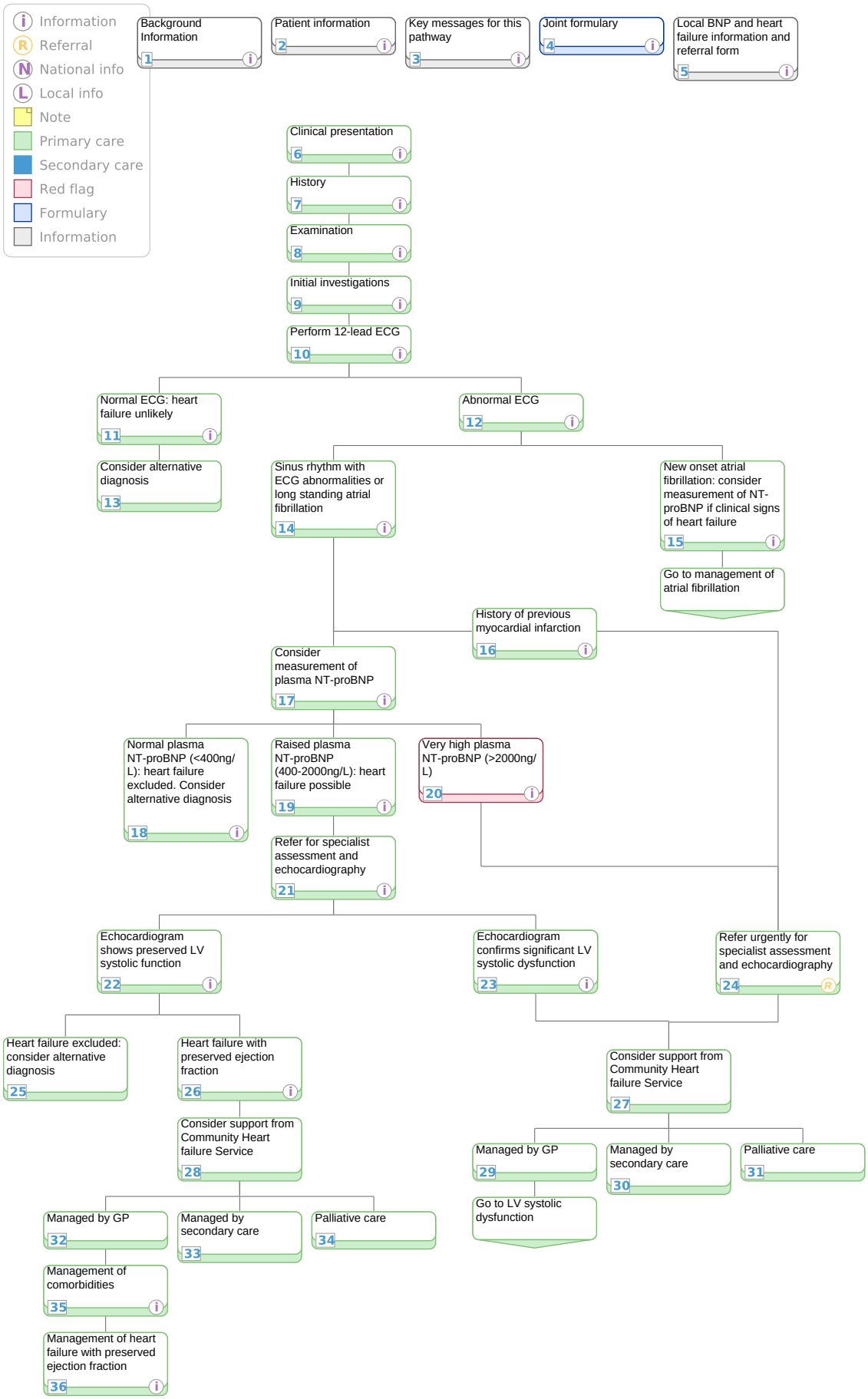
Heart failure - making the diagnosis - Southampton pathway

