Atrial Flutter

Atrial flutter has many clinical aspects that are similar to atrial fibrillation (AF) but they are different in terms of mechanism and management.[1] Some patients have both atrial flutter and atrial fibrillation and both arrhythmias are associated with a risk of thrombus formation and thromboembolism. Atrial flutter can be divided into two types:

- **Type I**, or typical, is well described both anatomically and electrically. It is always being interrupted by rapid atrial pacing, with atrial rates from 240-350 bpm.
- **Type II**, or atypical, is not fully characterised. It is associated with atrial rates above 350 bpm.

**Epidemiology**

- Atrial flutter is much less common than atrial fibrillation.
- Although the exact incidence is not known, it is a common arrhythmia estimated to be present in approximately 10% of patients presenting with a supraventricular tachycardia.[2]
- The prevalence increases with age.
- Atrial flutter is more common in men.
- It is common during the first week after open heart surgery.

**Aetiology**

Approximately 30% of patients have no underlying cardiac disease.

- Coronary heart disease.
- Atrial dilation due to septal defects, pulmonary emboli, mitral or tricuspid valve dysfunction or chronic ventricular failure.
- Open heart surgery.
- Hypertension.
- Obesity.
- Alcohol abuse.
- Chronic obstructive pulmonary disease.
- Cardiomyopathy.
- Atrial myxoma.
- Pericarditis.
- Sick sinus syndrome, cardiac conduction pre-excitation syndromes - eg, Wolff-Parkinson-White syndrome.
- Thyrotoxicosis, phaeochromocytoma, electrolyte imbalance.
- Obstructive sleep apnoea.

Use of non-aspirin non-steroidal anti-inflammatory drugs (particularly new use) has been found to be associated with a 40-70% increased relative risk of developing atrial flutter or fibrillation.[3]

**Presentation**

It may be asymptomatic but is generally not as well tolerated as atrial fibrillation and most often presents with palpitations.

- May present with ECG findings of atrial flutter.
- Mild symptoms include palpitations, irregular heartbeat, fatigue, dyspnoea, chest pain, dizziness.
- Syncope.
- Heart failure.
- Thromboembolism with transient ischaemic attacks or stroke.
Pulse may be irregular or regular, but is usually rapid. Arteriovenous conduction is usually 2:1, making the ventricular rate approximately 150 bpm. 1:1 atrioventricular (AV) conduction may lead to haemodynamic collapse. Carotid massage may decrease the ventricular rate. Atrial flutter waves may be present in the jugular venous pulse. May be associated with signs of underlying causes - eg, thyrotoxicosis, alcoholism, pericarditis, valvular dysfunction or septal heart defects. Heart failure, hypotension and respiratory distress may be present.

Differential diagnosis

- Supraventricular tachyarrhythmias.
- Atrial fibrillation.
- Wolff-Parkinson-White syndrome.

Investigations

Further assessment is focused on identifying any specific underlying cause and an assessment of cardiac function:

- Electrocardiogram:
  - The common form of type I atrial flutter has saw-tooth flutter waves, best seen in leads II, III, and aVF, with atrial rates of 240-340. A 12-lead ECG is gold standard for diagnosis. [4]
  - The ventricular response may be regular or irregular.
  - Variable AV conduction can also be seen (commonly present with 2:1 or 3:1 AV conduction).
  - May be normal if paroxysmal and between episodes of atrial flutter. Ambulatory ECG monitoring and event recorders may be required.

- Investigations for associated causes: CXR, TFTs, FBC, ESR, renal function and electrolytes, LFTs and coagulation screen (pre-warfarin).
- Echocardiogram:
  - To evaluate underlying cardiac function, structural abnormalities, evidence of coronary artery disease or pericardial fluid.
  - If immediate cardioversion is considered, it is also used to detect any thrombus formation.

Associated diseases

- Episodes of atrial flutter and atrial fibrillation often occur in the same patient.
- Atrial fibrillation occasionally occurs when atrial flutter deteriorates into multiple small re-entrant wavelets.

Management
Treatment shares similar goals to that of atrial fibrillation, including rate control, prevention of recurrent episodes and prevention of thromboembolism. Rate control is usually achieved with cardioversion or medications. The preferred therapy for recurrent or persistent atrial flutter is now considered to be radiofrequency and cryotherapy catheter ablation.\cite{5, 6, 7}

- Treatment of underlying conditions - eg, hyperthyroidism, alcoholism, obesity. After the initial episode is terminated and the underlying disease is treated, the patient may not need any further intervention except avoidance of the precipitating factor (eg, alcohol, caffeine).
- If haemodynamically unstable: urgent rate control or cardioversion is required.
- Adequate anticoagulation has been shown to decrease thromboembolic complications in patients with persistent or paroxysmal atrial flutter and in patients who are undergoing cardioversion. Patients with atrial flutter are anticoagulated in the same way as for atrial fibrillation. See the separate article on Atrial Fibrillation for details.

