NICE National Institute for Health and Care Excellence

NICE guideline

Acute heart failure: diagnosis and management

Clinical guideline
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www.nice.org.uk/guidance/cg187

Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guideline is partially replaced by NG208.

This guideline is the basis of QS103.

Overview

This guideline covers diagnosing and managing acute heart failure or possible acute heart failure in people aged 18 and over. It aims to improve the immediate care of someone who is acutely unwell as a result of heart failure.

Heart failure may indicate acute myocardial injury in patients with COVID-19. See the recommendations on diagnosing and managing acute myocardial injury in our COVID-19 rapid guideline on managing COVID-19.

Who is it for?

- Healthcare professionals
- Commissioners
- Adults who have a diagnosis of acute heart failure, or have possible acute heart failure, or are being investigated for acute heart failure

Introduction

Heart failure is a condition in which the heart does not pump enough blood to meet all the needs of the body. It is caused by dysfunction of the heart due to muscle damage (systolic or diastolic dysfunction), valvular dysfunction, arrhythmias or other rare causes. Acute heart failure can present as new-onset heart failure in people without known cardiac dysfunction, or as acute decompensation of chronic heart failure.

Acute heart failure is a common cause of admission to hospital (over 67,000 admissions in England and Wales per year) and is the leading cause of hospital admission in people 65 years or older in the UK.

This guideline includes important aspects of the diagnosis and management of acute heart failure that are not addressed by the NICE guideline on chronic heart failure. The guideline on chronic heart failure focuses on long-term management rather than on the immediate care of someone who is acutely unwell as a result of heart failure.

This guideline covers the care of adults (aged 18 years or older) who have a diagnosis of acute heart failure, have possible acute heart failure, or are being investigated for acute heart failure. It includes the following key clinical areas:

- the role of early natriuretic peptide testing and echocardiography
- the role of specialist management units
- the use of ventilatory support, pharmacological therapy and ultrafiltration
- treatment after stabilisation, including selected surgical interventions and initiation of the pharmacological therapies that are used in the management of chronic heart failure.

Drug recommendations

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients.

In memory of Christopher Jones, patient member of the GDG who ensured that the patient voice was heard during the development of this guideline.

Key priorities for implementation

The following recommendations have been identified as priorities for implementation. See the full list of recommendations.

Organisation of care

- All hospitals admitting people with suspected acute heart failure should provide a specialist heart failure team that is based on a cardiology ward and provides outreach services.
- Ensure that all people being admitted to hospital with suspected acute heart failure have early and continuing input from a dedicated specialist heart failure team.

Diagnosis, assessment and monitoring

- In people presenting with new suspected acute heart failure, use a single measurement of serum natriuretic peptides (B-type natriuretic peptide [BNP] or N-terminal pro-B-type natriuretic peptide [NT-proBNP]) and the following thresholds to rule out the diagnosis of heart failure.
  - BNP less than 100 ng/litre
  - NT-proBNP less than 300 ng/litre.
- In people presenting with new suspected acute heart failure with raised natriuretic peptide levels (see recommendation 1.2.2), perform transthoracic Doppler 2D echocardiography to establish the presence or absence of cardiac abnormalities.
- In people presenting with new suspected acute heart failure, consider performing transthoracic Doppler 2D echocardiography within 48 hours of admission to guide early specialist management.

Treatment after stabilisation

- In a person presenting with acute heart failure who is already taking beta-blockers, continue the beta-blocker treatment unless they have a heart rate less than 50 beats

per minute, second or third degree atrioventricular block, or shock.

- Start or restart beta-blocker treatment during hospital admission in people with acute heart failure due to left ventricular systolic dysfunction, once their condition has been stabilised – for example, when intravenous diuretics are no longer needed.
- Ensure that the person's condition is stable for typically 48 hours after starting or restarting beta-blockers and before discharging from hospital.
- Offer an angiotensin-converting enzyme inhibitor (or angiotensin receptor blocker if there are intolerable side effects) and an aldosterone antagonist during hospital admission to people with acute heart failure and reduced left ventricular ejection fraction. If the angiotensin-converting enzyme inhibitor (or angiotensin receptor blocker) is not tolerated an aldosterone antagonist should still be offered.

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

The following guidance is based on the best available evidence. The full guideline gives details of the methods and the evidence used to develop the guidance.

1.1 Organisation of care

1.1.1 All hospitals admitting people with suspected acute heart failure should provide a specialist heart failure team that is based on a cardiology ward and provides outreach services.

1.1.2 Ensure that all people being admitted to hospital with suspected acute heart failure have early and continuing input from a dedicated specialist heart failure team.

1.1.3 Plan the following with people with acute heart failure in line with the NICE guideline on chronic heart failure:

- discharge from hospital after the acute phase **and**
- subsequent management in primary care, including ongoing monitoring and care provided by the multidisciplinary team **and**
- information and communication about their condition, its treatment and prognosis.

1.1.4 A follow-up clinical assessment should be undertaken by a member of the specialist heart failure team within 2 weeks of the person being discharged from hospital.