Medicine > Cardiology > Heart failure



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1 Background Information

Quick info:

Scope:

- acute and chronic heart failure (HF) in adults, including:
  - prevention of HF in people at increased risk
  - the assessment and investigation of suspected HF
  - assessment of stage and severity of HF
  - management of asymptomatic patients with left ventricular (LV)dysfunction demonstrated on echocardiogram
  - stepwise management of patients with symptomatic HF, including both pharmacological and non-pharmacological intervention, up to terminal end stage HF
  - lifestyle measures and management
  - presentation and emergency management of acute HF
- limited evidence is available on the management of HF due to diastolic dysfunction, this is covered only briefly in accordance with the guidance available
- the initial presentation and management of HF has been written from a primary care perspective with referral to cardiology as indicated, however this pathway is equally relevant to clinicians in both primary and secondary care settings

Definitions:

- HF is the inability of the heart to provide an output sufficient to maintain systemic circulation (commonly due to structural or functional impairment)
- it is a syndrome, rather than a single disease, characterised by:
  - symptoms of dyspnoea
  - exercise intolerance
  - fatigue
  - peripheral oedema (in some cases)
  - echocardiographic evidence of systolic or diastolic dysfunction
- other terms have previously been used to describe HF, eg:
  - right or left sided HF
  - congestive HF
  - high output or low output failure
- acute HF is used to describe potentially life threatening failure that is of sudden severe onset – it may occur following myocardial infarction or in patients with chronic HF that become decompensated
- acute HF has a variable presentation depending on the underlying pathology, eg:
  - pulmonary oedema or acute left ventricular failure (LVF)
  - hypotensive low output failure or cardiogenic shock (combination of hypoperfusion and pulmonary oedema)
  - hypertensive acute HF
  - high output failure, eg in thyrotoxicosis

Pathophysiology:

- the majority of cases are caused by LV systolic dysfunction, which can be demonstrated by a reduced LV ejection fraction (LVEF) on echocardiogram
- LV systolic dysfunction frequently co-exists with some degree of diastolic dysfunction, however in certain cases diastolic dysfunction may be evident in the presence of a normal LVEF – known as diastolic HF (or heart failure with normal LVEF)
- the degree of impairment of LVEF does not necessarily correlate with the severity of HF, ie patients with poor LVEF may be asymptomatic whereas patients with diastolic HF and preserved LVEF may have severe morbidity
- HF is a progressive process that causes a gradual functional impairment associated with the typical structural changes of myocardial hypertrophy and ventricular dilatation
- such structural change causes a cycle of further impairment in function and increased progression of the condition
- comorbidity, eg coronary artery disease or hypertension is common

Incidence and prevalence:

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- variable definitions of HF and the use of different diagnostic criteria have made reliable epidemiological figures difficult
- the West London Hillingdon HF study suggested an overall incidence of HF of 1.3 cases/1000/year for all age groups:
  - to obtain in those over age 85 years, the incidence was 11.6/1000/year
- the West Midlands ECHOE screening study of 3960 randomly selected participants from primary care age 45 years or more, demonstrated a prevalence of definite LV systolic dysfunction of 1.8% (defined as ejection fraction of less than 40%):
  - this related to an overall prevalence of symptomatic LV systolic dysfunction of 0.96% and asymptomatic of 0.86%
- in the US, an estimated 5 million patients have chronic HF, with 500,000 new cases diagnosed every year
- more than 85% of those with HF under age 65 years have impaired LV systolic dysfunction, compared to 60% of those over age 65 years, ie the percentage that demonstrate diastolic failure with preserved LV function increases with age

Risk factors:

- cardiac diseases
- smoking
- hypertension
- family history
- coronary artery disease
- myocardial infarction
- hypercholesterolaemia

Measurement of plasma NT-proBNP for the diagnosis of heart failure:

- BNP (Brain Natriuretic Peptide) is a cardiac neurohormone released from ventricular cardiomyocytes in response to ventricular dilatation and volume overload
- rarely normal in a patient with HF and levels increase with severity of HF
- the sensitivity of BNP in diagnosis of HF is considered to be similar to interpretation of the ECG by experienced personnel:
  - however the specificity of BNP has been demonstrated to be greater, ie someone with a negative test result is unlikely to have HF

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National Institute for Health and Clinical Excellence (NICE). Chronic heart failure – management of chronic heart failure in adults in primary and secondary care. London: NICE; 2010. http://guidance.nice.org.uk/CG108/NICEGuidance/pdf/English

2 Patient information

Quick info:

http://www.patient.co.uk/health/Heart-Failure.htm

3 Key messages for this pathway

Quick info:

This pathway has been locally developed for South West Hampshire.

Key messages for this pathway:

- patients with symptoms or signs consistent with heart failure should have an ECG. If this is normal, consider alternative diagnoses
- plasma NT-proBNP may be considered when there is diagnostic doubt and the cause of dyspnoea is unknown. A normal value excludes the diagnosis of heart failure
- echocardiography should be considered for all patients with clinical suspicion of heart failure and an abnormal ECG
- LVSD is significant only if moderate or severe (which is equivalent to LV ejection fraction <40%) on echocardiography

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4 Joint formulary

Quick info:

2.2 Diuretics

2.2.1 Thiazides and related diuretics

- Bendroflumethiazide tab - first line thiazide
- Chlorothiazide susp

2.2.2 Loop diuretics

- Furosemide tab/liq/inj - first line loop
- Bumetanide tab/liq/inj

2.2.3 Potassium-sparing diuretics and aldosterone antagonists

- Amiloride tab/liq
- Eplerenone tab - if hormonal side effects on spironolactone
- Spironolactone tab/susp

2.2.4 Potassium-sparing diuretics with other diuretics

- Co-amilofruse tab - only as an aid to compliance

2.4 Beta-adrenoceptor Blocking Drugs

- Bisoprolol tab: heart failure – first line
- Carvedilol tab: heart failure – second line

2.5 Hypertension and Heart Failure

2.5.5 Drugs affecting the renin-angiotensin system

2.5.5.1 Angiotensin-converting enzyme inhibitors

- Ramipril cap - first line ACE inhibitor
- Enalapril tab
- Lisinopril tab

2.5.5.2 Angiotensin-II receptor antagonists - only if patients have to discontinue ACE inhibitors due to persistent, refractory cough

- Candesartan tab
- Losartan tab

5 Local BNP and heart failure information and referral form

Quick info:

BNP and Heart failure launch information

Rapid access outpatient clinic referral for suspected heart failure: BNP fax proforma

6 Clinical presentation

Quick info:

- dyspnoea
- reduced exercise tolerance
- fatigue
- peripheral oedema
- asymptomatic with abnormal LV function on echo

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7 History

Quick info:

Ask about:

- onset and duration of symptoms
- dyspnoea (shortness of breath):
  - level of activity required to cause dyspnoea
  - whether it occurs at rest or only with exertion
  - the effect on daily life
  - disturbance of sleep
  - number of pillows needed
  - presence of paroxysmal nocturnal dyspnoea (PND)
- peripheral oedema:
  - severity
  - association to time of day
- fatigue, lethargy
- weight loss
- associated symptoms:
  - chest pain
  - palpitations
  - syncope, dizziness or altered consciousness
  - cough or wheeze
  - gastrointestinal disturbance, eg appetite loss or early satiety, nausea and vomiting
- general systemic health
- past medical history:
  - ischaemic heart disease (IHD)
  - diabetes
  - hypertension
  - hyperlipidaemia
  - past transient ischaemic attack (TIA) or ischaemic stroke
  - chronic obstructive pulmonary disease (COPD)
  - hyperthyroidism
  - rheumatic fever
  - congenital heart disease
  - systemic disorders, eg amyloid or sarcoidosis
  - treatment with chemotherapy agents
- family history, eg IHD, cardiomyopathy, sudden death
- smoking and alcohol intake
- current medications

