UHL Guideline - Management of Atrial Fibrillation in Adults

University Hospitals of Leicester NHS
NHS Trust

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Background

Atrial fibrillation (AF) is the commonest cardiac arrhythmia encountered in clinical practice. The prevalence of AF is estimated at 1.5-2% in the population, with a clear increase in age-standardised prevalence (>10% in the over 80 age group); and a selectively higher prevalence in hospitalised patients (5-6%). The incidence of AF is projected to increase steadily, with a preferential increase in AF-associated stroke and systemic embolism in the over 80 population, as shown in **Figure 1**.

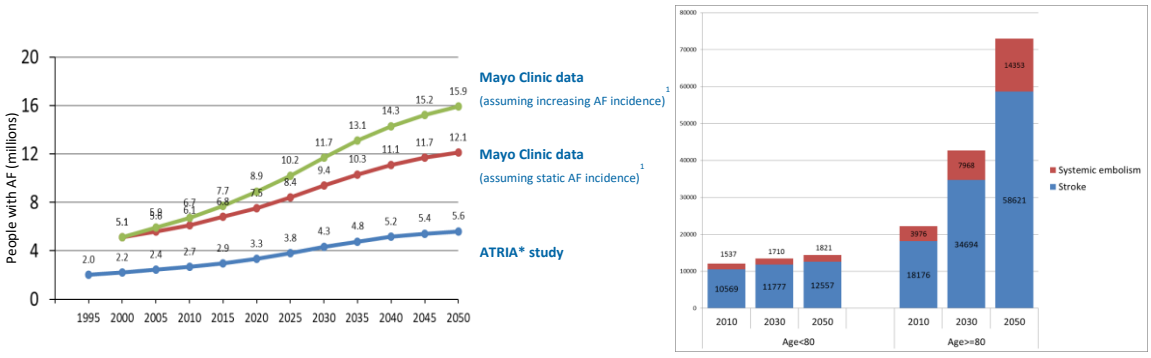

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Figure 1.
a) Current and projected incidence of AF (adapted from reports by the Mayo Clinic[1] and the ATRIA study[2])
b) Current and projected incidence of cardioembolic stroke and systemic embolism, stratified by age (adapted using data from OXVASC[3])

The natural history of AF is well recognised, initially manifesting as brief paroxysms of increasing duration (paroxysmal), going on to persistent and, eventually, permanent AF, as shown in

Figure 2. It is important to note that a significant proportion of people with persistent and permanent AF have no or atypical symptoms – consequently a significant proportion of patients with AF remain undiagnosed. AF is easily recognised when associated with complications, including haemodynamic instability due to tachyarrhythmia or bradyarrhythmia, acute coronary syndrome, congestive cardiac failure or cardioembolic stroke. Given the natural history and mostly asymptomatic nature of AF, there is a significant opportunity to detect AF by screening targeted towards at-risk groups.

DISCLAIMER: This guideline **does not cover** the management of atrial fibrillation in children or in the setting of congenital heart disease. Please refer to the appropriate specialists in such settings.

[1] Miyasaka et al. Circulation 2006;114:119–25, and Go et al. JAMA 2001;285:2370–5.

[2] Savelieva et al. Clin Cardiol 2008;31:55–62.

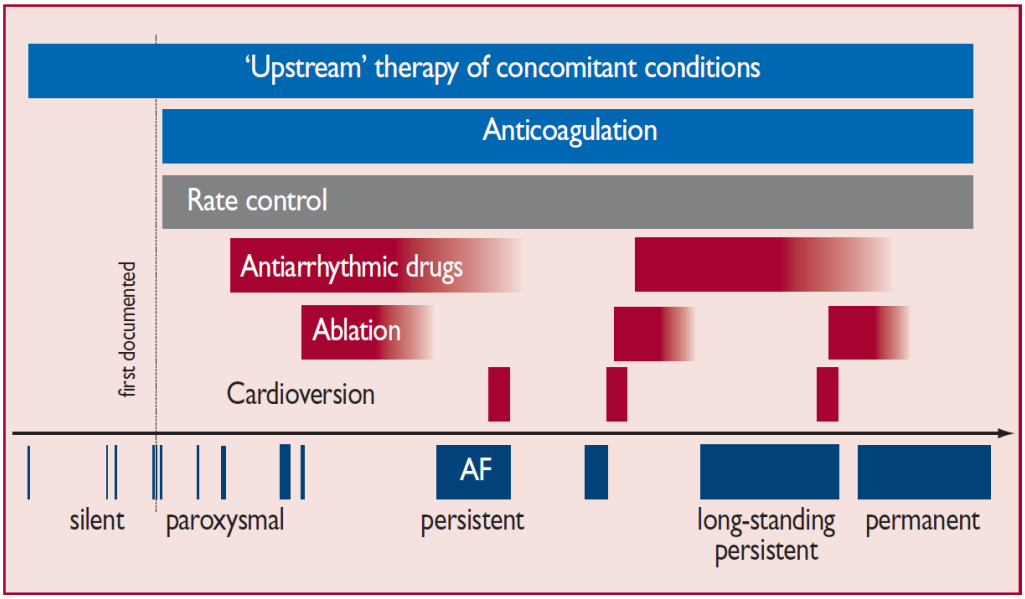


Figure 2. Natural history of AF, and treatment options[3]

A diagnosis of AF indicates a clear adverse prognosis compared to non-AF counterparts. There is an increased risk of complications, including a 5-fold risk of cardio-embolic stroke[4], and a 2-fold risk of death, with associated increase in healthcare cost (1.5x)[5].

Given the relatively high prevalence, not all patients with AF can be managed by a Cardiologist, and NICE recommended initial management does not necessitate Cardiology involvement[5]. This guideline is intended to improve awareness of AF as a risk factor across primary and secondary care, highlight the key intervention of anticoagulation to improve outcome, summarise evidence from peer-reviewed guidelines to facilitate a standardised approach to management of people with AF, and clarify criteria for specialist referral.

The latest NICE guidance (NG 196[6]) represents a significant change in AF management, including emphasis on patient engagement and involvement, and use of DOAC as first line anticoagulants unless *contraindicated, not tolerated or not suitable*.

[3] Kirchhof P, Lip GYH et al. Guidelines for the management of atrial fibrillation. The task force for the management of atrial fibrillation of the European Society of Cardiology. European Heart Journal 2010 (31); 2369-2429
[4] Wolf PA et al. Framingham Study. Stroke. 1991 Aug;22(8):983-988.
[5] NICE CG 180 Atrial fibrillation: management https://www.nice.org.uk/guidance/cg180
[6] NICE NG 196 Atrial fibrillation: diagnosis and management https://www.nice.org.uk/guidance/ng196/chapter/Recommendations

Diagnosis

AF can be identified by an irregular pulse, irregular heart sounds, incidentally on electrocardiogram (ECG), or by cardiac monitoring. AF must be confirmed formally on an ECG (or a cardiac monitor printout).

Pulse checks

Manual pulse checks for irregularity due to atrial fibrillation are recommended in the presence of symptoms of AF, including: breathlessness, palpitations, syncope/dizziness, chest discomfort, and stroke or TIA. An ECG is indicated to confirm if an irregular pulse is due to AF. Care must be taken to avoid false positives due to other causes of pulse irregularity (see **Table 1**), most of which can be distinguished by a single or repeated ECG.

	Regular	Occasional irregularity	Regularly irregular	Irregular (irregularly irregular)
COMMON	Sinus rhythm	Sinus rhythm with infrequent ectopics		Atrial fibrillation
UNCOMMON	**Supra ventricular rhythms** • atrial rhythm • nodal rhythm • supraventricular tachycardia (SVT)		**2nd degree AV block** - Mobitz type 1 - Mobitz type 2	**Sinus rhythms** • Sinus arrhythmia • Sinus rhythm with frequent ectopics
	Ventricular rhythms • 3rd degree AV or complete heart block • Ventricular tachycardia (VT)		Atrial flutter with fixed block	Atrial flutter with varying block

Table 1. Causes of irregular pulse and underlying rhythms

Whilst the National Screening Committee did not recommend routine population screening[7], pulse checks are a routine part of clinical examination. The updated 2020 ESC Guidelines for Atrial Fibrillation[8] recommend opportunistic screening over the age of 65 years, and suggest consideration of systematic screening in individuals at high risk of stroke (i.e. CHA_2DS_2VaSc >=2, including all over the age of 75 years). The pulse rhythm should be assessed and recorded at every hospital admission, and, annually for high risk groups in primary care or in specialty clinics (see **Figure 3**).

