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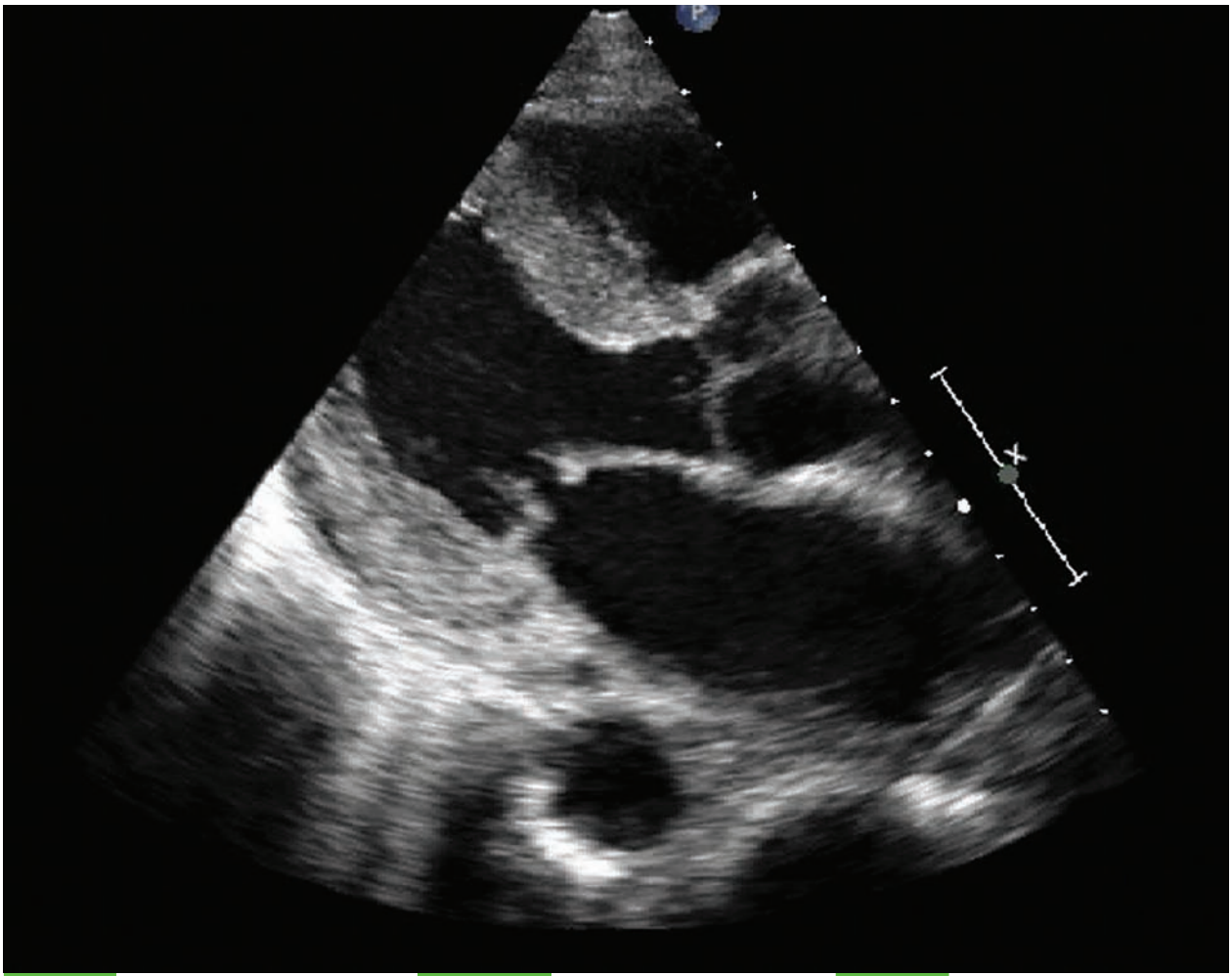
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Recent developments in the management of heart failure

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Transthoracic echocardiogram image from a patient with heart failure due to amyloid heart disease, showing left ventricular hypertrophy, mitral valve thickening, and an enlarged left atrium

How should diagnosis be confirmed?

