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PRACTICE

GUIDELINES

The management of atrial fibrillation: summary of updated NICE guidance

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This is one of a series of *BMJ* summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists.

Atrial fibrillation is increasingly common,[1] with more than 800 000 people being affected in England.[2] Many people are managed in primary care without hospital involvement. The condition is a major cause of morbidity, particularly stroke, and it reduces life expectancy. Strokes caused by atrial fibrillation are largely avoidable—most can be prevented by anticoagulation. Yet uptake of anticoagulation by people with known atrial fibrillation who are at increased risk of stroke is suboptimal.[3-5]

Since the publication of the 2006 guidance, several developments relating to risk stratification, stroke prevention, and rhythm management have led to a partial update on the 2006 guidance. This article summarises the most recent recommendations from the National Institute for Health and Care Excellence (NICE).[6]

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the Guideline Development Group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are given in italic in square brackets. All recommendations below should be in accordance with the NICE patient experience guideline,[7] and the benefits and risks of treatment should be discussed with the patient.

Diagnosis and assessment

- Perform manual pulse palpation to assess for the presence of an irregular pulse, which might be indicative of underlying atrial fibrillation in people presenting with any of the following: breathlessness or dyspnoea, palpitations, syncope or dizziness, chest discomfort, stroke or transient ischaemic attack. (Recommendation from 2006 guideline.)
- Perform electrocardiography (ECG) in all people, whether symptomatic or not, in whom atrial fibrillation is suspected because an irregular pulse has been detected. (Recommendation from 2006 guideline.)
- In people with suspected paroxysmal atrial fibrillation undetected by standard ECG:
  -Use 24 hour ambulatory ECG in those with suspected asymptomatic episodes or symptomatic episodes less than 24 hours apart
  -Use event recorder ECG in those with symptomatic episodes more than 24 hours apart.
  (Recommendation from 2006 guideline.)

Personalised package of care

- Offer people with atrial fibrillation a personalised package of care (box). Ensure that the package of care is documented and delivered. (New recommendation.) [*Based on very low to moderate quality evidence from randomised controlled trials (RCTs) and the experience and opinion of the Guideline Development Group (GDG)*]

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Components of a care package for people with atrial fibrillation

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[8]
- Support networks (such as cardiovascular charities)

*Examples of stroke awareness include information on the symptoms of stroke and how atrial fibrillation can lead to a stroke; measures to prevent stroke include anticoagulation for atrial fibrillation.

Referral

- Refer people promptly at any stage if treatment does not control the symptoms of atrial fibrillation and more specialised management is needed. Prompt referral was defined as no longer than four weeks after the final failed treatment or no longer than four weeks if atrial fibrillation recurs after cardioversion and further specialised management is needed. (New recommendation.) [*Based on low to high quality evidence from RCTs, economic evidence with potentially serious limitations and partial applicability, and the experience and opinion of the GDG*]

Assessment of stroke and bleeding risks

Stroke and bleeding risk should be assessed in all people with atrial fibrillation.

- Use the CHA_2DS_2-VASc (table 1⇓)[9] 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 the recurrence of arrhythmia after cardioversion back to sinus rhythm.

  (New recommendation.) [*Based on low to high quality evidence from observational studies, an original economic analysis with potentially serious limitations and direct applicability, and the experience and opinion of the GDG*]
- Use the HAS-BLED (table 2⇓)[10] score to assess the risk of bleeding in people who are starting, or have started, anticoagulation and to highlight, correct, and monitor modifiable risk factors:
  -Uncontrolled hypertension

  -Poor control of international normalised ratio (INR; "labile INRs")

  -Concurrent drugs, such as concomitant use of aspirin or a non-steroidal anti-inflammatory drug

  -Harmful alcohol consumption.