1.2 Diagnosis, assessment and monitoring

1.2.1 Take a history, perform a clinical examination and undertake standard investigations – for example, electrocardiography, chest X-ray and blood tests – in line with the NICE guideline on chronic heart failure.

1.2.2 In people presenting with new suspected acute heart failure, use a single measurement of serum natriuretic peptides (B-type natriuretic peptide [BNP] or N-terminal pro-B-type natriuretic peptide [NT-proBNP]) and the following thresholds to rule out the diagnosis of heart failure:

- BNP less than 100 ng/litre
- NT-proBNP less than 300 ng/litre.

1.2.3 In people presenting with new suspected acute heart failure with raised natriuretic peptide levels (see recommendation 1.2.2), perform transthoracic Doppler 2D echocardiography to establish the presence or absence of cardiac abnormalities.

1.2.4 In people presenting with new suspected acute heart failure, consider performing transthoracic Doppler 2D echocardiography within 48 hours of admission to guide early specialist management.

1.2.5 Do not routinely offer pulmonary artery catheterisation to people with acute heart failure.

1.3 Initial pharmacological treatment

1.3.1 For guidance on patient consent and capacity follow recommendations on consent and capacity in the NICE guideline on patient experience in adult NHS

services.

1.3.2 Do not routinely offer opiates to people with acute heart failure.

1.3.3 Offer intravenous diuretic therapy to people with acute heart failure. Start treatment using either a bolus or infusion strategy.

1.3.4 For people already taking a diuretic, consider a higher dose of diuretic than that on which the person was admitted unless there are serious concerns with patient adherence to diuretic therapy before admission.

1.3.5 Closely monitor the person's renal function, weight and urine output during diuretic therapy.

1.3.6 Discuss with the person the best strategies of coping with an increased urine output.

1.3.7 Do not routinely offer nitrates to people with acute heart failure.

1.3.8 If intravenous nitrates are used in specific circumstances, such as for people with concomitant myocardial ischaemia, severe hypertension or regurgitant aortic or mitral valve disease, monitor blood pressure closely in a setting where at least level 2 care can be provided.

1.3.9 Do not offer sodium nitroprusside to people with acute heart failure.

1.3.10 Do not routinely offer inotropes or vasopressors to people with acute heart failure.

1.3.11 Consider inotropes or vasopressors in people with acute heart failure with potentially reversible cardiogenic shock. Administer these treatments in a cardiac care unit or high dependency unit or an alternative setting where at least level 2 care can be provided.

Level 2 care is for people needing more detailed observation or intervention, including support for a single failing organ system or postoperative care and for those stepping down from higher levels of care. From levels of critical care for

adult patients.

1.4 Initial non-pharmacological treatment

1.4.1 Do not routinely use non-invasive ventilation (continuous positive airways pressure [CPAP] or non-invasive positive pressure ventilation [NIPPV]) in people with acute heart failure and cardiogenic pulmonary oedema.

1.4.2 If a person has cardiogenic pulmonary oedema with severe dyspnoea and acidaemia consider starting non-invasive ventilation without delay:

- at acute presentation **or**
- as an adjunct to medical therapy if the person's condition has failed to respond.

1.4.3 Consider invasive ventilation in people with acute heart failure that, despite treatment, is leading to or is complicated by:

- respiratory failure **or**
- reduced consciousness or physical exhaustion.

1.4.4 Do not routinely offer ultrafiltration to people with acute heart failure.

1.4.5 Consider ultrafiltration for people with confirmed diuretic resistance.

Diuretic resistance is defined as dose escalation beyond a person's previously recognised dose ceiling or a dose approaching the maximum recommended daily dose without incremental improvement in diuresis. From diuretics and ultrafiltration in acute decompensated heart failure.

1.5 Treatment after stabilisation

1.5.1 In a person presenting with acute heart failure who is already taking beta-blockers, continue the beta-blocker treatment unless they have a heart rate

less than 50 beats per minute, second or third degree atrioventricular block, or shock.

1.5.2 Start or restart beta-blocker treatment during hospital admission in people with acute heart failure due to left ventricular systolic dysfunction, once their condition has been stabilised – for example, when intravenous diuretics are no longer needed.

1.5.3 Ensure that the person's condition is stable for typically 48 hours after starting or restarting beta-blockers and before discharging from hospital.

1.5.4 Offer an angiotensin-converting enzyme inhibitor (or angiotensin receptor blocker if there are intolerable side effects) and an aldosterone antagonist during hospital admission to people with acute heart failure and reduced left ventricular ejection fraction. If the angiotensin-converting enzyme inhibitor (or angiotensin receptor blocker) is not tolerated an aldosterone antagonist should still be offered.

In February 2016, the Medicines and Healthcare products Regulatory Agency (MHRA) published advice on the concomitant use of spironolactone and renin-angiotensin system drugs in heart failure concerning the risk of potentially fatal hyperkalaemia. See the MHRA advice for more information.

