CAEP Acute Atrial Fibrillation/Flutter Best Practices Checklist

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The *CAEP Acute Atrial Fibrillation/Flutter Best Practices Checklist* was created to assist emergency physicians in Canada and elsewhere manage patients who present to the emergency department (ED) with acute/recent-onset atrial fibrillation or flutter. The checklist focuses on symptomatic patients with acute atrial fibrillation (AAF) or flutter (AAFL), 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.[1,2] Canadian emergency physicians are known for publishing widely on this topic and for managing these patients quickly and efficiently in the ED.[3-5]

This project was funded by a research grant from the Canadian Arrhythmia Network and the resultant guidelines have been formally recommended by the Canadian Association of Emergency Physicians (CAEP). We chose to adapt, for use by emergency physicians, existing high-quality clinical practice guidelines (CPG) previously developed by the Canadian Cardiovascular Society (CCS).[6-8] These CPGs were developed and revised using a rigorous process that is based on the GRADE (Grading of Recommendations Assessment, Development and Evaluation) system of evaluation.[9,10] With the assistance of our PhD methodologist (IG), we used the recently developed Canadian CAN-IMPLEMENT© process adapted from the ADAPTE Collaboration.[11-13] We created an Advisory Committee consisting of ten academic emergency physicians (one also expert in thrombosis medicine), four community emergency physicians, three cardiologists, one PhD methodologist, and two patients. Our focus was four key elements of ED care: assessment and risk stratification, rhythm and rate control, short-term and long-term stroke prevention, and disposition and follow-up. The Advisory Committee communicated by a two-day face-to-face meeting in March 2017, teleconferences,

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and email. The checklist was prepared and revised through a process of feedback and discussions on all issues by all panel members. These revisions went through ten iterations until consensus was achieved. We then circulated the draft checklist for comment to approximately 300 emergency medicine and cardiology colleagues; their email written feedback was further incorporated and the final version created and approved by the panel.

During the consensus and feedback processes, we addressed a number of issues and concerns, some of which required extensive discussion. We spent considerable time defining what is meant by "unstable" and highlighting the issue that many unstable patients are actually suffering from underlying medical problems rather than a primary arrhythmia. Where possible we chose to simplify the checklist, for example listing only procainamide for pharmacological cardioversion. Other drugs were considered including vernakalant, ibutilide, propafenone, flecainide, and amiodarone. We also tried to give specific drug dosage recommendations, recognizing that physicians are free to consult any number of excellent pharmaceutical references. The panel believes that, overall, a strategy of ED cardioversion and discharge home from the ED is preferable from both the patient and the healthcare system perspective, for most patients. One controversial recommendation is to consider rate control or transesophageal echocardiography (TEE)-guided CV if the duration of symptoms is 24-48 hours and the patient has two or more CHADS-65 criteria. This is based on some recent data from Finland.[14,15] We emphasize the importance of evaluating long-term stroke risk by use of the CHADS-65 algorithm and encourage ED physicians to prescribe anticoagulants where indicated.

Our hope is that the *CAEP Acute Atrial Fibrillation/Flutter Best Practices Checklist* will standardize and improve care of AAF and AAFL in large and small EDs alike. We believe that these patients can be managed rapidly and safely, with early ED discharge and return to normal activities.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit https://doi.org/10.1017/cem.2018.26

