Atrial Fibrillation (AF)

Disclaimer

This pathway has been developed using the 2018 guidelines developed by the National Heart Foundation of Australia (NHF) and the Cardiac Society of Australia and New Zealand (CSANZ).

Contents

Disclaimer ................................................................. 1
Red Flags ....................................................................... 2
Background – About Atrial Fibrillation (AF) ........................................ 2
Assessment ..................................................................... 2
Diagnosis ........................................................................ 2
Management .................................................................... 5
Follow-up ....................................................................... 11
Referral .......................................................................... 11
Information ...................................................................... 12
For health professionals ................................................... 12
For patients .................................................................... 12
References ...................................................................... 12
Disclaimer ...................................................................... 13
Red Flags

- Haemodynamic instability
- Shortness of breath
- Chest pain
- Heart failure
- Current syncope or pre-syncope
- Sustained heart rate > 150 beats per minute
- Known Wolf-Parkinson-White syndrome

Background – About Atrial Fibrillation (AF)

AF is the most common recurrent arrhythmia and is becoming more prevalent. Its current 2 to 4% prevalence is probably an under-estimate, and it becomes more common with age.

AF is independently associated with an increased long-term risk of stroke, heart failure, and all-cause death. It often leads to an impaired quality of life. Though the risk of stroke death can be mitigated, the non-thrombo-embolic causes of death predominate and need a more comprehensive approach.

Aboriginal and Torres Strait Islanders have a higher incidence of AF and subsequent mortality.

Non-valvular AF (NVAF) is defined as AF in the absence of moderate to severe mitral stenosis or mechanical heart valve.

Assessment

Diagnosis

1. Opportunistic screening in the clinic or community is recommended for all patients aged > 65 years. Assess and treat atrial fibrillation, atrial flutter, and paroxysmal AF similarly.

2. If suspected AF, confirm rhythm diagnosis by a 12-lead ECG. AF may be persistent or paroxysmal. If paroxysmal AF, consider Holter monitoring or event monitoring.

Paroxysmal atrial fibrillation (PAF)

PAF is defined as an episode of atrial fibrillation (AF) that stops spontaneously or with intervention within 7 days. It is often asymptomatic.

- Patients may describe that the heart skips around and jumps, i.e. rapid irregular palpitations.
- PAF can progress to AF. This is more likely in patients with hypertension, heart failure, or underlying heart condition, and with increasing age.

Holter monitoring

- Only consider in patients with concerning features that occur at least 3 times per week for > 1 month.
- Provides limited clinical value. Diagnosis is found in only 2 to 15% of tests. It may be useful to rule out serious arrhythmias when sinus rhythm is correlated to the timing of the patient’s symptoms.
• Order through most pathology providers and cardiology investigation providers. An out-of-pocket cost may apply.

3. Perform an examination.
   • Apical and radial pulse
   • Blood pressure
   • Look for evidence of:
     o Heart failure
     o Valvular disease
     o Thyrotoxicosis
     o Pulmonary disease

4. Look for other thromboembolic risk factors.
   • Aged > 65 years, especially aged > 75 years
   • Heart failure
   • Hypertension
   • Diabetes
   • History of TIA or stroke
   • Female

5. Exclude underlying aetiology and reversible causes.
   • Hypertensive heart disease
   • Coronary heart disease and myocardial infarction (MI)
   • Heart failure
   • Valvular heart disease
   • Cardiomyopathy – ischaemic or non-ischaemic
   • Alcohol and caffeine excess
   • Thyrotoxicosis
   • Respiratory e.g., COPD, obstructive sleep apnoea (OSA), pulmonary embolism, pneumonia
   • Surgery – cardiac or other major surgery
   • Acute infection
   • Obesity
   • Genetic predisposition – channelopathies and familial AF

6. Arrange investigations.
   • Blood tests
     o FBE
     o Electrolytes – creatinine, urea, sodium, potassium, magnesium and calcium
     o Liver function tests (LFTs)
     o Thyroid function tests (TFTs) – delay in acutely ill patients
     o INR and APTT – if starting oral anticoagulants

   • Arrange echocardiography for all first episodes of AF, if
     o valvular or structural heart disease suspected.
     o there is doubt about the risk or benefit for anticoagulation after calculating the CHA2DS2-VASc score.

   • Detected LV dysfunction or structural abnormality of the heart may influence the decision to anticoagulate.
7. Assess suitability for anticoagulation:
   • Assess stroke risk using the **CHA₂DS₂-VA score** unless patient has mitral stenosis or hypertrophic cardiomyopathy, as these patients **always** require anticoagulation.

