Heart failure 2: treatment options and long-term management

In recent years, the treatment options offered to patients with heart failure (HF), and the consistency of care provided, have improved. This is partly due to standardised clinical guidelines – such as those published by the European Society of Cardiology (Ponikowski et al, 2016; Ponikowski et al, 2014) and the National Institute for Health and Care Excellence (NICE) (2014) – as well as UK-wide audits evaluating the care given (National Institute for Cardiovascular Outcomes Research, 2015). This article covers the management of HF according to the latest guidance, gives an overview of treatment options, explains the importance of patient education and self-care, and discusses the role of nurses.

Goal of therapy
Most HF guidelines focus on three essential stages of care:
- Timely diagnosis;
- Immediate management with appropriate treatment;
- Long-term management with appropriate follow-up, support, education and monitoring.

The goal of therapy is to improve patients’ clinical status and functional capacity – potentially reducing hospital admissions, improving quality-of-life and curbing morbidity and mortality rates (Ponikowski et al, 2016). The management of HF rests on medications that provide symptom relief and improve prognosis, and on interventions aimed at modifying risks factors. Since this often involves both polypharmacy and lifestyle modifications, patients’ adherence to treatment and engagement with self-care are crucial.

Pharmacological management
There are two main pharmacological approaches to HF management:
- Diuretics, which reduce oedema caused by congestion (symptomatic benefit) but do not alter prognosis;
- Angiotensin-converting enzyme (ACE) inhibitors, beta-blockers and
**ACE inhibitors**

ACE inhibitors reduce morbidity and mortality in patients with HFrEF and are recommended for most patients.

One of the earliest trials of ACE inhibitors in HF showed a 40% relative risk reduction in mortality (CONSENSUS Trial Study Group, 1987). Since then, a large amount of data has confirmed the benefits of ACE inhibitors, which are recommended in patients who are asymptomatic but have left ventricular systolic dysfunction, as they can reduce the risk of developing HF (Ponikowski et al, 2016).

ACE inhibitors are associated with increased blood potassium levels, so these must be monitored. Patients who are intolerant to ACE inhibitors can be given angiotensin receptor blockers (ARBs) with similar benefits (Granger et al, 2003).

**Beta-blockers**

Beta-blockers have been shown to reduce mortality, morbidity and hospital admissions. The Cardiac Insufficiency Bisoprolol Study II demonstrated reduced mortality and fewer readmissions (CIBIS-II investigators, 1999), while Hjalmarson et al (2000) showed fewer hospitalisations, reduced mortality, improved New York Heart Association functional class and quality-of-life.

**Mineralocorticoid receptor antagonists**

Spironolactone and eplerenone are recommended in symptomatic HF patients with normal renal function (Ponikowski et al, 2016). Pitt et al (1999) showed benefit from using them alongside ACE inhibitors and beta-blockers in patients with NYHA class II-IV and an ejection fraction (EF) ≤ 35%.

This has informed various guidelines (Ponikowski et al, 2016; Yancy et al, 2013). The EMPHASIS-HF trial showed that eplerenone is safe, and can improve survival and prevent readmission when initiated soon after a hospitalisation for HF, in patients with acute coronary syndrome and those with systolic HF (Girerd et al, 2015). Like ACE inhibitors, MRAs are

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### Fig 1. Treatment algorithm for symptomatic HFrEF

<table>
<thead>
<tr>
<th>Event</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing treatment with diuretics to relieve congestion</td>
<td>Patient able to tolerate ACE inhibitor (or ARB)**</td>
</tr>
<tr>
<td>Treatment with ACE inhibitor (or ARB if ACE inhibitor not tolerated) and beta-blockers with up-titration</td>
<td>Sinus rhythm, QRS duration ≥150msec, Sinus rhythm, HR ≤70bpm</td>
</tr>
<tr>
<td>Add MRA (or ARB if MRA not tolerated)*</td>
<td>If resistant symptoms, consider digoxin, H-ISDN, an LVAD or heart transplantation</td>
</tr>
<tr>
<td>Patient still symptomatic and LVEF ≥35%</td>
<td>Treatments above may be combined if indicated</td>
</tr>
<tr>
<td>Yes</td>
<td>No further action</td>
</tr>
</tbody>
</table>

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**Key:** ACE = angiotensin converting enzyme; ARB = angiotensin receptor blocker; CRT = cardiac resynchronisation therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; H-ISDN = hydralazine and isosorbide dinitrate; HR = heart rate; LVAD = left ventricular assist device; LVEF = left ventricular ejection fraction; MRA = mineralocorticoid receptor antagonist.

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* If the patient has had a hospital admission for HF within the last six months or has elevated natriuretic peptide level.
** If the patient has been admitted to hospital for HF within the last 12 months and/or has elevated natriuretic peptide level.