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APPENDICES

CAEP Acute Atrial Fibrillation/Flutter Best Practices Checklist

Panelists

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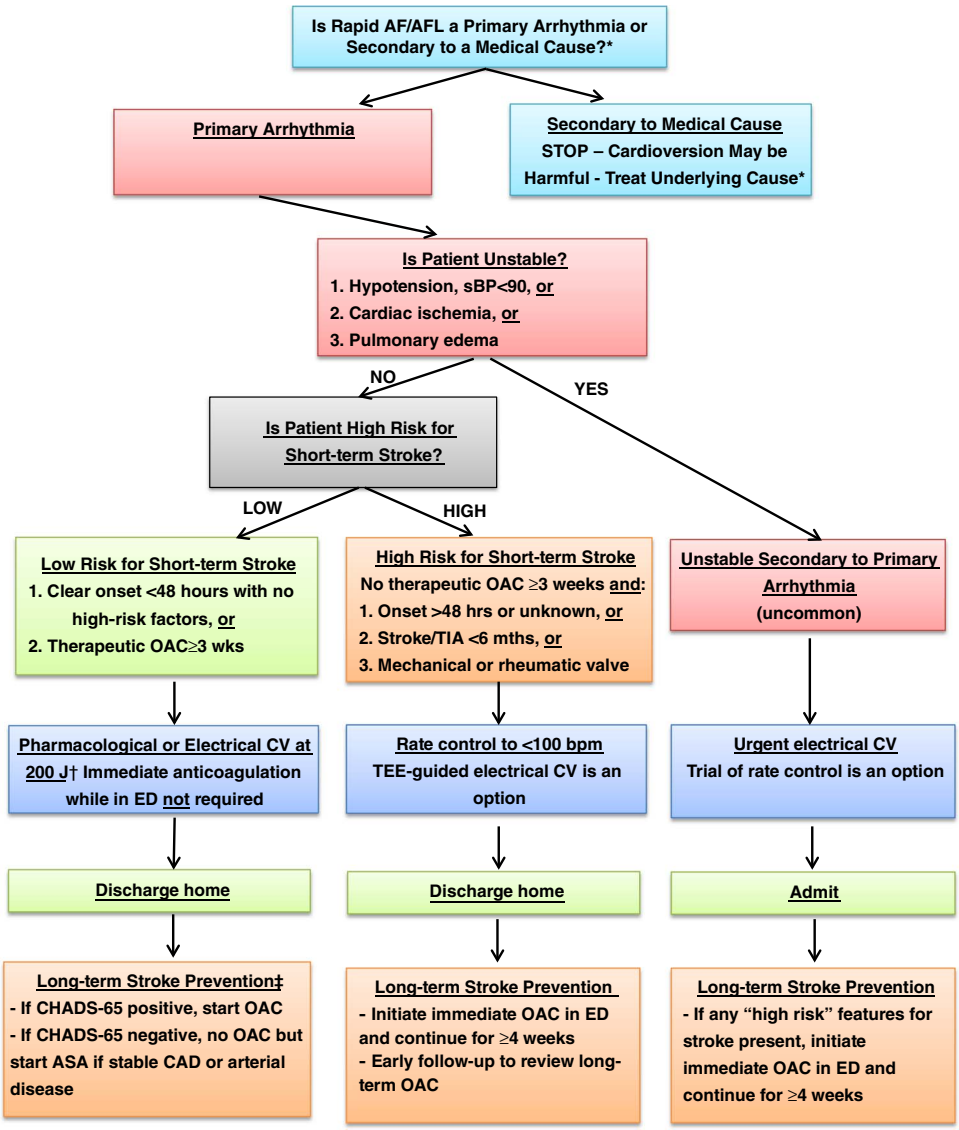

Figure 1. Overall management algorithm for patients presenting to the ED with acute atrial fibrillation or flutter. Adapted from CCS 2014 Figure 2.[7]

Notes.

* Consider medical cause (e.g. sepsis, bleeding, PE, heart failure, ACS, etc) if not sudden onset, HR < 150, fever, known permanent AF; cardioversion may be harmful, rate control discouraged; investigate and treat underlying condition aggressively

† Consider rate control or transesophageal echocardiography (TEE)-guided CV if duration 24-48 hrs and two or more CHADS-65 criteria

‡ If CHADS-65 positive, start OAC; if stable CAD, discontinue ASA; if CAD with other anti-platelets or recent PCI, consult cardiology (see Figure 2)

ASA = acetylsalicylic acid; CAD = coronary artery disease; CHADS-65 = age 65, congestive heart failure, hypertension, age, diabetes, stroke / transient ischemic attack; CV = cardioversion; NOAC = novel direct oral anticoagulant; OAC = oral anticoagulant; TIA = transient ischemic attack.

A. Assessment and Risk Stratification

□ 1a) Is Rapid AF/AFL a Primary Arrhythmia or Secondary to Medical Causes?

- □ **Secondary to medical causes (usually in patients with pre-existing/permanent AF),** *e.g. sepsis, bleeding, PE, heart failure, ACS, etc*
  - *Investigate and treat underlying causes aggressively*
  - *Cardioversion may be harmful*
  - *Avoid rate control*
- □ **Primary arrhythmia**

TIP: More likely to be secondary to medical cause if:
- *Not sudden onset, no palpitations*
- *Known permanent AF, on OACs, old ECGs show AF*
- *No history of ED cardioversions*
- *HR <150*
- *Fever, dyspnea, pain*

□ 1b) Is the Patient Unstable?