**CHA2DS2-VA Score for atrial fibrillation (AF) stroke risk**

The CHA₂DS₂-VA score:
- has superseded the CHA₂DS₂-VASc and CHADS₂ scores as best tool to help determine the need for anticoagulation in AF.
- is a sexless CHA₂DS₂-VASc score, now recommended for predicting stroke risk in AF for both sexes.
- should be re-evaluated yearly in low-risk patients who are not anticoagulated.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Points</th>
</tr>
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</table>
| **C** Congestive heart failure – recent signs, symptoms, or admission for decompensated heart failure. This includes:  
  - heart failure with reduced ejection fraction (HFrEF)  
  - heart failure with preserved ejection fraction (HFpEF)  
  moderately to severely reduced systolic left ventricular function, whether or not there is a history of heart failure. | +1     |
| **H** History of hypertension, whether or not blood pressure is currently elevated | +1     |
| **A₂** Aged ≥ 75 years                                                   | +2     |
| **D** Diabetes                                                           | +1     |
| **S₂** History of prior Stroke, TIA, or systemic thromboembolism         | +2     |
| **V** Vascular disease history – prior myocardial infarction, peripheral arterial disease, or complex aortic atheroma or plaque on imaging (if performed) | +1     |
| **A** Aged 65 to 74 years                                                | +1     |

**Total score:**

If total score is:
- 0, no anticoagulation is recommended.
- 1, consider anticoagulation. Use echocardiography to help determine individual risk and anticoagulation option.
- ≥ 2, anticoagulation is recommended, unless there are contraindications, with consideration for individual bleeding risk and preference.

Source: National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand: [Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018:Table 3](#)

• Consider **contraindications to anticoagulation**.
  - Absolute contraindications
    - Bleeding diathesis
    - Previous intracranial bleed or retinal haemorrhage
    - Recent gastrointestinal or genitourinary bleed
    - First trimester and last month of pregnancy
  - Relative contraindications
    - Poorly controlled hypertension (systolic > 160 mmHg consistently)
    - Thrombocytopenia
Abnormal liver or renal function
- Stroke history
- Bleeding predisposition
- Elderly aged > 80 years
- Drugs or alcohol abuse

A patient with 3 or more relative contraindications may not be suitable for anticoagulation.

- Evaluate bleeding risk using **HAS-BLED**. Identify and correct modifiable bleeding risk factors.

**HAS-BLED**
- Use the **HAS-BLED scoring tool**.
- The HAS-BLED risk score is based upon 7 risk factors for bleeding, some of which may be modifiable.
- HAS-BLED score over 3 indicates caution and increased monitoring when considering anticoagulants but is not a contraindication to their use.

- See also **SPARC – Stroke Prevention in Atrial Fibrillation Risk Tool**.

### Management

1. Arrange **immediate cardiology assessment or admission** if recent onset AF with red flags.

2. If any **reversible causes**, treat or arrange endocrinology, respiratory, or cardiology referral as appropriate regardless of the length of time AF has been present.

**Reversible causes**
- **Thyrotoxicosis**
- Pneumonia
- [Myocardial infarction (MI)]
- **Pulmonary embolism (PE)**

3. If AF > 48 hours arrange an [urgent or routine cardiology assessment] for consideration of cardioversion. Start oral antiocoagulants and rate control treatment.

**Rhythm control and cardioversion**
- The goal is to revert to and maintain sinus rhythm either by electrical cardioversion, chemical cardioversion, or AF ablation.

**Chemical cardioversion** may be indicated in some patients following specialist assessment. Cardiologist initiation of amiodarone, flecainide, and sotolol is recommended.

- Consider if:
  - first episode of AF, especially if severe symptoms.
  - younger patient.
  - patient with few co-morbidities.
  - failure to obtain adequate symptomatic heart rate control.
  - clear precipitant for AF e.g., infection, surgery, thyrotoxicosis.
• Only commence anti-arrhythmic medication (chemical cardioversion) after cardiologist advice.

• See Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018: Long-term Rhythm Control Strategies.

4. If suitable for oral anticoagulants and no contraindications, manage as follows

**Oral anticoagulants**
Consider which anticoagulant to use.
• In patient with non-valvular AF (NVAF) use **Novel Oral Anticoagulants (NOACs)** if no contraindications.

**Novel oral anticoagulants (NOACs)**
  o Contraindicated in patients with valvular AF (mechanical heart valves or moderate to severe mitral stenosis).
  o PBS authority – non-valvular AF plus at least one risk factor for stroke or embolism:
    ▪ **Apixaban**
    ▪ **Dabigatran** (now reversible with idarucizumab)

**Idarucizumab (Praxbind)**
  o A monoclonal antibody binds specifically to dabigatran and reverses its anticoagulant effect.
  o Recommended dose is 5 g (2 x 2.5 g/50 mL) intravenously, only available through a tertiary hospital.
  o Results in immediate rapid reversal of anticoagulation with 90% of patients having complete reversal within 4 to 12 hours.

