Heart failure (HF) - acute inpatient management

Derbyshire local pathways > Cardiology > Heart failure

Patient presents in A&E, medical assessment unit (MAU), or cardiac diagnostic unit (CDU)

Hospital at Home Service (Derby only at present)

Heart failure specialist nurse (HFSN)

Admit as inpatient to secondary care

Appropriate bed on admission and patient seen by cardiologist

Clinical assessment

Consider differential diagnoses

Acute management

Investigation and monitoring

ECHO within 2 days of admission

Further investigation and intervention as required

Considerations for discharge when stable

Referral by cardiologist to HFSN for LVH, HFREF, or HFNEF

Discharge with management plan

Confirmed diagnosis - add patient to primary care heart failure register

Manage in primary care

Confirmed diagnosis - add patient to primary care heart failure register

Discharge with management plan

Further investigation and intervention as required

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Referral by cardiologist to HFSN for LVH, HFREF, or HFNEF

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Investigation and monitoring

Background information

Information resources for patients and carers

Updates to this care map

Information

Primary care

Secondary care

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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
Heart failure (HF) - acute inpatient management

Derbyshire local pathways > Cardiology > Heart failure

- pericardial disease
- obstructive sleep apnoe
- conditions that result in a high cardiac output, such as:
  - anaemia
  - thyrotoxicosis
  - septicemia
  - 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]
Heart failure (HF) - acute inpatient management

- 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 care map.

References:

2 Information resources for patients and carers

Quick info:
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 the 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.

NB: This information appears on each page of this care map.

3 Updates to this care map

Quick info:
Date of publication: 18-Mar-2011

This care map was created in line with the following references:
9 Clinical assessment

Quick info:
A full examination may not be possible in the acute situation – make a rapid assessment including the following:

- general appearance [5]:
  - respiratory rate at rest [5]
  - agitation [4]
- pale, clammy, or cyanosed [5]
- level of consciousness [5]
- temperature [5]
- blood pressure (BP) [5]
- pulse rate, rhythm, volume, and character [5]:
  - arrhythmias [4]
  - bounding suggesting high output failure [4]
  - tachycardia [4]
  - paradoxic pulse (suggesting cardiac tamponade) [4]
  - characteristics of valve abnormalities, eg slow rising pulse of aortic stenosis or collapsing pulse of regurgitation [4]
- elevated jugular venous pressure (JVP) or distended neck veins [5]
- palpate for the apex, presence of heaves or thrills [4]
- heart auscultation [5]:
  - third heart sound (gallop rhythm)
  - murmurs
  - aortic stenosis
- chest auscultation [5]:
  - wheeze
  - inspiratory crepitations – basal or distributed throughout lung fields
  - pleural effusion
- abdominal palpation [4]:
  - ascites
  - tender hepatomegaly
  - peripheral pitting oedema [4]

Initiate all investigations urgently (ECG, bloods and chest X-ray – covered in nodes below), currently to starting treatment [5].

References:

10 Consider differential diagnoses

Quick info:
Differential diagnoses may be associated with acute heart failure (HF) or as an alternative diagnosis – these include [4]:

- acute coronary syndrome (ACS) – see ‘Acute coronary syndrome’ care map
- pneumonia or exacerbation of chronic obstructive pulmonary disorder (COPD) – see ‘Community-acquired pneumonia’ and ‘Chronic obstructive pulmonary disease’ care maps
Heart failure (HF) - acute inpatient management

Derbyshire local pathways > Cardiology > Heart failure

11  Acute management

Quick info:
Consider initial priorities of treatment if patient is hypoxic or hypotensive [5]:

• stabilise the patient's airway, breathing, and circulation
• relieve dyspnoea, pain, or agitation – consider analgesia sedation
• pulmonary congestion – medical therapy with diuretic/vasodilator
• achieve arterial oxygen saturation less than 95%:
  • increase oxygenation
  • consider continuous positive airway pressure (CPAP), non-invasive positive pressure ventilation (NIPPV), mechanical ventilation
• normalise heart rate and rhythm using:
  • pacing
  • antiarrhythmics
  • electroversion
• investigation should be carried out concurrently to detect underlying causes

Reference:

12  Investigation and monitoring

Quick info:
Apply an ECG monitor as soon as possible and continuously monitor [5]:

• assess for abnormal rhythms, eg atrial fibrillation (AF) or flutter, and other tachyarrhythmia, eg supraventricular or ventricular tachycardia:
  • if present, manage the arrhythmia, eg acute AF with signs of haemodynamic compromise is likely to require electronic cardioversion
  • management of peri-arrest arrhythmias is beyond the scope of this care map
• assess for any signs of ischaemia or infarction and proceed as appropriate if an acute coronary syndrome (ACS) is present
• the ECG may suggest left ventricular (LV) or right ventricular (RV) hypertrophy or other signs consistent with heart failure (HF)

