

Atrial fibrillation: management

Clinical guideline

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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.

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.

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This guideline replaces CG36.

This guideline is the basis of QS93.

Introduction

This guideline updates and replaces 'Atrial fibrillation' (NICE clinical guideline 36). See [update information](#) for details.

Atrial fibrillation is the most common sustained cardiac arrhythmia, and estimates suggest its prevalence is increasing. If left untreated atrial fibrillation is a significant risk factor for stroke and other morbidities. Men are more commonly affected than women and the prevalence increases with age.

The aim of treatment is to prevent complications, particularly stroke, and alleviate symptoms. Drug treatments include anticoagulants to reduce the risk of stroke and antiarrhythmics to restore or maintain the normal heart rhythm or to slow the heart rate in people who remain in atrial fibrillation. Non-pharmacological management includes electrical cardioversion, which may be used to 'shock' the heart back to its normal rhythm, and catheter or surgical ablation to create lesions to stop the abnormal electrical impulses that cause atrial fibrillation.

This updated guideline addresses several clinical areas in which new evidence has become available, including stroke and bleeding risk stratification, the role of new antithrombotic agents and ablation strategies.

The recommendations apply to adults (18 years or older) with atrial fibrillation, including paroxysmal (recurrent), persistent and permanent atrial fibrillation, and atrial flutter. They do not apply to people with congenital heart disease precipitating atrial fibrillation.

Drug recommendations

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

Key priorities for implementation

The following recommendations have been identified as priorities for implementation. The full list of recommendations is in [section 1](#).

Personalised package of care and information

- Offer people with atrial fibrillation a personalised package of care. Ensure that the package of care is documented and delivered, and that it covers:
 - stroke awareness and measures to prevent stroke
 - rate control
 - assessment of symptoms for rhythm control
 - who to contact for advice if needed
 - psychological support if needed
 - up-to-date and comprehensive education and information on:
 - ◇ cause, effects and possible complications of atrial fibrillation
 - ◇ management of rate and rhythm control
 - ◇ anticoagulation
 - ◇ practical advice on anticoagulation in line with [recommendation 1.3.1](#) in 'Venous thromboembolic diseases' (NICE clinical guideline 144)
 - ◇ support networks (for example, cardiovascular charities). [new 2014]

Referral for specialised management

- Refer people promptly^[1] at any stage if treatment fails to control the symptoms of atrial fibrillation and more specialised management is needed. [new 2014]

Assessment of stroke and bleeding risks

Stroke risk

- Use the CHA₂DS₂-VASc stroke risk score to assess stroke risk in people with any of the following:
 - symptomatic or asymptomatic paroxysmal, persistent or permanent atrial fibrillation
 - atrial flutter
 - a continuing risk of arrhythmia recurrence after cardioversion back to sinus rhythm. [new 2014]

Bleeding risk

- Use the HAS-BLED score to assess the risk of bleeding in people who are starting or have started anticoagulation. Offer modification and monitoring of the following risk factors:
 - uncontrolled hypertension
 - poor control of international normalised ratio (INR) ('labile INRs')
 - concurrent medication, for example concomitant use of aspirin or a non-steroidal anti-inflammatory drug (NSAID)
 - harmful alcohol consumption. [new 2014]

Interventions to prevent stroke

Anticoagulation

Anticoagulation may be with apixaban, dabigatran etexilate, rivaroxaban or a vitamin K antagonist.

- Offer anticoagulation to people with a CHA₂DS₂-VASc score of 2 or above, taking bleeding risk into account. [new 2014]

Assessing anticoagulation control with vitamin K antagonists

- Calculate the person's time in therapeutic range (TTR) at each visit. When calculating TTR:
 - use a validated method of measurement such as the Rosendaal method for computer-assisted dosing or proportion of tests in range for manual dosing
 - exclude measurements taken during the first 6 weeks of treatment
 - calculate TTR over a maintenance period of at least 6 months. [new 2014]
- If poor anticoagulation control cannot be improved, evaluate the risks and benefits of alternative stroke prevention strategies and discuss these with the person. [new 2014]

Antiplatelets

- Do not offer aspirin monotherapy solely for stroke prevention to people with atrial fibrillation. [new 2014]

Rate and rhythm control

When to offer rate or rhythm control

- Offer rate control as the first-line strategy to people with atrial fibrillation, except in people:
 - whose atrial fibrillation has a reversible cause
 - who have heart failure thought to be primarily caused by atrial fibrillation
 - with new-onset atrial fibrillation
 - with atrial flutter whose condition is considered suitable for an ablation strategy to restore sinus rhythm
 - for whom a rhythm control strategy would be more suitable based on clinical judgement. [new 2014]

Left atrial ablation and a pace and ablate strategy

Left atrial ablation

- If drug treatment has failed to control symptoms of atrial fibrillation or is unsuitable:
 - offer left atrial catheter ablation to people with paroxysmal atrial fibrillation
 - consider left atrial catheter or surgical ablation for people with persistent atrial fibrillation
 - discuss the risks and benefits with the person^[2]. [new 2014]

^[1]The Guideline Development Group defined 'promptly' as no longer than 4 weeks after the final failed treatment or no longer than 4 weeks after recurrence of atrial fibrillation following cardioversion when further specialised management is needed.

^[2]For more information on left atrial catheter ablation see [Percutaneous balloon cryoablation for pulmonary vein isolation in atrial fibrillation](#) (NICE interventional procedure guidance 427), [Percutaneous endoscopic catheter laser balloon pulmonary vein isolation for atrial fibrillation](#) (NICE interventional procedure guidance 399) and [Percutaneous \(non-thoracoscopic\) epicardial catheter radiofrequency ablation for atrial fibrillation](#) (NICE interventional procedure guidance 294). For more information on left atrial surgical ablation without thoracotomy see [Thoracoscopic epicardial radiofrequency ablation for atrial fibrillation](#) (NICE interventional procedure guidance 286).