1.5.5 Closely monitor the person's renal function, electrolytes, heart rate, blood pressure and overall clinical status during treatment with beta-blockers, aldosterone antagonists or angiotensin-converting enzyme inhibitors.

1.6 Valvular surgery and percutaneous intervention

The recommendations on valvular surgery and percutaneous intervention have been replaced by the NICE guideline on heart valve disease.

1.7 Mechanical assist devices

1.7.1 At an early stage, the specialist should have a discussion with a centre providing mechanical circulatory support about:

- people with potentially reversible severe acute heart failure **or**
- people who are potential candidates for transplantation.

Recommendations for research

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future.

1 Dopamine

In people with acute heart failure, congestion and worsening renal function, does the addition of low-dose dopamine to standard therapy lead to greater diuresis and renal protection compared with adding placebo to standard therapy?

Why this is important

A randomised controlled trial should be conducted to investigate whether the addition of low-dose dopamine to standard therapy leads to more clinically and cost effective decongestion in people admitted to hospital for treatment of decompensated heart failure. The study should aim to investigate the diuretic effect of dopamine as well as effects on renal function.

One of the most common and difficult to manage problems arising during the initial treatment of people with acute heart failure is an inadequate response to intravenous diuretic therapy (that is, failure to relieve congestion), which is often associated with worsening renal function. This combination frequently leads to a prolonged inpatient stay and is associated with higher inpatient mortality rates and higher post-discharge mortality and re-admission rates. The best treatment for this combination of problems is unknown. However, theoretical and experimental evidence indicates that low-dose dopamine may improve renal blood flow, as well as enhance sodium and water excretion. Clinical trials have not yet resolved whether in some patients, the use of low-dose dopamine actually results in improved decongestion and shorter hospital stays.

2 Thiazide

In people with acute heart failure and persistent congestion, does the addition of a thiazide diuretic to standard therapy lead to greater diuresis compared with adding placebo to standard therapy?

Why this is important

A randomised controlled trial should be conducted to investigate whether the addition of a thiazide diuretic to standard therapy leads to more clinically and cost effective decongestion in people admitted to hospital for treatment of decompensated heart failure.

One of the most common and difficult to manage problems arising during the initial treatment of people with acute heart failure is an inadequate response to intravenous diuretic therapy. This frequently leads to a prolonged inpatient stay and is associated with higher inpatient mortality and higher post-discharge mortality and re-admission rates. The best treatment for this problem is unknown. However, there is some inconsistent and non-robust evidence that addition of a thiazide or thiazide-like diuretic (metolazone) may be beneficial. The proposed study would aim to resolve this uncertainty and guide the management of a difficult clinical problem.

3 Intra-aortic balloon counter-pulsation

In people with acute heart failure and hypoperfusion syndrome, is the use of intra-aortic balloon counter-pulsation pump (IABP) better than the use of intravenous inotropes?

Why this is important

A randomised controlled trial should be conducted in people with decompensated heart failure due to left ventricular systolic dysfunction and systemic hypoperfusion comparing the use of IABP with the use of inotropes/vasopressors. This would determine which strategy is more clinically and cost effective in this cohort.

IABP is used in the hospital setting as an adjuvant in people with critical coronary ischaemia and in people with mechanical complications of acute myocardial infarction. It has also been used in people who develop cardiogenic shock after acute myocardial infarction. However, it is uncertain whether it can provide clinical benefit in the critically unwell patients with acute heart failure due to left ventricular systolic dysfunction and systemic hypoperfusion.

4 Ultrafiltration

In people with decompensated heart failure, fluid congestion and diuretic resistance, does

ultrafiltration lead to more rapid and effective decongestion compared with continuing diuretic treatment?

Why this is important

A randomised controlled trial should be undertaken to determine whether ultrafiltration is more clinically and cost effective than conventional diuretic therapy for people admitted to hospital with decompensated heart failure. The study should not only investigate several clinical outcomes but also consider the impact of treatments on quality of life and provide data on safety.

People who have fluid retention that is resistant to conventional diuretic therapy, with or without renal dysfunction, make up a high proportion of hospital admissions due to heart failure. Such admissions are often prolonged and therefore have important budgetary implications for the NHS. The few, relatively small scale, randomised trials of ultrafiltration performed so far have been conducted in healthcare settings very different from the UK, with less fluid retention than is usually seen in UK practice, and where length of stay is usually much shorter than in UK (and European) practice. Although technically feasible, the evidence for benefit on heart failure outcomes is inconsistent and difficult to generalise to UK practice. Therefore, a UK-based study of sufficient quality is needed.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on cardiovascular conditions.

For full details of the evidence and the guideline committee's discussions, see the full guideline. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

Update information

November 2021: We withdrew recommendations 1.6.1 to 1.6.4 on valvular surgery and percutaneous intervention because they have been replaced by the NICE guideline on heart valve disease.

Minor changes since publication

March 2016: MHRA advice on spironolactone and renin-angiotensin system drugs added to recommendation 1.5.4.

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