Mini Review

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Modern management of acute atrial fibrillation and atrial flutter

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CAPSULE SUMMARY
Modern management of acute atrial fibrillation and flutter includes aggressive rhythm control with drugs or electricity, performed by emergency department physicians without the need for consultation. Most patients can be rapidly discharged home after treatment and resume normal activities without the need for hospitalization or delayed cardioversion. Important concepts include differentiating between primary and secondary tachyarrhythmias and when it is safe to cardiovert versus using rate control. Understanding how to prevent stroke is equally important.

ABSTRACT
This clinical review is intended to assist emergency physicians manage patients who present to the emergency department (ED) with acute/recent-onset atrial fibrillation (AF) or flutter (AFL). This article is based primarily on the 2021 Canadian Association of Emergency Physicians (CAEP) Acute Atrial Fibrillation/Flutter Best Practices Checklist. We encourage readers to download the open access CAEP Checklist article (https://link.springer.com/article/10.1007/s43678-021-00167-y) and the free smartphone app (CAEP Atrial Fibrillation Guide). We focus on four key elements of ED care: assessment and risk stratification, rate and rhythm control, short-term and long-term stroke prevention, and disposition and follow-up.

It is important to determine if AF/AFL with rapid ventricular response is a primary arrhythmia or secondary to medical causes. While it is unusual for patients with primary AF to be unstable, urgent cardioversion is occasionally required. The criteria for when cardioversion is safe have recently changed and it is essential that physicians are well versed in them. When rhythm control is not safe, provide effective and safe IV rate control. When rhythm control is safe, either pharmacological or electrical cardioversion acceptable, per patient and physician preference. Rapid ventricular pre-excitation (Wolff-Parkinson-White Syndrome) usually, but not always, requires urgent electrical cardioversion. ED physicians should prescribe oral anticoagulants at discharge if indicated. No specific direct oral anticoagulant is preferred, and references should be freely consulted for optimal dosing. Hospital admission is rarely required for acute AF/AFL patients, who should be given good discharge instructions.

Word count: 235
Key Words: Emergency Department, Atrial Fibrillation, Atrial Flutter, Cardioversion
INTRODUCTION

This clinical review is intended to assist emergency physicians everywhere manage patients who present to the emergency department (ED) with acute/recent-onset atrial fibrillation (AF) or flutter (AFL). We will focus on symptomatic patients with acute AF or AFL, i.e. those with recent-onset episodes (either first detected, recurrent paroxysmal or recurrent persistent episodes) where the onset is generally less than 48 hours but may be as much as seven days. These are the most common acute arrhythmia cases requiring care in the ED.

Canadian emergency physicians are known for publishing widely on this topic and for managing these patients quickly and efficiently in the ED.1-15 This article is based primarily on the 2021 Canadian Association of Emergency Physicians (CAEP) Acute Atrial Fibrillation/Flutter Best Practices Checklist.16 The CAEP Checklist was adapted, for use by emergency physicians, from existing high-quality clinical practice guidelines previously developed by the Canadian Cardiovascular Society (CCS).17 18 These guidelines were developed and revised using a rigorous process that is based on the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system of evaluation.19 The CAEP Checklist Advisory Committee consisted of 14 emergency physicians, four cardiologists, and two patients. The 2021 process included review of new evidence,2 13 20 the 2020 CCS guidelines,17 and several commentaries that had expressed the concern of the Canadian ED community.21-23

We focus on four key elements of ED care: assessment and risk stratification, rate and rhythm control, short-term and long-term stroke prevention, and disposition and follow-up. We encourage readers to download the open access CAEP Checklist article (https://link.springer.com/article/10.1007/s43678-021-00167-y) and the free smartphone app (CAEP Atrial Fibrillation Guide).

A. ASSESSMENT AND RISK STRATIFICATION

1. Is AF/AFL with Rapid Ventricular Response a Primary Arrhythmia or Secondary to Medical Causes?

While rapid AF/AFL is often a primary arrhythmia with sudden onset, it may also be secondary to medical causes (usually in patients with pre-existing/permanent AF) such as sepsis, bleeding, pulmonary embolus, heart failure, acute coronary syndrome, etc. For these secondary cases, investigate and treat the underlying causes aggressively, do not cardiovert as it may be harmful, and avoid aggressive rhythm control.