8 Examination

Quick info:

Look for:

- general appearance and respiratory rate
- pulse:
  - rate
  - rhythm, eg atrial fibrillation

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- volume
- character, eg the slow rising pulse of aortic stenosis

- blood pressure
- assess for elevated jugular venous pressure
- displaced or prominent apex beat
- palpate for thrills and parasternal heave
- heart sounds:
  - murmurs
  - third heart sound (gallop rhythm)
- chest auscultation:
  - wheeze
  - fine inspiratory crackles
- palpate abdomen:
  - ascites
  - right upper quadrant tenderness and hepatomegaly
  - sacral or scrotal oedema
- pitting peripheral oedema
- peripheral perfusion
- assess for signs of systemic disease

9 Initial investigations

Quick info:

- CXR
- U&E's, FBC, fasting Glucose, TFTs
- urinalysis

10 Perform 12-lead ECG

Quick info:

12 lead ECG, significant abnormalities include:

- atrial fibrillation
- left ventricular hypertrophy
- previous myocardial infarction (pathological Q waves)
- bundle branch block
- non-specific ST and T wave changes
- left axis deviation

11 Normal ECG: heart failure unlikely

Quick info:

View examples of ECGs at http://www.ecglibrary.com/ecghome.html

If there is any doubt about whether an ECG is within normal limits, then faxing to cardiology or the GPSI cardiology service for Southampton City should be considered.

12 Abnormal ECG

Quick info:

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12 lead ECG, significant abnormalities include:

- atrial fibrillation
- previous myocardial infarction (pathological Q waves)
- left ventricular hypertrophy
- bundle branch block
- non-specific ST and T wave changes
- left axis deviation

View examples of ECGs at http://www.ecglibrary.com/ecghome.html

14 Sinus rhythm with ECG abnormalities or long standing atrial fibrillation

Quick info:

If atrial fibrillation is present, ensure that the local guidelines for ventricular rate control and thromboprophylaxis are followed (see local management of atrial fibrillation pathway).

15 New onset atrial fibrillation: consider measurement of NT-proBNP if clinical signs of heart failure

Quick info:

If there is good clinical evidence of recent onset atrial fibrillation, then management should be according to the local atrial fibrillation guidelines. A rapid ventricular response will often cause symptoms similar to heart failure and rate control or cardioversion will be important in initial management.

However, if there are clinical signs of heart failure, consider measurement of NT-proBNP with urgent referral if this is very high (above 2000ng/L)

16 History of previous myocardial infarction

Quick info:

Urgent referral (target wait <2 weeks) for transthoracic echo and management advice is recommended.

17 Consider measurement of plasma NT-proBNP

Quick info:

Plasma NT-pro BNP (Brain Natriuretic Peptide) is of the greatest value in **excluding** heart failure. It's positive predictive value is less accurate and it should not be considered a diagnostic tool.

NT-pro BNP may be considered when there is diagnostic doubt and the cause of dyspnoea is unknown, eg when heart failure is considered possible by thorough history and examination, but other diagnoses are also possible.

18 Normal plasma NT-proBNP (<400ng/L): heart failure excluded. Consider alternative diagnosis

Quick info:

A normal plasma NT-proBNP (<400ng/L) excludes heart failure. An alternative diagnosis for the symptoms should be sought.

19 Raised plasma NT-proBNP (400-2000ng/L): heart failure possible

Quick info:

If the plasma NT-proBNP is raised (between 400 and 2000ng/L), then heart failure is possible. Refer for echocardiography and specialist opinion within 6 weeks.

Elevated plasma NT-proBNP levels may be detected in:

- the elderly (females in particular)
- severe respiratory disease

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- renal failure; or
- long-term beta blocker use

20 Very high plasma NT-proBNP (>2000ng/L)

Quick info:

Very high plasma NT-proBNP levels (above 2000ng/L) are associated with a poor prognosis.