1 Recommendations

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.

People have the right to be involved in discussions and make informed decisions about their care, as described in [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 professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

These recommendations apply to adults (aged 18 and over) with suspected or diagnosed atrial fibrillation.

1.1 Diagnosis and assessment

1.1.1 Perform manual pulse palpation to assess for the presence of an irregular pulse that may indicate underlying atrial fibrillation in people presenting with any of the following:

- breathlessness/dyspnoea
- palpitations
- syncope/dizziness
- chest discomfort
- stroke/transient ischaemic attack. [2006]

1.1.2 Perform an electrocardiogram (ECG) in all people, whether symptomatic or not, in whom atrial fibrillation is suspected because an irregular pulse has been detected. [2006]

1.1.3 In people with suspected paroxysmal atrial fibrillation^[3] undetected by standard ECG recording:

- use a 24-hour ambulatory ECG monitor in those with suspected asymptomatic episodes or symptomatic episodes less than 24 hours apart
- use an event recorder ECG in those with symptomatic episodes more than 24 hours apart. [2006]

1.1.4 Perform transthoracic echocardiography (TTE) in people with atrial fibrillation:

- for whom a baseline echocardiogram is important for long-term management
- for whom a rhythm-control strategy that includes cardioversion (electrical or pharmacological) is being considered
- in whom there is a high risk or a suspicion of underlying structural/functional heart disease (such as heart failure or heart murmur) that influences their subsequent management (for example, choice of antiarrhythmic drug)
- in whom refinement of clinical risk stratification for antithrombotic therapy is needed (see [section 1.4 Assessment of stroke and bleeding risks](#) and [section 1.5 Interventions to prevent stroke](#)). [2006, amended 2014]

1.1.5 Do not routinely perform TTE solely for the purpose of further stroke risk stratification in people with atrial fibrillation for whom the need to initiate anticoagulation therapy has already been agreed on appropriate clinical criteria (see [section 1.4 Assessment of stroke and bleeding risks](#) and [section 1.5 Interventions to prevent stroke](#)). [2006, amended 2014]

1.1.6 Perform transoesophageal echocardiography (TOE) in people with atrial fibrillation:

- when TTE demonstrates an abnormality (such as valvular heart disease) that warrants further specific assessment
- in whom TTE is technically difficult and/or of questionable quality and where there is a need to exclude cardiac abnormalities
- for whom TOE-guided cardioversion is being considered. [2006]

1.2 Personalised package of care and information

1.2.1 Offer people with atrial fibrillation a personalised package of care. Ensure that

the package of care is documented and delivered, and that it covers:

- stroke awareness and measures to prevent stroke
- rate control
- assessment of symptoms for rhythm control
- who to contact for advice if needed
- psychological support if needed
- up-to-date and comprehensive education and information on:
 - cause, effects and possible complications of atrial fibrillation
 - management of rate and rhythm control
 - anticoagulation
 - practical advice on anticoagulation in line with [recommendation 1.3.1](#) in 'Venous thromboembolic diseases' (NICE clinical guideline 144)
 - support networks (for example, cardiovascular charities). [new 2014]

1.2.2 NICE has produced guidance on the components of good patient experience in adult NHS services. Follow the recommendations in [patient experience in adult NHS services](#) (NICE clinical guideline 138). [new 2014]

1.3 Referral for specialised management

1.3.1 Refer people promptly^[4] at any stage if treatment fails to control the symptoms of atrial fibrillation and more specialised management is needed. [new 2014]

1.4 Assessment of stroke and bleeding risks

Stroke risk

1.4.1 Use the [CHA₂DS₂-VASc](#) stroke risk score to assess stroke risk in people with any of the following:

- symptomatic or asymptomatic paroxysmal, persistent or permanent atrial fibrillation

- atrial flutter
- a continuing risk of arrhythmia recurrence after cardioversion back to sinus rhythm. [new 2014]

Bleeding risk

1.4.2 Use the [HAS-BLED](#) score to assess the risk of bleeding in people who are starting or have started anticoagulation. Offer modification and monitoring of the following risk factors:

- uncontrolled hypertension
- poor control of international normalised ratio (INR) ('labile INRs')
- concurrent medication, for example concomitant use of aspirin or a non-steroidal anti-inflammatory drug (NSAID)
- harmful alcohol consumption. [new 2014]

1.4.3 When discussing the benefits and risks of anticoagulation, explain to the person that:

- for most people the benefit of anticoagulation outweighs the bleeding risk
- for people with an increased risk of bleeding the benefit of anticoagulation may not always outweigh the bleeding risk, and careful monitoring of bleeding risk is important. [new 2014]

1.4.4 Do not withhold anticoagulation solely because the person is at risk of having a fall. [new 2014]

1.5 Interventions to prevent stroke

1.5.1 Do not offer stroke prevention therapy to people aged under 65 years with atrial fibrillation and no risk factors other than their sex (that is, very low risk of stroke equating to a [CHA₂DS₂-VASc](#) score of 0 for men or 1 for women). [new 2014]

Anticoagulation

Anticoagulation may be with apixaban, dabigatran etexilate, rivaroxaban or a vitamin K antagonist.

NICE has also produced a [patient decision aid about anticoagulation in atrial fibrillation](#).

- 1.5.2 Consider anticoagulation for men with a [CHA₂DS₂-VASc](#) score of 1. Take the bleeding risk into account. [new 2014]
- 1.5.3 Offer anticoagulation to people with a [CHA₂DS₂-VASc](#) score of 2 or above, taking bleeding risk into account. [new 2014]
- 1.5.4 Discuss the options for anticoagulation with the person and base the choice on their clinical features and preferences. [new 2014]

Apixaban

1.5.5 Apixaban is recommended as an option for preventing stroke and systemic embolism within its marketing authorisation, that is, in people with nonvalvular atrial fibrillation with 1 or more risk factors such as:

- prior stroke or transient ischaemic attack
- age 75 years or older
- hypertension
- diabetes mellitus
- symptomatic heart failure.

