on an ARB and is not of African or Caribbean origin. You monitor for hyperkalaemia and deterioration of renal function in line with recommendation 1.2.2.10 of the NICE guideline.

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 deteriorates. **[1.2.2.10]**

Case scenario 8

Presentation

A 64-year-old female has a 2-day history of breathlessness.

Past medical history

She has hypertension. She had an ST-segment-elevation myocardial infarction 8 days ago, which was treated with primary percutaneous coronary intervention. She is taking aspirin 75 mg daily, clopidogrel 75 mg daily, atenolol 25 mg daily and ramipril 3.75 mg daily.

On examination

You find fine crepitations in the lower third of the lung fields bilaterally, elevated jugular venous pressure and a third heart sound. Renal function is normal.

Next steps for diagnosis

8.1 Question:

You suspect heart failure after myocardial infarction, what would you do next?

8.1 Answer:

Start the patient on a loop diuretic such as furosemide 40 mg daily.

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. **[1.2.2.17]**

You refer the patient to have specialist assessment and echocardiography within 2 weeks in line with recommendation 1.1.1.2 of the NICE guideline.

Refer patients with suspected heart failure and previous myocardial infarction (MI) urgently, to have transthoracic Doppler 2D echocardiography and specialist assessment within 2 weeks. **[1.1.1.2]**

8.2 Question:

The echocardiogram shows moderately severe left ventricular systolic dysfunction, shortly after acute myocardial infarction. The specialist advises the introduction of an aldosterone antagonist licensed for use in heart failure following myocardial infarction, in line with recommendation 1.2.2.11 of the NICE guideline.

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.) **[1.2.2.11]**

What aldosterone antagonist would you select and how would you manage the introduction of this medication?

8.2 Answer:

You start the patient on eplerenone 25 mg daily and monitor for hyperkalaemia and deterioration of renal function, in line with recommendation 1.2.2.10 of the NICE guideline.

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 deteriorates. **[1.2.2.10]**

8.3 Question:

Would you change or introduce any medications?

8.3 Answer:

You would stop the atenolol and start the patient on a beta-blocker licensed for heart failure, such as bisoprolol 1.25 mg daily.

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.

[1.2.2.9]

You uptitrate the ACE inhibitor and then uptitrate the beta-blocker once the signs of congestion have cleared.

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. **[1.2.2.2]**

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. **[1.2.2.5]**

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

You closely monitor renal function during the uptitration of ACE inhibitor. This is especially important given the concomitant treatment with the loop diuretic and the aldosterone antagonist.

Measure serum urea, creatinine, electrolytes and eGFR at initiation of an ACE inhibitor and after each dose increment. **[1.2.2.6]**

Implementation tools

NICE has developed tools to help organisations implement the clinical guideline on chronic heart failure (listed below). These are available on the NICE website (www.nice.org.uk/guidance/CG108).

- Slide set – highlighting key messages for local discussion.
- Audit support – for monitoring local practice.
- Baseline assessment tool – the document can help you identify which areas of practice may need more support, decide on clinical audit topics and prioritise implementation activities.

A practical guide to implementation, 'How to put NICE guidance into practice: a guide to implementation for organisations', is also available (www.nice.org.uk/usingguidance/implementationtools).

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