THE MANAGEMENT OF ATRIAL FIBRILLATION AND OTHER ATRIAL TACHYARRHYTHMIAS

KEY POINTS:

1. Atrial flutter (AFL) and atrial fibrillation (AF) are important causes of stroke, palpitation, heart failure/shortness of breath, blackouts (syncope), chest pain and sudden death.
2. AFL and AF are a major cause of embolic phenomena, because both arrhythmias lead to stagnation of blood in the heart and formation of blood clots in the heart.
3. AFL & AF are associated with 30% of all strokes.
4. AFL and AF also cause symptoms though rapid, irregular heart rhythms that may cause breathlessness, palpitation and heart failure.
5. AFL and AF are very common, getting commoner, and are a major cause of ill-health in the elderly.
6. The cost to the NHS from AF alone is estimated to have risen from £244 in 1995 to £459 million in 2000 and in the UK in 1995 resulted in 59000 hospitalisations and was a secondary cause in a further 129000 admissions to hospital.
7. AF roughly doubles the risk of death in both sexes, independent of age-group, over a 40 year follow-up period. In the USA, adjusted total healthcare spending in the first year of a diagnosis of AF was 8.6- to 22.6-fold greater in men, and 9.8- to 11.2-fold greater in women. Second- and third-year costs were increased as well, reflecting the common lack of a definitive treatment for AF.
8. Improved quality of life and reduction of the consequences of AF/AFL, particularly stroke, can be achieved by appropriate treatment. Prescribing of appropriate therapy for AFL or AF is inadequate in the UK. Nearly 40% of patients do not receive either aspirin or warfarin after diagnosis of AF, and only 22% of those eligible are prescribed warfarin.
9. AFL can be cured with high success and low complication rates using catheter ablation. Similarly there is evidence that catheter ablation of the AV node with implantation of a pacemaker is effective in improving quality of life in AF. There is increasing evidence to support curative catheter ablation for AF. Referral rates are low and access to care is unequal in the UK.
10. Atrial tachycardia (AT) is a rarer form of atrial arrhythmia, which like AFL and AF may also be associated with heart failure and stroke. It should be treated as AFL and is also amenable to ablation although success rates may be lower than AFL.
11. The NSF should require primary care agencies to establish databases of patients with AFL & AF and ensure that they receive appropriate and timely treatment.

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INTRODUCTION

The national service framework (NSF) for heart disease will now include clear standards for prevention and treatment of cardiac arrhythmia and their consequences that will lead to improvement in the quality and access.

This document sets out standards for the prevention and treatment of AFL, AT and AF as set out under the following headings:

- Aims
- Standard
- Rationale
- Effective interventions
- Service Models
  - Identifying patients for referral to electrophysiologist
  - Investigation and treatment
  - Clinical audit
- Immediate Priority
- Milestones and Goals
- Holding the NHS to account
- Summary

References

Appendices:

A. Indications for anticoagulation for atrial flutter and atrial fibrillation
B. Algorithm for assessment and treatment of atrial flutter
C. Algorithm for assessment and treatment of atrial fibrillation

AIMS

This chapter sets out how the NHS can best help people reduce their risk of death or stroke, eliminate their symptoms and return to as full and active a life as possible if they have AFL, AT or AF.

It describes:

- Why AFL, AT and AF are an important health problem.
- The evidence based interventions that will reduce risk of stroke, heart failure, death and admission to hospital.
- The service models that the NHS will be expected to put in place to reduce inequalities and inappropriately low rates of effective interventions.
- Milestones marking progress in NSF goals.
- Measures that will be used to mark progress.

STANDARDS

The standard that the NHS should aim for

Standard
People with suspected AFL, AT or AF should be investigated to confirm the diagnosis

Standard
In those in whom the diagnosis is confirmed investigation to exclude underlying causes should be performed and treatment offered to both eliminate or improve symptoms and prevent complications arising from these arrhythmias

RATIONALE

Presentation

AFL & AF may present as; stroke, palpitation, heart failure/shortness of breath, blackouts (syncope), chest pain or sudden death. The symptoms of AFL/AF are caused by the rapid and uncoordinated contraction of the atria. This results in a risk of clots forming in the atria (which can break off to cause stroke) and inappropriately high heart rates that can lead to permanent damage of the ventricles and heart failure.