[This recommendation is from [Apixaban for preventing stroke and systemic embolism in people with nonvalvular atrial fibrillation](#) (NICE technology appraisal guidance 275).] [2013]

1.5.6 The decision about whether to start treatment with apixaban should be made after an informed discussion between the clinician and the person about the risks and benefits of apixaban compared with warfarin, dabigatran etexilate and rivaroxaban. For people who are taking warfarin, the potential risks and benefits of switching to apixaban should be considered in light of their level of international normalised ratio (INR) control.

[This recommendation is from [Apixaban for preventing stroke and systemic embolism in people with nonvalvular atrial fibrillation](#) (NICE technology appraisal guidance 275).] [2013]

Dabigatran etexilate

1.5.7 Dabigatran etexilate is recommended as an option for the prevention of stroke and systemic embolism within its licensed indication, that is, in people with nonvalvular atrial fibrillation with one or more of the following risk factors:

- previous stroke, transient ischaemic attack or systemic embolism
- left ventricular ejection fraction below 40%
- symptomatic heart failure of New York Heart Association (NYHA) class 2 or above
- age 75 years or older
- age 65 years or older with one of the following: diabetes mellitus, coronary artery disease or hypertension.

[This recommendation is from [Dabigatran etexilate for the prevention of stroke and systemic embolism in atrial fibrillation](#) (NICE technology appraisal guidance 249).] [2012]

1.5.8 The decision about whether to start treatment with dabigatran etexilate should be made after an informed discussion between the clinician and the person about the risks and benefits of dabigatran etexilate compared with warfarin. For people who are taking warfarin, the potential risks and benefits of switching to dabigatran etexilate should be considered in light of their level of international normalised ratio (INR) control.

[This recommendation is from [Dabigatran etexilate for the prevention of stroke and systemic embolism in atrial fibrillation](#) (NICE technology appraisal guidance 249).] [2012]

Rivaroxaban

1.5.9 Rivaroxaban is recommended as an option for the prevention of stroke and systemic embolism within its licensed indication, that is, in people with nonvalvular atrial fibrillation with one or more risk factors such as:

- congestive heart failure

- hypertension
- age 75 years or older
- diabetes mellitus
- prior stroke or transient ischaemic attack.

[This recommendation is from [Rivaroxaban for the prevention of stroke and systemic embolism in people with atrial fibrillation](#) (NICE technology appraisal guidance 256).] [2012]

1.5.10 The decision about whether to start treatment with rivaroxaban should be made after an informed discussion between the clinician and the person about the risks and benefits of rivaroxaban compared with warfarin. For people who are taking warfarin, the potential risks and benefits of switching to rivaroxaban should be considered in light of their level of international normalised ratio (INR) control. [This recommendation is from [Rivaroxaban for the prevention of stroke and systemic embolism in people with atrial fibrillation](#) (NICE technology appraisal guidance 256).] [2012]

Assessing anticoagulation control with vitamin K antagonists

1.5.11 Calculate the person's time in therapeutic range (TTR) at each visit. When calculating TTR:

- use a validated method of measurement such as the Rosendaal method for computer-assisted dosing or proportion of tests in range for manual dosing
- exclude measurements taken during the first 6 weeks of treatment
- calculate TTR over a maintenance period of at least 6 months. [new 2014]

1.5.12 Reassess anticoagulation for a person with poor anticoagulation control shown by any of the following:

- 2 INR values higher than 5 or 1 INR value higher than 8 within the past 6 months
- 2 INR values less than 1.5 within the past 6 months
- TTR less than 65%. [new 2014]

1.5.13 When reassessing anticoagulation, take into account and if possible address the

following factors that may contribute to poor anticoagulation control:

- cognitive function
- adherence to prescribed therapy
- illness
- interacting drug therapy
- lifestyle factors including diet and alcohol consumption. [new 2014]

1.5.14 If poor anticoagulation control cannot be improved, evaluate the risks and benefits of alternative stroke prevention strategies and discuss these with the person. [new 2014]

Self-monitoring and self-management of vitamin K antagonists

NICE has developed diagnostics guidance on [Self-monitoring coagulation status in people on long-term vitamin K antagonist therapy who have atrial fibrillation or heart valve disease: point-of-care coagulometers \(the CoaguChek XS system and the INRatio2 PT/INR monitor\)](#).

Antiplatelets

1.5.15 Do not offer aspirin monotherapy solely for stroke prevention to people with atrial fibrillation. [new 2014]

Review of people with atrial fibrillation

1.5.16 For people who are not taking an anticoagulant, review stroke risk when they reach age 65 or if they develop any of the following at any age:

- diabetes
- heart failure
- peripheral arterial disease
- coronary heart disease
- stroke, transient ischaemic attack or systemic thromboembolism. [new 2014]

- 1.5.17 For people who are not taking an anticoagulant because of bleeding risk or other factors, review stroke and bleeding risks annually, and ensure that all reviews and decisions are documented. [new 2014]
- 1.5.18 For people who are taking an anticoagulant, review the need for anticoagulation and the quality of anticoagulation at least annually, or more frequently if clinically relevant events occur affecting anticoagulation or bleeding risk. [new 2014]

Left atrial appendage occlusion

- 1.5.19 Consider left atrial appendage occlusion (LAAO) if anticoagulation is contraindicated or not tolerated and discuss the benefits and risks of LAAO with the person. For more information see [Percutaneous occlusion of the left atrial appendage in non-valvular atrial fibrillation for the prevention of thromboembolism](#) (NICE interventional procedure guidance 349). [new 2014]
- 1.5.20 Do not offer LAAO as an alternative to anticoagulation unless anticoagulation is contraindicated or not tolerated. [new 2014]