[7] UK NSC recommendation on AF screening in adults https://legacyscreening.phe.org.uk/atrialfibrillation

[8] 2020 ESC (European Society of Cardiology) Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Atrial-Fibrillation-Management

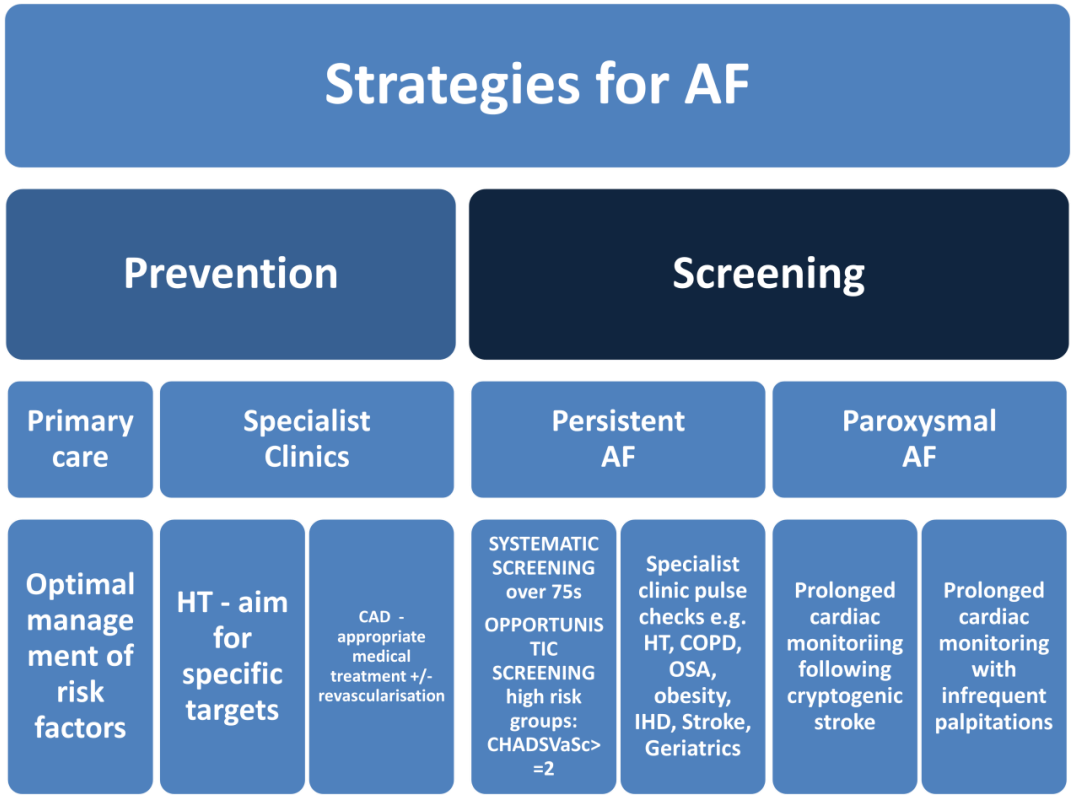


Figure 3: Strategies for AF prevention and screening for AF (adapted)[9]

Electrocardiogram (ECG)

Pulse irregularity may be due to conditions other than atrial fibrillation. An ECG is mandated for documenting atrial fibrillation, before initiating treatment. Delay to ECG following identification of pulse irregularity should be minimised (i.e. ideally same day) irrespective of location, as this contributes to delay in treatment exposing patients to potential risk of stroke.

Cardiac monitoring

If paroxysmal (intermittent) AF is suspected, further cardiac monitoring is recommended. Short term cardiac monitoring with a 24 hour cardiac monitor is considered the first line investigation, and is universally available to clinicians in primary and secondary care, without requiring Cardiology input. However, this may be inadequate where symptoms are infrequent i.e. not occurring daily. In such situations, repeated pulse checks, ECG or AliveCor® assessments especially during symptoms can increase diagnostic yield. Where clinical suspicion remains high (e.g. infrequent symptoms, cryptogenic stroke or TIA) in a patient eligible for anticoagulation based on CHA_2DS_2VaSc, or unexplained syncope, prolonged cardiac monitoring should be considered by referring to cardiology. This is usually accessed by referral to Cardiology to establish the appropriate type of prolonged monitoring, such as a prolonged Holter monitor or an implantable loop recorder. The Reveal LINQ device is recommended by NICE as an option to help detect AF after cryptogenic stroke[10]. GPs should refer to 'palpitations' guidance in PRISM.

[9]James J et al. Screening for atrial fibrillation: a societal imperative? Geriatric Medicine 2017

[10]NICE DG 41. Implantable cardiac monitors to detect atrial fibrillation after cryptogenic stroke www.nice.org.uk/guidance/dg41

Assessment

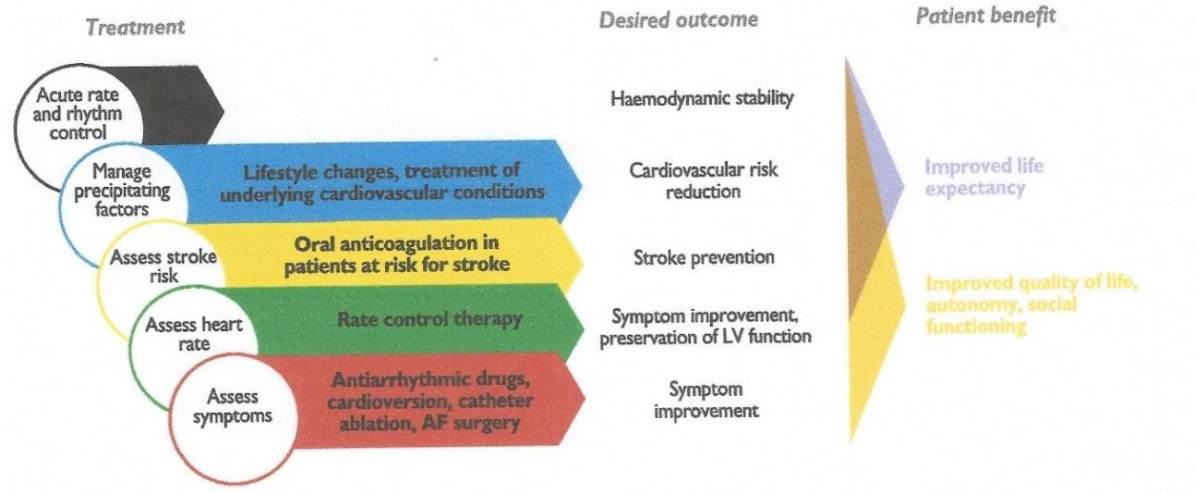


Figure 4. Principles of AF treatment, desired outcomes and patient benefits[11]

Haemodynamic stability

AF can be associated with haemodynamic instability, usually due to tachyarrhythmia (fast ventricular rates), and less commonly, bradyarrhythmia. Haemodynamic instability can manifest as hypotension, cerebral hypoperfusion (syncope/pre-syncope, falls, and nonspecific dizziness), cardiac failure and acute coronary syndrome.

Precipitating factors

AF can be precipitated by acute medical illnesses. Common precipitating factors include: alcohol binge or withdrawal, infection, electrolyte imbalance, dehydration, hypovolaemia, thyrotoxicosis, exacerbation of COPD, pulmonary embolism, recent heart failure, and acute coronary syndrome (summarised in **Table 5**). Treatment of the underlying condition is of primary importance. Initial management of AF may be unsuccessful if the underlying cause is not treated.

Despite being paroxysmal in most cases, such paroxysmal AF is indicative of arrhythmogenic substrate and long term anticoagulation is likely to be required (in accordance with estimated stroke risk, using the CHA_2DS_2VaSc score criteria). If there is uncertainty, Cardiology advice should be sought and further assessment, including Echocardiography, may be required to complete a risk assessment.

Risk assessment

Assessment to quantify embolic risk consequent to AF, bleeding risk whilst on anticoagulation, frailty status and patient choice, is mandated to reach a considered judgment about stroke risk management. Possible outcomes from this include:

Anticoagulation	No Anticoagulation		Specialist input
Start or continue	Temporary cessation *Repeat assessment after a specified interval*	Permanent cessation	Referral done, or Not required

Note: A high bleeding risk score does not necessarily contraindicate anticoagulation, as the net clinical benefit is greater amongst such patients[12]. An individualised decision is required with specialist input, as needed.

[11] Kirchhof P et al. European Heart Journal 2010 (31); 2369-2429

Embolic risk – CHA_2DS_2VaSc score[13]

The CHA_2DS_2VaSc score is recommended to quantify risk of stroke or systemic embolism. The score is based on medical diagnoses and risk remains or increases over time with acquisition of new medical conditions. The score estimates an adjusted stroke rate per year, as shown in **Table 2** (a & b), which informs management considerations for anticoagulation (summarised in **Figure 5**). ESC and NICE guidelines recommend the following:

a) HIGH RISK: A score of 2 or more is associated with significant risk, where risk of embolic stroke is high and **anticoagulation should be offered**.
b) INTERMEDIATE RISK: A score of 1 in men is considered intermediate risk, where **anticoagulation should be considered**, and a careful decision has to be made keeping in mind the bleeding risk. A Cardiology discussion is recommended if there is uncertainty.
c) LOW RISK: A score of 1 in women (1 point due to gender), and a score of 0 indicate truly low risk of stroke and anticoagulation is not offered. A Cardiology discussion is recommended to consider the need for specialist aetiological workup.

In addition, electronic systems should incorporate flags to ensure that any increase in risk / risk score is identified e.g. age 65 & age 75 years.