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**Diuretics**

Furosemide, a loop diuretic, is the most commonly used diuretic for treating HF. Patients normally start on 20mg and this can be titrated up or down according to the amount of oedema (Williams and Oakshott, 2014). Those with renal disease may be more resistant to furosemide and so require higher doses. The thiazide class of diuretics— which includes bendrofluamide, thiazide and indapamide—is also used, often in patients with resistant oedema or an insufficient response to loop diuretics (Ponikowski et al, 2016).

All diuretics can cause electrolyte deficiencies, in particular lowering sodium and potassium levels, so urea and electrolyte levels and renal function should be monitored. Drugs should be given early in the day so patients do not need to get up at night to pass urine, which disrupts sleep.
associated with increased blood potassium levels, so monitoring is important.

Other drugs
Since an increased heart rate is thought to contribute to increased morbidity and mortality in HF, the selective sinus node If (channel inhibitor ivabradine can be used to reduce resting heart rate in patients meeting criteria for its use (Fig 1).

Digoxin was previously considered in certain cases (Ponikowski et al, 2016); however, there are concerns about an increased mortality risk in HF patients taking it for atrial fibrillation (Yamos et al, 2015).

A new group of medications combine a drug targeting the renin-angiotensin-aldosterone system (for example, valsartan) with a nepriyslin inhibitor. Nepriyslin, a naturally occurring enzyme that degrades natriuretic and other peptides in HF, can be inhibited by sacubitril and the combination of valsartan/sacubitril has proven useful in HFrEF (Jhund and McMurray, 2016; Ponikowski et al, 2016).

Coronary reperfusion and mechanical therapies

Percutaneous coronary intervention
Many patients develop HF after a myocardial infarction (MI). In up to 20% of patients, HF will resolve, but it will persist in most (Cleland et al, 2005), so primary percutaneous coronary intervention (PCI) should be organised as early as possible (Minicucci et al, 2011). PCI can reduce the size of the infarct in patients presenting acutely, influencing the extent of myocardial tissue damage, which in turn directly affects the risk of developing HFrEF.

Cardiac resynchronisation therapy
Some patients with ventricular dilatation and dysfunction may develop ventricular dyssynchrony, in which case cardiac resynchronisation therapy (CRT) can be considered to help prevent cardiac remodelling and the worsening of HF (Ponikowski et al, 2016). Trials have shown an improvement in left ventricular function in appropriately selected patients (Sohaib et al, 2015). Women are thought to respond to CRT better than men, while patients with ischaemic heart disease will see less improvement (Steffel et al, 2015).

Mechanical heart devices
Despite maximal medical therapy, patients with chronic refractory HF may receive an implantable left ventricular assist device (LVAD). Those at risk of sudden death due to electrical disturbances causing arrhythmias may be given an implantable cardioverter defibrillator (ICD) (Ponikowski et al, 2016). CRT combined with an implantable cardioverter defibrillator (CRT-D) may sometimes be considered.

Self-care
Although pharmacological treatment can help relieve symptoms and reduce morbidity and mortality, self-care is also important, but this requires patient education. Current guidelines (NICE, 2017; Ponikowski, 2016) emphasise the importance of patients’ responsibility in caring for themselves and adopting healthy behaviours. This includes making dietary changes, stopping smoking, adhering to medication, weighing themselves daily, monitoring fluid overload (and possibly adjusting diuretics) and attending follow-up appointments. Patients, and when possible their families, need education from health professionals; this can promote a stable heart function and improve quality-of-life, mortality and admission rates. Remote monitoring to promote self-care in HF has been shown to be generally effective (Bashi et al, 2017).

Around 40-50% of HF-related hospital readmissions could be avoided, and readmissions are most common in the first six months after an acute HF episode (Yilmaz and Mebazaa, 2015). Careful discharge planning, with support, education and continuity of care in the community, can enable a smooth transition and promote patients’ engagement in their care, encourage them to take their medications and teach them to recognise signs of deterioration (Cowie et al, 2014). A disease management plan can also help (Abraham et al, 2017).

Role of nurses
Given HF’s high prevalence, nurses from many specialties and settings are likely to be involved in managing patients with HF. They will need a good understanding of signs and symptoms, diagnosis, acute treatment and long-term management.

During an acute admission
The mainstay of treatment is to promptly ‘offload’ fluid using intravenous (IV) diuretics – often with nitroglycerine. Drug selection will depend on the patient’s heart function, blood pressure and renal function. Nurses should observe vital signs and administer medication. Patients should be weighed daily and fluid input and output should be charted, to check if there is a reduction in weight due to fluid loss without negatively affecting renal function.