1.6 Rate and rhythm control

When to offer rate or rhythm control

- 1.6.1 Offer rate control as the first-line strategy to people with atrial fibrillation, except in people:
- whose atrial fibrillation has a reversible cause
 - who have heart failure thought to be primarily caused by atrial fibrillation
 - with new-onset atrial fibrillation
 - with atrial flutter whose condition is considered suitable for an ablation strategy to restore sinus rhythm
 - for whom a rhythm control strategy would be more suitable based on clinical judgement. [new 2014]

Rate control

- 1.6.2 Offer either a standard beta-blocker (that is, a beta-blocker other than sotalol) or a rate-limiting calcium-channel blocker as initial monotherapy to people with atrial fibrillation who need drug treatment as part of a rate control strategy. Base the choice of drug on the person's symptoms, heart rate, comorbidities and preferences when considering drug treatment. [new 2014]
- 1.6.3 Consider digoxin monotherapy for people with non-paroxysmal atrial fibrillation only if they are sedentary (do no or very little physical exercise). [new 2014]
- 1.6.4 If monotherapy does not control symptoms, and if continuing symptoms are thought to be due to poor ventricular rate control, consider combination therapy with any 2 of the following:
- a beta-blocker
 - diltiazem
 - digoxin. [new 2014]
- 1.6.5 Do not offer amiodarone for long-term rate control. [new 2014]

Rhythm control

- 1.6.6 Consider pharmacological and/or electrical rhythm control for people with atrial fibrillation whose symptoms continue after heart rate has been controlled or for whom a rate-control strategy has not been successful. [new 2014]

Cardioversion

- 1.6.7 For people having cardioversion for atrial fibrillation that has persisted for longer than 48 hours, offer electrical (rather than pharmacological) cardioversion. [new 2014]
- 1.6.8 Consider amiodarone therapy starting 4 weeks before and continuing for up to 12 months after electrical cardioversion to maintain sinus rhythm, and discuss the benefits and risks of amiodarone with the person. [new 2014]
- 1.6.9 For people with atrial fibrillation of greater than 48 hours' duration, in whom

elective cardioversion is indicated:

- both transoesophageal echocardiography (TOE)-guided cardioversion and conventional cardioversion should be considered equally effective
- a TOE-guided cardioversion strategy should be considered:
 - where experienced staff and appropriate facilities are available and
 - where a minimal period of precardioversion anticoagulation is indicated due to the person's choice or bleeding risks. [2006]

Drug treatment for long-term rhythm control

- 1.6.10 Assess the need for drug treatment for long-term rhythm control, taking into account the person's preferences, associated comorbidities, risks of treatment and likelihood of recurrence of atrial fibrillation. [new 2014]
- 1.6.11 If drug treatment for long-term rhythm control is needed, consider a standard beta-blocker (that is, a beta-blocker other than sotalol) as first-line treatment unless there are contraindications. [new 2014]
- 1.6.12 If beta-blockers are contraindicated or unsuccessful, assess the suitability of alternative drugs for rhythm control, taking comorbidities into account. [new 2014]
- 1.6.13 Dronedaron is recommended as an option for the maintenance of sinus rhythm after successful cardioversion in people with paroxysmal or persistent atrial fibrillation:
- whose atrial fibrillation is not controlled by first-line therapy (usually including beta-blockers), that is, as a second-line treatment option and after alternative options have been considered and

- who have at least 1 of the following cardiovascular risk factors:
 - hypertension requiring drugs of at least 2 different classes
 - diabetes mellitus
 - previous transient ischaemic attack, stroke or systemic embolism
 - left atrial diameter of 50 mm or greater or
 - age 70 years or older and
- who do not have left ventricular systolic dysfunction and
- who do not have a history of, or current, heart failure.
[This recommendation is from [Dronedarone for the treatment of non-permanent atrial fibrillation](#) (NICE technology appraisal guidance 197).] [2010, amended 2012]

1.6.14 People who do not meet the criteria in recommendation 1.6.13 who are currently receiving dronedarone should have the option to continue treatment until they and their clinicians consider it appropriate to stop. [This recommendation is from [Dronedarone for the treatment of non-permanent atrial fibrillation](#) (NICE technology appraisal guidance 197).] [2010, amended 2012]

1.6.15 Consider amiodarone for people with left ventricular impairment or heart failure. [new 2014]

1.6.16 Do not offer class 1c antiarrhythmic drugs such as flecainide or propafenone to people with known ischaemic or structural heart disease. [new 2014]

1.6.17 Where people have infrequent paroxysms and few symptoms, or where symptoms are induced by known precipitants (such as alcohol, caffeine), a 'no drug treatment' strategy or a 'pill-in-the-pocket' strategy^[5] should be considered and discussed with the person. [2006]

1.6.18 In people with paroxysmal atrial fibrillation, a 'pill-in-the-pocket' strategy should be considered for those who:

- have no history of left ventricular dysfunction, or valvular or ischaemic heart disease and

- have a history of infrequent symptomatic episodes of paroxysmal atrial fibrillation and
- have a systolic blood pressure greater than 100 mmHg and a resting heart rate above 70 bpm and
- are able to understand how to, and when to, take the medication. [2006]

Left atrial ablation and a pace and ablate strategy

Left atrial ablation

1.6.19 If drug treatment has failed to control symptoms of atrial fibrillation or is unsuitable:

- offer left atrial catheter ablation to people with paroxysmal atrial fibrillation
- consider left atrial catheter or surgical ablation for people with persistent atrial fibrillation
- discuss the risks and benefits with the person^[6]. [new 2014]

1.6.20 Consider left atrial surgical ablation at the same time as other cardiothoracic surgery for people with symptomatic atrial fibrillation^[7]. [new 2014]

Pace and ablate strategy

1.6.21 Consider pacing and atrioventricular node ablation for people with permanent atrial fibrillation with symptoms or left ventricular dysfunction thought to be caused by high ventricular rates. [new 2014]