SOME PATIENTS WITH HEART FAILURE WILL PRESENT WITH THE SUDDEN ONSET OF severe symptoms that require hospital attention (acute heart failure), but the more typical presentation in primary care is more insidious, with progressive breathlessness on exertion, ankle swelling, orthopnoea or paroxysmal nocturnal dyspnoea. Not all patients will have all these symptoms, and in many patients there may be other causes. Because it can be difficult to diagnose heart failure correctly, NICE has given specific advice in its guideline, issued in 2010.[1] The diagnostic algorithm recommended by NICE is shown in figure 1, p26.

ASSESSMENT

After taking a history and examining the patient, if a GP suspects heart failure, then the key blood test is B-type natriuretic peptide (BNP or NTproBNP). If the BNP level is normal then heart failure is unlikely and other diagnoses should be considered. If it is raised, or if there is a past history of myocardial infarction (MI), there is a high likelihood of heart failure and the patient requires further assessment, which must include echocardiography and a specialist assessment. BNP/NTproBNP testing can be performed in a hospital biochemistry department, or as a point-of-care test. »

What are the evidence-based treatments?

How should patients be monitored?

For the first time, NICE has indicated time limits for this full assessment. If the patient has a history of previous MI or a very high BNP level (> 400 pg/ml) or NTproBNP level (> 2,000 pg/ml) then the echocardiography and specialist assessment must be completed within two weeks. If the BNP level is moderately raised (BNP 100-400 pg/ml, or NTproBNP 400-2,000 pg/ml) then the assessment should be completed within six weeks.

It is important to remember that heart failure is not a complete diagnosis in itself. The underlying cardiac abnormality should be identified. In many cases the causes may be multiple, for example, an elderly patient with atrial fibrillation, left ventricular systolic dysfunction, and moderate aortic stenosis is a common clinical situation.

An ECG is often very useful. If it is completely normal it makes heart failure less likely, but it may show evidence of previous infarction, or an arrhythmia such as atrial fibrillation. A chest X-ray may point towards lung disease. Blood tests such as urea and electrolytes, creatinine, full blood count, thyroid function, and lipids and glucose may give important background information or alternative explanations for symptoms.