- **Unstable due to acute primary AF/AFL is uncommon, except for AF with rapid ventricular pre-excitation (WPW)**
  - □ **i) Hypotension:** s*BP <90, or signs of shock (e.g. altered mental status)*
  - □ **ii) Cardiac ischemia:** ongoing *severe chest pain or marked ST depression (>2mm) on ECG despite therapy*
  - □ **iii) Pulmonary edema:** *significant dyspnea, crackles, and hypoxia*

□ 2a) Stable Low-Risk for Short-term Stroke

- □ **Clear onset <48 hours, OR**
  - *If 24-48 hrs and two or more CHADS-65 criteria, may not be low risk*
- □ **NOAC or therapeutic warfarin for at least 3 weeks**

□ 2b) Stable High-Risk for Short-term Stroke

- □ **No/Inadequate OAC, AND**
- □ **One of:**
  - □ **Onset >48 hours or unknown, or**
  - □ **Stroke/TIA <6 months or**
  - □ **Valvular heart disease:** *Mechanical (INR should be >2.5) or rheumatic mitral stenosis*

TIP: How to determine if therapeutic OAC x 3 weeks?
- *Based on MD judgment*
- *NOAC - confirm compliance by history*
- *Warfarin*
  - *Current INR >2.0?*
  - *Recent INR values >2.0?*
  - *Recent INR testing confirmed by history?*
  - *No recent changes in dose?*

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B. Rhythm and Rate Control

☐ 1) Unstable due to Primary Arrhythmia

- **Unstable due to acute AF/AFL is very uncommon**
  - ☐ **Urgent electrical CV if onset <48 hrs or WPW**
  - ☐ **Consider trial of rate control if onset >48 hrs**

☐ 2a) Stable Low-Risk for Short-term Stroke

- ☐ **Rhythm control preferable,** *patient quality of life, shorter length of stay, fewer hospital resources*
  - *Immediate anticoagulation in ED not required*
  - *If onset 24-48 hrs and two or more CHADS-65 criteria, consider rate control or TEE-guided CV*
- ☐ **Rate control acceptable, per patient and physician preference**
  - *E.g. elderly patients who are minimally symptomatic*

☐ 2b) Stable High-Risk for Short-term Stroke

- ☐ **Rate control recommended**
- ☐ **Rhythm control only if cleared by transesophageal echocardiography (TEE)**
  - *Requires bridging with LMW heparin or NOAC*

☐ 3a) Rhythm Control

- **Either pharmacological or electrical cardioversion acceptable, per patient and physician preference**
  - *consider previous episodes; if one doesn't work, try the other*
- **Pre-treatment with rate control agents not recommended** – *ineffective and delays treatment*
  - ☐ **Pharmacological cardioversion**
    - ☐ **Procainamide IV –** *15 mg/kg in 500 ml NS over 30-60 minutes*
      - *avoid if SBP <100 mm Hg or QTc >500 msec*
      - *interrupt infusion if BP drops or QRS lengthens visibly (i.e. >30%)*
      - *check QTc after conversion*
    - **Amiodarone IV not recommended –** *slow, low efficacy*
    - **Less commonly used options include:** vernakalant IV, ibutilide IV, propafenone PO, and flecainide PO
  - ☐ **Electrical cardioversion**
    - ☐ **Setup –** *minimum 2 staff (RN/RRT; RN/RN), 2nd physician ideal*
    - ☐ **Procedural sedation per local practice –** *e.g. Fentanyl, Propofol*
    - ☐ **Pad/paddle position –** *either antero-lateral or antero-posterior acceptable*
      - *avoid sternum, breast tissue; if failure, apply pressure with paddles, try the other position*
    - ☐ **Start with 200 joules synchronized –** *avoid starting with low energy level*
- **Most patients can be discharged within 30 minutes of conversion**

☐ 3b) Rate Control

- **Calcium channel- and beta- blockers considered first line**
  - *If patient 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*
  - ☐ **Calcium channel blocker:** *avoid if acute heart failure or known LV dysfunction*
    - *Diltiazem 0.25 mg/kg IV over 10 minutes; repeat q15-20 min at 0.35 mg/kg up to 3 doses*

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- *Start 30-60 mg PO within 30 mins of effective IV rate control*
- *Discharge on 30-60mg QID or Extended Release 120-240 mg once daily*

☐ **Beta Blocker –** *Metoprolol 2.5-5 mg IV over 2 minutes, repeat q15-20 min up to 3 doses*

- *Start 25-50 mg PO within 30 mins of effective IV rate control*
- *Discharge on 25-50 mg BID*