**Catheter radiofrequency ablation**

- **Catheter ablation** is suggested as the first-line therapy in patients with atrial flutter and normal or mildly enlarged left atrial size. The success rate of radiofrequency catheter ablation for atrial flutter is 90-95\%.\cite{8}
- It has been shown to have a higher success rate, better quality of life, lower occurrence of atrial fibrillation and less need for hospital re-admission when compared with drug treatment.
- Type I atrial flutter is amenable to cure with catheter ablation. Type II flutter is potentially curable with catheter-based techniques but is more difficult.

**Electrical cardioversion**

- **External electrical cardioversion** is safe and effective.
- If the atrial flutter has persisted for more than 48 hours then adequate anticoagulation is required before cardioversion to avoid the complication of emboli.

**Pharmacological cardioversion**

- Intravenous amiodarone, sotalol, flecainide or propafenone may be used to restore sinus rhythm.
- Ibutilide and dofetilide, which are able to achieve very rapid cardioversion, are not currently available in the UK.

**Ventricular rate control**

- Rate control should not be used as the first-line strategy for people with with atrial flutter whose condition is considered suitable for an ablation strategy to restore sinus rhythm.\cite{9}
- Rate control is usually more difficult for atrial flutter than for atrial fibrillation. However, rate control is less likely than rhythm control to make the arrhythmia worse.
- Ventricular rate control can be achieved with drugs that block the AV node. Calcium-channel blockers (eg, verapamil, diltiazem), beta-blockers and amiodarone can be used. The National Institute for Health and Care Excellence Clinical Knowledge Summaries (NICE CKS) suggest atenolol or metoprolol if the rate is uncontrolled.\cite{4}
- The ventricular rate at rest can sometimes be controlled with digoxin but digoxin does not usually adequately control heart rate during exertion.

**Anti-arrhythmic agents**

- The use of anti-arrhythmic drugs in atrial flutter is similar to that of atrial fibrillation.
- The most effective drugs are the class III anti-arrhythmic agents, dofetilide or ibutilide. Alternative class III agents include amiodarone and sotalol, which are the most commonly used anti-arrhythmic agents for the prevention of recurrences of atrial flutter.
- Second-line treatment to control rhythm are the class Ic anti-arrhythmics flecainide or propafenone. Class Ic agents should only be considered for patients with no structural heart disease.\cite{1}

**Pacemaker**

- In some situations - eg, after cardiac surgery - overdrive atrial pacing may be required for acute control of atrial flutter.
- Atrial overdrive pacing can be performed invasively or via a transoesophageal electrode to pace the left atrium, with a success rate of approximately 50\%.\cite{2}
Prevention of thromboembolism

- Patients with atrial flutter should be given antithrombotic therapy in the same manner as those with atrial fibrillation.\(^9\) The CHA\(_2\)DS\(_2\)-VASc stroke risk score should be used to assess stroke risk in people with atrial flutter.\(^10\) See the separate article on Atrial Fibrillation for details.
- Adequate anticoagulation has been shown to decrease thromboembolic complications in patients with chronic atrial flutter and in patients undergoing cardioversion.
- Long-term anticoagulation is therefore advised for patients with persistent or paroxysmal atrial flutter.
- After successful catheter ablation, anticoagulation can be stopped 4-6 weeks later if sinus rhythm is still present.
- Cardioversion of atrial flutter presents similar risks to cardioversion of atrial fibrillation and therefore requires similar anticoagulation. See the separate article on Atrial Fibrillation.

Surgical

In patients who have atrial flutter and need cardiac surgery, creation of a cryothermal lesion can be curative for atrial flutter and may also prevent an incisional re-entrant arrhythmia.

Complications

- Heart failure; acute atrial flutter can impair cardiac function, lower blood pressure, and initiate myocardial ischaemia.\(^2\)
- Thromboembolism (transient ischaemic attacks and stroke). Systemic embolism is less commonly associated with atrial flutter than with atrial fibrillation, but is still a significant risk. The risk of stroke in patients with atrial flutter is increased by about 40% (compared to 60% for patients with atrial fibrillation).
- Tachycardia-induced cardiomyopathy.
- Persistent untreated atrial flutter can become chronic atrial fibrillation.

Prognosis

- Atrial flutter leads to an increased overall mortality.
- It often converts within one week to normal sinus rhythm or atrial fibrillation but can occasionally persist for weeks or months.

Prevention

- Effective prevention and management of potential causes - eg, hypertension, obesity, excessive alcohol intake, hyperthyroidism and obstructive sleep apnoea.

Further reading & references

- Palpitations; NICE CKS, March 2009 (UK access only)
- Percutaneous radiofrequency catheter ablation for atrial fibrillation; NICE Interventional Procedure Guidance, April 2006
- Management of atrial fibrillation; NICE Clinical Guideline (June 2014)
- CHA2DS2-VASc Score - Stroke Risk in Atrial Fibrillation; MDCalc Online Calculator

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