1.6.22 When considering pacing and atrioventricular node ablation, reassess symptoms and the consequent need for ablation after pacing has been carried out and drug treatment further optimised. [new 2014]

1.6.23 Consider left atrial catheter ablation before pacing and atrioventricular node ablation for people with paroxysmal atrial fibrillation or heart failure caused by non-permanent (paroxysmal or persistent) atrial fibrillation. [new 2014]

1.7 Management for people presenting acutely with atrial fibrillation

Rate and rhythm control

- 1.7.1 Carry out emergency electrical cardioversion, without delaying to achieve anticoagulation, in people with life-threatening haemodynamic instability caused by new-onset atrial fibrillation. [new 2014]
- 1.7.2 In people with atrial fibrillation presenting acutely without life-threatening haemodynamic instability, offer rate or rhythm control if the onset of the arrhythmia is less than 48 hours, and start rate control if it is more than 48 hours or is uncertain. [new 2014]
- 1.7.3 Consider either pharmacological or electrical cardioversion depending on clinical circumstances and resources in people with new-onset atrial fibrillation who will be treated with a rhythm control strategy. [new 2014]
- 1.7.4 If pharmacological cardioversion has been agreed on clinical and resource grounds for new-onset atrial fibrillation, offer:
- A choice of flecainide or amiodarone to people with no evidence of structural or ischaemic heart disease or
 - amiodarone to people with evidence of structural heart disease. [new 2014]
- 1.7.5 In people with atrial fibrillation in whom the duration of the arrhythmia is greater than 48 hours or uncertain and considered for long-term rhythm control, delay cardioversion until they have been maintained on therapeutic anticoagulation for a minimum of 3 weeks. During this period offer rate control as appropriate. [2006, amended 2014]
- 1.7.6 Do not offer magnesium or a calcium-channel blocker for pharmacological cardioversion. [new 2014]

Anticoagulation

- 1.7.7 In people with new-onset atrial fibrillation who are receiving no, or subtherapeutic, anticoagulation therapy:

- in the absence of contraindications, offer heparin at initial presentation
- continue heparin until a full assessment has been made and appropriate antithrombotic therapy has been started, based on risk stratification (see [section 1.4 Assessment of stroke and bleeding risks](#) and [section 1.5 Interventions to prevent stroke](#)). [2006, amended 2014]

1.7.8 In people with a confirmed diagnosis of atrial fibrillation of recent onset (less than 48 hours since onset), offer oral anticoagulation if:

- stable sinus rhythm is not successfully restored within the same 48-hour period following onset of atrial fibrillation or
- there are factors indicating a high risk of atrial fibrillation recurrence^[a] or
- it is recommended in [section 1.4 Assessment of stroke and bleeding risks](#) and [section 1.5 Interventions to prevent stroke](#). [2006, amended 2014]

1.7.9 In people with new-onset atrial fibrillation where there is uncertainty over the precise time since onset, offer oral anticoagulation as for persistent atrial fibrillation (see [section 1.4 Assessment of stroke and bleeding risks](#) and [section 1.5 Interventions to prevent stroke](#)). [2006, amended 2014]

1.8 Initial management of stroke and atrial fibrillation

1.8.1 For guidance on the initial management of stroke and atrial fibrillation see [recommendation 1.4.3.1](#) in 'Stroke' (NICE clinical guideline 68). [new 2014]

1.9 Prevention and management of postoperative atrial fibrillation

1.9.1 In people undergoing cardiothoracic surgery:

- reduce the risk of postoperative atrial fibrillation by offering 1 of the following:
 - amiodarone
 - a standard beta-blocker (that is, a beta-blocker other than sotalol)
 - a rate-limiting calcium antagonist

- do not offer digoxin. [2006, amended 2014]
- 1.9.2 In people undergoing cardiothoracic surgery on pre-existing beta-blocker therapy, continue this treatment unless contraindications develop (such as postoperative bradycardia or hypotension). [2006, amended 2014]
- 1.9.3 Unless contraindicated, offer a rhythm-control strategy as the initial management option for the treatment of postoperative atrial fibrillation following cardiothoracic surgery. [2006, amended 2014]
- 1.9.4 Unless contraindicated, manage postoperative atrial fibrillation following non-cardiothoracic surgery as for new-onset atrial fibrillation with any other precipitant. [2006, amended 2014]
- 1.9.5 In the prophylaxis and management of postoperative atrial fibrillation, use appropriate antithrombotic therapy and correct identifiable precipitants (such as electrolyte imbalance or hypoxia). [2006, amended 2014]

^[3] Paroxysmal atrial fibrillation spontaneously terminates within 7 days, usually within 48 hours.

^[4] The Guideline Development Group defined 'promptly' as no longer than 4 weeks after the final failed treatment or no longer than 4 weeks after recurrence of atrial fibrillation following cardioversion when further specialised management is needed.

^[5] A 'pill-in-the-pocket' strategy is defined as the person managing paroxysmal atrial fibrillation themselves by taking antiarrhythmic drugs only when an episode of atrial fibrillation starts.

^[6] For more information on left atrial catheter ablation see [Percutaneous balloon cryoablation for pulmonary vein isolation in atrial fibrillation](#) (NICE interventional procedure guidance 427), [Percutaneous endoscopic catheter laser balloon pulmonary vein isolation for atrial fibrillation](#) (NICE interventional procedure guidance 399) and [Percutaneous \(non-thoracoscopic\) epicardial catheter radiofrequency ablation for atrial fibrillation](#) (NICE interventional procedure guidance 294). For more information on left atrial surgical ablation without thoracotomy see [Thoracoscopic epicardial radiofrequency ablation for atrial fibrillation](#) (NICE interventional procedure guidance 286).