☐ **Digoxin is second line, as slow onset –** *0.25-0.5 mg loading dose, then 0.25mg IV q4-6h to a maximum of 1.5 mg over 24 hours; caution in renal failure*

- *Consider first line if hypotension or acute HF*

☐ **Heart rate target achieved:** *<100 bpm at rest, <110 walking*

☐ 4) Rapid Ventricular Pre-Excitation (WPW)

☐ **Urgent electrical CV**

☐ **Procainamide IV if stable**

- **AV nodal blocking agents contraindicated:** *digoxin, calcium channel blockers, beta-blockers, adenosine, amiodarone*

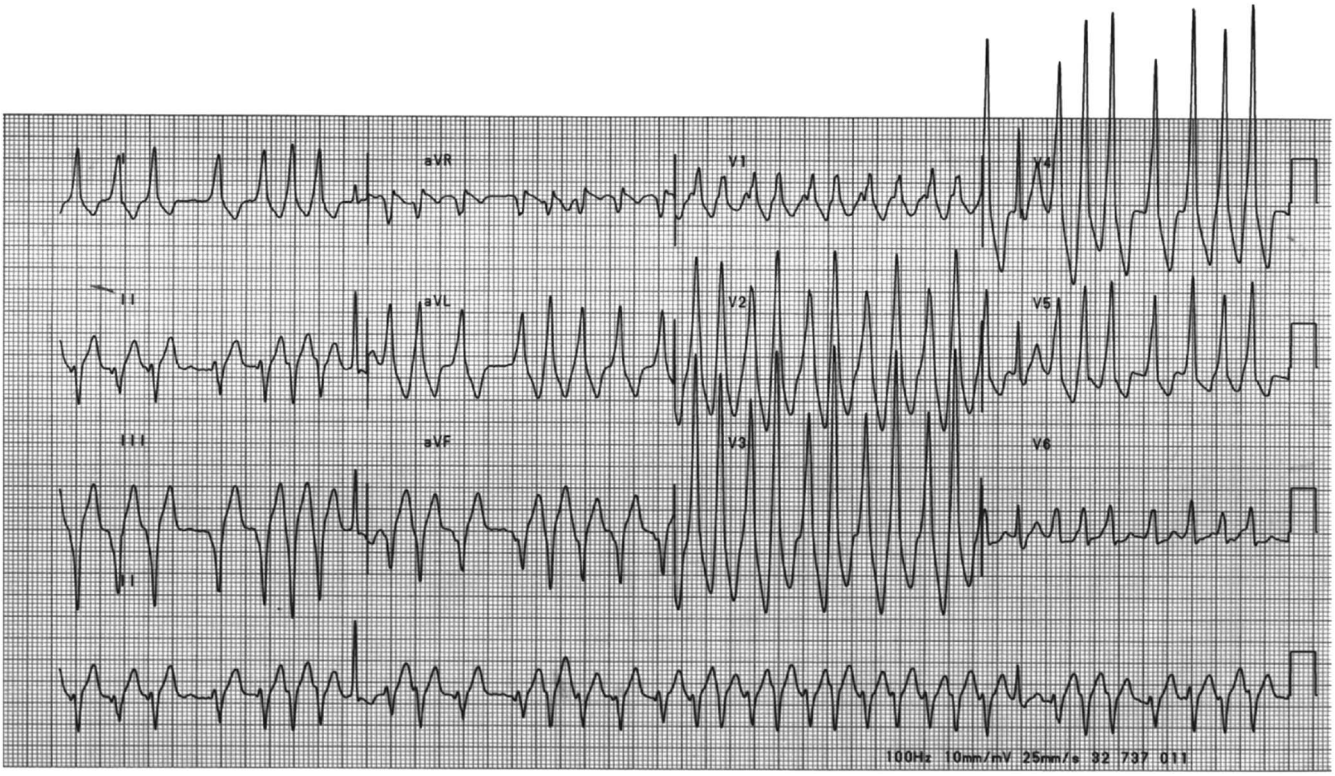

Figure 2. Rapid Ventricular Pre-Excitation

C. Long-term Stroke Prevention

☐ 1) CHADS-65 Algorithm[8]–*Figure 3*

- **Antithrombotic therapy prescribed at discharge is for long-term prevention of strokes**
  - ☐ **If CHADS-65 positive, initiate oral anticoagulation**
    - *NOACs preferred over warfarin*
    - *Use warfarin if mechanical valve, rheumatic mitral stenosis, severe renal impairment (CrCl <30 ml/min)*
    - *To decrease bleeding risk: exercise caution if very high fall risk; advise discontinuation of NSAIDs and heavy drinking*
    - *If stable CAD, discontinue ASA*
    - *If CAD with other anti-platelets or recent PCI <12 mos, consult cardiology*
  - ☐ **If CHADS-65 negative, no oral anticoagulation**
  - ☐ **If CHADS-65 negative and stable coronary, aortic, or peripheral vascular disease, initiate ASA-***81 mg daily*
    - *Patients already taking anti-platelet agents require follow-up with cardiology*
  - ☐ **If TEE-guided CV, must initiate NOAC immediately x 4 weeks** *(for rapid onset)*
    - *If warfarin, need LMW heparin bridging*
    - *Need follow-up with cardiology for long-term stroke prevention*
- **Patients converting spontaneously before ED treatment should generally be prescribed OAC according to the CHADS-65 criteria**
- Physicians prescribing OACs should consider ***shared decision making*** to include patients preferences with regards to risks and benefits

☐ 2a) NOACs

- **See *Thrombosis Canada App* for details;** *avoid in pregnancy, breastfeeding*
- **Do not use if CrCl <30 ml/min**