	Item	*Points*
C	Congestive Heart Failure	1
H	Hypertension	1
A_2	Age > 75 years	2
	Age 65-75	1
D	Diabetes	1
S_2	Previous Stroke or TIA	2
Va	Vascular disease	1
Sc	Sex category	1
CHADSVaSc Score (add points)		0-9

CHA_2DS_2VaSc Score	Adjusted stroke rate (% year)
0	0%
1	1.3%
2	2.2%
3	3.2%
4	4.0%
5	6.7%
6	9.8%
7	9.6%
8	6.7%
9	15.2%

Table 2. a) CHA_2DS_2VaSc score b) Adjusted stroke rate per year for given CHA_2DS_2VaSc score[10]

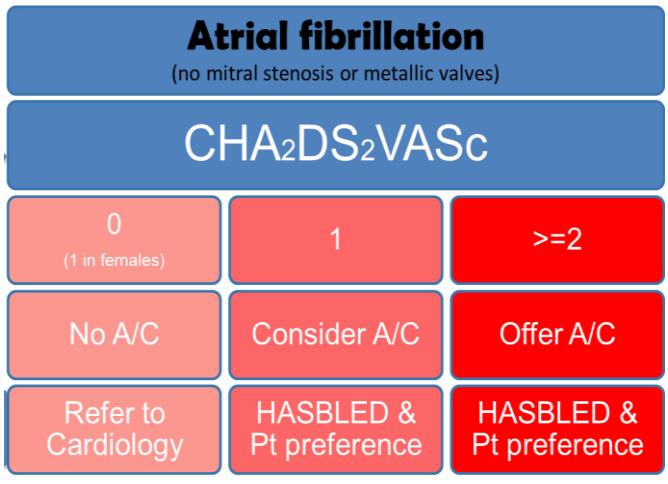


Figure 5. CHA_2DS_2VaSc-based recommendations for anticoagulation (adapted from ESC and NICE guidance)

[12]2020 ESC (European Society of Cardiology) Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Atrial-Fibrillation-Management
[13]Gage BF et al. JAMA 2001;285:2864–2870

Bleeding Risk

Risk benefit assessment within this context involves making a clinical assessment in respect of the safety or otherwise of continuing anticoagulation. Relevant indicators to look out for include:

- **Major spontaneous bleeding complications** including gastrointestinal, intracranial bleeding etc.
- Deterioration in cognitive function, onset of dementia etc. (e.g. patient unable to remember whether has taken medication or not, carer prompted medication).
- **Recurrent accidental falls with significant head injury** or likely to lead to significant head injury.
- Requirement for **new medication** likely to potentiate risk of bleeding e.g. NSAIDs.
- Significant deterioration in **renal or hepatic function** (both likely to increase bleeding risk).
- *Warfarin: **Stability of anticoagulation in terms of TTR** (widely fluctuating INRs with no obvious cause may indicate a higher risk of bleeding, stable INR control with high TTR is associated with a more favourable bleeding risk profile). Note: NICE NG 196 recommends that all patients on warfarin should be considered for a change to DOAC, unless contraindicated, not tolerated or not suitable*[1].

Modifiable bleeding risk factors must be considered and addressed at every review e.g. controlling blood pressure, discontinuing concomitant antiplatelet or NSAID therapy (where appropriate), and counselling patient about reducing alcohol intake where applicable. The frequency of AF-anticoagulation review is based on the baseline bleeding risk and the renal function.

ORBIT-AF score

The NICE AF Guideline (2021 update[14]) recommends the **ORBIT-AF** Bleeding Score [Outcomes Registry for Better Informed Treatment of Atrial Fibrillation] to assess the risk of bleeding in patients with Atrial Fibrillation [AF] on anticoagulation with oral anticoagulants. This has superceded the HAS-BLED score for prediction of major bleeds (including: fatal bleeding, symptomatic bleeding in a critical area or organ, and bleeding causing a fall in Hb >20g/dl or leading to the transfusion of 2 or more units of whole blood or red cells).

	Clinical Characteristic	Points
O	Older: age >=75 years	1
R	**Reduced haemoglobin** **Males**: Hb<130 Haematocrit <40% **Females**: Hb <120 Haematocrit <30% OR history of anaemia	2
B	**Bleeding history** (any h/o gastrointestinal bleeding, intracranial bleeding or haemorrhagic stroke)	2
I	**Insufficient renal function** (eGFR<60 mg/dl)	1
T	Treatment with antiplatelet agents	1
Add points to get score (out of 7)		*

ORBIT score*	Major Bleed Risk per 100 patient years (py)	Bleed risk category	Major Bleed Risk per 100 py (by category)	Prevalence[2] (%)
0	1.7	Low	2.4	58.6
1	2.3			
2	2.9			
3	4.7	Medium	4.7	18.2
4	6.8	High	8.1	23.2
5	9.0			
6	12.3			
7	14.9			

Figure 6. ORBIT Bleeding Risk Score[15]

Link to online tool for ORBIT AF calculation, as included in the NICE NG 196.

[14] NICE NG96 Atrial fibrillation: diagnosis and management https://www.nice.org.uk/guidance/ng196

[15] O'Brien EC, Simon DN, et al. The ORBIT bleeding score: a simple bedside score to assess bleeding risk in atrial fibrillation. European Heart Journal. 2015; 36: 3258-64. (link to online article)

HAS-BLED score[16]

The HAS-BLED score retains some utility in identifying modifiable risk factors, and can continue to be used whilst the transition to ORBIT-AF is happening. The score (and associated risk) can go up, and more importantly, down if reversible factors are addressed. The HAS-BLED score and quantified risk may differ from ORBIT-AF estimations.

Clinical characteristic	Points
Hypertension (SBP>160)	1
Abnormal liver function (Bilirubin >2x ULN/AST/ALT>3x ULN)	1
Abnormal renal function (creatinine >200 or dialysis)	1
Stroke	1
Bleeding (previous bleeding, bleeding diathesis, or unexplained anaemia)	1
Labile INRs (TTR<60%) - *NICE advises review if <65%*	1
Elderly (Age >65)	1
Drugs	1
Alcohol (excess consumption - >14 units/week)	1
HAS-BLED score (add points)	0-9

HAS-BLED score	Bleeds per 100 patient years
0	1.13
1	1.02
2	1.88
3	374
4	8.70
5	12.50
6-9	Insufficient data

Table 3, a) HAS-BLED score, b) Major bleeds per 100 patient years for given HAS-BLED score

It is important to note that there are interventions feasible for bleeding (replacement of blood products and antidotes where available), whilst cardioembolic stroke, despite availability of emergency interventions for stroke, is invariably associated with poor outcome and results in significant disability and impaired quality of life. On the whole, fatal bleeding is a less common occurrence than major stroke; and, data from population studies indicate that overall mortality in anticoagulated AF populations is significantly lower than those not anticoagulated[17].

Frailty assessment

The Trust has adopted the Clinical Frailty Scale[18], which can be assessed and recorded on Nerve Centre. The scale ranges from 0-9, and is summarised in **Table 4**. At higher frailty scores, it is important to establish patient (and where relevant, carer) expectations when considering potentially hazardous treatment like anticoagulation. Referral to a Cardiologist for interventional management is generally not appropriate in frail populations (CFS 6-9).

Score	Description	Proposed management strategy
1	Very fit	Standard management with primary focus on preventing adverse outcomes e.g. stroke, death
2	Well, with no active disease symptoms	
3	Managing well, with well controlled medical problems	
4	Vulnerable	
5	Mildly frail	
6	Moderately frail	Focus treatment on preventing adverse outcomes or symptom control / comfort, based on patient preference.
7	Severely frail	
8	Very severely frail	
9	Terminal illness	Generally avoid anticoagulation

Table 4. CHSA Clinical Frailty Scale - revised version 2007

[16] Pisters R et al. Chest 2010; 138: 1093–100.
[17] Friberg et al. Circulation 2012;125:2298–307
[18] Rockwood K et al. CMAJ. 2005;173(5):489-95

Echocardiography

NICE does not recommend a routine trans-thoracic echocardiogram (TTE) in AF, if a decision has already been made to initiate anticoagulation. Indications for TTE include:

1. Suspected structural heart disease, on the basis of:
    a. Symptoms, or
    b. Examination finding of a murmur, or
    c. Signs of heart failure

2. VIA REFERRAL TO CARDIOLOGY
    a. Where a rhythm control strategy (cardioversion) is being considered
    b. Baseline echocardiogram required to inform long term management
    c. Where risk is deemed to be low (based on CHA_2DS_2VaSc score), and anticoagulation is not being started, to refine risk assessment by identifying subclinical cardiac disease.

NOTE: **Anticoagulation, if appropriate, should not be delayed whilst awaiting an Echocardiogram.** Given the relative infrequency of moderate to severe mitral stenosis, a DOAC is not considered contraindicated whilst awaiting the Echocardiogram (unless a specific mitral stenosis murmur is auscultated, in which case warfarin should be initiated). **Trans-oesophageal echocardiography (TOE) is not a routine test**, and may be indicated in select situations. Cardiology will arrange this if appropriate to the clinical context.

Management

Tachyarrhythmia

Discontinuation of rate-limiting drugs is a common cause of tachyarrhythmia, and reinstituting the original regime will often provide good rate control. Screen for precipitating factors (as summarised in **Table 5**) and treat.

Alcohol binge or withdrawal	Thyrotoxicosis
Infection	Exacerbation of COPD
Electrolyte imbalance	Pulmonary embolism
Dehydration	Recent heart failure
Hypovolaemia	Acute coronary syndrome

Table 5. Common medical precipitating factors for tachyarrhythmia

Initial management is focussed on achieving haemodynamic stability. Haemodynamic instability is usually due to tachyarrhythmia (fast ventricular rates), and less commonly, bradyarrhythmia. Haemodynamic instability can manifest as hypotension, cerebral hypoperfusion (syncope, pre-syncope, falls, and dizziness), cardiac failure and acute coronary syndrome. Haemodynamically unstable patients need emergency management, in a suitably monitored environment. A proposed initial management pathway is summarised in **Figure 7.**

Cardioversion should be undertaken in a suitably monitored controlled environment. Emergency cardioversion should only be undertaken to manage haemodynamic instability, in accordance with agreed local policy and in a suitably monitored environment. Subsequent management is summarised in

Figure 8, and drug options for rate control are summarised in **Table 6**.

There is ongoing work to optimise the pathway for Rapid Access Atrial Fibrillation (RAAF) Clinic referral, from within the hospital.

Bradyarrhythmia

Overall management is summarised in **Figure 9**.

Transcutaneous pacing

Initiate transcutaneous pacing immediately if there is no response to atropine, or if atropine is contraindicated. Transcutaneous pacing can be painful and may fail to achieve effective electrical capture (i.e. a QRS complex after each pacing stimulus) or fail to achieve a mechanical response (i.e. palpable pulse). Check for electrical capture on the monitor or ECG and for mechanical response in the form of a palpable pulse. Reassess the patient's condition (ABCDE). Use analgesia and sedation as necessary to control pain; sedation may compromise respiratory effort so continue to reassess the patient at frequent intervals. Refer to Cardiology for transvenous pacing.