^[7] For more information on left atrial surgical ablation at the same time as other cardiothoracic surgery see [High-intensity focused ultrasound for atrial fibrillation in association with other](#)

cardiac surgery (NICE interventional procedure guidance 184), Cryoablation for atrial fibrillation in association with other cardiac surgery (NICE interventional procedure guidance 123), Microwave ablation for atrial fibrillation in association with other cardiac surgery (NICE interventional procedure guidance 122) and Radiofrequency ablation for atrial fibrillation in association with other cardiac surgery (NICE interventional procedure guidance 121).

^[6] Factors indicating a high risk of atrial fibrillation recurrence include: a history of failed attempts at cardioversion; structural heart disease (mitral valve disease, left ventricular dysfunction or an enlarged left atrium); a prolonged history of atrial fibrillation (more than 12 months); previous recurrences of atrial fibrillation.

2 Research recommendations

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.

2.1 Cognitive behavioural therapy for people with atrial fibrillation

What is the clinical and cost effectiveness of cognitive behavioural therapy (CBT) compared with usual care for people with newly diagnosed atrial fibrillation?

Why this is important

There is currently little evidence to support psychological care for people with atrial fibrillation. Assessing the effectiveness of CBT in lowering people's levels of anxiety, reducing episodes of planned or unplanned care and improving their quality of life will help determine whether CBT should be an essential component of atrial fibrillation services. [new 2014]

2.2 Rate control drug treatment for people aged 75 and over with atrial fibrillation

What is the comparative effectiveness of the 3 main drug classes used for rate control (beta-blockers, calcium-channel blockers and digoxin) in people aged 75 and over with atrial fibrillation in controlling symptoms, improving quality of life and reducing morbidity and mortality?

Why this is important

Atrial fibrillation is the most common arrhythmia in people aged 75 and over, with a prevalence of more than 15%. This guideline recommends rate control of atrial fibrillation as the treatment of choice. However, there are no good-quality randomised controlled trials (RCTs) comparing the 3 main drug classes (beta-blockers, calcium-channel blockers and digoxin) used for rate control, and no studies specifically addressing people aged 75 and over.

Drug treatment for rate control in people aged 75 and over with atrial fibrillation is particularly challenging because of comorbidities. For example, heart failure is prevalent in this age group but RCTs comparing beta-blockers with digoxin in people aged over 70 are of low quality. Although

these RCTs suggest no advantage of beta-blockers compared with digoxin for rate control, and an increased incidence of hospitalisations with heart failure, current guidelines propose beta-blockers as first-line therapy for rate control. Other conditions such as chronic kidney disease, ischaemic heart disease, valvular heart disease, concomitant heart conduction disorders, dementia, pulmonary disease, hypo- and hypertension and frailty might also affect the choice of drugs for this age group. Optimal treatments for people with these comorbidities are not known.

Optimising drug treatment for atrial fibrillation in this age group has the potential to reduce hospitalisations and the need for services such as GPs and specialist nurses to manage secondary symptoms, with consequent economic benefits. [new 2014]

2.3 Case volume as an indicator of quality for people offered left atrial catheter ablation

What is the effect of case volume on complications and outcomes after left atrial catheter ablation?

Why this is important

As interest in left atrial catheter ablation for atrial fibrillation increases, more clinicians are taking up this procedure. Many people offered left atrial catheter ablation want to know whether they will receive safe and effective treatment. If increased experience and case volume are associated with improved outcomes, the case volume of a centre or a clinician is an easily measurable parameter that people with atrial fibrillation could use to help judge the quality of the procedure they are likely to receive. [new 2014]

2.4 Non-vitamin K antagonist oral anticoagulants

Do people with atrial fibrillation whose anticoagulant control is poor, or is predicted to be poor, with warfarin benefit from changing to one of the non-vitamin K antagonist (non-VKA) oral anticoagulants?

Why this is important

Trials of the non-VKA oral anticoagulants have shown that the degree of benefit of these agents compared with warfarin may depend on the time in therapeutic range (TTR) of the warfarin group. These trials assessed the degree of benefit in relation to the mean TTR for the warfarin group in that country.

However, the inference of benefit is based on a number of assumptions. It is unclear that the population TTR can be extrapolated to decision-making in an individual. If, for example, an individual's low TTR is a result of poor compliance, it is unlikely that compliance will improve with a non-VKA oral anticoagulant and uncertain whether a non-VKA oral anticoagulant will offer any benefit. Moreover, the threshold of TTR at which a non-VKA oral anticoagulant might offer benefit is unclear. The same question can be extended to include people before they start warfarin treatment, using criteria that prospectively identify those likely to have poor control on warfarin.

A study with 2 arms should be carried out. One arm should randomise people with atrial fibrillation, whose control is poor with warfarin, to either continue warfarin treatment or change to a non-VKA oral anticoagulant. The other arm should randomise people newly diagnosed as having atrial fibrillation, who have not previously had anticoagulant therapy and in whom poor anticoagulant control is predicted (using the SAME-TT₂R₂ score^[9]), to have treatment with either warfarin or a non-VKA oral anticoagulant. Outcomes should include stroke and other thromboembolic complications, major haemorrhage and death. [new 2014]

2.5 Stroke risk assessment

Can routine data from UK primary care databases clarify stroke risk in people with atrial fibrillation according to baseline risk factors and treatment?

Why this is important

There are several scores available to predict stroke risk in people with atrial fibrillation. Most have been derived from secondary care populations and validated in non-UK populations. The availability of routine primary care databases such as CPRD (The Clinical Practice Research Datalink) and THIN (The Health Improvement Network) provides the opportunity to assess these risk tools, and the impact of treatment on risk, in a non-selected UK population.

A prospective cohort study should be carried out to establish baseline risk in people with atrial fibrillation, using established risk scores, and to prospectively evaluate the outcomes of stroke and mortality, taking into account treatment and changes in risk over time.