  (New recommendation.) [*Based on low to high quality evidence from observational studies and the experience and opinion of the GDG*]
- When discussing the benefits and risks of anticoagulation:
  -For most people the benefit of anticoagulation outweighs the risk of bleeding

  -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 recommendation.) [*Based on the experience and opinion of the GDG*]
- Do not withhold anticoagulation solely because the person is at risk of having a fall. (New recommendation.) [*Based on the experience and opinion of the GDG*]

Drug treatments to prevent stroke (figure)

The guideline revision emphasises that people at very low risk, who should not receive an anticoagulant, should be identified first, with anticoagulation considered or offered to the remainder, taking bleeding risk into account. Anticoagulation may be with a non-vitamin K antagonist oral anticoagulant (apixaban, dabigatran etexilate, or rivaroxaban, in accordance with individual NICE appraisals[11-13]) or a vitamin K antagonist (such as warfarin).

- Do not offer stroke prevention treatment 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 CHA_2DS_2-VASc score of 0 for men or 1 for women). (New recommendation.) [*Based on very low to high quality evidence from RCTs, economic evidence with minor to potentially serious limitations and direct to partial applicability, an original economic analysis with potentially serious limitations and direct applicability, and the experience and opinion of the GDG*]
- Consider anticoagulation for men with a CHA_2DS_2-VASc score of 1. Take the bleeding risk into account. (New recommendation.) [*Based on very low to high quality evidence from RCTs, economic evidence with minor to potentially serious limitations and direct to partial applicability, an original economic analysis with potentially serious limitations and direct applicability, and the experience and opinion of the GDG*]
- Offer anticoagulation to people with a CHA_2DS_2-VASc score of 2 or above, taking bleeding risk into account. (New recommendation.) [*Based on very low to high quality evidence from RCTs, economic evidence with minor to potentially serious limitations and direct to partial applicability, an original economic analysis with potentially serious limitations and direct applicability, and the experience and opinion of the GDG*]
- Discuss options for anticoagulation with the person and base choice on his or her clinical features and preferences.

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(New recommendation.) [*Based on the experience and opinion of the GDG*]

- Do not offer aspirin monotherapy solely for stroke prevention to people with atrial fibrillation. (New recommendation.) [*Based on very low to high quality evidence from RCTs, economic evidence with minor to potentially serious limitations and direct to partial applicability, an original economic analysis with potentially serious limitations and direct applicability, and the experience and opinion of the GDG*]

Assessing anticoagulation control with vitamin K antagonists

For people receiving a vitamin K antagonist, adequacy of anticoagulant control should be assessed.

- Calculate individual time in therapeutic range (TTR) at each visit. When calculating TTR:
  -Use a validated method of measurement, such as the Rosendaal method,[14] for computer assisted dosing or proportion of tests in range for manual dosing
  -Exclude measurements taken during the first six weeks of treatment
  -Calculate TTR over a maintenance period of at least six months.
  (New recommendation.) [*Based on the experience and opinion of the GDG*] [Note: TTR is a means of assessing the quality of anticoagulant control—that is, the proportion of time an individual patient's INR values are within the target range. It is expressed as a percentage and assumes a linear change between INR results. A higher TTR is associated with a reduction in both bleeding and thrombotic events.]
- Reassess anticoagulation for a person with poor anticoagulation control shown by any of the following:
  -Two INR values higher than 5 or one INR value higher than 8 within the past six months
  -Two INR values less than 1.5 within the past 6 months
  -TTR less than 65%.
  (New recommendation.) [*Based on the experience and opinion of the GDG*]
- When reassessing anticoagulation, take into account and, if possible, correct the following factors that may contribute to poor anticoagulation control:
  -Cognitive function
  -Adherence to prescribed treatment
  -Illness
  -Interacting drugs
  -Lifestyle factors including diet and alcohol consumption.
  (New recommendation.) [*Based on the experience and opinion of the GDG*]
- If poor anticoagulation control cannot be improved, evaluate risks and benefits of alternative stroke prevention. (New recommendation.) [*Based on the experience and opinion of the GDG*]. [Note: The GDG agreed that a logical alternative would be to offer one of the non-vitamin K antagonist oral anticoagulants.]

Review of stroke and anticoagulant risk

All people with atrial fibrillation should undergo review at least annually.