Incidence

AFL and AF occur in more than 1% of the population with this increasing to 10% in those over 70 years of age[1]. The prevalence is continuing to rise because of the increasing age of the population and improved survival from associated diseases like hypertension and coronary disease[2]. Atrial Tachycardia (AT) is rarer than AFL and AF with poorly defined incidence but it possible for AT if left untreated may progress to AFL or AF[3]**.**

Prognosis

AFL and AF are one of the commonest causes of stroke and heart failure and results in an 1.5 to 1.9 fold mortality risk after independent of other risk factors[4]. People in AFL and AF have significantly reduced quality of life compared to people in normal sinus rhythm[5]. In 30% of patients with a stroke, AF & AFL is also present.

Health service use

The cost to the health service from AF alone is estimated to have risen from £244 in 1995 to £459 million in 2,000 and in the UK in 1995 resulted in 59,000 hospitalisations and was a secondary cause in a further 129000 hospitalisations[6].

Diagnosis and treatment

Diagnosis of persistent AFL/AT/AF can be easily diagnosed made on a 12 lead ECG, but when it is intermittent Holter monitoring or ECG event recorders may be required. When the diagnosis has been made people with AFL/AT/AF should be screened for common secondary causes(hypertension, thyroid disease, valvular/structural heart disease).

Improved quality of life and reduction of the consequences of AFL and AF, particularly stroke can be achieved by appropriate treatment[7]. Prescribing appropriate therapy for AFL or AF is low in the UK. Nearly 40% of patients do not receive either aspirin or warfarin after diagnosis of AF and only 22% of those eligible are prescribed warfarin [8]. AFL can be cured with high success and low

complication rates using catheter ablation [9]. Similarly there is evidence that catheter ablation of the AV node and pacing is effective in improving quality of life in AF[10] and increasing evidence to support curative catheter ablation for AF[11]. Referral rates are low and access to care is unequal in the UK.

KEY EFFECTIVE INTERVENTIONS AND INVESTIGATIONS

The aims of investigating people with suspected AFL, AT and AF are:

- to confirm or refute the presence of AFL, AT and AF
- to identify underlying causes
- to assess the risk of complications of AFL, AT and AF

The aims of treating people with AFL, AT and AF are:

- to control the heart rate
- to prevent stroke
- to treat underlying causes
- to return them to normal sinus rhythm as soon as possible/when possible
- to prevent recurrence if sinus rhythm can be restored

Key investigations for people with AFL, AT and AF are:

- 12 lead ECG (reported by a trained individual)
- Thyroid function test
- Echocardiogram
- Other investigations that may be useful are
    - Chest X-ray
    - Ambulatory ECG monitoring or ECG event recording
    - 24 hour blood pressure recording (if hypertension is suspected)
    - Investigation for possible coronary artery disease in patients with structural heart disease or suggestive symptoms

Key treatments for people with AFL, AT or AF are:

- Heart rate control - Beta-blockers and calcium antagonists are superior to digoxin [12,13]. Digoxin may have a role in combination with beta-blocker or calcium antagonist particularly in the presence of heart failure [14]. Heart rate control should be assessed over a full range of the patients daily activities which may require ambulatory ECG monitoring. If drug therapy fails to control heart rate or cannot be tolerated the patient should be referred to a cardiac electrophysiologist.

- Stroke prevention – unless contraindicated warfarin therapy should be offered to all people with AFL or AF at increased of stroke. Unless contraindicated aspirin should be offered to all people with AFL or AF at low risk of stroke (appendix A). Anticoagulation should be offered to all patients who have been in AF for more than 12 hours for at least 1 month (INR 2-3) prior to cardioversion. Anticoagulation should be continued for life after cardioversion in all patients who are at high risk of stroke even if sinus rhythm is maintained. Anticoagulants should be stopped after one month after cardioversion in patients at low risk of stroke even if sinus rhythm is not maintained (should be replaced by Aspirin). Stroke prevention should be the same whether the patient has intermittent (paroxysmal) or persistent AFL/AT/AF.

- Underlying causes – should be treated appropriately and high blood pressure should be given particular attention.