The results would help determine the most effective means of providing stroke prevention in a non-selected general practice population and establish the discriminatory value of existing stroke risk scores. [new 2014]

^[9] The SAME-TT₂R₂ score is defined as: 'Sex female, Age <60 years, Medical history (at least 2 of the

following: hypertension, diabetes, coronary artery disease/myocardial infarction, peripheral arterial disease, congestive heart failure, previous stroke, pulmonary disease, hepatic or renal disease), Treatment (interacting drugs, for example, amiodarone for rhythm control): all 1 point; plus current Tobacco use (2 points) and Race (non-Caucasian, 2 points)!

Apostolakis S, Sullivan RM, Olshansky B et al. (2013) Factors affecting quality of anticoagulation control among patients with atrial fibrillation on warfarin: the SAME-TT₂-R₂ score. Chest 144: 1555-63.

Finding more information and resources

You can see everything NICE says on atrial fibrillation in the NICE Pathway on [atrial fibrillation](#).

To find out what NICE has said on topics related to this guideline, see our web page on [heart rhythm conditions](#).

For full details of the evidence and the guideline committee's discussions, see the [full version of the 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 NICE guidelines into practice, see [resources to help you put guidance into practice](#).

Update information

February 2016: Recommendation 1.7.4 has been amended to clarify the populations referred to and their treatment choices.

August 2014: The wording of recommendation 1.7.2 has been clarified, and now refers to people without life-threatening haemodynamic instability.

June 2014: This guideline updates and replaces NICE clinical guideline 36 (published June 2006). New recommendations have been added for a personalised package of care and information, referral for specialised management, stroke prevention, rate and rhythm control and the management of acute atrial fibrillation.

Recommendations are marked as [2006], [2006, amended 2014], [2010, amended 2012], [2012], [2013] or [new 2014]:

- [2006] indicates that the evidence has not been reviewed since 2006
- [2006, amended 2014] indicates that the evidence has not been reviewed since 2007, but changes have been made to the recommendation wording that change the meaning
- [2010, amended 2012] applies to guidance from NICE technology appraisal 197, published in 2010 and amended in 2012
- [2012] applies to guidance from NICE technology appraisal 249, published in 2012
- [2013] applies to guidance from NICE technology appraisal 275, published in 2013
- [new 2014] indicates that the evidence has been reviewed and the recommendation has been updated or added to.

Recommendations from NICE clinical guideline 36 that have been amended

Recommendations are labelled [2006, amended 2014] if the evidence has not been reviewed but changes have been made to the recommendation wording that change the meaning.

Recommendations 1.6.13 and 1.6.14 (labelled [2010, amended 2012]) are from NICE technology appraisal guidance 197, which was amended and reissued in December 2012 to reflect changes to

dronedarone's UK marketing authorisation.

Recommendation in 2006 guideline	Recommendation in current guideline	Reason for change
<p>1.1.4.1 Transthoracic echocardiography (TTE) should be performed in patients with AF:</p> <ul style="list-style-type: none"> • for whom a baseline echocardiogram is important for long-term management, such as younger patients • for whom a rhythm-control strategy that includes cardioversion (electrical or pharmacological) is being considered • in whom there is a high risk or a suspicion of underlying structural/functional heart disease (such as heart failure or heart murmur) that influences their subsequent management (for example, choice of antiarrhythmic drug) • in whom refinement of clinical risk stratification for antithrombotic therapy is needed (see section 1.8.6). 	<p>1.1.4 Perform transthoracic echocardiography (TTE) in people with atrial fibrillation:</p> <ul style="list-style-type: none"> • for whom a baseline echocardiogram is important for long-term management • for whom a rhythm-control strategy that includes cardioversion (electrical or pharmacological) is being considered • in whom there is a high risk or a suspicion of underlying structural/functional heart disease (such as heart failure or heart murmur) that influences their subsequent management (for example, choice of antiarrhythmic drug) • in whom refinement of clinical risk stratification for antithrombotic therapy is needed (see section 1.4 Assessment of stroke and bleeding risks and section 1.5 Interventions to prevent stroke). [2006, amended 2014] 	<p>'Such as younger patients' has been removed to ensure that all people with atrial fibrillation are included, and not just younger patients, for equality purposes.</p> <p>The cross-reference to section 1.8.6 has been amended to cross-refer to the recommendations on assessment of stroke and bleeding risks and interventions to prevent stroke in the 2014 guideline.</p>

<p>1.1.4.2 Do not routinely perform TTE solely for the purpose of further stroke risk stratification in people with atrial fibrillation for whom the need to initiate anticoagulation therapy has already been agreed on appropriate clinical criteria (see stroke risk stratification algorithm in the full guideline).</p>	<p>1.1.5 Do not routinely perform TTE solely for the purpose of further stroke risk stratification in people with atrial fibrillation for whom the need to initiate anticoagulation therapy has already been agreed on appropriate clinical criteria (see section 1.4 Assessment of stroke and bleeding risks and section 1.5 Interventions to prevent stroke). [2006, amended 2014]</p>	<p>The cross-reference to the stroke risk stratification algorithm has been amended to cross-refer to the recommendations on assessment of stroke and bleeding risk and interventions to prevent stroke in the 2014 guideline.</p>
<p>1.2.6.1 In people with acute atrial fibrillation who are receiving no, or subtherapeutic, anticoagulation therapy:</p> <ul style="list-style-type: none"> • in the absence of contraindications, heparin should be started at initial presentation • continue heparin until a full assessment has been made and appropriate antithrombotic therapy has been started, based on risk stratification (see section 1.8.6). 	<p>1.7.7 In people with new-onset atrial fibrillation who are receiving no, or subtherapeutic, anticoagulation therapy:</p> <ul style="list-style-type: none"> • in the absence of contraindications, offer heparin at initial presentation • continue heparin until a full assessment has been made and appropriate antithrombotic therapy has been started, based on risk stratification (see section 1.4 Assessment of stroke and bleeding risks and section 1.5 Interventions to prevent stroke). [2006, amended 2014] 	<p>'Acute' has been amended to 'new-onset' for clarification and consistency. In the 2006 guideline 'acute' denotes new-onset atrial fibrillation. In the 2014 guideline 'acute' refers to the nature of the presentation of atrial fibrillation.</p> <p>The cross-reference to section 1.8.6 has been amended to cross-refer to the recommendations on assessment of stroke and bleeding risks and interventions to prevent stroke in the 2014 guideline.</p>