- For people 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 recommendation.) [*Based on the experience and opinion of the GDG*]
- For people who are not taking an anticoagulant, review stroke and bleeding risks annually. Ensure that all reviews and decisions are documented. (New recommendation.) [*Based on the experience and opinion of the GDG*]
- For people who are taking an anticoagulant, review the need for anticoagulation and the quality of anticoagulation at least annually, or more often if clinically relevant events that affect anticoagulation or bleeding risk occur. (New recommendation.) [*Based on the experience and opinion of the GDG*]

Left atrial appendage occlusion for people unable to take anticoagulants

This is a catheter based technique for closure or obliteration of the left atrial appendage, which is thought to be the major source of thrombus that causes stroke and peripheral thromboembolism in people with atrial fibrillation.

- Consider left atrial appendage occlusion if anticoagulation is contraindicated or not tolerated. (New recommendation.) [*Based on very low to moderate quality evidence from RCTs, economic evidence with minor limitations and partial applicability, and the experience and opinion of the GDG*]

Rate and rhythm control

There is currently no evidence that rhythm management is superior to rate control in preventing stroke or reducing mortality. The main treatment objective is therefore control of symptoms.

- Offer rate control as the first line strategy to people with atrial fibrillation except for those in whom a rhythm control strategy would be more suitable on the basis of clinical judgment (these include people with new onset atrial fibrillation or atrial fibrillation with a reversible cause). (New recommendation.) [*Based on very low to moderate quality evidence from RCTs, economic evidence with minor to potentially serious limitations and partial applicability, and the experience and opinion of the GDG*]
- Offer a standard β blocker (a β 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. (New recommendation.) [*Based on very low to low quality evidence from RCTs and the experience and opinion of the GDG*]

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- Consider digoxin monotherapy for people with non-paroxysmal atrial fibrillation only if they are sedentary (do no physical exercise or very little). (New recommendation.) [*Based on very low to low quality evidence from RCTs and the experience and opinion of the GDG*]
- If monotherapy does not control symptoms, and if continuing symptoms are thought to be caused by poor ventricular rate control, consider combination therapy with any two of the following:
  -A β blocker
  -Dilitazem
  -Digoxin. (New recommendation.) [*Based on very low to low quality evidence from RCTs and the experience and opinion of the GDG*]
- Consider pharmacological or electrical rhythm control (or both) for people with atrial fibrillation whose symptoms continue after their heart rate has been controlled or for whom a rate control strategy has not been successful. (New recommendation.) [*Based on very low to high quality evidence from RCTs and the experience and opinion of the GDG*]
- Assess the need for drug treatment for long term rhythm control. (New recommendation.) [*Based on very low to high quality evidence from RCTs and the experience and opinion of the GDG*] [Note: Drug treatment for long term rhythm control might be needed in people with paroxysmal atrial fibrillation to maximise their time in sinus rhythm, or after cardioversion in people who are thought likely to relapse, to increase the likelihood of maintaining sinus rhythm.]
- If drug treatment for long term rhythm control is needed, consider a standard β blocker (a β blocker other than sotalol) as first line treatment unless there are contraindications. (New recommendation.) [*Based on very low to high quality evidence from RCTs and the experience and opinion of the GDG*] [Note: Examples of possible contraindications include excessive bradycardia, asthma, or peripheral vascular disease.]
- If β blockers are contraindicated or unsuccessful, assess the suitability of alternative drugs for rhythm control, taking comorbidities into account. (New recommendation.) [*Based on very low to high quality evidence from RCTs and the experience and opinion of the GDG*]

Non-pharmacological management of rate and rhythm

Left atrial ablation is an effective option when drug management has failed. Ablation treatment has a better outcome when undertaken earlier rather than later and for paroxysmal rather than persistent atrial fibrillation. Pacing followed by atrioventricular node ablation is an alternative to left atrial ablation. Pacing followed by atrioventricular node ablation does not restore sinus rhythm but successfully limits ventricular rate.