Fist pacing

If atropine is ineffective and transcutaneous pacing is not immediately available, fist pacing can be attempted for life-threatening, extreme bradycardia, while waiting for pacing equipment or personnel. Give repeated rhythmic thumps with the side of a closed fist over the left lower edge of the sternum to stimulate the heart at a rate of 50–70 per minute.

Transvenous pacing

Seek expert help to assess the need for temporary transvenous pacing, and to initiate this when appropriate. Temporary transvenous pacing should be considered if there is risk of asystole as highlighted in **Figure 9**.

Atrial Fibrillation – Tachyarrhythmia Initial Management

① Seek senior support when out of your depth

② In the setting of severe haemodynamic compromise, electrical cardioversion in a suitably monitored environment should be considered.

③ It is usually possible to achieve haemodynamic stability by pharmacological rate control

④ Anticoagulation is the most important intervention to reduce stroke risk, and should be initiated promptly and maintained long term.

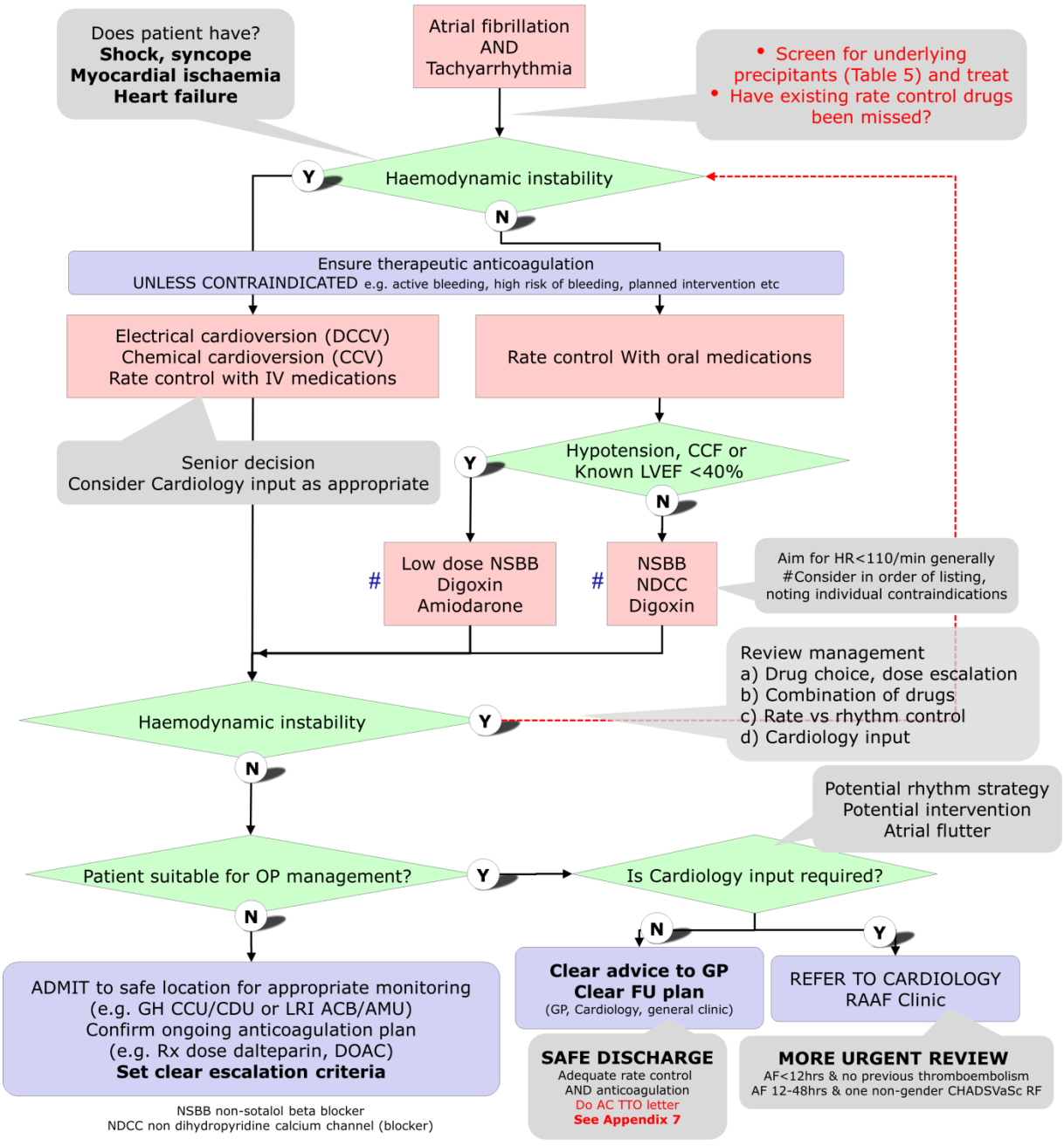


Figure 7: Initial management of tachyarrhythmia

Atrial Fibrillation – Tachyarrhythmia Subsequent Management

① **Once haemodynamically stable, consider oral medication options**

② **Rhythm control should be considered in the following situations (NICE)**

- Atrial fibrillation with a reversible cause
- Heart failure thought to be primarily caused by atrial fibrillation
- New-onset atrial fibrillation
- Atrial flutter considered suitable for an ablation strategy to restore sinus rhythm
- A rhythm control strategy considered more suitable based on clinical judgement

③ **Screen for underlying precipitants and treat:** alcohol binge or withdrawal, infection, electrolyte imbalance, dehydration, hypovolaemia, thyrotoxicosis, exacerbation of COPD, pulmonary embolism, recent heart failure, and acute coronary syndrome

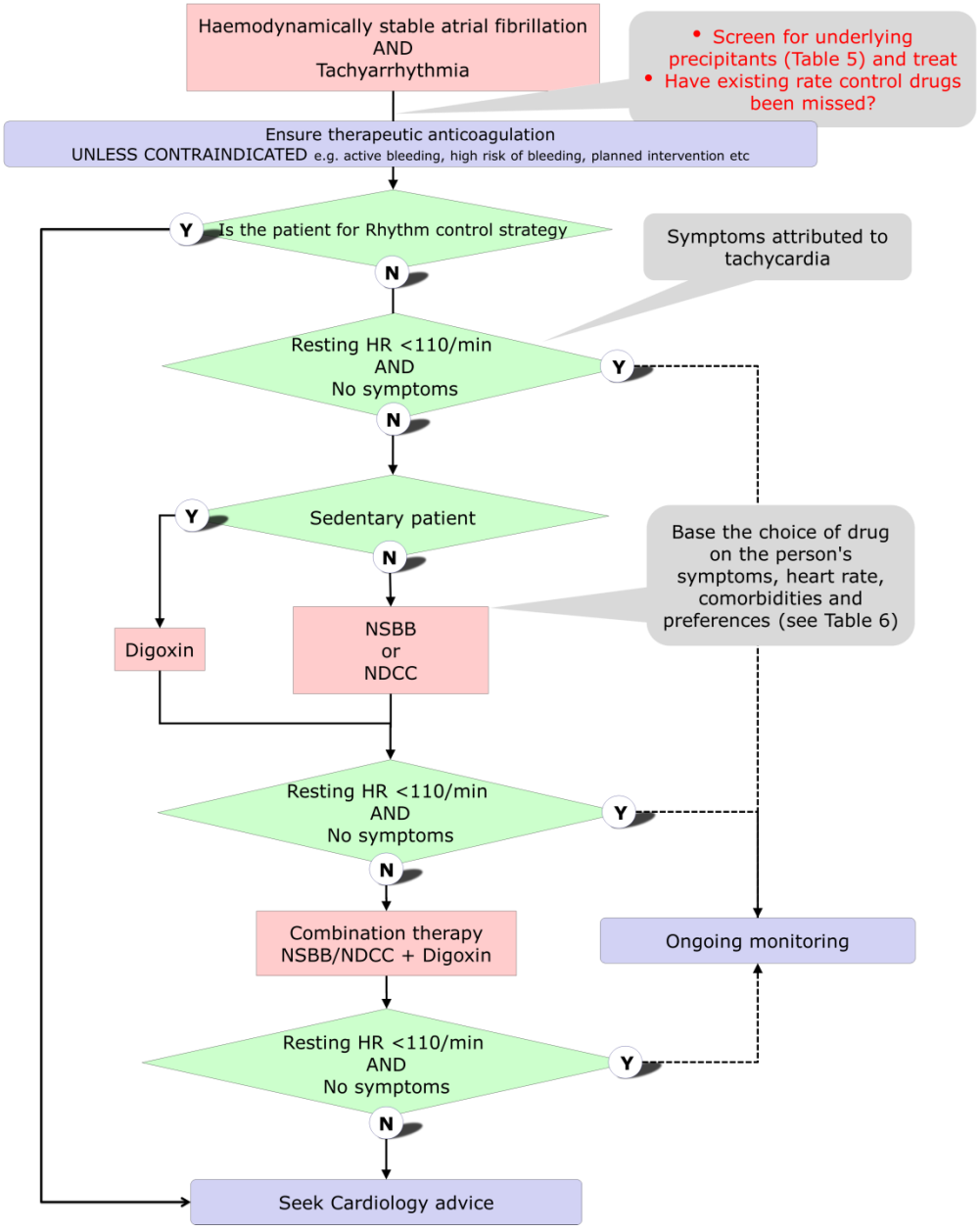


Figure 8. Subsequent management of tachyarrhythmia (adapted)[19]

