by Jane Diggle

Identifying and diagnosing heart failure

What and why

- The European Society of Cardiology (ESC) defines heart failure (HF) as a clinical syndrome caused by a structural and/or functional cardiac abnormality leading to reduced cardiac output and/or elevated intracardiac pressures at rest or during stress.
- The prevalence of HF depends on how it is defined, but it is estimated that approximately 1–2% of the adult population in developed countries are affected, rising to ≥10% among those >70 years of age.
- The latest figures from the British Heart Foundation suggest that as many as 920 000 people are living with HF in the UK.[1]
- Around 80% of HF diagnoses are made in hospital, despite 40% of patients having symptoms that should have triggered an earlier assessment.[1]
- People with diabetes have more than twice the risk of developing HF, worse cardiovascular outcomes, more hospitalisations and a worse prognosis than those without diabetes.[2]
- The interventions that reduce morbidity and mortality in those with HF with reduced ejection fraction (HFrEF) are as applicable to those with diabetes as those without.

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Abbreviations:
ACE[i]=angiotensin-converting enzyme [inhibitor]; ADA=American Diabetes Association; AF=atrial fibrillation; ARB=angiotensin receptor blocker; CCB=calcium channel blocker; CKD=chronic kidney disease; CV=cardiovascular; EASD=European Association for the Study of Diabetes; ECG=electrocardiogram; FBC=full blood count; FBG=fasting blood glucose; HF=heart failure; HFrEF=heart failure with reduced ejection fraction; HFpEF=heart failure with preserved ejection fraction; LVEF=left ventricular ejection fraction; MRA=mineralocorticoid receptor antagonist; NSAIDs=non-steroidal anti-inflammatory drugs; NT-proBNP=N-terminal pro-B-type natriuretic peptide; NYHA=New York Heart Association; SGLT2=sodium–glucose cotransporter 2; VT/VF=ventricular tachycardia and ventricular fibrillation

The keys to improving outcomes for people with heart failure are:[3]

● **A TIMELY DIAGNOSIS** ● **APPROPRIATE REFERRAL** ● **OPTIMAL TREATMENT**

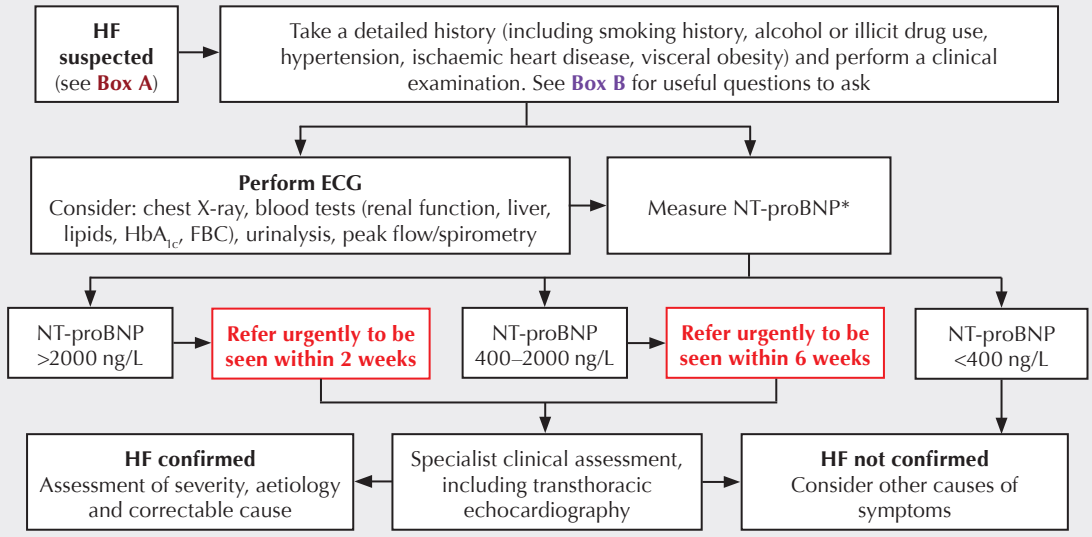
Box A. Heart failure symptoms and signs

Symptoms	Signs
Shortness of breath	Bi-basal crepitations
Orthopnoea	Peripheral oedema
Paroxysmal nocturnal dyspnoea	Raised jugular venous pressure
Ankle swelling	Third heart sounds and gallop rhythm
Fatigue	Displaced apex beat
Reduced exercise tolerance	

However, there are less typical **symptoms** (including nocturnal cough, wheezing, loss of appetite, palpitations, dizziness and syncope) and **signs** (feeling bloated, rapid weight gain or loss, tachycardia or irregular pulse).[4]

Box B. Useful questions

- ❑ Is the person feeling more tired than usual, even at rest?
- ❑ Are they becoming more breathless doing normal daily activities?
- ❑ Do they have a persistent cough?
- ❑ Do they have problems when lying flat in bed?
- ❑ Do they wake up gasping for breath?
- ❑ Are their ankles, legs or abdomen swollen?
- ❑ Do they experience chest pain?
- ❑ Do they ever feel dizzy or like their heart is racing?
- ❑ What is their appetite like? Is it reduced and have they lost weight unintentionally?
- ❑ Has their body weight significantly risen (fluid retention)?