- 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 (New recommendation) [*Based on very low to moderate quality evidence from RCTs, economic evidence with minor to potentially serious limitations and direct to partial applicability, and the experience and opinion of the GDG*]
- Consider left atrial surgical ablation at the same time as other cardiothoracic surgery for people with symptomatic atrial fibrillation. (New recommendation) [*Based on very low to moderate quality evidence from RCTs, economic evidence with potentially serious limitations and direct to partial applicability, and the experience and opinion of the GDG*]
- Consider pacing and atrioventricular node ablation for people with permanent atrial fibrillation and symptoms of left ventricular dysfunction thought to be caused by high ventricular rates. (New recommendation) [*Based on very low to moderate quality evidence from RCTs and the experience and opinion of the GDG*]
- 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 recommendation) [*Based on very low to moderate quality evidence from RCTs and the experience and opinion of the GDG*]

Overcoming barriers

Anticoagulation is underused in the management of atrial fibrillation.[4 5] In older people in particular, aspirin is often used in preference to anticoagulation,[3] even though anticoagulation has been shown to reduce stroke rates by about 50% in this population, compared with aspirin.[15] We believe the new guideline deals with these problems through paradigm change, identifying low risk people in whom anticoagulation is not indicated, and making it clear that aspirin is no longer considered a cost effective alternative.

The members of the Guideline Development Group (GDG) were Campbell Cowan (chair), John Campbell, V-Lin Cheong, George Chung, Matthew Fay, David Fitzmaurice, Gregory Lip, Clifford Mann, Nick Mills, Eileen Porter, Suzannah Power, Richard Schilling, and Rebekah Schiff. Peter Rose and Steve Hunter were appointed as co-opted members of the GDG. The technical team at the National Clinical Guideline Centre included Joanna Ashe, Liz Avital, Clare Jones, Zahra Naqvi, Jill Parnham, and Vicki Pollit.

Contributors: CC wrote the first draft. All authors reviewed the draft, were involved in writing further drafts, and reviewed and approved the final version for publication. CC is guarantor.

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Provenance and peer review: Commissioned; not externally peer reviewed.

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Further information on the guidance

An update to the existing guideline was necessary as a result of changes in anticoagulant practice and developments in the pharmacological and interventional management of people with atrial fibrillation.

Methods

The Guideline Development Group (GDG) comprised four cardiologists (including the chair), two general practitioners, two patient representatives, an emergency medicine consultant, a consultant in general and geriatric medicine, a pharmacist, and two specialist nurses. The GDG also co-opted a consultant cardiothoracic surgeon and a consultant haematologist.

The GDG followed the standard NICE methods in the development of this guideline.[16] The group developed clinical questions; collected and appraised clinical evidence; and evaluated the cost effectiveness of proposed interventions through literature review and original economic modelling.

Quality ratings of the evidence were based on GRADE methodology.[17] These relate to the quality of the available evidence for assessed outcomes rather than the quality of the clinical study.

The draft guideline went through a rigorous reviewing process, in which stakeholder organisations were invited to comment; the group took all comments into consideration when producing the final version of the guideline.

A formal review of the need to update a guideline is usually undertaken by NICE after its publication. NICE will conduct a review to determine whether the evidence base has progressed significantly to alter the guideline recommendations and warrants an update.

Cost effectiveness

A new cost effectiveness analysis was undertaken from an NHS and Personal Social Services perspective to compare decision rules on when anticoagulation should be given. The analysis focused on the low stroke risk groups, where uncertainty about when anticoagulation may be appropriate is most uncertain, given the risk of bleeding on this therapy. Where anticoagulation was not indicated by the decision rule, the analysis compared three alternative treatment options: single antiplatelet therapy, dual antiplatelet therapy, and a do nothing approach. The compared decision rules were based on the $CHADS_2$ score, the CHA_2DS_2-VASc score, and the HAS-BLED score. Combinations of stroke and bleeding risk thresholds using these scores were compared to determine when anticoagulation should be given.

The analysis used and adapted an existing and validated discrete event time simulation model.[18] The analysis suggests that, of the decision rules compared, the highest net monetary benefit was most likely to be achieved when anticoagulation was offered at a CHA_2DS_2-VASc score of 2 or above, with a do nothing approach below this risk score. There is only a slightly lower probability that an offer of anticoagulation at a CHA_2DS_2-VASc score of 1 would be the optimal strategy. The analysis also suggested that once the patient achieves a HAS-BLED score of 1 or more, the risks of bleeding should be taken into account.