[19] NICE CG 180 Atrial fibrillation: management 2014, updated 2017

	IV administration	Oral maintenance dose	Contraindications
Non-Sotalol Beta blockers (NSBB)	Metoprolol 2.5-5mg IV bolus (up to 4 doses)	Bisoprolol 1.25 -20mg od	Contraindicated in acute HF and history of severe bronchospasm Propranolol and labetalol **not** recommended as specific rate control therapy in AF NOTE: Propranolol may be used in the setting of thyrotoxicosis
	Esmolol 500 micrograms/kg IV bolus over 1 min; followed by 50 - 300 micrograms/kg/min	Metoprolol 50mg 2-3 times a day, increased if necessary up to 300mg daily in divided doses	
Non-dihydropyridine calcium channel antagonists (NDCC)		Diltiazem 60 – 120mg tds Diltiazem XL (Viazem) 120 – 360mg od Diltiazem SR (Angitil) 90-180mg BD	Contraindicated in HFrEF Adapt doses in hepatic and renal impairment
		Verapamil 40 – 240 mg bd Verapamil extended release 240-480 mg od	
Digoxin	500 microgram IV bolus (over 30 minutes) – can be repeated after 4-6 hours depending on response (up to 1500 micrograms in 24 hours) Note: The same dose can be used for oral loading (where feasible and clinically appropriate)	Digoxin 62.5 – 250 micrograms od (Loading regime recommended at drug initiation)	High plasma levels associated with increased mortality (consider digoxin levels if needing high maintenance dose) Check renal function before starting and adjust maintenance dose for CKD patients
Amiodarone	300 mg IV diluted in 250 ml 5% dextrose over 60 min (preferably via central venous cannula), followed by 900 - 1200 mg IV over 24 hours diluted in 500 - 1000 mL 5% dextrose (**mandated** via a central venous cannula)	Amiodarone 200 mg od *Oral loading regimen on starting (if not had IV loading): 200 mg tds for 1 week, then 200mg bd for 1 week (reduce other rate controlling drugs according to heart rate)	In case of thyroid disease, **only** if no other options

bd = twice daily; CKD = chronic kidney disease; HF = heart failure; HFrEF = HF with reduced ejection fraction; IV = intravenous; mcg = microgram; min = minutes; ml = millilitres; od = once daily; tds = three times daily. *Loading regimen may vary; previous IV dosage should be considered when calculating total load.
All rate control drugs and IV amiodarone are contraindicated in Wolff-Parkinson-White syndrome. Intravenous medication administration must be undertaken in an appropriate environment with suitable monitoring.

Table 6. Pharmacological options for rate control of tachyarrhythmia – dosing guidance [adapted from: 2020 ESC guidelines[20]] - refer to flowcharts in Figure 7 and

Figure 8.

[20]2020 ESC (European Society of Cardiology) Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Atrial-Fibrillation-Management

Atrial Fibrillation – Bradyarrhythmia Management

① Persistent bradycardia may cause haemodynamic instability

② Patient should be managed in a suitably monitored environment

③ Seek medical causes, including rate limiting drugs

④ Anticoagulation is the most important intervention to reduce stroke risk, and should be initiated promptly and maintained long term.
NOTE: hold anticoagulation if pacing planned

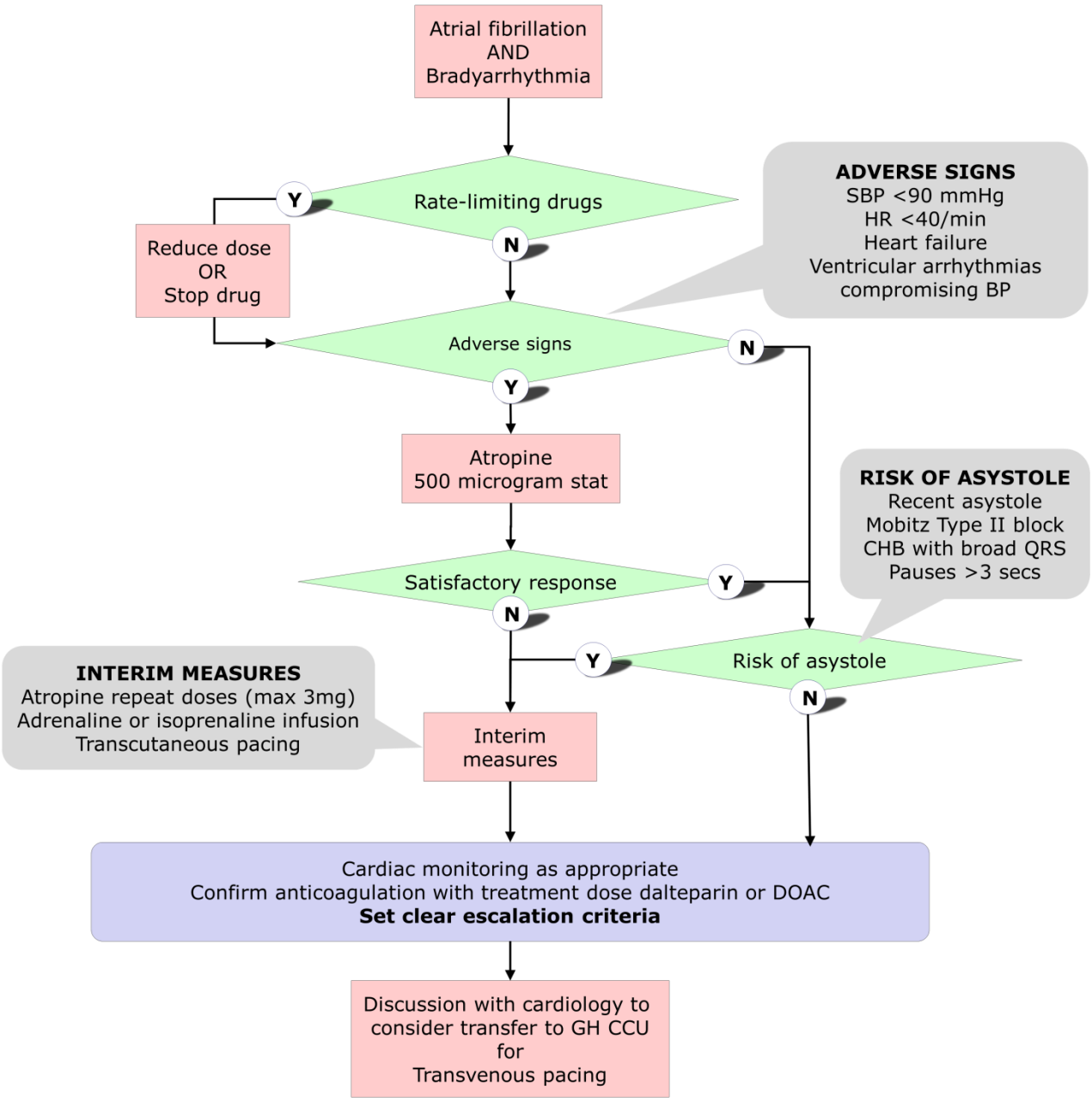


Figure 9. Algorithm for management of bradyarrhythmia

Cardiovascular risk reduction

A structured evaluation of vascular risk factors is advised for all patients with AF to assess the overall patient risk of stroke. General management of risk factors is beyond the scope of this guidance.

Stroke prevention

Options for stroke prevention include: Anticoagulation - most common intervention, and consideration of left atrial appendage occlusion (LAAO) in select cases.

Anticoagulation

Anticoagulation is the key intervention to be considered for all people with AF to reduce risk of stroke and consequent disability. The reduction of stroke risk is substantial both in relative terms and absolute terms, the absolute benefit being more in people who have already had an embolic event i.e. secondary prevention.

For stroke prevention in the context of non-valvular atrial fibrillation (NVAF)[21], anticoagulation is the dominant intervention. Available anticoagulants include direct oral anticoagulants (DOAC), Warfarin and LMWH. In the context of NVAF, DOAC are now first-line (NICE 2021, ESC 2020[22].). Warfarin is now deemed second line, to be used when a DOAC is contraindicated, not tolerated or not suitable. Following the national DOAC commissioning recommendations[23], the LLR DOAC for NVAF guidance[24] specifies: "*unless clinically inappropriate, edoxaban is recommended as the preferred DOAC in LLR due to the lowest acquisition cost. If edoxaban is not suitable, clinicians should then consider rivaroxaban first, then apixaban or dabigatran*".

LMWH is generally reserved for acute use in hospital, either for a new diagnosis or, for bridging where anticoagulation has been interrupted. Treatment dose LMWH should be continued, until a definitive decision on long term anticoagulation has been made. In cases where bleeding risk is high, prophylactic LMWH or no anticoagulation may be appropriate.

All patients with AF should receive at least an annual review, to ensure appropriate anticoagulation status.

i. **Not on anticoagulation**: has risk-benefit balance altered to allow anticoagulation?
ii. **On anticoagulation**: has risk benefit balance altered to stop anticoagulation?
    a. On warfarin: the potential risks and benefits of switching to a DOAC should be considered
    b. On DOAC: ensure appropriately prescribed for non-valvular atrial fibrillation (i.e. atrial fibrillation in the absence of "moderate or severe mitral stenosis"). Key DOAC contraindications include: metallic heart valve, antiphospholipid syndrome, and left ventricular thrombus (see detailed list in Appendix 3. Contraindications for DOAC. Verify that the patient is on the appropriate dose (reduced dose **only if** drug specific criteria for dose reduction met) and ensure compliance.

An Echocardiogram can be considered if there is clinical suspicion of mitral disease or cardiac failure. However, it is not a routine test for all patients and **should not delay initiation of anticoagulation**. The major advantage of DOAC is that frequent coagulation monitoring is not necessary. However, monitoring is still required at intervals guided by the renal function (Cockroft-Gault Creatinine Clearance – CrCl) and bleeding risk – see Algorithm 1, and appropriate doses must be used, in accordance with the licensing.