Order a chest X-ray [5]:

• consider either a portable antero-posterior (AP) chest X-ray, or accompanied transfer to radiology for a departmental X-ray, if the patient is in a stable condition
• may demonstrate:
  • pulmonary oedema – perihilar 'bat wing' shadowing, Kerley B lines, pulmonary venous congestion and upper lobe diversion
  • cardiomegaly (portable AP film will be unreliable for this)
Heart failure (HF) - acute inpatient management

Derbyshire local pathways > Cardiology > Heart failure

- pleural effusions
- suggestion of other diagnoses, eg consolidation

Take an arterial blood gas – continue to monitor oxygen saturation whilst the patient is on oxygen therapy [5].

Consider additional tests as indicated [5]:
- full blood count (FBC)
- urea and electrolytes
- liver function tests (LFTs)
- magnesium and calcium
- C-reactive protein (CRP)
- urinalysis

Echocardiography [5]:
- echocardiography with Doppler (echo/Doppler) imaging should be used to evaluate and monitor:
  - regional and global left and right ventricular systolic function
  - diastolic function
  - valvular structure and function
  - pericardial pathology
  - mechanical complications of acute myocardial infarction
  - evidence of dyssynchrony

Instrumentation and monitoring of patients in acute HF [5]:
- monitoring should be started as soon as possible
- non-invasive monitoring – monitor the routine basic observations of:
  - temperature
  - respiratory rate (RR)
  - heart rate
  - blood pressure (BP)
  - oxygenation
  - urine output
  - ECG
  - pulse oximeter
- invasive monitoring:
  - consider insertion of an arterial catheter if there is:
    - a need for continuous analysis of arterial BP due to haemodynamic instability
    - the requirement for frequent arterial blood samples
  - consider central venous lines – useful for:
    - the delivery of fluids and medications
    - monitoring of the central venous pressure (CVP) and venous oxygen saturation
  - pulmonary artery catheter can be useful:
    - to distinguish between cardiogenic and non-cardiogenic mechanism in complex patients with concurrent cardiac and pulmonary disease
    - in haemodynamically unstable patients who are not responding as expected to traditional treatments

Reference:

13 ECHO within 2 days of admission

Quick info:
Perform transthoracic Doppler 2D echocardiography to [1]:

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Heart failure (HF) - acute inpatient management
Derbyshire local pathways > Cardiology > Heart failure

- exclude important valve disease
- assess the systolic and diastolic function of the left ventricle
- detect intracardiac shunts

Consider alternative methods of imaging the heart when a poor image is produced by transthoracic Doppler 2D echocardiography, including [1]:
- transoesophageal Doppler 2D echocardiography
- radionuclide angiography
- cardiac magnetic resonance imaging

For all patients [1]:
- assess severity of symptoms and classify HF according to New York Heart Association (NYHA) classifications – see 'Background information' node
- check patient's functional capacity, fluid status, cardiac rhythm (minimum of examining the pulse), cognitive status and nutritional status
- review current medication – consider the need for changes and possible side effects
- measure serum urea, electrolytes, creatinine, and eGFR levels

Reference:

14 Further investigation and intervention as required

Quick info:
Care of people with acute heart failure (HF) is highly individualised, and depends on [4]:
- clinical severity
- haemodynamic stability
- response to treatment
- associated cardiac morbidity
- non-cardiac co-morbidity

Patients who are considered to be unstable include those with [4]:
- continued haemodynamic instability
- ECG or troponins demonstrating signs of ischaemia or infarction
- the need for continuous vasodilator or inotropic infusion
- severe electrolyte imbalance
- non-sustained ventricular tachycardia (VT)
- end organ hypoperfusion, eg altered mental state, renal failure

Transfer patients to intensive care unit (ICU) as indicated by clinical severity and consider invasive haemodynamic monitoring for those [5]:
- with cardiogenic shock or sustained low cardiac output
- refractory to treatment
- where accurate measures of haemodynamic status and pulmonary capillary wedge pressure (PCWP) are required to monitor response to therapy and guide further treatment
- modalities include:
  - arterial line – useful for repeated blood gas measurements and monitoring arterial blood pressure (BP)
  - central venous line:
    - inserted into the superior vena cava or right atrium, to monitor central venous pressure (note that this will be affected by tricuspid regurgitation and is a poor indicator of left atrial filling pressure)
    - separate ports can also be used for drug and fluid administration
    - for high impact interventions to reduce healthcare associated infections, see ‘Central venous catheter care bundle’
  - pulmonary artery catheter:

Reference:
Heart failure (HF) - acute inpatient management

Derbyshire local pathways > Cardiology > Heart failure

- measures pressures in the pulmonary artery, superior vena cava, right atrium, and right ventricle
- can be used to determine PCWP, cardiac output, and hence the individualised measure of cardiac index (CI) – it is therefore an accurate measure to guide therapy
- is indicated in all patients with cardiogenic shock and those with low cardiac output or pulmonary oedema that is not responding to therapy, when measures of these direct parameters are necessary
- note that inaccurate measures will be obtained in patients with valve stenosis or regurgitation
- a recent study did not show a survival benefit when patients with acute HF who were invasively monitored were followed up over a 12 month period
- current advice is that invasive monitoring is not required routinely in the management of all acute HF patients
- transfer to a tertiary care centre may be required as indicated

Further investigations [5]:
- all patients with acute HF or chronic HF require echocardiological confirmation of the underlying structural or functional abnormality – this should be considered as a matter of urgency in unstable cases, particularly in patients with suspected acute coronary syndromes (ACS)
- patients with ACS should be considered for angiography at an early stage with a view to revascularisation, as this has been demonstrated to improve outcomes
- where appropriate, consider primary percutaneous coronary intervention (PCI) or thrombolysis
- if the patient is hypoperfused but there are no signs of pulmonary congestion – low BP, decreased CI but low PCWP, ie not in cardiogenic shock – assess response to a crystalloid fluid challenge
- if there is no haemodynamic response to diuretics and inotropes and BP remains low, consider adrenaline by IV bolus or infusion
- noradrenaline may be considered alternatively as indicated – it increases systemic vascular resistance and infusion may therefore be of use in certain situations, eg septic shock
- if cardiac output becomes profoundly low, commence advanced life support as indicated

Monitoring [4]:
- all patients should receive continued observation, monitoring of haemodynamic status, and blood test results as indicated – this will include frequent assessment of:
  - pulse rate and rhythm, BP, oxygen saturation and ECG
  - fluid intake and output
  - signs and symptoms of acute HF
  - adverse effects
  - daily weight
  - daily urea, electrolytes, and creatinine – hyponatraemia occurs frequently as a result of volume overload and may respond to fluid restriction
  - other blood tests as indicated, eg:
    - full blood count (FBC)
    - international normalised ratio (INR)
    - cardiac enzymes
- assess and manage other specific precipitants and co-morbidity, eg:
  - arrhythmias,
  - valvular pathology
  - other non-cardiac causes

References:

15 Considerations for discharge when stable

Quick info:
Heart failure (HF) - acute inpatient management

Discharge planning [1]:
- discharge patients from hospital only when their condition is stable and their management plan optimised
- when considering the timing of discharge take account of patient and carer wishes
- ensure that:
  - the primary care team, patient, and carers are aware of the management plan
  - the patient and their carers are given clear instructions about how they can get advice, particularly in the high-risk period immediately after discharge
  - management plans are discussed with non-NHS agencies involved in patient care and the educational needs of any non-NHS agency carers are considered level of care and support available in the community
  - follow-up is managed by a multidisciplinary team

Prognosis – discuss prognosis with patients and carers in a sensitive, open, and honest manner [1].

Anxiety and depression [1]:
- consider a diagnosis of depression in patients with heart failure (HF)
- reassess psychological status once HF has stabilised
- carefully consider the risks and benefits of pharmacological treatment for depression

End of life [1]:
- ensure that patients and carers have the opportunity at all stages of care to discuss issues of sudden death and living with uncertainty
- identify and manage palliative care needs as soon as possible
- ensure patients and carers have access to healthcare professionals within the HF team who have skills in palliative care

Prior to considering discharge, patients should [4]:
- have optimal fluid balance achieved and control of symptoms
- have been successfully commenced and stabilised on continued oral therapy – an angiotensin converting enzyme (ACE) inhibitor should be commenced for HF, in addition to diuretics, following recovery from the acute phase
- have had precipitating factors identified and a management plan for co-morbidity decided with referral where indicated
- have been ambulant in hospital and assessment made of their functional or social needs
- have full follow-up arranged, eg specialist nurse home visit, GP, next clinic appointment
- not have received intravenous (IV) vasodilator or inotropic therapy within the last 24 hours

References:

19 Manage in primary care

Quick info:
See local info tab.
Provenance certificate

Overview

This document describes the provenance of Derbyshire Health Community’s Heart failure care map.

This care map has been localised by Derbyshire Health Community, under the lead of Anne Hayes, NHS Derbyshire County Public Health Specialist. The care map has been reviewed by Derbyshire stakeholders and has been approved by the Health Community-wide Clinical Effectiveness and Guideline Group (CEGG).

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Editorial methodology

The Map of Medicine Editorial Team have undertaken the localisation editing of the care map. The text is based on the Map of Medicine international care map, which was created in line with the Map of Medicine editorial methodology.