MANAGEMENT

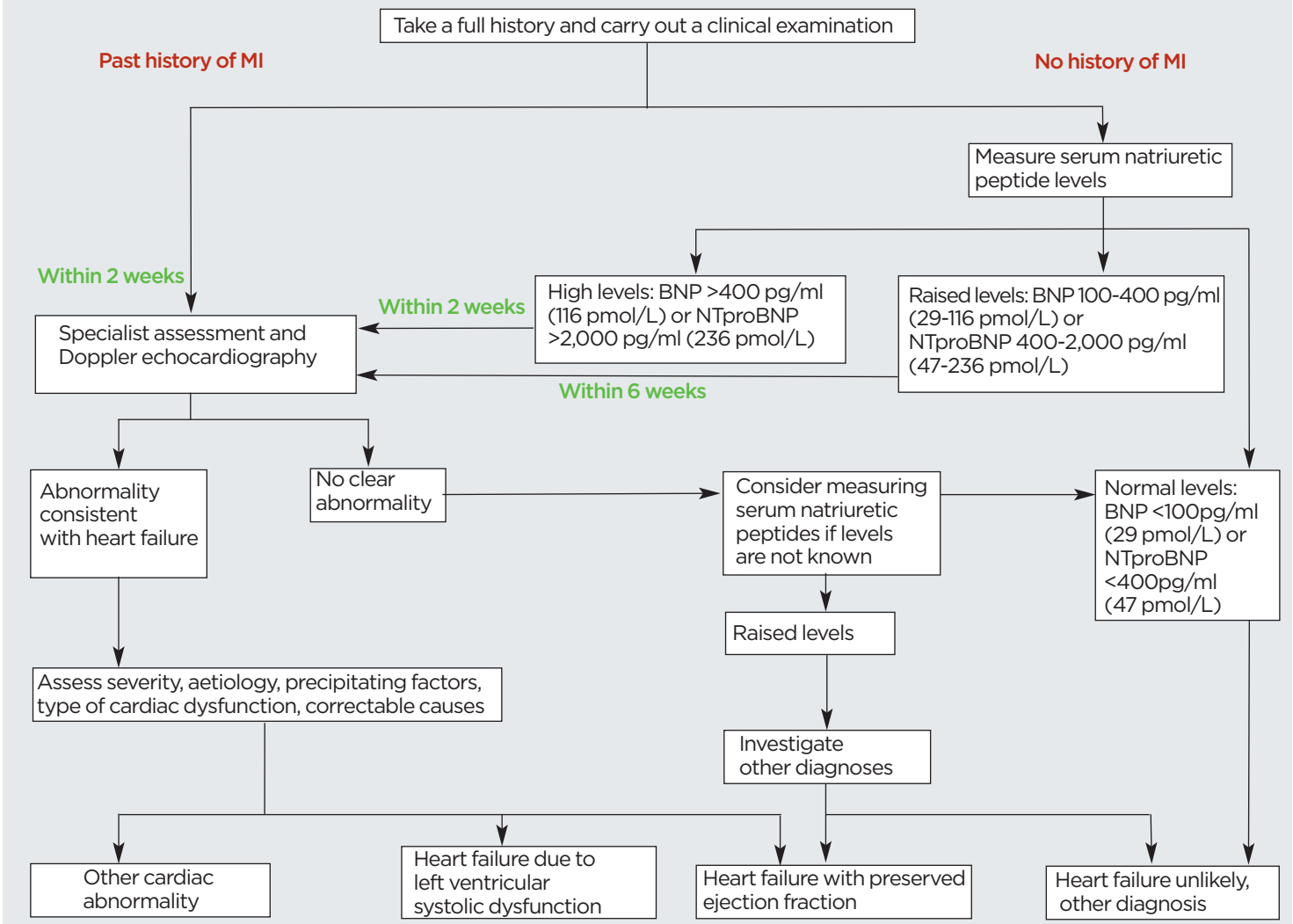
The European Society of Cardiology (ESC) has updated its guidance on the management of heart failure in 2012.[2] Drug therapy is necessary to improve life expectancy and quality of life, and to reduce the risk of hospitalisation. However, both the NICE[1] and the ESC guidance[2] also emphasise the importance of:

- Lifestyle management (regular appropriate exercise, avoiding excessive salt and alcohol consumption)
- Supporting patients to learn about their condition and to self-monitor and self-manage if so desired
- Palliation of symptoms at all stages of the condition
- Identification of the minority of patients in whom surgical intervention is required (for example, for severe valve disease, or when heart transplantation is appropriate)

The drug treatment of heart failure due to systolic dysfunction of the left ventricle is well worked out, and there is a clear treatment algorithm