- **Provincial formularies may require Limited Use codes,** *e.g. failure of warfarin or INR monitoring not possible*
  - ☐ **Dabigatran –** *150 mg BID; use 110 mg BID if age > 80 years, or >75 years with bleeding risk*
  - ☐ **Rivaroxaban –** *20 mg daily; use 15 mg daily if CrCl 30-49 ml/min*
  - ☐ **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*
  - ☐ **Edoxaban –** *60 mg daily; use 30 mg daily if CrCl 30-50 ml/min or weight ≤ 60 kg; important drug interactions*

☐ 2b) Warfarin

- ☐ **Initiate warfarin:** *5 mg daily; 1-2 mg daily if frail, low weight, Asian descent*
  - *Heparin bridging not required unless TEE-guided CV*

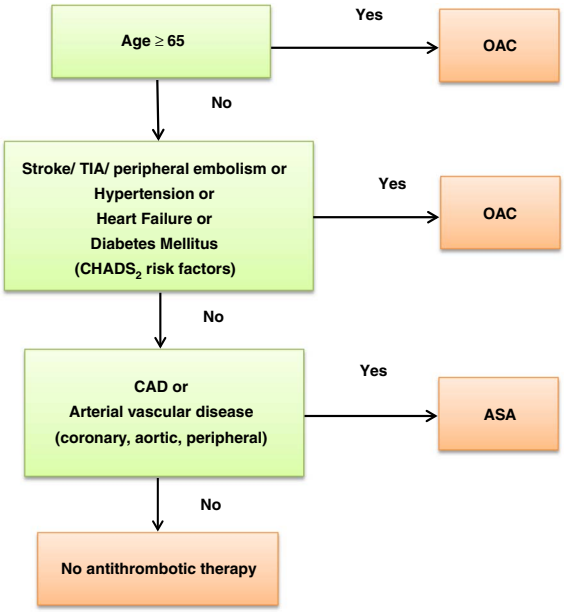

Figure 3. "CCS algorithm" ("CHADS65") for long-term stroke prevention in AF

D. Disposition and Follow-up

□ 1) Admission to Hospital

- **Patients rarely require hospital admission for uncomplicated acute AF/AFL unless they:**
  - **□ are highly symptomatic despite adequate treatment**
  - **□ have ACS with significant chest pain, troponin rise, and ECG changes**
    - *no need to routinely measure troponin, small demand rise expected*
  - **□ have acute heart failure not improved with ED treatment**

□ 2) Anti-thrombotic Therapy for Long-term Stroke Prevention

- **□ If CHADS-65 positive, prescribe NOAC or warfarin, regardless of whether rhythm or rate control used**
- **□ If CHADS-65 negative and stable CAD or arterial vascular disease, continue or prescribe ASA**

□ 3) Follow-up Issues

- **□ Ensure INR monitoring at 3-5 days if warfarin initiated**
- **□ Recommend physician follow-up <7 days, if new warfarin or rate control meds**
- **□ Recommend cardiology / internal medicine follow-up in 4-6 weeks if not already followed or if new medications prescribed**
- **□ Provide handout describing new medication, atrial fibrillation, and follow-up; early renal function monitoring if new NOAC; Thrombosis Canada has patient information sheets**

- **Do not initiate anti-arrhythmic agents like amiodarone or propafenone in the ED**
- **If sinus rhythm achieved, generally no need to initiate beta- or calcium channel-blockers**

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