  See Australian Prescriber – **Idarucizumab**

  ▪ **Rivaroxaban**

• Review **advantages and disadvantages**

• Avoid or reduce dose of NOACs in patients with severe hepatic or renal impairment, in the elderly, and in those with extremes of body weight e.g., < 50 kg.

**Renal impairment**
Do not prescribe if CrCl is < 30 mL/min.
If CrCl is between 30 and 50 mL/min, use a lower dose, or consider whether dabigatran is safe to use.
It is recommended that the CrCl is calculated using the Cockcroft and Gault equation, rather than using the laboratory reported GFR.

**Cockcroft and Gault creatinine clearance formula**

\[
CrCl \text{ (mL/min)} = \frac{(140 - \text{age}) \times \text{ideal body weight (kg)}}{\text{plasma creatinine (mcmol/L)} \times 0.8} \times 0.85 \text{ if female}
\]

  o Ideal body weight (males) = 50 kg + 0.9 kg for each cm over 150 cm in height.
  o Ideal body weight (females) = 45 kg + 0.9 kg for each cm over 150 cm in height.
  o Use actual body weight if this is lower than the ideal body weight.

  **Creatinine Clearance (CrCl) Calculator**
• In patient with valvular AF (mechanical heart valves or moderate to severe mitral stenosis) use warfarin.

**Warfarin**
- Preferred for patients with renal impairment and valvular heart disease
- No known long term side-effects
- Inexpensive
- Readily reversed with Vitamin K
- See Warfarin – Starting and Monitoring

• **Antiplatelet therapy** is not recommended for stroke prevention in NVAF patients, regardless of stroke risk.

<table>
<thead>
<tr>
<th>Consider</th>
<th>Warfarin</th>
<th>NOAC</th>
<th>Apixaban</th>
<th>Dabigatran</th>
<th>Rivaroxiban</th>
</tr>
</thead>
</table>
| PBS funding       | Valvular (rheumatic mitral valve disease, a prosthetic heart valve, or mitral valve repair) and non-valvular AF | Non-valvular AF with at ≥ 1 additional risk factors for stroke Past medical history of:  
• cerebrovascular accident (CVA)  
• transient ischaemic attack (TIA), or  
• systemic embolism.  
Aged > 75 years  
Hypertension  
Diabetes  
Heart failure | Superior to warfarin in stroke prevention and reduced major bleeding by 27%³ | Superior to warfarin in stroke prevention, less fatal or critical bleeding than warfarin, more gastrointestinal bleeds (risk less with lower dose)  
*reversal agent available Dyspepsia | Non-inferior to warfarin in stroke prevention, less fatal or critical bleeding than warfarin, more gastrointestinal bleeds |
| Cost to PBS       | +                                                                         | +++                                           | +                         | +                                 | +                                |
| Cost to MBS       | +++ (ongoing monitoring)                                                  | +                                             |                           |                                   |                                   |
| Side-effects      | Increased risk of bleeding                                               | Increased risk of bleeding[^4^]               | Superior to warfarin in stroke prevention and reduced major bleeding by 27%³ | Superior to warfarin in stroke prevention, less fatal or critical bleeding than warfarin, more gastrointestinal bleeds (risk less with lower dose)  
*reversal agent available Dyspepsia | Non-inferior to warfarin in stroke prevention, less fatal or critical bleeding than warfarin, more gastrointestinal bleeds |
<table>
<thead>
<tr>
<th>Consider (cont’):</th>
<th>Warfarin</th>
<th>NOAC</th>
<th>Apixaban</th>
<th>Dabigatran</th>
<th>Rivaroxiban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dosing</td>
<td>Once daily</td>
<td>Once or twice daily</td>
<td>Twice daily</td>
<td>Twice daily</td>
<td>Once daily</td>
</tr>
<tr>
<td>Reversibility</td>
<td>Yes, Vitamin K</td>
<td>Dabigatran only</td>
<td>No</td>
<td>Yes, Idarucizumab (Praxbind)</td>
<td>Available at all major public hospitals. See vicTAG for up-to-date information.</td>
</tr>
<tr>
<td>Venepuncture</td>
<td>12 to many more per year</td>
<td>2 per year (renal function or creatinine clearance)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affected by diet</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use in renal impairment</td>
<td>Yes</td>
<td>Caution with creatinine clearance 30 to 50 mL/min Not to be used if creatinine clearance &lt; 30 mL/min (Use Cockcroft and Gault creatinine clearance formula, not eGFR) See NOACs</td>
<td>Contraindicated creatinine clearance &lt; 25 mL/min</td>
<td>Contraindicated creatinine clearance &lt; 30 mL/min</td>
<td>Contraindicated if undergoing dialysis, creatinine clearance &lt; 30 mL/min (15 mg and 20 mg tabs) and creatinine clearance &lt; 15 mL/min (10 mg tabs)</td>
</tr>
<tr>
<td>Use in hepatic impairment</td>
<td>No if severe</td>
<td>Contraindications</td>
<td>Hepatic disease associated with coagulopathy and clinically relevant bleeding risks, including severe hepatic impairment (Child-Pugh C)</td>
<td>Hepatic impairment or liver disease expected to have any impact on survival and if liver enzymes &gt; 2 x ULN</td>
<td>Significant hepatic disease (including Child-Pugh B and C), which is associated with coagulopathy leading to a clinically relevant bleeding risk</td>
</tr>
<tr>
<td>Use in elderly, extremes of body weight (&lt; 50 kg)</td>
<td>Caution</td>
<td>Avoid</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Consider (cont’):