Figure 1

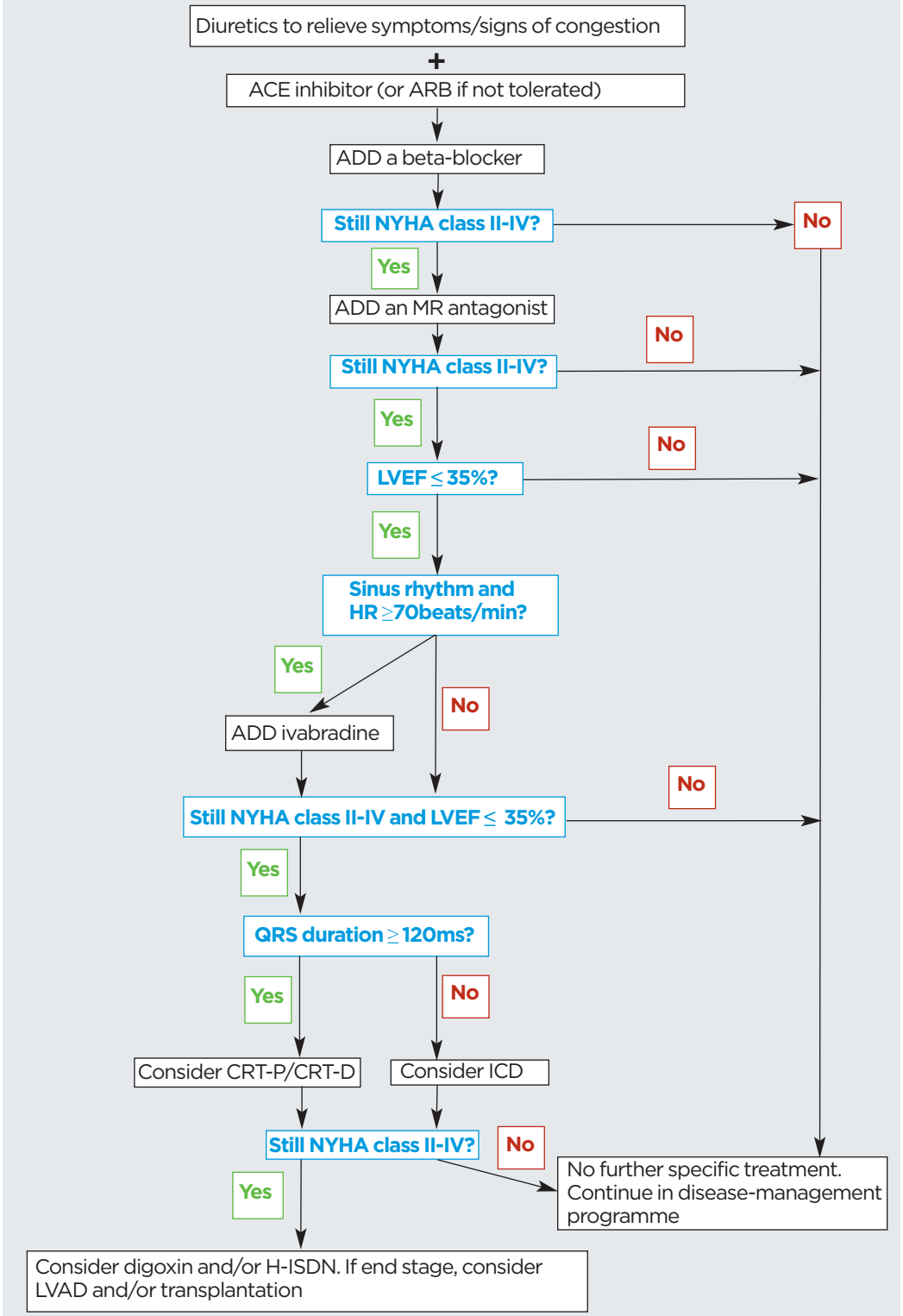
Algorithm for the diagnosis of heart failure, as recommended by NICE



Adapted from NICE CG108. Management of chronic heart failure in adults in primary and secondary care[1]

Figure 2

Treatment algorithm for systolic heart failure, as recommended by the European Society of Cardiology (2012)[2]



Key: ARB: angiotensin receptor blocker; NYHA class II-IV: New York Heart Association classes associated with symptoms at rest or on any degree of exertion; MR: mineralocorticoid; LVEF: left ventricular ejection fraction; HR: heart rate; CRT-P: cardiac resynchronisation pacemaker; CRT-D: combined cardiac resynchronisation pacemaker and implantable cardioverter defibrillator (ICD); H-ISDN: hydralazine-isosorbide dinitrate combination; LVAD: left ventricular assist device.

(see figure 2, left). GPs will be familiar with the use of ACE inhibitors, or angiotensin receptor blockers if the patient is truly ACE-inhibitor intolerant, and beta-blockers licensed for heart failure (carvedilol, bisoprolol, nebivolol). These remain the mainstay of treatment in addition to as small a dose of diuretic as possible to control any fluid retention. However, two recent large randomised trials have changed best practice, adding two more drug options to best treatment.