- Restoration/maintenance of normal sinus rhythm – should be offered to all patients who are not completely free of symptoms. This should be done at the earliest possible opportunity after underlying causes have been eliminated (this may mean that restoration of sinus rhythm cannot be recommended to some patients) and risk of stroke has been minimised. Anticoagulation should be continued in patients at high risk of stroke after restoration of sinus rhythm. Rhythm control is no more risky than rate control but is more complex to effect [15].

SPECIAL CONSIDERATIONS

Maintenance of sinus rhythm

AFL - In people who have intermittent or recurrent AFL then catheter ablation offers the best option for maintenance of sinus rhythm and they should be referred to a specialist cardiac electrophysiologist for this.
AF - People with symptomatic recurrent AF should be referred to a cardiac electrophysiologist for specialist treatment to maintain sinus rhythm.
All patients at high risk of thromboembolic stroke should remain on anticoagulation (appendix A).

Restoration of sinus rhythm – Direct current cardioversion

AFL – patients who have their first episode of AFL may be returned to sinus rhythm by direct current shock. Recurrence of AFL is best referred to cardiac electrophysiologists for definitive treatment with catheter ablation.
AF – recurrence rates of AF after direct current shock are high but success rates may be improved by:

- Using pre-treatment with certain adjunctive antiarrhythmic drugs [16,17].
- Using an anteroposterior vector (easily achieved with adhesive defibrillation electrodes).
- Using biphasic defibrillators[18] as first choice for cardioversion of AF.
- Using high energies of 200J or more. This is not harmful, and increases the chances of a first-shock success.
- Internal cardioversion may be useful in resistant cases [19].

High recurrence rates are one of the reasons why trials comparing rate vs rhythm control strategies for managing AF have failed to show an advantage for restoration of sinus rhyhthm[15]. However the landmark AFFIRM study has shown a clear mortality benefit associated with sinus rhythm vs AF[20], and therefore direct current (DC) cardioversion should be offered to all appropriate patients. DC cardioversion is poorly provided for in the UK with patients waiting for long periods for cardioversion. There is evidence that prolonged AF results in remodelling of the atrium and encourages a tendency to AF[21] and that this can be reversed by restoration of normal sinus rhythm [22]. It is therefore important that all patients be offered DC cardioversion as soon as they have received the required period of adequate anticoagulation. This may be achieved by:

- Nurse led cardioversion services [23].
- Use of conscious sedation [23].
- As part of a specialist AF clinic.

Atrial Tachycardia
Inappropriate AT, not the result of external stimulants or exercise, should be treated in the same way as atrial flutter. Persistent AT can result in ventricular damage and heart failure and so should be taken seriously. Intermittent AT will not cause ventricular damage if it occurs for short periods. Because AT is rare there is little data describing stroke risk and so stroke prevention should be performed for AT in the same way as AFL and AF.

Patient Support
AFL, AT and AF are frightening arrhythmias for patients to experience not only because of the symptoms but also because of their association with stroke and mortality. It is therefore important that patients have access to doctor or nurse led patient support groups with provide opportunities to share experiences with other patients but also access to further and detailed information about their condition.

Indications for referral to a cardiac electrophysiologist

- Symptomatic AF resistant to optimum drug therapy or when drug therapy cannot be tolerated
- AF with poor control of heart rate despite drug therapy or when drug therapy cannot be tolerated
- Recurrent or paroxysmal atrial flutter

Other Considerations

Ablation of Atrial Fibrillation
Evidence for the utility of catheter ablation for intermittent and permanent atrial fibrillation is accumulating[11,23] but the precise role of these procedures in clinical practice remains to be determined, and the technology for undertaking these procedures is constantly changing. However all patients who are resistant to medical therapy should be referred to a cardiac electrophysiologist for consideration of curative catheter ablation (or AV node ablation and pacing if curative ablation is not suitable for the patient). These procedures should be offered if drug therapy and direct current cardioversion fail to control their symptoms or heart rate. Surgical ablation of AF can be performed with increasing ease and success. Surgical ablation of AF should be considered for all patients who are undergoing cardiothoracic surgery for another reason and are in atrial fibrillation.

SERVICE MODELS

Patient groups and studies have reported wide variations in provision for the management of AFL/AF across the country. One example of this is that anticoagulation for AF varies from 2 to 50 per1000 between general practices in England and Wales[2].

