Heart failure (HF) - advanced therapies

Refer to tertiary care as indicated

Consider the following non-pharmacological interventions where appropriate

Cardiac resynchronisation therapy
Implantable cardiac defibrillator
Other surgical options

Consider cardiac transplantation

Terminal care for refractory or end-stage HF

Go to end of life assessment and planning
1 Background information

Quick info:

Scope:
- assessment and emergency management of acute heart failure (HF) in adults (age 18 years and older)
- diagnosis, assessment, and management of chronic HF in adults (age 18 years and older), including:
  - pharmacological therapies
  - invasive procedures, such as cardiac resynchronisation and implantable cardioverter defibrillator (ICD) insertion
  - monitoring of disease progression
  - consideration of cardiac rehabilitation and end-of-life issues

Out of scope:
- assessment and management of HF in:
  - children and adolescents (under age 18 years)
  - pregnant women
- ‘right-sided’ HF
- management of specific causes of HF

Definition [1]:
- HF is a complex clinical syndrome of symptoms and signs that suggest impairment of the heart as a pump supporting physiological circulation
- caused by structural or functional abnormalities of the heart

Classification [1]:
- New York Heart Association (NYHA) class I:
  - includes asymptomatic left ventricular systolic dysfunction (LVSD)
  - ordinary physical activity does not cause fatigue, breathlessness, or palpitation
- NYHA class II:
  - symptomatically ‘mild’ HF
  - slight limitation of physical activity
  - ordinary physical activity may result in fatigue, palpitation, breathlessness, or angina pectoris
- NYHA class III:
  - symptomatically ‘moderate’ HF
  - patient is comfortable at rest, but ordinary physical activity will lead to symptoms
- NYHA class IV:
  - symptomatically ‘severe’ HF
  - symptoms of cardiac failure are present even at rest

Potential causes include [1]:
- conditions that damage heart muscle or limit its ability to function normally, such as:
  - coronary artery disease (CAD) – accounts for about 70% of all HF cases [2]
  - hypertension
  - cardiomyopathies
  - endocrine conditions, eg diabetes mellitus (DM), hypothyroidism, hyperthyroidism, Cushing’s syndrome, adrenal insufficiency, excessive growth hormone, phaeochromocytoma
  - infiltrative conditions, eg sarcoidosis, amyloidosis, haemochromatosis, connective tissue disease
  - HIV infection
  - end-stage renal failure
- conditions that reduce cardiac output, such as:
  - increased vascular resistance with hypertension
  - abnormal heart rhythm, eg atrial fibrillation (AF)
  - aortic stenosis
• pericardial disease
• obstructive sleep apnoea
• conditions that result in a high cardiac output, such as:
  • anaemia
  • thyrotoxicosis
  • septicaemia
  • liver failure
  • arteriovenous shunts
  • Paget's disease
  • thiamine (vitamin B1) deficiency
• medications, such as:
  • beta-blockers, calcium-channel blockers, and antiarrhythmics interfere with the heart's rhythm
  • cytotoxic agents, eg anthracyclines and trastuzumab, can result in cardiomyopathy
• toxins, eg alcohol, mercury, cobalt, arsenic, cocaine

Incidence and prevalence:
• around 900,000 people in the UK today have HF – with almost as many with damaged hearts but, as yet, no symptoms of HF [1]
• both incidence and prevalence of HF increase steeply with age [1]:
  • average age at first diagnosis is 76 years
  • HF affects approximately:
    • 1 in 35 people between age 65-74 years
    • 1 in 15 people between age 75-84 years
    • 1 in 7 people age 85 years and older
• HF currently accounts for [2]:
  • 2% of all hospitalised bed-days
  • 5% of all medical emergency admissions
• the prevalence of HF is expected to rise through a combination of [1]:
  • improved survival of people with ischaemic heart disease
  • more effective treatments for HF
  • the effects of an ageing population

Risk factors:
• age [1]
• cardiac diseases [1]
• CAD [1]
• myocardial infarction (MI) [1]
• smoking [3]
• hypertension [1]
• family history of HF [1]
• hypercholesterolaemia [4]
• male gender – although risk of HF is higher in men, there are more women than men with HF due to population demographics [1]
• ethnic background [1]:
  • people of African or Afro-Caribbean origin are more likely to develop HF due to hypertension rather than CAD
  • people of Asian origin have a greater risk of developing HF due to CAD, often accompanied by obesity and DM

Prognosis:
• 30-40% of patients diagnosed with HF die within a year, after which mortality risk drops to less than 10% per year [1]
• five year survival rate is estimated at 58% [1]
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- prognosis for people with HF and preserved left ventricular ejection fraction (LVEF) is a little better than for people with HF and reduced ejection fraction [2]
- younger patients tend to do better, as do patients with no co-morbidities [1]
- HF has a major impact on quality of life (QoL) and is associated with mood disorders [1]

NB: This information appears on each page of this pathway.