Eplerenone

EMPHASIS-HF was a study of the addition of the aldosterone antagonist eplerenone to optimal heart failure treatment (typically with a diuretic, ACE inhibitor and beta-blocker) in patients with systolic impairment of the left ventricle but only mild symptoms.[3] The trial was stopped early because of overwhelming benefit; a 24% reduction in mortality (P=0.008) as well as a 37% reduction in the primary combined endpoint of cardiovascular death and hospitalisation for heart failure (P < 0.001).

Aldosterone antagonism is therefore recommended by the 2012 ESC guidance for all patients who remain symptomatic despite an ACE inhibitor and beta-blocker. Previously such aldosterone antagonism (usually with spironolactone) was reserved for those with more severe symptoms or in those who had developed heart failure in the context of an acute MI. It is important to remember that the presence of mild symptoms in heart failure does not necessarily mean mild underlying cardiac disease and low risk.

Ivabradine

SHIFT was a study of the heart rate lowering agent ivabradine. It is the only drug in its class, acting on the I_f channels in the sinus node to slow the heart down in sinus rhythm by typically 10-15 beats per minute. Although already licensed for use in angina, the licence has recently been extended to patients with systolic heart failure, sinus rhythm, and a heart rate of 75 beats per minute or more despite optimal treatment, typically with an ACE inhibitor, beta-blocker to maximal tolerated dose, and diuretic.

The trial reported an 18% reduction in the combined endpoint of cardiovascular mortality and hospitalisation for heart failure (P < 0.0001), largely driven by a 26% reduction in hospitalisation for heart failure (P < 0.0001) and a 26% reduction in the risk of dying from »

heart failure (P=0.014), with the benefit larger in those with a higher resting heart rate at the time of starting therapy. As discussed below, assessing the heart rhythm and rate is an important part of the clinical assessment of a patient with heart failure – if the rhythm is sinus but the rate is ≥ 75 beats per minute, therapy needs to be optimised – perhaps by increasing the beta-blocker dose if possible, or by the addition of ivabradine.

For patients with heart failure, no significant valve disease, and normal systolic function (previously termed diastolic heart failure) the treatment options remain disappointing. No trial has convincingly shown benefit for any drug class, but symptomatic relief can be obtained by judicious use of diuretics, ACE inhibitors, and perhaps beta-blockers if the heart rate is fast. Treatment of comorbidities such as hypertension, obesity, diabetes and atrial fibrillation is also vital.

Table 1

NICE quality standard for chronic heart failure

1 People presenting in primary care with suspected heart failure and previous myocardial infarction (MI) are referred urgently, to have specialist assessment including echocardiography within two weeks.

2 People presenting in primary care with suspected heart failure without previous MI have their serum natriuretic peptides measured.

3 People referred for specialist assessment including echocardiography, either because of suspected heart failure and previous MI or suspected heart failure and high serum natriuretic peptide levels, are seen by a specialist and have an echocardiogram within two weeks of referral.

4 People referred for specialist assessment including echocardiography because of suspected heart failure and intermediate serum natriuretic peptide levels are seen by a specialist and have an echocardiogram within six weeks of referral.

5 People with chronic heart failure are offered personalised information, education, support and opportunities for discussion throughout their care to help them understand their condition and be involved in its management, if they wish.

6 People with chronic heart failure are cared for by a multidisciplinary heart failure team led by a specialist and consisting of professionals with appropriate competencies from primary and secondary care, and are given a single point of contact for the team.

7 People with chronic heart failure due to left ventricular systolic dysfunction are offered ACE inhibitors (or angiotensin II receptor antagonists licensed for heart failure if there are intolerable side effects with ACE inhibitors) and beta-blockers licensed for heart failure, which are gradually increased up to the optimal tolerated or target dose with monitoring after each increase.

8 People with stable chronic heart failure and no precluding condition or device are offered a supervised group exercise-based cardiac rehabilitation programme that includes education and psychological support.