The reasons that people with AFL/AF have unequal access to care can include:

- Variation in general practitioners and hospital physicians in rates of referral for anticoagulation and specialist cardiac electrophysiology assessment.
- Variation in provision of basic cardiac investigations.
- Variation in investment in cardiac electrophysiology specialists and facilities.
- Variation in provision of anticoagulation clinics.

Primary care teams, PCT's, hospitals and Strategic Health Authorities should work together to put in place models of care so that they:

Use a systematic approach to:

- Identify people with AFL or AF, and contribute their data to databases.
- Assess and investigate people with suspected AFL or AF.
- Provide and document delivery of appropriate advice and treatment.
- Determine who should be referred for specialist cardiac electrophysiology opinion.
- Determine the level of investment in cardiac electrophysiology and anticoagulation services required, based on the demographics of their local community.

Systematic care implies that the relevant organisations should agree and audit a detailed plan and protocol for the investigation, treatment, follow up and referral of those people with suspected AFL or AF.

The method for determining the level of local investment in cardiac electrophysiology and anticoagulation services should be included in the local Health Improvement Programme (HImP)

The appropriate method for delivering systematic care will usually involve

Primary care:

- Consultations in routine general practice surgeries preferably supported by the active use of a paper or electronic practice protocol/guideline.
- Provision of anticoagulation management and follow up in primary care when possible.

Primary/Secondary care interface:

- Clear protocols and guidelines facilitating referral for key investigations from primary care.

Hospital care:

- Nurse-led arrhythmia/AF/AFL clinics.
- Specialist cardiac electrophysiology advice from outpatient clinics.
- Clear hospital-wide protocols for management of AFL and AF including anticoagulation consistent with national guidelines.
- Clear protocols and guidance specifying indications and routes of referral within the local network of cardiac care.

Systematic approaches to identifying people with AFL and AF

Primary care teams and hospitals should put in place systems so that all people presenting with palpitation lasting more than 2 beats or 2 seconds, or people with an irregular pulse should have symptom/ECG correlation. This means that primary care teams and hospitals will need facilities to perform 12 lead ECG's, ambulatory ECG monitoring and event recording.

Primary care teams will also be able to use their CHD registers to help them identify, assess risk of stroke, and monitor those with a current diagnosis of AF (Read code G67 (4 byte set) and G573 (5 byte set)). If they have not been investigated it would be prudent to review the evidence for the diagnosis. All people with persistent or recurrent AFL should be referred for a specialist

cardiac electrophysiology opinion. We should be working towards a comprehensive screening program such that all patients over 65 without a diagnosis of AF who attend their GP should have an ECG once a year to screen them for asymptomatic AF.

Systematic approaches to investigation and treatment

High quality care involves delivering a full and appropriate package of advice and interventions to every patient. Structuring and auditing this care provides the mechanism for ensuring that this occurs.

General practices, PCT's and hospitals should agree local written protocols for managing people with suspected AFL and AF including methods for accessing investigations such as ECG, and echocardiography. These protocols should include a description of:

- Patient assessment (including risk factors for stroke, evidence of treatment of structural heart disease, symptoms and signs).
- Indications for investigations (including ECG, ambulatory ECG monitoring, event recorder, echocardiography and thyroid function test).
- Local arrangements for referral for ECG, Holter, event recorder echocardiography and competent interpretation of the results. This could be done:
    - within the primary care practice
    - direct request to a cardiology department
    - referral to a cardiology outpatient clinic
    - referral to nurse led arrhythmia/AF/AFL clinics
- Local arrangements for referral for anticoagulation. This may be done:
    - in primary care and nursing homes using local pathology services or coagulation monitoring machines within the practice
    - referral to an anticoagulation clinic
    - referral to nurse led arrhythmia/AF/AFL clinics
    - consideration should be given to other anticoagulation strategies under assessment at the time of writing which is likely to improve access and ease of anticoagulation
- Indications for referral to cardiac electrophysiologist.
- Arrangements for patient education and support.
- Arrangements for follow up an review.
- Expected standards of communication between health professionals.
- Clinical audit.

A proposed care pathway for managing AF in primary care is included in appendix B.

The protocols used in hospitals should be hospital-wide and be used by all clinical teams that provide care to patients with AFL and AF. They should specifically address methods for assessing and controlling heart rate and arrangements for initiating anticoagulation and withdrawing anticoagulation at the time of invasive procedures. A proposed algorithm for managing AF in hospital care is included in appendix C.