While awaiting referral if symptomatic, consider starting loop diuretic (e.g. furosemide 20–40 mg/day providing no contraindications) and, if possible, stop NSAIDs and review CCB if prescribed.

*Be aware NT-proBNP false readings:
↑with CKD, AF
↓with obesity, African or African–Caribbean ethnicity, treatment with diuretics, ACE inhibitors, beta-blockers, ARBs and MRAs.

Classification of heart failure

HF is categorised according to the measurement of left ventricular ejection fraction (LVEF) by echocardiography as:

- **HF with preserved ejection fraction** (HFpEF) is seen in those with a normal LVEF of ≥50% and another cardiac abnormality, typically left ventricular hypertrophy or dilated left atrium.
- **HF with reduced LVEF** (HFrEF) is seen in those with a LVEF <40% and is most commonly caused by ischaemic heart disease.
- **HF with mid-range LVEF** (HFmrEF) in those with a LVEF 40–49%.

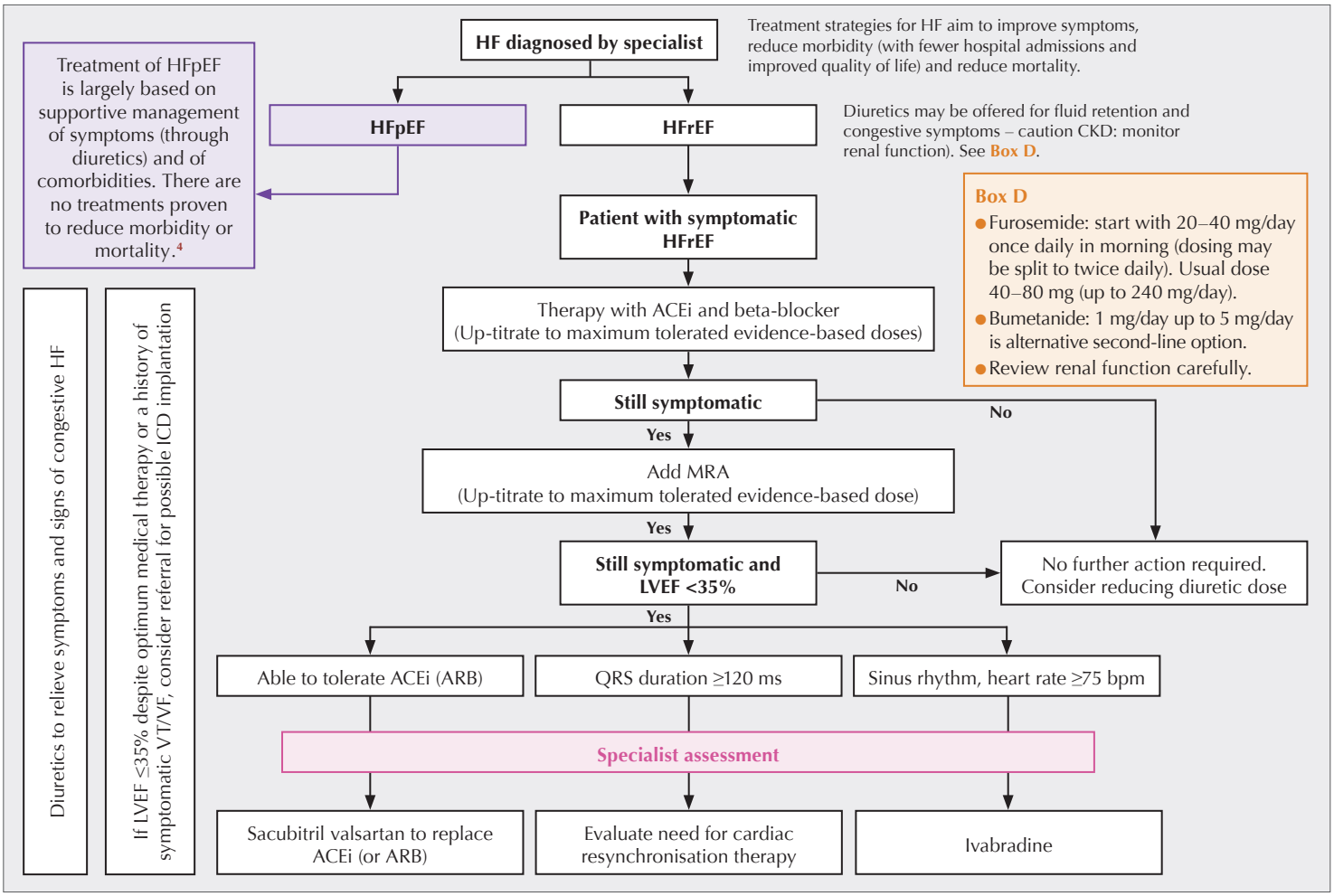
Differentiating type of HF is essential as underlying aetiologies, comorbidities and the evidence base for pharmacological management differs depending on type.[4]