Urgent referral for transthoracic echocardiography and specialist assessment (within 2 weeks) is recommended.

Rapid access outpatient clinic referral for suspected heart failure: BNP fax proforma

21 Refer for specialist assessment and echocardiography

Quick info:

A specialist assessment should be undertaken by a physician with a subspeciality interest in heart failure, who leads a specialist multidisciplinary heart failure team.

Patients with significant valvular heart disease, unexplained LVH, marked LA enlargement and evidence of pulmonary hypertension may have important cardiological diagnoses and should be referred for general cardiological review.

22 Echocardiogram shows preserved LV systolic function

Quick info:

Heart failure with preserved LV ejection fraction (LVEF) is possible, but consider other cardiac diagnoses.

NB: Treat mild or mild to moderate LV dysfunction as preserved LVEF.

- heart failure with preserved LVEF is often associated with significant diastolic dysfunction
- preserved LVEF is an LVEF more than 40%
- prevalence of preserved LVEF in confirmed chronic heart failure (HF) is between 13-76%
- hospitalisation rates and mortality are similar for heart failure with impaired or preserved LVEF
- elderly females with hypertension, ischaemic heart disease (IHD) or diabetes most commonly have heart failure with preserved LVEF
- there is limited evidence available for the treatment of HF with preserved LVEF
- consider identifying the underlying cause of symptoms, which has a wide range of differentials:
  - demonstrated LV hypertrophy:
    - hypertensive cardiomyopathy (the most common cause)
    - aortic stenosis or coarctation
    - infiltrative or restrictive cardiomyopathy
  - no LV hypertrophy:
    - pericardial constriction or tamponade
    - mitral stenosis
    - ischaemic HF
    - infiltrative or restrictive cardiomyopathy
    - right ventricular dysfunction, eg pulmonary hypertension (cor pulmonale) or right sided myocardial infarction
    - aortic or mitral regurgitation
    - high output HF, eg anaemia, hyperthyroidism

23 Echocardiogram confirms significant LV systolic dysfunction

Quick info:

Left ventricular dysfunction is significant only if **moderate** or **severe** (equivalent to LV ejection fraction <40%) on echocardiography.

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Mild or mild to moderate LV systolic dysfunction should be treated as preserved ejection fraction.

The evidence base for treatment of LV systolic dysfunction is for patients with an LV ejection fraction <40%.

Patients should ideally have a specialist assessment within 6 weeks of confirming significant LV systolic dysfunction.

26 Heart failure with preserved ejection fraction

Quick info:

Management of these patients can be complex.

A specialist opinion is often helpful to guide optimal therapy.

35 Management of comorbidities

Quick info:

While heart failure with preserved ejection fraction may be causing the symptoms, consider the contribution of other factors and manage as appropriate:

- maintain blood pressure in patients with hypertension below the lower limit target of 130/80mmHg
- IHD frequently co-exists – it is an adverse predictor of mortality and patients should be investigated and treated in accordance with current guidance
- rhythm or rate control therapy as appropriate in those with atrial fibrillation (AF; see 'Atrial fibrillation' pathway)

36 Management of heart failure with preserved ejection fraction

Quick info:

- patients should receive the same advice and education on lifestyle modifications as patients with LV systolic dysfunction
- consider use of diuretics (eg loop diuretic or thiazide) in patients with pulmonary or systemic congestion as with HF due to LV dysfunction
- consider spironolactone when high dose of loop diuretic is needed, or if resistant hypertension
- consider angiotensin II receptor blocker:
  - may reduce hospitalisation
  - should not be initiated in suspected aortic valve disease
- there is less reliable evidence for the use of angiotensin converting enzymes (ACE) inhibitors in patients with either atherosclerotic disease or diabetes in addition to other risk factors
- consider the addition of a beta blocker in patients with:
  - previous MI; or
  - hypertension; or
  - those requiring a rate control treatment strategy for AF

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Key Dates

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Evidence summary for Heart failure - making the diagnosis - Southampton pathway

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

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