References:

2 Information resources for patients and carers

Quick info:
Patients and carers in England and Wales can access this pathway through NHS Choices at http://healthguides.mapofmedicine.com/choices/map/heart_failure1.html

The following resources have been produced by organisations certified by The Information Standard:
- ‘Heart Failure’ (URL) from Blood Pressure Association at http://www.bpassoc.org.uk
- ‘Heart failure’ (URL) from Bupa at http://www.bupa.co.uk
- ‘Heart Failure and Oedema’ (URL) from Datapharm at http://www.medguides.medicines.org.uk
- ‘Understanding NICE guidance: Chronic heart failure’ (PDF) from National Institute for Health and Clinical Excellence (NICE) at http://www.nice.org.uk
- ‘Heart failure’ (URL) from Patient UK at http://www.patient.co.uk

Information for carers and people with disabilities is available at:
- ‘Caring for someone’ (URL) from Directgov at http://www.direct.gov.uk
- ‘Disabled people’ (URL) from Directgov at http://www.direct.gov.uk

Patient stories describing their care journeys are available at ‘Healthtalkonline’ (URL) from DIPEX at http://www.healthtalkonline.org

Explanations of clinical laboratory tests used in diagnosis and treatment are available at ‘Understanding Your Tests’ (URL) from Lab Tests Online-UK at http://www.labtestsonline.org.uk.

The Map of Medicine is committed to providing high quality health and social care information for patients and carers. For details on how these resources are identified, please see Map of Medicine Patient and Carer Information.

NB: This information appears on each page of this pathway.

3 Updates to this pathway

Quick info:
Date of publication: 31-Jan-2011

Three floating nodes now appear at the top of each pathway page. These provide:
- easy access to scope and background information on each page of the pathway whilst reducing repetition between nodes
- easy access to patient resources/leaflets
- information on pathway updates

This pathway was updated in line with the following guidelines:
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For further information, please see the pathway's Provenance certificate.

Practice-based knowledge has been contributed to this pathway by:
• Selected members of Map of Medicine's (MoM) Clinical Editorial team and Fellows
• Contributors representing the Royal College of Physicians

The pathway has been completely restructured and redrafted in line with the Map of Medicine editorial methodology and to bring it in line with current clinical practice.

NB: This information appears on each page of this pathway.

National information:
Accreditation update – [17/02/2011] Since the last publication, this pathway has been accredited by the Royal College of Physicians. The Provenance certificate will be updated to reflect this from the next publication.

4 Productivity Considerations for Service Design [Beta]

Quick info:
Heart Failure Productivity Considerations for Service Design [Beta] (PDF) explicitly states interventions that can reduce the cost of care, whilst maintaining or improving patient outcomes. They are based on high quality clinical and economic evidence. These recommendations are intended to aid those charged with healthcare improvement and service design identify opportunities to improve productivity.

This document has been produced separately from the pathway and, as such, has not received feedback or accreditation from the Royal College of Physicians (RCP). It has, however, been peer reviewed by an independent group of experts.

This approach to productivity guidance is being trialled as a beta product alongside Map of Medicine’s ‘Heart failure’ pathway. We welcome your feedback. If you know of additional resources that demonstrate cost-effective interventions, please forward the reference information to us at productivity@mapofmedicine.com.

5 Heart failure (HF) - advanced therapies

Quick info:
Common indications for advanced therapies include:
• patients who remain refractory despite optimal treatment and persist with severe signs and symptoms [2,3,7] – in these cases [4]:
  • control features of systemic and pulmonary congestion as far as possible
  • consider referral at an early stage to tertiary care if cardiac surgery is an option
• patients may also be candidates for advanced therapies if there are specific indications, eg if they have survived a cardiac arrest from ventricular tachycardia (VT) or ventricular fibrillation (VF)
• when the patient's condition is considered to be terminal and further intervention is either not indicated or not possible, consideration must be given to end of life care

References:
8 Cardiac resynchronisation therapy

Quick info:
Cardiac resynchronisation therapy (CRT) uses a device for biventricular pacing, and may [5]:
• improve left ventricular (LV) geometry
• improve papillary muscle dyssynchrony
• reduce mitral regurgitation (MR)

Consider for patients in sinus rhythm with all of the following characteristics [1,2,3,5,7]:
• systolic dysfunction with left ventricular ejection fraction (LVEF) of 35% or less
• New York Heart Association (NYHA) class III or IV heart failure (HF) that is refractory to drug treatment
• QRS complex duration greater than 120 milliseconds

Biventricular pacing eliminates the ventricular contraction disharmony in these patients by simultaneous stimulation of both ventricles [1,2,3,5,7]. Several trials have demonstrated significant improvements in morbidity and mortality [3]:
• CRT can be combined with defibrillator in certain circumstances [3,7]
• further trials are still continuing in this area [4]

References:

9 Implantable cardiac defibrillator

Quick info:
An implantable cardiac defibrillator (ICD) can be considered for selected patients as follows (National Institute for Health and Clinical Excellence [NICE] criteria) [1,2,5,7,8]:
• as secondary prevention for patients who have developed a ventricular tachycardia (VT) once other treatable causes of heart failure (HF) have been excluded, and who also fulfil one of the following criteria:
  • have recovered from VT or ventricular fibrillation (VF) related cardiac arrest
  • spontaneous sustained VT causing syncope or haemodynamic compromise
  • stable VT with associated left ventricular ejection fraction (LVEF) less than 35% but with HF no worse than New York Heart Association (NYHA) stage III
• they can be considered for primary prevention in patients with past myocardial infarctions (MIs) on optimal therapy who fulfil all of the following criteria:
  • inducible VT on electrophysiological testing
  • non-sustained VT on 24-hour ECG
  • LVEF less than 30% but with HF no worse than NYHA stage III; or
  • LVEF less than 35% and a QRS complex greater than 120 milliseconds (these patients should be considered for cardiac resynchronisation therapy)
• ICDs can also be considered as primary prevention in patients with hereditary cardiac conditions associated with a high risk of sudden death, eg:
  • hypertrophic cardiomyopathy
  • long QT syndrome
  • arrhythmogenic RV dysplasia
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• Brugada syndrome
• following repaired tetralogy of Fallot
• ICDs can be considered in patients with non-ischaemic cardiomyopathy and LVEF below 35%

References:

10 Other surgical options

Quick info:
Alternative surgical options that may be considered if specifically indicated include:
• coronary revascularisation [1]:
  • should be considered in patients with chest pain and significant coronary artery disease
  • may relieve myocardial ischaemia, however there is no evidence to suggest an improvement in heart failure (HF) symptoms or outcome
  • coronary artery bypass graft (CABG) may be preferable to angioplasty for patients with multi vessel disease [5]
• patients with left ventricular (LV) systolic dysfunction have increased operative mortality and the risk/benefit balance should be considered
• other surgical techniques may also have a role [5]:
  • mitral valve repair or annuloplasty may be considered for patients with impaired LV systolic function and significant mitral incompetence [3]
  • LV aneurysmectomy is occasionally considered in those with large discrete LV aneurysms

References:

11 Consider cardiac transplantation

Quick info:
Cardiac transplantation may offer patients good outcomes [2,3]:
• increased quality of life (QoL)
• increased survival – 1-year survival of 80%, and 10-year survival of 50% [3]

Consider transplantation for patients with [1]:
• refractory severe chronic heart failure (HF)
• refractory cardiogenic shock (supra-urgent listing)
• refractory ventricular arrhythmias (supra-urgent listing)

Improvement in survival and functional capacity are considered to be significant when carried out in carefully selected individuals [1,5]:

Contraindications include [5]:
• renal failure – creatinine clearance less than 40mL per minute
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- thromboembolism within 6 months
- liver disease
- fixed high pulmonary vascular resistance
- peptic ulcer disease
- alcohol or substance misuse
- severe uncontrolled psychiatric disturbance
- treated cancer – seek advice from an oncologist
- systemic disease with multi-organ involvement
- infection
- other co-morbidity with poor prognosis
- patient unlikely/unwilling to comply with immunosuppressant regime
- advanced physiological age – risks of transplantation need to be carefully considered

Further considerations regarding cardiac transplantation:
- refer at an early stage if transplantation is a possibility
- currently there is a shortage of organ donors in the UK limiting availability of the procedure [5]
- patients considering this option should receive counselling on the implications, risks, and complications of the procedure
- optimise treatment for pulmonary and systemic congestion whilst awaiting transplant where possible – this may involve:
  - temporary use of intravenous (IV) inotropes [5]
  - occasionally, left ventricular assist devices (LVAD) to bridge the gap until transplantation [2,3,5,9]:
    - involves inserting, under general anaesthesia, inflow and outflow pipes to and from the left ventricle [9]
  - the partial left ventriculectomy (Batista) procedure is currently lacking in supportive evidence and is not recommended as an alternative to transplant [9]

References:

12 Terminal care for refractory or end-stage HF

Quick info:
Patients who are severely symptomatic, despite optimal medical/device therapy, and who are ineligible for transplantation should be offered supportive/palliative care, focusing on [3,5]:
- symptom relief
- discontinuation of non-essential treatments

Issues of sudden death and living with uncertainty are pertinent to all patients with heart failure [1,2,3,5]:
- offer education to patient and their family regarding palliative care treatment goals
- ensure that the patient is aware of his/her right to refuse any and all unwanted medical interventions or to request their withdrawal
- ensure access to professionals with palliative care skills within the heart failure team
- consider patient preferences for place and type of future care and resuscitation

In addition, advise patients [6]:
- driving may continue provided there are no symptoms that may distract attention
- avoid driving large goods vehicle (LGV), or passenger carrying vehicle (PCV)
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- if symptomatic, disqualify from driving
- re-licensing may be permitted if:
  - left ventricular (LV) ejection fraction is 0.4 or more
  - no other disqualifying condition
- exercise or other functional testing may be required depending on the likely cause for heart failure

References:
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Key Dates

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References

This is a list of all the references that have passed critical appraisal for use in the pathway Heart failure

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