Box C. Severity of heart failure

The severity of HF symptoms and their effects on exercise tolerance are classified according to the NYHA scale.[4]

Class	Description
I	No limitation of physical activity. Ordinary physical activity does not cause undue breathlessness, fatigue or palpitations.
II	Slight limitation of physical activity. Comfortable at rest, but ordinary physical activity results in undue breathlessness fatigue or palpitations.
III	Marked limitation of physical activity. Comfortable at rest, but less-than-ordinary physical activity results in undue breathlessness, fatigue or palpitations.
IV	Unable to carry on any physical activity without discomfort. Symptoms at rest can be present. If any physical activity is undertaken, discomfort is increased.

Managing heart failure



Target drug doses.

	Starting dose	Target dose
ACE inhibitor		
Enalapril	2.5 mg twice daily	10–20 mg twice daily
Lisinopril	2.5 mg once daily	20–35 mg once daily
Ramipril	2.5 mg once daily	10 mg once daily or 5 mg twice daily
ARB		
Candesartan	4 mg once daily	32 mg once daily
Losartan	12.5–50 mg once daily	150 mg once daily
Valsartan	40 mg twice daily	160 mg twice daily
Beta-blocker		
Bisoprolol	1.25 mg once daily	10 mg once daily
Carvedilol	3.125 mg twice daily	25–50 mg twice daily
MRA		
Spironolactone	12.5 mg once daily	25–50 mg once daily
Eplerenone	25 mg once daily or alternate days	50 mg once daily

The CCB amlodipine can be used to treat comorbid hypertension and/or angina, but verapamil, diltiazem and short-acting dihydropyridine should be avoided due to their negative inotropic effects, which may exacerbate HFrEF.[5]

Checklist for primary care

Individuals with diabetes and HF should have a 6-monthly review including:

- ❑ Is person stable?
- ❑ Review diabetes medications (ensure the person is not on saxagliptin, alogliptin or pioglitazone).
- ❑ Assess signs and symptoms of HF (**Boxes A** and **B**).
- ❑ Assess HF severity (see **Box C**):
  - Monitor response to treatment including weight (to check for signs of fluid retention).
  - Check blood pressure.
  - Assess pulse regularity for early identification of AF.
- ❑ Check renal function (consider FBC and iron, if symptomatic).
- ❑ Check vaccination status (pneumonia, influenza).
- ❑ Offer lifestyle advice (weight management, physical activity, smoking, alcohol, diet*) and signpost to education/support resources (e.g. Pumping Marvellous).

*The kidneys retain salt in HF, leading to fluid retention. Fluid restriction of 1500–2000 mL/day may help those with severe symptoms. Daily weight check can support adjustment of diuretic therapy.

Individuals should aim for <6 g of salt per day. Salt substitutes (e.g. LoSalt) should be avoided (high potassium content).

When to refer to specialist multidisciplinary HF team

- To confirm the diagnosis in suspected HF.
- Management of severe HF (NYHA class IV).
- Can no longer be managed effectively at home.
- Failure to respond to treatment/ requiring escalation of therapy (with specialist-only initiation drugs (e.g. sacubitril valsartan, ivabradine).

Reducing the risk of HF in the context of type 2 diabetes

Results from large CV outcome trials of newer blood-glucose-lowering drugs have shown CV benefits for those with type 2 diabetes and established CV disease or multiple risk factors. Several SGLT2 inhibitors are associated with significant reductions in HF admissions and, while the mechanism is not fully understood, the latest ADA/EASD consensus statement recommends the use of an SGLT2 inhibitor with evidence of reducing HF after first-line metformin if HF predominates, particularly HFrEF (LVEF <45%).[6]

Resources

- **British Society for Heart Failure** provides expert advice for healthcare professionals: www.bsh.org.uk
- **The Pumping Marvellous Foundation** is the UK's patient-led heart failure charity: www.pumpingmarvellous.org

References

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[6]Buse JB et al (2020) *Diabetologia* **63**: 221–8