Clinical Audit

Practices and hospitals should aim to undertake an annual audit of the care they provide for people with AFL or AF. Primary care teams may find it helpful to estimate:

- Number and % of registered population with a diagnosis of AFL or AF.
- Number and % of people who have had ECG confirmation, a thyroid function test and an echocardiogram.
- Number and % of people with a diagnosis of AFL or AF who have been prescribed warfarin.
- Number and % of people who have been prescribed a beta-blocker or calcium antagonist.
- Number and % of people with AFL or AF who have been referred for restoration of sinus rhythm.
- Number and % of people with AFL or AF who have had their heart rate assessed at rest and during exercise.

Hospitals should audit the uptake and use of their hospital wide protocols paying particular attention to anticoagulation and appropriate indications for referral for specialist cardiac electrophysiology opinion.

IMMEDIATE PRIORITY

The immediate priorities for implementing this area of the NSF are:

- delivering the early milestones

This will be monitored through performance management processes

MILESTONES AND GOALS

This framework provides a mechanism for continually improving clinical care. The milestones listed below provide a measure against which every hospital, general practice, PCT can assess themselves. The basic organisational processes for improving quality of care including mechanisms for audit, complete and retrievable medical records and a CHD register should now be in place in response to chapter 6 of the coronary heart disease NSF. It is therefore assumed that these processes are in place and are not included in these milestones.

Milestone 1
By April 2007 every primary care team and hospital should have:
A protocol describing the systematic assessment, treatment, indications for referral to a cardiac electrophysiologist and follow up of people with suspected AFL and AF agreed locally and being used to provide structured care.

Milestone 2
By April 2008 every primary care team should have:
Clinical audit data no more than 12 months old available that describes the items listed in bold in the clinical audit paragraph

By April 2008 every hospital should have:
Clinical audit data no more than 12 months old describing the delivery of key investigations and treatments listed above.

The NSF goal

Every primary care team should:

Ensure that all those with suspected or confirmed AFL or AF are receiving a full package of appropriate investigations and treatment demonstrated by clinical audit no more than 12 months old, and enter patients onto a database.

Every hospital should:

Ensure that all those people discharged with a diagnosis of AFL or AF have been offered a complete and correct package of investigations and interventions demonstrated by clinical audit no more than 12 months old

By April 2006 all primary care team and hospital trusts should:

have assessed themselves against these milestones and agreed a target milestone for April 2007 with its PCG/PCT or regional office.

Most practices will want to reach milestones well ahead of the dates indicated above.

As these milestones are reached more demanding milestones will be added to promote the continuous improvement of quality of care throughout the NHS.

HOLDING THE NHS TO ACCOUNT

The Commission for Health Improvement and Regional Offices of the NHS Executive will use both local and national indicators to judge the performance of individual organisations.

NHS organisations will be expected to demonstrate that, in implementing this NSF, they are making full use of the new mechanisms for improving the quality of care. This includes ensuring that local systems for clinical governance and life-long learning are used to promote the quality of services for the prevention and treatment of CHD.

NHS Performance Assessment Framework

Nationally the Performance Assessment Framework (PAF) and the associated High Level Performance Indicators (HLPIs) can be used to assess overall performance of the NHS. Equally the PAF can be used to assess performance of a specific aspect of the NHS, supported by suitable indicators. The CHD performance indicators, relevant to this chapter, fit within the areas of the Performance Assessment Framework as follows:

Health improvement

- annual stroke mortality rates

Fair access and effective delivery of care

- age-sex standardised admission rates for AFL/AF and stroke
- age-sex standardised rates for D.C. cardioversion by PCG/PCT and HA
- age-sex standardised rates for catheter ablation by PCG/PCT and HA

Efficiency

Reference costs for:

- arrhythmia
- catheter ablation

SUMMARY

This chapter has described:

- Why the correct investigation and management of AFL and AF is important.
- The evidence-based interventions that can make the diagnosis and either cure or improve prognosis and quality of life.
- Service models that the NHS will be expected to put in place to ensure equality and quality of care.
- Milestones to mark progress and the NSF goals.
- Measures that will be used to judge progress and performance.