Note that the rapid rate is more likely to be secondary to an underlying medical cause if there is no sudden onset or palpitations; the patient has known permanent AF, is on oral anticoagulants, and old ECGs show AF; there is no history of ED cardioversions; and the patient has fever, dyspnea, or pain.

2. Is the Patient Unstable?

Instability due to acute primary AF/AFL is uncommon, except for AF with rapid ventricular pre-excitation, which usually requires cardioversion. Consider urgent cardioversion if definitely primary and the patient has: a) hypotension with systolic BP <90 mmHg or signs of shock (e.g., altered mental status), b) cardiac ischemia with ongoing severe chest pain or marked ST depression (>2mm) on ECG despite therapy, or c) pulmonary edema with significant dyspnea, crackles, and hypoxia. Note that there is often a small rise in troponin due to demand and this should not be considered acute coronary syndrome.

3. Is it Safe to Cardiovert this Patient with Primary AF/AFL?

When it is safe, rhythm control is usually preferable to rate control with better patient quality of life, shorter length of stay, and fewer hospital resources.12 The guidance has recently changed based on several observational studies,24 25 and it is now considered safe to cardiovert if: a) The patient has been adequately anticoagulated for a minimum of 3 weeks, or...
b) The patient is not adequately anticoagulated for > 3 weeks, has no history of stroke or TIA, AND does not have valvular heart disease, and:
1. Onset < 12 hours ago, or
2. Onset 12 - 48 hours ago and there are <2 of these CHADS criteria (age ≥ 65, diabetes, hypertension, heart failure), or
3. The patient is negative for left atrial thrombus on transesophageal echocardiography
   Consider delaying cardioversion if there is a recent history of frequent palpitations. Rate control may be acceptable, per patient and physician preference, e.g. older patients who are minimally symptomatic with a mildly elevated heart rate.

B. RATE AND RHYTHM CONTROL
4. Rate Control for Patients for Whom Cardioversion is Unsafe
   Calcium channel- and beta- blockers are considered first line. If patient is already taking oral calcium channel- or beta- blocker, choose same drug group first. If difficulty achieving adequate rate control, consider using the other first-line agent, IV digoxin, or cardiology consultation. Aim for a target heart rate of <100 bpm at rest and <110 walking.
   a) Calcium channel blockers should be avoided if acute heart failure or known left ventricular dysfunction (POCUS may be helpful). Suggest diltiazem 0.25 mg/kg IV over 10 minutes; repeat q15-20 min at 0.35 mg/kg up to 3 doses within one hour. Start 30-60 mg orally within 30 mins of effective IV rate control. Discharge on 30-60mg QID or Extended Release 120-240 mg once daily.
   b) Beta blockers. Give metoprolol 2.5-5 mg IV over 2 minutes and repeat q15-20 min up to 3 doses within one hour. Start 25-50 mg PO within 30 mins of effective IV rate control and discharge on 25-50 mg BID.
   c) Digoxin is second line, as slow onset. Give 0.25-0.5 mg loading dose, then 0.25mg IV q4-6h to a maximum of 1.5 mg over 24 hours; use caution in renal failure. Consider first line if hypotension or acute HF.
5. Rhythm Control
   Either pharmacological or electrical cardioversion is acceptable, per patient and physician preference. Consider previous episodes and if one doesn’t work, try the other. Pre-treatment with rate control agents is not recommended as it is ineffective and delays definitive treatment. We prefer IV medications as they are much faster in onset than oral agents such as propafenone and flecainide.
   a) Pharmacological cardioversion. We recommend procainamide IV – 15 mg/kg in 500 ml NS over 60 minutes, to a maximum of 1,500mg. Avoid if systolic BP <100 mm Hg or QTc >500 msec. Interrupt infusion if BP drops and administer IV fluid bolus.
   While IV amiodarone may be useful for post-operative or medically ill patients, it is not recommended for acute AF in the ED as it is slow and has low efficacy. Depending on where you live other options include IV vernakalant, propafenone, flecainide, and ibutilide (which may cause torsades de pointes).
   b) Electrical cardioversion can be easily performed by ED physicians without need for cardiology or anesthesia. We recommend a minimum of two staff (RN/RRT; RN/RN) and a second physician is ideal if feasible. Use procedural sedation as per local practice, administered by the ED physician.
   Start with 150-200 joules synchronized – avoid starting with low energy level or the patient may awaken prematurely. Both the antero-lateral or antero-posterior paddle/pad positions
are equally effective. Avoid sternum and breast tissue. If unsuccessful, apply pressure with paddles and try the other position. Many patients can be discharged as soon as 30 minutes after conversion if treated with IV procainamide or electrical cardioversion.