<table>
<thead>
<tr>
<th></th>
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<th>Rivaroxiban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use in pregnancy</td>
<td>No (teratogenic)</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drug contraindications</td>
<td>Multiple</td>
<td>HIV protease inhibitors and ketoconazole, other anticoagulants</td>
<td>HIV protease inhibitors and ketoconazole, other anticoagulants</td>
<td>Systemic ketoconazole, cyclosporin, itraconazole or dronedarone Other anticoagulants</td>
<td>HIV protease inhibitors and ketoconazole, other anticoagulants</td>
</tr>
<tr>
<td>Drug interactions</td>
<td>Multiple</td>
<td>Fewer than warfarin</td>
<td>See Warfarin</td>
<td>See NOACs</td>
<td></td>
</tr>
</tbody>
</table>

For more information see [Anticoagulation](#).

- **Calculators and scores** can assist in the choice of anticoagulant.
  - Use the **SAME-TT₂R₂ Score Calculator**:
    - A score of 0 to 2 suggests a patient may benefit from warfarin.
    - A score > 2 indicates the use of alternative strategies e.g., NOACs.
  - Use **HAS-BLED** and **CHA₂DS₂-VASc** to identify and reduce or modify major risk factors e.g., falls risk, uncontrolled hypertension.
  - See [Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018: Figure 6: Stroke Prevention in AF](#).

- See also: [Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018: Section 6.3 Stroke Prevention with Anticoagulation](#) (for special situations)

- Address any modifiable bleeding risk factors.
- If CHA₂DS₂-VA score is 1, consider oral anticoagulants.
- If CHA₂DS₂-VA score is ≥ 2, start oral anticoagulants.

5. Decide and document selected rate or rhythm control strategy and review regularly. Consider:

- **Rate control therapy**
  - Consider in all patients with AF to ideally reduce heart rate to < 80 beats/minute. However, in some patients this will not be easily achieved and a rate between 80 and 110 may be acceptable.
  - May be the only treatment required in patients:
    - who are minimally symptomatic.
    - with failed attempts to control rhythm by cardioversion or antiarrhythmic therapy.
    - unsuitable for cardioversion or antiarrhythmic therapy (elderly or multiple co-morbidities).
  - **Medications**
    - Many patients will need more than one medication to control their rate.
    - To obtain and maintain long-term control of ventricular rate, use:
      - **Beta blockers**:
        - Metoprolol: 25 mg twice a day, up to 50 mg twice a day as tolerated.
        - Atenolol: 25 mg once daily, up to 50 mg once daily as tolerated.
      - **Calcium channel blockers**:  

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**South Eastern Melbourne PHN Atrial Fibrillation (AF) pathway**

9
- Diltiazem controlled release 180 to 360 mg orally, daily, or
- Verapamil sustained release 160 to 240 mg orally, daily – do not combine with beta blockers.

- **Digoxin** – usually second-line, except in heart failure:
  - If normal renal function – start with a 0.5 mg loading dose, then give two further doses of 0.25 mg at 4 hours and 8 hours on day 1.
  - Continue giving 0.25 mg daily and check digoxin levels in 4 to 5 days.
  - If elderly or renal impairment – start at 0.125 mg or 0.0625 mg daily, check levels in 4 to 5 days.
  - Toxicity: confusion, anorexia, nausea, visual disturbance, arrhythmias.
  - Drugs which may increase digoxin levels include amiodarone, diltiazem, verapamil, and quinidine.
  - Changes in frusemide dose can affect potassium balance, and hypokalaemia predisposes to digoxin toxicity.