[21] For purposes of DOAC usage, non valvular AF is AF in the absence of moderate to severe mitral stenosis

[22] 2020 ESC (European Society of Cardiology) Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association of Cardio-Thoracic Surgery (EACTS) https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Atrial-Fibrillation-Management

[23] NHS 2022. Operational note: Commissioning recommendations for national procurement for DOACs

[24] LLR Area Prescribing Committee 2022. Direct Oral Anti-Coagulants for Non-Valvular Atrial Fibrillation in Adults

The decision about whether to start treatment should be made after an informed discussion between the clinician and the patient about the risks and benefits of anticoagulation versus not anticoagulating, and include consideration of all NICE-approved oral anticoagulant choices. Education about anticoagulation has been shown to improve outcomes by reducing thrombotic and haemorrhagic adverse events. Outcomes improve when patients take responsibility for, understand and adhere to an anticoagulation care plan. There are many educational materials for warfarin, low molecular weight heparin and for the direct oral anticoagulants, with key emphasis on stressing adherence to prescribed regimes. Flowcharts for anticoagulation initiation, patient decision aid and DOAC specific prescription guidance is included in the appendices.

Special attention should be directed at recognising the signs of bleeding and stressing that major bleeding requires urgent medical attention. The NPSA Anticoagulation Alert (NPSA/2007/18)[25] was published in 2007 before DOACs were available. Subsequently, an implementation resource document was updated on 1st May 2018 to support NHS organisations in implementing medication-related requirements as highlighted in the NPSA alert[26]. Compliance with relevant standards is listed in Table 1 below.

NPSA alert standard	Compliant
1. Review and, where necessary, update written procedures and clinical protocols for anticoagulant services to ensure they reflect safe practice, and that staff are trained in these procedures.	✓
How to safely initiate anticoagulant therapy.	✓
Effective communication systems when clinical responsibility for anticoagulant treatment is being transferred e.g. discharge from hospital.	✓
The healthcare practitioner who provides this information must record in the patient's healthcare record that this information has been supplied.	✓
An annual clinical review	✓
2. Ensure patients prescribed anticoagulants receive appropriate verbal and written information.	✓
Information should be provided before the first dose of anticoagulant is administered, and reinforced at hospital discharge, at the first anticoagulant clinic appointment and throughout the course of their treatment when necessary.	✓
An anticoagulation alert card should be provided and is designed to be carried by patients at all times. It informs health professionals that the patient is taking oral anticoagulants and provides a contact telephone number.	✓
General information about the safe use of oral anticoagulants which reinforces the information that the prescribers and other Health Care Practitioners give to the patient before the first dose of A/C was administered, at the first A/C clinic appointment and when necessary throughout the course of the treatment. It is a concise guide on practical issues to consider when taking oral anticoagulants. It is intended to remain with the patient and be readily available for reference but not carried by the patient at all times.	✓

Table 7. Compliance with NPSA Alert Standards

[25] NPSA Actions that can make Anticoagulants Safer. Patient Safety Alert. Accessed on line at https://webarchive.nationalarchives.gov.uk/20101125185252/http://www.nrls.npsa.nhs.uk/resources/search-by-audience/community-nurse/?entryid45=59814

[26] Implementing Patient Safety Alert 18: Anticoagulant Therapy Resource [UPDATE] - https://webarchive.nationalarchives.gov.uk/20180501180040/http://www.nrls.npsa.nhs.uk/resources/healthcare-setting/community-pharmacy/?entryid45=61777&cord=ASC&p=2

Atrial flutter

The management of atrial flutter is similar to the management of atrial fibrillation, with the following key differences:

a) All patients with atrial flutter should be considered for Cardiology referral
b) Ablation has a high success rate and should be considered as a rhythm control strategy, except in frail populations (e.g. CFS 6-9)
c) Successful ablation may allow cessation of anticoagulation in accordance with Cardiologist opinion (in the absence of another indication for anticoagulation e.g. concomitant atrial fibrillation).

Concomitant antiplatelet therapy in patients on anticoagulation

The responsible specialist should routinely provide an individualised plan regarding the choice and duration of concomitant antiplatelet therapy. Indications include: history of a vascular intervention (coronary, carotid, renal) or acute coronary syndrome (ACS) in the last 12 months. In general, DOAC are continued with dual antiplatelet therapy where thrombotic risk is very high (e.g. 1 month post stent; 3 months post ACS), and with single antiplatelet therapy up to 12 months from a coronary procedure/ACS[27]. In the absence of a vascular intervention or ACS in the last 12 months, antiplatelets should generally be discontinued when anticoagulation is initiated.

NOTE: there is an indication for low dose rivaroxaban with concomitant antiplatelets in stable coronary artery disease without AF. Please refer to relevant LMSG guidance.

Left Atrial Appendage Occlusion (LAAO)

90% of AF related strokes are caused by thrombus originating from the left atrial appendage (LAA). Therefore, closing the lumen from the LAA to the left atrium should prevent development and migration of the thrombus. This new therapeutic avenue requires the implantation of an LAAO device (see **Figure 10**), and is reserved for high risk patients who have:

a) recurrent embolic events despite appropriate anticoagulation, or
b) an absolute contraindication for anticoagulation (including high bleeding risk consequent to a non-modifiable cause, which precludes anticoagulation).

In patients with moderate risk of stroke, LAAO with the Watchman device is associated with similar stroke risk compared to warfarin, with lower bleeding risk. Locally, LAAO is available via specialised commissioning, reserved for high stroke risk patients who cannot tolerate any anticoagulants. Referrals should be to Prof Kovacs who is the cardiologist involved in assessing patient eligibility and implanting suitable devices.

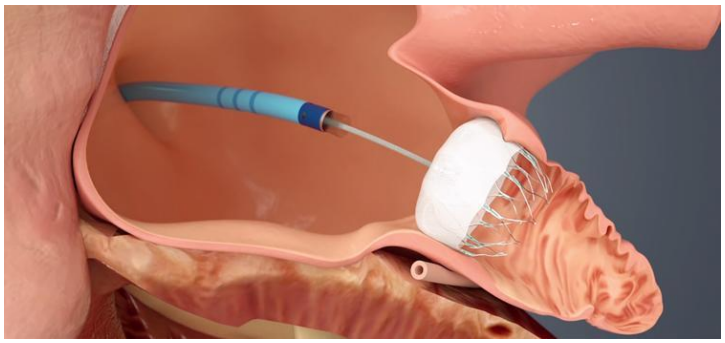


Figure 10. LAAO device (white) into LAA

[27]The 2018 European Heart Rhythm Association Practical Guide on the use of non-vitamin K antagonist oral anticoagulants in patients with atrial fibrillation. Steffel et al European Heart Journal. 2018; 39(16): 1330-1393

Personalised package of care

Discussion with patients should cover the following topics

1. Stroke awareness and measures to prevent stroke
2. Rate control
3. Assessment of symptoms to consider rhythm control
4. Contact points for advice and ongoing monitoring
5. Psychological support, if needed
6. Basic information about AF
    a. Cause, effects and complications
    b. Management of rate and rhythm control
    c. Anticoagulation and drug options
    d. Support networks

Supporting information leaflets can be obtained from the AF Association - www.heartrhythmalliance.org/afa/uk/, or other reliable sources. Use locally developed information where available.

Specialist Management

The vast majority patients have uncomplicated AF, which can be managed in primary care with a standard policy of rate control, and risk assessment to inform an anticoagulation plan. Most hospitalised patients can be managed by general medical physicians. Referral to Cardiology should be selective.

Indications for referral to Cardiology

1. Potential for a rhythm control strategy
    a. ***Non-urgent outpatient*** (age <65 years, few co-morbidities but not restrictive) – outpatient referral
    b. ***Urgent outpatient***: for patients with a new diagnosis avoiding hospital admission: GPs can refer to Rapid Access AF clinic via PRISM (RAAF), front-door referrals to Cardiology oncall
    c. ***Emergency inpatient***: Recent symptom onset with chest pain/haemodynamic instability (< 48 hours) – refer to Cardiology oncall
2. Initial rate control fails to control symptoms – GP RAAF clinic referral via PRISM
3. AF complicated by acute coronary syndrome (inpatient referral / admission) – refer to Cardiology oncall
4. Indication for a specific specialist intervention, if failure of initial medical therapy – outpatient referral

Rate control fails to control symptoms

Referral to Cardiology should be considered in the setting of

a) Failure to achieve adequate rate control (<110 beats/min) despite initial rate control attempts, or
b) Persisting symptoms despite adequate rate control.

Referral to the **heart failure clinic** should be considered if there is predominant heart failure. Hospital emergency admission in indicated if there is haemodynamic instability or chest pain.

At outpatient Cardiology review, alternative individualised management strategies may be considered e.g. rhythm control strategy (planned cardioversion), a lower heart rate target (to improve symptom burden), or “pace and ablate” (pacemaker insertion with AV node ablation).

Rhythm control

Where initial treatment fails to control symptoms, NICE recommends consideration of rhythm control, which usually consists of planned cardioversion after an appropriate length of anticoagulation. However, in those inpatients with instability due to AF of > 48hrs duration or uncertain duration, a transoesophageal echo can be performed to rule out clot in the LAA, allowing safe cardioversion to be performed before discharge.

AF with cardiac complications

Where AF is associated with cardiac complications like acute coronary syndrome or congestive cardiac failure, initial standard management of ACS and CCF applies. Cardiology advice should be sought to generate an individualised management plan. Details should be documented in the clinical record, and transferred onto primary care on the Discharge letter.