Future research

The GDG identified some priority areas for research:

- What is the clinical and cost effectiveness of cognitive behavioural therapy compared with usual care for people with newly diagnosed atrial fibrillation?
- What is the comparative effectiveness of the three main drug classes used for rate control (β blockers, calcium channel blockers, and digoxin) in people aged 75 years or more with atrial fibrillation in controlling symptoms, improving quality of life, and reducing morbidity and mortality?
- What is the effect of case volume on complications and outcomes after left atrial catheter ablation?
- Do people with atrial fibrillation whose anticoagulant control with warfarin is poor, or is predicted to be poor, benefit from changing to one of the non-vitamin K antagonist oral anticoagulants?
- Can routine data from UK primary care databases clarify stroke risk in people with atrial fibrillation according to baseline risk factors and treatment?

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Tables

Table 1| CHA2DS2-VASc stroke risk stratification. Reproduced with permission from the American College of Chest Physicians[9]

Congestive heart failure or left ventricular dysfunction	1
Hypertension	1
Age ≥75 years	2
Diabetes mellitus	1
Stroke or transient ischaemic attack or systemic thromboembolism	2
Vascular disease*	1
Age 65-74 years	1
Female sex (sex category)	1

*Vascular disease defined as previous myocardial infarction, peripheral arterial disease, or aortic plaque.

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Table 2| HAS-BLED bleeding risk score. Reproduced with permission from the American College of Chest Physicians[10]

Hypertension	1
Abnormal renal and liver function (1 point each)	1 or 2
Stroke	1
Bleeding	1
Labile international normalised ratios	1
Elderly (age >65 years)	1
Drugs or alcohol (1 point each)	1 or 2
Maximum score	9

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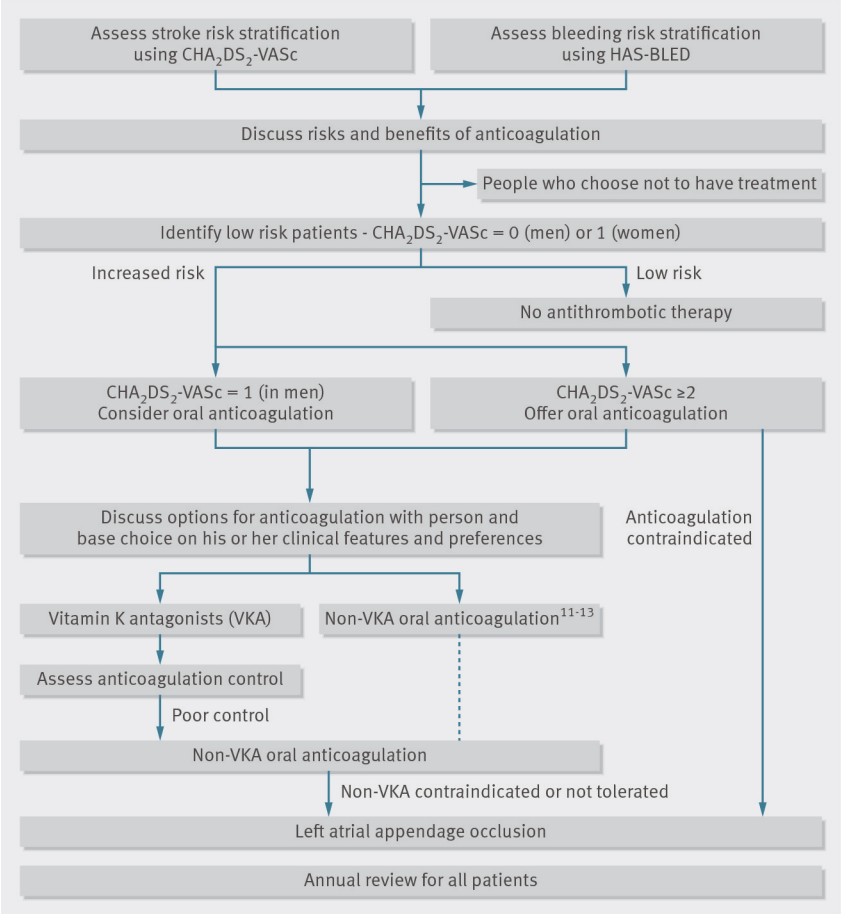
Figure



Stroke prevention in people with non-valvular atrial fibrillation

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