  - Do not combine metoprolol or atenolol with either verapamil or sotalol, as it may cause severe bradycardia. (Can be given safely if a pacemaker is in situ.)
  - If heart rate is > 110 beats/minute despite maximal tolerated therapy, consider a [cardiology assessment](#).

- See Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018:
  - Figure 3: Acute Rate Control of AF with Rapid Ventricular Response
  - Figure 4: Chronic Rate Control of Atrial Fibrillation with Rapid Ventricular Response

- **Rhythm control and cardioversion**
  The goal is to revert to and maintain sinus rhythm either by electrical cardioversion, chemical cardioversion, or AF ablation.

  For the majority of patients, with asymptomatic AF, rate control and anticoagulant therapy is preferable to rhythm control because:
  - cardioversion can control rhythm but has a high recurrence rate, and may have complications.
  - antiarrhythmic medications have significant side-effects.

Consider if:
- failure to obtain adequate symptomatic heart rate control.
- clear precipitant for AF e.g., infection, surgery, thyrotoxicosis.
- first episode of AF, especially if severe symptoms.
- younger patient with few co-morbidities.

If rhythm control treatment is appropriate:
- if AF < 48 hours, the patient may be suitable for acute DC cardioversion. Arrange immediate cardiology assessment.
- if AF > 48 hours, start oral anticoagulants and rate control treatment, and arrange a cardiology assessment to consider cardioversion:
  - For symptomatic or compromised patients, arrange immediate cardiology assessment.
  - For stable patients, arrange urgent or routine cardiology assessment.

Chemical cardioversion may be indicated in some patients following specialist assessment. Cardiologist initiation of amiodarone, flecaïnide, and sotolol is recommended.

- **Catheter ablation therapy.**
Follow-up

1. Arrange follow-up. Not all patients require cardiologist assessment or cardiologist follow-up if the general practitioner is comfortable caring for the patient and all of:
   - No red flags or complications found
   - Echocardiogram performed
   - Anticoagulation started
   - Rate control started if required

2. Address any cardiovascular risk factor and co-morbidities.
   - Smoker or ex-smoker
   - Diabetes
   - Hyperlipidaemia
   - Hypertension
   - Heart failure
   - Obesity
   - Obstructive sleep apnoea
   - Diet
   - Alcohol use
   - Exercise or inactivity
   See Absolute Cardiovascular Disease Risk Assessment.

3. Arrange regular review to assess whether rate and/or rhythm control remain the most appropriate option.

4. Consider:
   - Chronic Disease Management Plan
   - Medication Management Review (HMR or RMMR)

Referral

- Arrange immediate cardiology assessment if recent onset atrial fibrillation with red flags.
- Arrange an urgent or routine cardiology assessment if:
  - recurrent paroxysmal atrial fibrillation.
  - AF where anticoagulation is contraindicated
  - AF with reduced left ventricular function or moderate valvular disease.
  - AF that is unresponsive to medical management and requires further advice on, or review of, the current management plan, including:
    - for consideration of cardioversion if AF > 48 hours and patient is stable.
    - if heart rate control is inadequate (i.e., > 110 beats per minute) or symptomatic.
    - if echocardiogram report suggests significant valvular disease, LV hypertrophy, or LV dysfunction.
- If any reversible causes, arrange endocrinology, respiratory, or cardiology referral as appropriate.
- Consider referral for a medication management review (Home Medicines Review or Residential Medication Management Review) if appropriate.
Information

For health professionals

Further information
- European Heart Journal – 2016 ESC Guidelines for the Management of Atrial Fibrillation Developed in Collaboration with EACTS
- Medical Journal of Australia – National Heart Foundation Consensus Statement on Catheter Ablation as a Therapy for AF
- National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand – Australian Clinical Guidelines for the Diagnosis and Management of Atrial Fibrillation 2018
- NPS MedicineWise:
  - Anticoagulants
  - Atrial Fibrillation: an Update on Management
- Therapeutic Guidelines (eTG complete) – Cardiovascular [subscription and login required]

For patients
- Better Health Channel – Heart Conditions: Atrial Fibrillation
- Health& – Atrial Fibrillation [video 58 seconds]
- Heart Foundation:
  - Atrial Fibrillation
  - My Heart, My Life [app]
- myDr – Atrial Fibrillation
- National Stroke Foundation Australia – Living with Atrial Fibrillation
- NPS MedicineWise – Warfarin and How to Take It

References


Disclaimer

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