9 People with stable chronic heart failure receive a clinical assessment at least every six months, including a review of medication and measurement of renal function.

10 People admitted to hospital because of heart failure have a personalised management plan that is shared with them, their carer(s) and their GP.

11 People admitted to hospital because of heart failure receive input to their management plan from a multidisciplinary heart failure team.

12 People admitted to hospital because of heart failure are discharged only when stable and receive a clinical assessment from a member of the multidisciplinary heart failure team within two weeks of discharge.

13 People with moderate to severe chronic heart failure, and their carer(s), have access to a specialist in heart failure and a palliative care service.

Device therapy

Device therapy, with cardiac resynchronisation pacemakers and/or implantable cardioverter defibrillators, is increasingly used for patients with chronic heart failure, particularly if they have low ejection fractions (30-35% or below) and/or left bundle branch block on their ECG. NICE is due to issue updated recommendations on the indications for this therapy in 2013, which will clarify which patient characteristics should lead to consideration of this therapy. Each healthcare community should have a clear route for referral, usually involving patients who have been admitted to hospital at some point, or who remain symptomatic despite best drug therapy.

Rehabilitation

GPs should make sure that patients have been referred to a rehabilitation programme – something that is now enshrined in the NICE quality standard for heart failure, see table 1, left.[5] This standard has 13 quality statements that are intended to guide commissioners regarding what are the key markers of high quality, cost-effective care.

Additionally, NICE recommends annual vaccination against influenza, and a one-off vaccination against pneumococcal disease.

FOLLOW-UP

All patients with heart failure require monitoring. This can be done in primary care and/or secondary care but it is vital that it is carried out. The frequency of monitoring will depend on the clinical status and stability of the patient. The monitoring interval should be short (days to two weeks) if the clinical condition or medication has changed, but it is required at least six-monthly for stable patients. Monitoring should include:

- Clinical assessment of functional capacity, fluid status, cardiac rhythm and rate (minimum of examining the pulse), cognitive status and nutritional status
- A review of medication, including the need for changes, and possible side effects
- Serum urea, electrolytes, creatinine and estimated glomerular filtration rate

More detailed monitoring will be

key points

SELECTED BY

Dr Peter Saul

GP, Wrexham and Associate GP Dean for North Wales

The typical presentation of heart failure in primary care is insidious, with progressive breathlessness on exertion, ankle swelling, orthopnoea or paroxysmal nocturnal dyspnoea. Not all patients will have all these symptoms, and in many patients there may be other causes.

If a GP suspects heart failure, then the key blood test is B-type natriuretic peptide (BNP). If the BNP is normal then heart failure is unlikely and other diagnoses should be considered. If it is raised, or if there is a past history of myocardial infarction, the patient requires further assessment, which must include echocardiography and a specialist assessment. The underlying cardiac abnormality should be identified. An ECG is often very useful and if it is completely normal it makes heart failure less likely.

Both the NICE and the ESC guidance emphasise the importance of lifestyle management (regular appropriate exercise, avoiding excessive salt and alcohol consumption). ACE inhibitors (or angiotensin receptor blockers) and beta-blockers licensed for heart failure (carvedilol, bisoprolol, nebivolol) remain the mainstay of treatment in addition to as small a dose of diuretic as possible to control any fluid retention. Aldosterone antagonism is recommended by the 2012 ESC guidance for all patients who remain symptomatic despite an ACE inhibitor and beta-blocker. If the rhythm is sinus but the heart rate is $\geq$ 75 beats per minute, therapy needs to be optimised, perhaps by increasing the beta-blocker dose, if possible, or by the addition of ivabradine.

For patients with heart failure, no significant valve disease, and normal systolic function (previously termed diastolic heart failure) the treatment options remain disappointing. Symptomatic relief can be obtained by judicious use of diuretics, ACE inhibitors, and perhaps beta-blockers if the heart rate is fast. Treatment of comorbidities such as hypertension, obesity, diabetes and atrial fibrillation is also vital.