<p>1.3.3.1 Before cardioversion, patients should be maintained on therapeutic anticoagulation with warfarin (INR 2.5, range 2.0 to 3.0) for a minimum of 3 weeks.</p>	<p>1.7.5 In people with atrial fibrillation in whom the duration of the arrhythmia is greater than 48 hours or uncertain and considered for long-term rhythm control, delay cardioversion until they have been maintained on therapeutic anticoagulation for a minimum of 3 weeks. During this period offer rate control as appropriate. [2006, amended 2014]</p>	<p>The 2006 recommendation has been updated to make the recommendation more consistent with the pathway of the updated 2014 guideline.</p>
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<p>1.6.2.2 In patients with a confirmed diagnosis of acute AF of recent onset (less than 48 hours since onset), oral anticoagulation should be used if:</p> <ul style="list-style-type: none"> • stable sinus rhythm is not successfully restored within the same 48-hour period following onset of acute AF; or • there are factors indicating a high risk of AF recurrence; or • it is recommended by the stroke risk stratification algorithm (see appendix E, page 47). 	<p>1.7.8 In people with a confirmed diagnosis of atrial fibrillation of recent onset (less than 48 hours since onset), offer oral anticoagulation if:</p> <ul style="list-style-type: none"> • stable sinus rhythm is not successfully restored within the same 48-hour period following onset of atrial fibrillation or • there are factors indicating a high risk of atrial fibrillation recurrence or • it is recommended in section 1.4 Assessment of stroke and bleeding risks and section 1.5 Interventions to prevent stroke. [2006, amended 2014] <p>Factors indicating a high risk of atrial fibrillation recurrence include: a history of failed attempts at cardioversion; structural heart disease (mitral valve disease, left ventricular dysfunction or an enlarged left atrium); a prolonged history of atrial fibrillation (more than 12 months); previous recurrences of atrial fibrillation</p>	<p>'Acute' has been deleted for clarification and consistency. In the 2006 guideline 'acute' denotes new-onset atrial fibrillation. In the 2014 guideline 'acute' refers to the nature of the presentation of atrial fibrillation.</p> <p>The cross-reference to the stroke risk stratification algorithm has been amended to cross-refer to the recommendations on assessment of stroke and bleeding risks and interventions to prevent stroke in the 2014 guideline.</p>
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<p>1.6.2.3 In patients with acute AF where there is uncertainty over the precise time since onset, oral anticoagulation should be used, as for persistent AF (see section 1.3.3).</p>	<p>1.7.9 In people with new-onset atrial fibrillation where there is uncertainty over the precise time since onset, offer oral anticoagulation as for persistent atrial fibrillation (see section 1.4 Assessment of stroke and bleeding risks and section 1.5 Interventions to prevent stroke). [2006, amended 2014]</p>	<p>'Acute' has been amended to 'new-onset' for clarification and consistency. In the 2006 guideline 'acute' denotes new-onset atrial fibrillation. In the 2014 guideline 'acute' refers to the nature of the presentation of atrial fibrillation.</p> <p>The cross-reference to the stroke risk stratification algorithm has been amended to cross-refer to the recommendations on assessment of stroke and bleeding risks and interventions to prevent stroke in the 2014 guideline.</p>
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<p>1.7.1.1 In patients undergoing cardiothoracic surgery:</p> <ul style="list-style-type: none"> • the risk of postoperative AF should be reduced by the administration of one of the following: <ul style="list-style-type: none"> – amiodarone – a beta-blocker – sotalol – a rate-limiting calcium antagonist • digoxin should not be used. 	<p>1.9.1 In people undergoing cardiothoracic surgery:</p> <ul style="list-style-type: none"> • reduce the risk of postoperative atrial fibrillation by offering 1 of the following: <ul style="list-style-type: none"> – amiodarone – a standard beta-blocker (that is, a beta-blocker other than sotalol) – a rate-limiting calcium antagonist. • do not offer digoxin. [2006, amended 2014] 	<p>Deleted option of sotalol in the 2014 guideline recommendation because it is no longer recommended as an option.</p>
<p>1.7.1.2 In patients undergoing cardiac surgery on pre-existing beta-blocker therapy, this treatment should be continued unless contraindications develop (such as post-operative bradycardia or hypotension).</p>	<p>1.9.2 In people undergoing cardiothoracic surgery on pre-existing beta-blocker therapy, continue this treatment unless contraindications develop (such as postoperative bradycardia or hypotension). [2006, amended 2014]</p>	<p>'Cardiac' has been amended to 'cardiothoracic' for clarification and consistency. The Guideline Development Group assumes that no distinction between the 2 terms was intended in the 2006 guideline.</p>

<p>1.7.2.2 Unless contraindicated, post-operative AF following non-cardiothoracic surgery should be managed as for acute-onset AF with any other precipitant.</p>	<p>1.9.4 Unless contraindicated, manage postoperative atrial fibrillation following non-cardiothoracic surgery as for new-onset atrial fibrillation with any other precipitant. [2006, amended 2014]</p>	<p>'Acute' has been deleted for clarification and consistency. In the 2006 guideline 'acute' denotes new-onset atrial fibrillation. In the 2014 guideline 'acute' refers to the nature of the presentation of atrial fibrillation.</p>
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Minor changes since publication

December 2019: Links to the [CHA₂DS₂-VASc](#) tool have been updated. A link to the [NICE patient decision aid on anticoagulation in atrial fibrillation](#) has been added.

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Accreditation