APPENDIX A

Patients at high risk of thromboembolic stroke who should be anticoagulated with warfarin unless contraindicated. All other patients should be on Aspirin (or Clopidogrel if aspirin is contraindicated).

Patients with no structural heart disease (INR 2-3)
Age 60 to 75 with diabetes mellitus or coronary heart disease
Age >75 with no risk factors

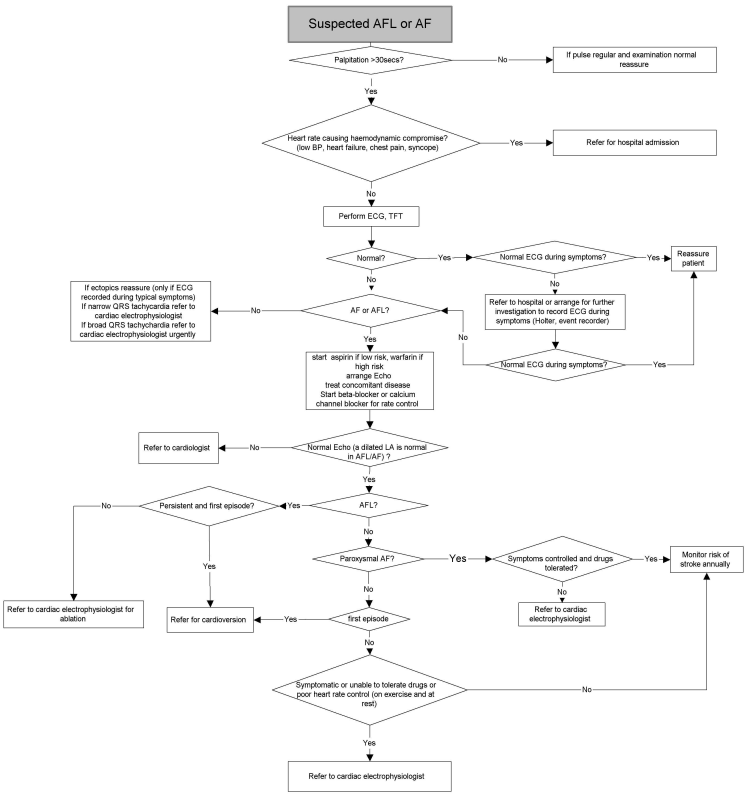
Patients with (INR 2-3):
Previous thromboembolic stroke
Heart failure
Left ventricular ejection fraction less than 35%
Thyrotoxicosis
Hypertension

Patients with (INR >2.5):
Rheumatic valve disease or prosthetic valves
Persistent atrial thrombus on echo

APPENDIX B

Proposed algorithm for management of atrial flutter and atrial fibrillation In primary care