All patients with heart failure require monitoring. This should include: clinical assessment of functional capacity, fluid status, cardiac rhythm and rate, cognitive status and nutritional status; a review of medication, and serum urea, electrolytes, creatinine and estimated glomerular filtration rate.

The high-risk period for any patient is after discharge from hospital, and good communication between the patient, carers, and all healthcare professionals is essential. Discharge should only occur once the patient has stabilised, with the primary care team aware of the management plan, and with clear instructions to the patient and family about how to access advice.

required if the patient has significant comorbidity or if their condition has deteriorated since previous review. This is particularly relevant for elderly patients on multiple medications, in whom renal function can deteriorate markedly in response to intercurrent infection or diarrhoea/vomiting.

NICE also recommends that if patients wish to be involved in monitoring of their condition, they should be provided with sufficient education and support to do this, with clear guidelines as to what to do in the event of deterioration.

A multidisciplinary team approach to heart failure is recommended by NICE, with an integrated approach across the healthcare community in primary and secondary care. Heart failure nurse specialists are an integral part of this team, although it is usually led by a hospital-based cardiologist. Such a team approach can ensure appropriate monitoring takes place, and can identify when patients should be seen by a physician with more expertise in heart failure, for example, when symptoms are severe or not responding to therapy, or when the heart failure can no longer be managed effectively in the home setting.

The high-risk period for any patient is after discharge from hospital, and good communication between the patient, carers, and all healthcare professionals is essential. Discharge should only occur once the patient has stabilised, with the primary care team aware of the management plan, and with clear instructions to the patient and family about how to access advice.

Thankfully, recognition of the palliative care and end of life needs of patients with heart failure is now widespread. Hospices are increasingly willing to play a role, and access to good palliative care services is vital for patients and their families. The GP has a key role to play in this aspect of care.

CONCLUSIONS

In 2012, any patient with suspected heart failure should have the diagnosis confirmed or refuted rapidly, with onward referral for echocardiography and specialist assessment. GP access to BNP/NTproBNP testing is key to doing this effectively. Once the causes of the heart failure are clear, a management plan needs to be put in place and enacted promptly. This will usually involve a multidisciplinary team, working with the patient and family to educate them about the condition, starting and uptitrating key drugs (an ACE inhibitor, beta-blocker and aldosterone antagonist), monitoring their clinical status, identifying who needs surgical intervention or device therapy, and thereby optimising their quality and length of life.

The GP is key to this process – acting as the patient's advocate for timely diagnosis, making sure drug therapy is introduced and optimised, monitoring the patient's condition, and identifying when the plan needs to be modified. With access to good diagnosis and good treatment the prognosis of this condition has improved remarkably in the past 20 years but without such modern therapy the syndrome can still be a death sentence.

REFERENCES

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2 The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2012 of the European Society of Cardiology. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2012. *Eur Heart J* 2012 (e-pub ahead of print). www.escardio.org/guidelines-surveys/esc-guidelines/Pages/acute-chronic-heart-failure.aspx

3 Zannad F, McMurray JJV, Krum H et al for the EMPHASIS-HF Study Group. Eplerenone in patients with systolic heart failure and mild symptoms. *N Engl J Med* 2011;364:11-21

4 Swedberg K, Komajda M, Bohm M et al on behalf of the SHIFT Investigators. Ivabradine and outcomes in chronic heart failure (SHIFT): a randomised placebo-controlled study. *Lancet* 2010;376:875-85

5 National Institute for Health and Clinical Excellence Centre for Clinical Practice: Quality Standards Programme. Chronic heart failure. NICE. London. 2011 www.nice.org.uk/media/D6F/93/CHFQualityStandard.pdf

Useful information

NICE CG108

The management of chronic heart failure in adults in primary and secondary care. The full guidelines, quick reference guide, and summary for patients are available at **www.nice.org.uk**

The Heart Failure Association

The HFA of the European Society of Cardiology patient website **www.heartfailurematters.org**

British Heart Foundation

Accessible explanatory booklets for patients and relatives **www.bhf.org.uk**

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