Specialist interventional management

Trans-oesophageal echocardiogram (TOE)

A TOE may be considered by outpatient referral to Cardiology after discussion, if:

1. TTE is suboptimal
2. TTE identified abnormality requires further clarification
3. TOE guided cardioversion is being considered (as part of a rhythm management strategy)

Pacing

Cardiologists may consider pacing in the setting of:

a) Sinus node disease (tachy-brady: slow sinus rates coupled with fast ventricular response to AF) to avoid bradycardia whilst allowing rate control medications to be started.
b) Drug-refractory tachyarrhythmia, to provide rate control when combined with AV node ablation.

Ablation

Cardiologists may consider an ablation procedure in the setting of drug refractory tachyarrhythmia, persistently symptomatic AF or in the presence of LV dysfunction. Success rates are higher for paroxysmal AF with structurally normal heart, and in the absence of multiple comorbidities. Some patients need repeat procedures, mostly in the setting of atypical flutter. Complication rates are around 4-5%.

Ablation for AF is not considered a cure, and anticoagulation should be continued as per individual patient stroke risk (CHA_2DS_2VaSc). However, ablation for typical atrial flutter has a high success rate and low complication rate, so:

1. ablation can be considered first line as a rhythm control strategy in atrial flutter
2. in specific situations, anticoagulation can be stopped in the absence of concomitant AF (fibrillation), regardless of individual CHA_2DS_2VaSc risk – in accordance with Cardiology advice.

Cardiac surgery

Interventional management (e.g. ligation of the left atrial appendage) can be undertaken alongside cardiac surgery to lower subsequent stroke risk; or ablation during valve surgery if AF is diagnosed as part of the assessment. However, in most patients anticoagulation will need to be continued in accordance with the CHA_2DS_2VaSc estimated risk.

Anticoagulation post interventional management for AF

Irrespective of the rhythm outcome for any interventional procedure, anticoagulation must be continued for stroke prevention in AF, in accordance with the CHA_2DS_2VaSc score. Atrial flutter is the exception where anticoagulation may be discontinued, if so advised by the Cardiologist.

Peri-operative atrial fibrillation (POAF)

AF is common after cardiac surgery (15-45%), associated with higher complication rates and mortality, and increased length of hospital stay[28]. AF is also associated with major operations, more so in the elderly.

Peri-operative beta blocker or amiodarone is recommended to prevent AF after cardiac surgery. If there is haemodynamic instability, restoration of sinus rhythm should be considered with electrical cardioversion or chemical cardioversion. For symptomatic AF, chemical cardioversion should be considered. For asymptomatic AF, an initial strategy of rate control is advised.

A careful consideration of anticoagulation is required, given increased bleeding risk associated with the operative intervention. Please see **Figure 11** for proposed POAF pathway.

There is no robust evidence for POAF prevention outside of cardiac surgery, and no recommendations can be made. The general principles of POAF management apply.

[28] 2016 ESC Guidelines for the management of atrial fibrillation developed in collaboration with EACTS

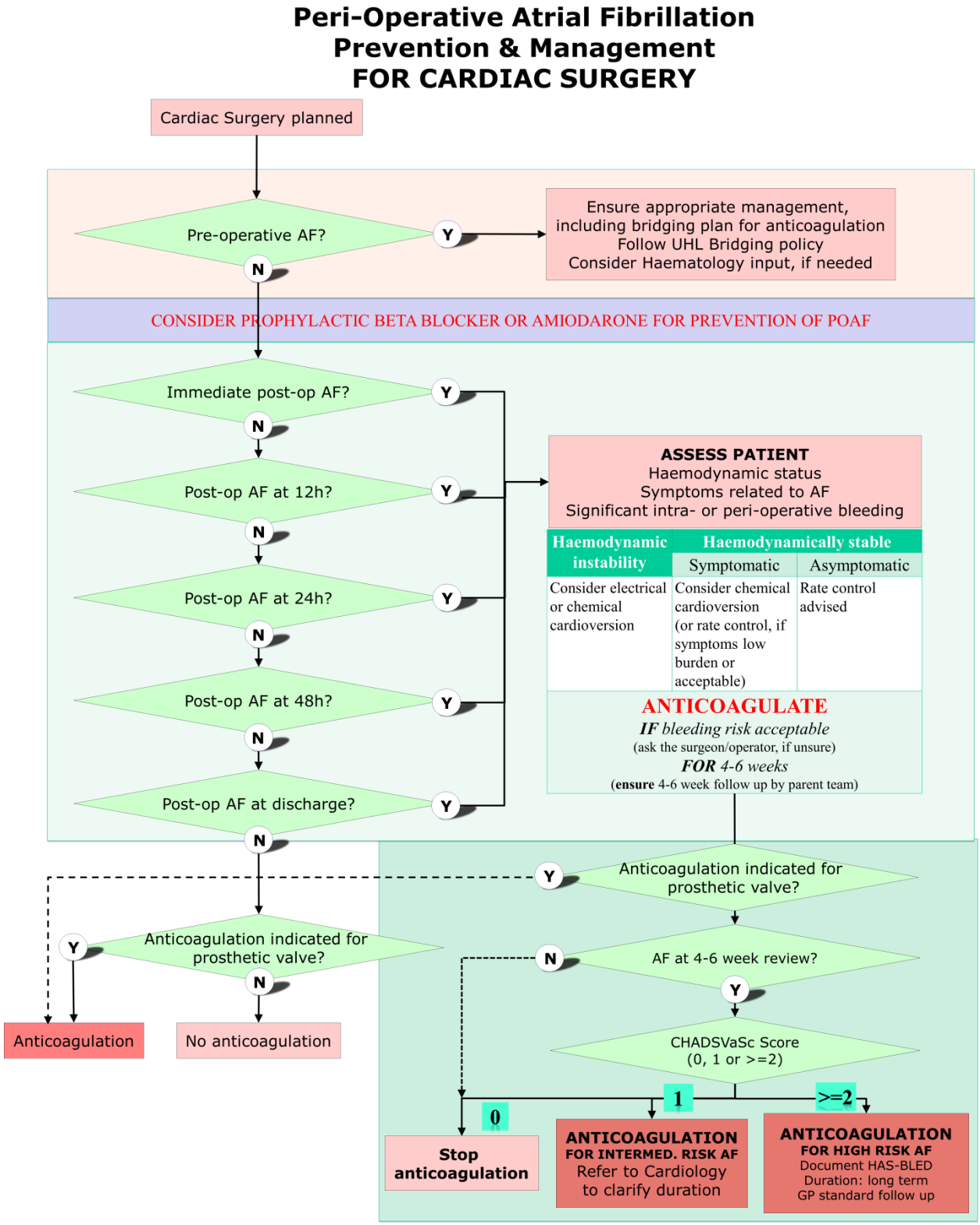


Figure 11. Screening and management of peri-operative atrial fibrillation (POAF), in cardiac surgery

QUALITY STANDARDS

NICE Quality Statement (QS 93)	
Anticoagulation to reduce stroke risk	
Adults with non-valvular atrial fibrillation and a $CHA_2DS_2VAS_C$ stroke risk score of 2 or above are offered anticoagulation.	We will engage with clinicians and IT systems to ensure consistent recording of diagnosis of AF and CHA_2DS_2VASc score, and develop an SPC chart to monitor
Use of aspirin	
Adults with atrial fibrillation are not prescribed aspirin as monotherapy for stroke prevention	All patients with AF should be assessed for anticoagulation, and contraindications should be clearly documented. Antiplatelets should be discontinued in the absence of a compelling other indication.
Discussing options for anticoagulation	
Adults with atrial fibrillation who are prescribed anticoagulation discuss the options with their healthcare professional at least once a year.	Primary care has processes in place for annual review of AF patients. We will work with CCGs to develop an annual report for monitoring.
Anticoagulation control	
Adults with atrial fibrillation taking a vitamin K antagonist who have poor anticoagulation control have their anticoagulation reassessed.	Primary care undertakes non-complex INR monitoring. We will work with CCGs to develop an annual report of TTR by patient, practice and CCG level.
Referral for specialised management	
Adults with atrial fibrillation whose treatment fails to control their symptoms are referred for specialised management within 4 weeks.	We will work with primary care to ensure documentation of symptom control (at 4 weeks), and where not achieved, review current pathways for referral to Cardiology

Local quality statements	
Stroke secondary to AF – prior anticoagulation	
Adults presenting with AF-associated Stroke should have a structured investigation of prior anticoagulation	The Stroke services will review prior anticoagulation following AF-associated Stroke, using a structured template
Stroke secondary to AF – subsequent anticoagulation	
Adults presenting with AF-associated Stroke should have a clear subsequent anticoagulation plan	The Stroke services will record a clear plan of management following AF-associated stroke at discharge on the TTO
Stroke secondary to AF – annual report	
The Stroke services will produce an annual report of AF associated stroke and associated quality of care.	The Stroke services will develop an annual report of AF-associated Stroke, and subsequent investigation.
Stroke secondary to AF – feedback	
The Stroke services will provide feedback to relevant primary and secondary care clinicians using a structured template.	The Stroke services will adopt a template and the responsible stroke Consultant will provide direct supportive constructive feedback to relevant clinicians (where deficiencies are identified, or general feedback is required).
DOAC associated incidents	
DATIX incidents – Elizabeth McKechnie GP concerns / complaints – Catherine Headley	The Thrombosis Committee will receive quarterly reports, discuss potential issues and solutions, and forward to MedOC as part of a quarterly report.
POAF audit in Cardiac surgery	
Cardiac surgery services will undertake annual audit of compliance with POAF recommendations	Cardiac surgery M&M process