Algorithms for Care – Primary Care



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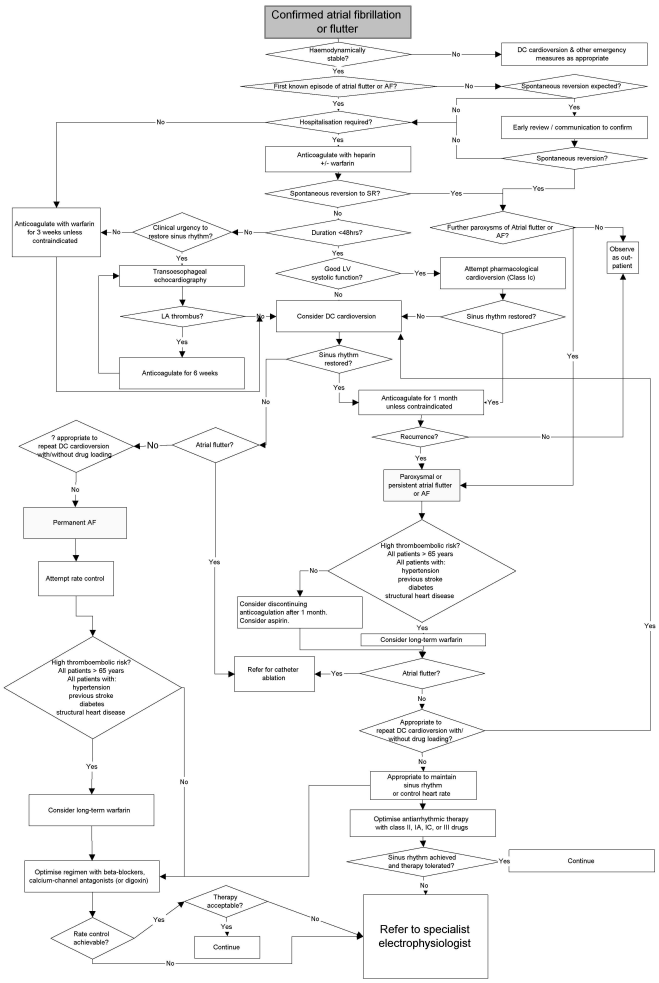
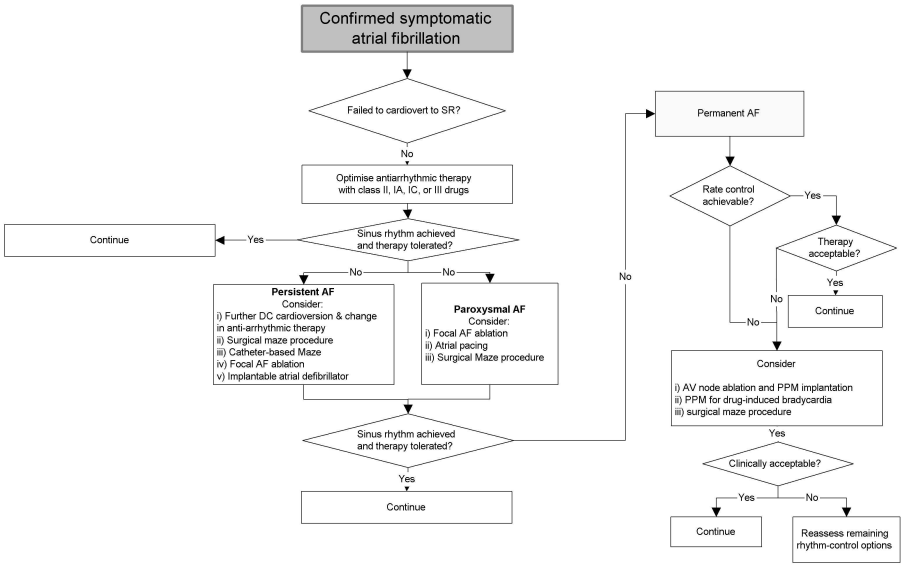
Algorithms for Care – Secondary Care



Algorithms for Care – Tertiary Care



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LAY SUMMARY

Atrial flutter (AFL) and atrial fibrillation (AF) are arrhythmias effecting the top chambers of the heart. They are both are important causes of stroke, palpitation, heart failure/shortness of breath, blackouts (syncope), chest pain and sudden death.

In AFL and AF there is a high risk that blood clots can form inside the atria. This is because they are not beating regularly and efficiently, and the blood becomes stagnant. This produces a risk of the blood clot breaking off and travelling freely in the circulation. When this occurs, it is called an embolism
.
AFL and AF also cause symptoms though rapid, irregular heart rhythms that may cause breathlessness, palpitation and heart failure.

AFL and AF are very common, getting commoner, and are a major cause of ill-health in the elderly.
The cost to the NHS from AF alone is estimated to have risen from £244 in 1995 to £459 million in 2000 and in the UK in 1995 resulted in 59000 hospitalisations and was a secondary cause in a further 129000 admissions to hospital.

AF roughly doubles the risk of death in men and women, of all ages, over a 40 year follow-up period. In America, where information on spending on health is more available, spending in the first year of a diagnosis of AF was over 20 times greater in men, and over 10 times greater in women. Costs continued to be high over the following years, because AF is hard to treat well.

A better life and fewer strokes occur with proper treatment. Prescribing of appropriate therapy for AFL or AF is inadequate in the UK. Nearly 40% of patients do not receive either aspirin or blood-thinning with warfarin after diagnosis of AF, and only 22% of those eligible are prescribed warfarin.

AFL can be cured with high success and low complication rates using catheter ablation to cauterise the abnormal circuit in the heart. Similarly there is evidence that catheter ablation and then a pacemaker greatly improves symptoms in AF. There is increasing evidence to support curative catheter ablation for AF. Referral rates are low and access to care is unequal across the UK, often depending on local enthusiasm, rather than careful planning of services.

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