In acute HF, 80% of patients experience increased breathlessness; this can be frightening (NICOR, 2015). Some require non-invasive ventilation, which is given through a tight face mask and can exacerbate distress. Nurses need to be aware of the psychological impact of HF; providing comfort and reassurance is important as many patients may already have depression or anxiety (Moser et al, 2016).

Before discharge
The aim of acute treatment is to stabilise patients as quickly as possible and get them back to their baseline, when they can be discharged. At that point, contact with a member of the HF specialist team is a priority. Nurses should enquire whether patients are known to the HF specialist team and, if not, help with their referral. Once the acute phase is over, the inpatient stay is a good time to educate them about their condition and how to manage it (Table 1). Some may also be referred for cardiac rehabilitation (NICE, 2014).

After an acute admission
Nurses caring for HF patients in the community or other settings have a crucial role in encouraging patients to adhere to treatment and make any lifestyle changes needed. The nurse’s role also includes reporting any change in patients’ condition, addressing sleep issues and signposting patients to other resources. There is increasing awareness that HF has a negative impact on emotional, social and spiritual wellbeing (Olano-Lizarraga et al, 2016), so nurses should be attentive to patients’ psychosocial condition.

Good communication between patients, their nurses and other health professionals is vital. Self-care is more effective when patients perceive that health professionals are responsive to, and interested in, their needs. Poor communication is a common barrier to good HF self-care (Currie et al, 2015).

Specialist nurses
Heart failure specialist nurses (HFSNs) started to gain prominence in the 1990s, and early studies showed improved patient outcomes and reduced admissions thanks to structured follow-up, optimisation of drug treatments, care coordination and promotion of self-care (McAlister et al, 2004). The role of HFSNs has evolved from providing nurse-led drug titration clinics to case managing complex patients across the boundaries of acute and community care (Grange, 2005). Nurse-led transitional

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care can be effective and certain programmes led by heart failure specialist nurses – encompassing patient education, home visits and telephone support – can reduce readmission and death rates, and improve quality-of-life (Cowie et al, 2014).

Conclusion
The complex and progressive nature of HF means careful disease monitoring, patient adherence to treatment, uptake of self-care behaviours, and multidisciplinary team involvement are crucial. Nurses have a key role in helping patients understand and manage their condition. NT

References

Box 1. Educational topics and patient resources

- Aetiology of HF (including prognosis): Provide oral and written information that takes account of educational grade and health literacy. Recognise HF disease barriers to communicate and provide information at regular time intervals;
- Symptom monitoring and self-care: Provide individualised information to support self-management. Advise that in the case of increasing dyspnoea or oedema, or a sudden unexpected weight gain of >2kg in 3 days, patients may increase their diuretic dose and/or alert their healthcare team;
- Weight management: Tailor information on fluid intake to body weight and advise about periods of high heat and humidity. Adjust advice during periods of acute decompensation. Tailor alcohol advice to aetiology of HF (abstinence in alcoholic cardiomyopathy). In other cases of HF: normal alcohol guidelines apply (2 units/day in men or 1 unit/day in women);
- Smoking and recreational drug use: Refer for specialist advice for smoking cessation and drug withdrawal/replacement therapy. Consider referral for psychological therapies if patient needs support to stop smoking;
- Medications: Provide written and oral information on dosage, effects and side-effects. Consider self-care aids such as medication dosette box when appropriate;
- Immunisation: Advise on local guidance and immunisation practice;
- Travel: Prepare travel and leisure activities according to physical capacity. Inform patient to take medicine in cabin luggage in the plane; advise they have a list with treatments and the dosage with the generic name. Sun protection advice;
- Sleep and exercise: Provide advice such as on timing of diuretics, environment for sleep and devices. Advise on exercise that recognises physical and functional limitations. Refer to exercise programme when appropriate;
- Sexual health: Provide advice on eliminating factors predisposing to erectile dysfunction and available pharmacological treatments;
- Psychological aspects: Regularly communicate information on disease, treatment options and self-management. Involve family and carers in HF management and self-care. If there are concerns about mood disturbance, refer patient for support when necessary.

Signpost patients to education resources, such as the British Heart Foundation (BiLBy/BHFHeartFailure) and NHS Choices (BiLBy/NHSChoiceHF) strategies for the management of heart failure patients at high risk for admission: a systematic review of randomized trials. Journal of the American College of Cardiology; 44: 4, 810-819.
National Institute for Health and Care Excellence (2017) Chronic Heart Failure Overview. BiLBy/NICEHFPathway
National Institute for Health and Care Excellence (2014) Acute Heart Failure: Diagnosis and Management. nice.org.uk/cg187

Specialist nurses improve outcomes in heart failure BiLBy/NTHFSpecialist

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