Appendices

Appendix 1. AF Anticoagulation review

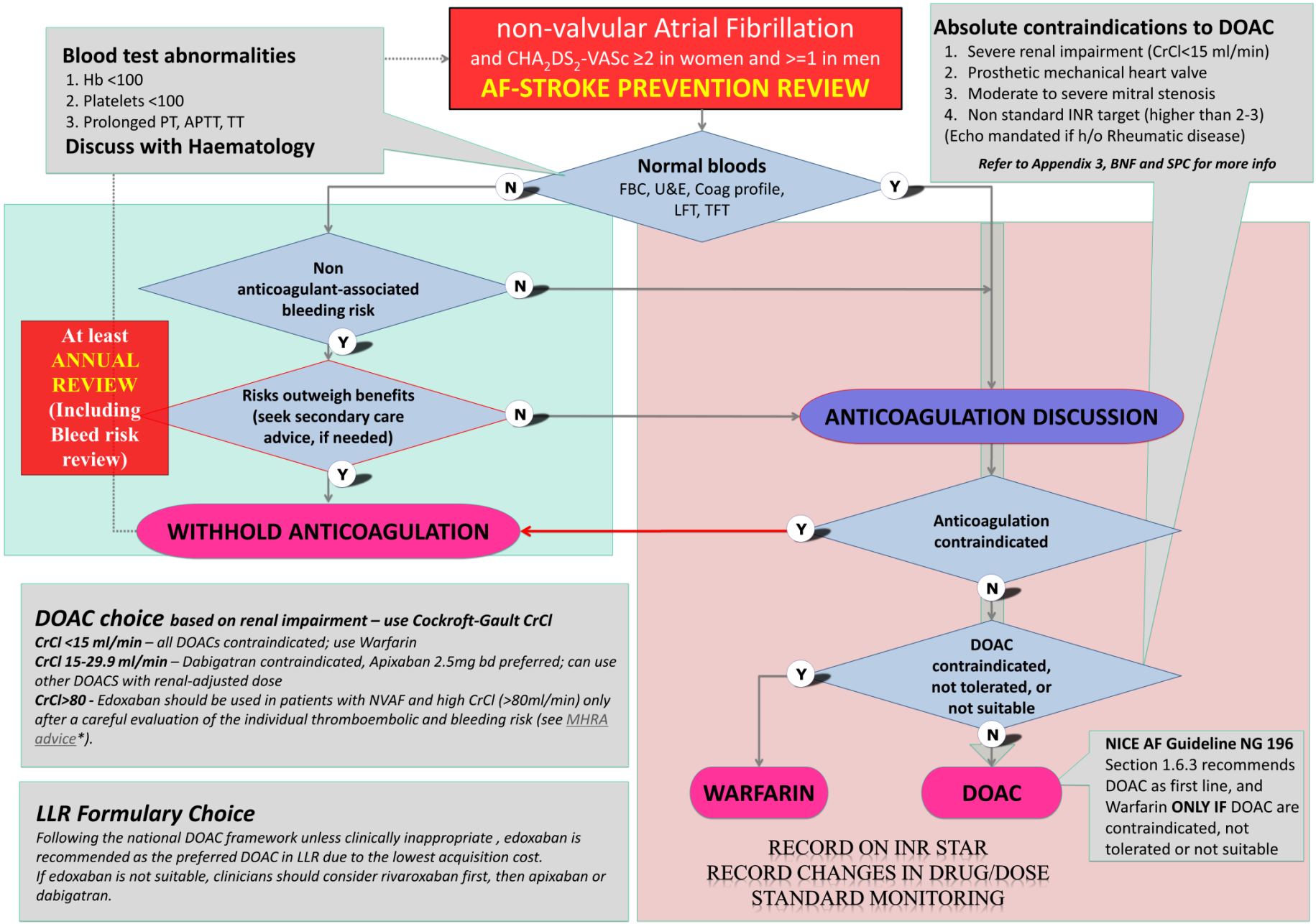
Appendix 2. Safer discharge on anticoagulants

Appendix 3. Contraindications for DOAC

DOAC-specific patient information leaflets are available on the LMSG website. **Please print and provide these to patients starting DOAC.**

NOTE: There is separate UHL guidance on Vitamin K antagonists (e.g. warfarin, sinthrome etc) initiation and monitoring, which is not covered in this document.

Appendix 1. AF Anticoagulation review (adapted from LLR APC Guidance: DOAC for NVAF in Adults)



Appendix 2. Safer discharge on anticoagulants

It is reasonable for GPs to receive updated information following hospital admission about significant medical conditions – AF being a high risk for disabling stroke and mortality. Moreover, anticoagulation therapy in itself carries an associated risk of bleeding complications, which have to be assessed objectively and balanced against intended benefits.

Discharge following a new / recent onset AF diagnosis should consider:

- **An AF assessment**, including:
  1. Rate control ("tachy / brady") – status, medications changes, interventions
  2. Haemodynamic stability – including 1, but also other complications like hypotension, cardiac failure, concomitant ACS etc
  3. Whether the AF is symptomatic or asymptomatic
  4. Suggestions on when a further referral may be appropriate (or direction to this guideline).
  5. Objective estimation of embolic risk: CHA_2DS_2VaSc
  6. Objective estimation of bleeding risk: ORBIT-AF / HAS-BLED
  7. A frailty review with a Clinical Frailty Score
  8. Whether a Cardiology referral is required, has been done, or any criteria for referral by GP

- **An anticoagulation assessment** including:
  1. A risk-benefit discussion with patient (or relevant representative, in line with the Mental Capacity Act) and outcome
  2. Documentation of contraindications, any relevant outstanding investigations, and whether these are likely to change in future (i.e. permanent or temporary contraindications)
  3. The anticoagulation status
     a. on AC (drug, dose, dose change, FU plan, as in AC Discharge Letter)
     b. not on AC
        i. <u>permanent</u>: absolute irremediable contraindication, or unacceptably high bleeding risk
        ii. <u>temporary</u>: review by whom & when
  4. Formal communication to the GP within the Discharge Letter.

Appendix 3. Contraindications for DOAC

Patients on warfarin should be reviewed at least annually to consider whether a switch to a DOAC can be done. This should be done in conjunction with the patient taking into account risks/benefits, patient choice and TTR. Contraindications to DOAC therapy need to be considered to avoid inappropriate switching to DOAC.

Absolute contraindications for DOAC therapy include:

1. Severe renal impairment (CrCl<15 ml/min)
2. Prosthetic mechanical heart valve
3. Moderate to severe mitral stenosis
4. Non-standard INR target (higher than 2-3)

Relative contraindications for DOAC therapy

In the following situations, DOAC for AF can be initiated by a specialist considering individual risks and benefits. Non-specialists must not initiate a DOAC, but can continue the DOAC in line with specialist advice.

1. Pregnancy, breastfeeding or planning a pregnancy
2. Active malignancy/chemotherapy
3. Antiphospholipid syndrome
4. Prescribed drugs interacting with DOAC
    a. e.g. specific antivirals for HIV and hepatitis (check the HIV drug interactions website)
    b. drugs lowering DOAC levels like phenytoin, carbamazepine, phenobarbitone or rifampicin (refer to individual drug SmPC or BNF)
5. Venous thrombosis at unusual sites - there is little data on DOAC for patients with venous thrombosis other than DVT &/or PE
6. Patients on triple therapy (dual antiplatelet plus warfarin)

4. Education and Training

Are there any new skills required to implement the guideline? Is a training programme being provided to support implementation or is it more a case of 'awareness raising'

If training is being considered as 'mandatory' this must be taken through the Training, Education and Development (TED) group before the policy is approved

This guideline enshrines current clinical practice into a structured guideline document. It is not considered a mandatory training need. Relevant training will be incorporated into ongoing training programs. Associated quality standards are incorporated, with the intention of incorporating into routine Trust monitoring.

5. Monitoring and Audit Criteria

All guidelines should include key performance indicators or audit criteria for auditing compliance,

if this template is being used for associated documents (such as procedures or processes) that support a Policy then this section is not required as all audit and monitoring arrangements will be documented in section 8 of the Policy.

Key Performance Indicator	Method of Assessment	Frequency	Lead
See QUALITY STANDARDS			

6. Legal Liability Guideline Statement

See section 6.4 of the UHL Policy for Policies for details of the Trust Legal Liability statement for Guidance documents

7. Supporting Documents and Key References

Incorporated into the guideline document

8. Key Words

List of words, phrases that may be used by staff searching for the Policy on SharePoint

AF, atrial, fibrillation, flutter, anticoagulation, DOAC, cardiology, stroke

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This table is used to track the development and approval and dissemination of the document and any changes made on revised / reviewed versions

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Reviewed by:	***V 1.0 submission*** ***Dr Amit Mistri*** ***Final review*** Emergency Department: Dr Vivek Pillai Thrombosis Committee Co-Chair: Dr Richard Gooding Cardiology: Dr Riyaz Somani, Dr Martin Behounek, Suzanne Armstrong – ANP Arrhythmia & Devices ***Comments on earlier drafts / sections*** Emergency Department: Dr Martin Wiese Cardiology: Dr Elved Roberts Cardiothoracic Specialty Trainee: Dr Henry Davies (perioperative guidance section) Acute Medicine: Dr Nigel Langford ***Advisory capacity*** Medication Safety Pharmacist: Elizabeth McKechnie Ex-ESM Clinical Director / now Deputy Medical Director: Dr Rachel Marsh ***V 1.1 minor update*** *to align with NICE NG 196 – addition of ORBIT-AF score, updated Appendix 1 (AF Anticoagulation Review, in line with LMSG DOAC AF update), new Appendix 3, and minor edits/clarifications.*	
Approved by:	**ESM Q&S Board – Chair: Dr Rachel Marsh CD**	**Date Approved: 07/10/20**

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