6. Rapid Ventricular Pre-Excitation (Wolff-Parkinson-White Syndrome)

Urgent electrical cardioversion is usually required. Some patients, however, may be stable in which case use IV procainamide. AV nodal blocking agents are contraindicated (digoxin, calcium channel-, beta-blockers, adenosine, amiodarone) and could lead to life-threatening deterioration.

C. STROKE PREVENTION

7. Anticoagulation

Antithrombotic therapy prescribed at discharge is for long-term stroke prevention. We do not recommend use of IV heparin or oral anticoagulants (OACs) for cardioversion in the ED.

If the patient is “CHADS-65 positive” (any of age ≥ 65, diabetes, hypertension, heart failure, stroke/TIA), prescribe OAC prior to discharge. Consider shared decision making to include patients’ preferences with regards to risks and benefits. Generally direct-acting OACs (DOAC) are preferred over warfarin. Use warfarin (DOACs contraindicated) if the patient has a mechanical valve, moderate-severe mitral stenosis, or severe renal impairment (CrCl <30 ml/min). For patients with coronary artery disease, discontinue ASA if stable. If patient is taking other anti-platelets or had PCI <12 months, consult cardiology.

If “CHADS-65 negative”, OAC might be considered for a 4-week period after careful consideration of risks and benefits and a shared decision-making process with the patient. Ensure patient is aware anticoagulation will be discontinued after 4 weeks.

If TEE-guided cardioversion is performed, DOACs should be started immediately for four weeks.

Patients who convert spontaneously before ED treatment should generally be prescribed OAC according to the CHADS-65 criteria.

8. DOACs and Warfarin

We recommend the Thrombosis Canada App for details. Avoid in pregnancy or breastfeeding. Consult nephrology or thrombosis if CrCl <30 ml/min.

a) DOACs. We do not recommend one DOAC over the others.
   a) Dabigatran – 150 mg BID; use 110 mg BID if age > 80 years, or >75 years with bleeding risk.
   b) Rivaroxaban – 20 mg daily; use 15 mg daily if CrCl 30-49 ml/min.
   c) Apixaban – 5 mg BID; use 2.5 mg BID if two of: 1) serum creatinine > 133 umol/L, 2) age > 80 years, or 3) body weight < 60 kg.
   d) Edoxaban – 60 mg daily; use 30 mg daily if CrCl 30-50 ml/min or weight <60kg; important drug interactions.

b) Warfarin. If indicated, initiate at 5 mg daily; (1-2 mg daily if frail, low weight, Asian descent). Heparin bridging not required unless TEE-guided cardioversion. Arrange for INR testing and review after 3 or 4 doses of warfarin. Subsequent warfarin doses should be communicated to patient on the day of the INR test.

D. DISPOSITION AND FOLLOW-UP

9. Admission to Hospital

Admission is rarely required for uncomplicated acute AF/AFL patients unless they a) are highly symptomatic despite adequate treatment, b) have acute coronary syndrome with
significant chest pain, troponin rise, and ECG changes, or c) have acute heart failure not improved with ED treatment. We do not recommend routine measurement of troponin.

10. Follow-up Issues

We recommend physician follow-up within 7 days if a new prescription for warfarin or rate control agents. We suggest cardiology or internal medicine follow-up in 4-6 weeks, unless already followed or if new medications prescribed. Provide a patient handout (e.g. from Thrombosis Canada) describing new medications, atrial fibrillation, and follow-up. Early renal function monitoring is important for newly prescribed DOACs. Do not initiate oral anti-arrhythmic agents like amiodarone or propafenone in the ED, as these are better left to cardiologists. If sinus rhythm achieved, there is generally no need to initiate beta- or calcium channel-blockers.
REFERENCES


