

## ACUTE ATRIAL FIBRILLATION DURING HOSPITALIZATION

### Acute atrial fibrillation (AF)

Acute AF is defined as AF detected in an acute care setting or during an acute illness.

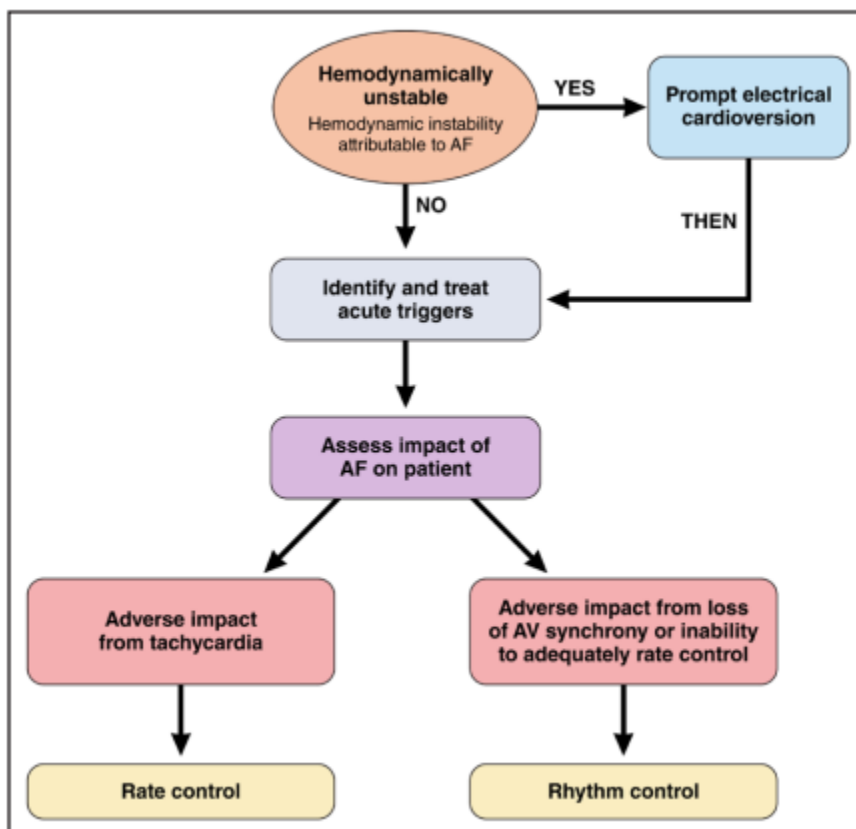
- This terminology is preferred because it is often unclear whether AF detected in an acute care settings is truly secondary to or attributable to the acute issue and would not have otherwise arisen. In other words, AF might have been present in the individual before the acute illness but not previously diagnosed or detected.

AF deleterious effect may relate to rapid ventricular rates, atrioventricular dyssynchrony and thromboembolism predisposition. The physiological ramifications can include:

- Decreased systemic blood pressure and cardiac output-shock.
- Increased pulmonary vascular pressures-pulmonary edema.
- Atrioventricular valve regurgitation.
- Acute thromboembolism.

### ACUTE MANAGEMENT

The approach to acute management of acute AF is summarized in the following figure:



Taken from Circulation. 2023;147:e676–e698

Principal goals of management of AF occurring during acute hospitalization are:

- Optimization of hemodynamics

- Alleviation of patient symptoms
- Reduction of short and long-term risks of thromboembolism.

The above goals can be achieved by:

- Identification and treatment of acute triggers
- Acute rate control
- Acute rhythm control
- Anticoagulation for stroke prevention

### Identification and Treatment of Acute Triggers

Aggressive management of acute illnesses and prompt treatment of triggers remain the cornerstone of acute AF management in critically ill patients. Common potential sources of triggers include:

- Sepsis/infection
- Acute respiratory distress/hypoxemia.
- Post procedural pulmonary complications
- Hypokalemia and hypomagnesemia
- Volume loss/overload
  - Atrial stretch is common in the development of AF in the critically ill
- Bleeding
- inotropic agents
  - Dopamine and epinephrine in particular have chronotropic effects that can lead to increased atrial ectopic discharges triggering new AF
- Post cardiac surgery
- Pericarditis/pericardial effusion

### Acute Rate Control

Because acute AF may spontaneously convert to sinus rhythm, an initial rate control and delayed cardioversion “wait-and-see” approach is reasonable for hemodynamically stable asymptomatic patients with acute AF while acute triggers are being aggressively treated.

In Critically Ill Patients it may be appropriate to wait to directly treat the acute AF until further treatment of the acute illness if the rapid heart rate is a compensatory mechanism for the critical illness.

Target heart rate for optimal rate control in the setting of acute AF has not been established. Recent guidelines recommend:

- HR <110 as a reasonable target for AF rate control for hemodynamically stable patients
- HR <80 for patients
  - Hemodynamically unstable or with symptoms
  - Deterioration of left ventricular function
  - Concomitant cardiac resynchronization therapy
  - Diagnosis of tachycardia mediated cardiomyopathy

### Medications for rate control

- BBs and CCBs are frequently used for rate control, and less frequently digoxin

- BBs provide better rate control compared with CCBs because critically ill patients are characterized by increased sympathetic tone. For this reason, digoxin may not be effective.
  - The ultra-short-acting esmolol allows rapid titration and discontinuation with fast recovery from potential drug-related hypotension, however, it is too expensive.
- CCBs also have a vasodilatory effect and not infrequently associated with hypotension.
- Digoxin should be reserved for situations in which other agents are ineffective or contraindicated
  - Digoxin slows heart rate by increasing vagal tone, therefore, may not be effective in critically ill patients
  - it is associated with low rates of hypotension but has a narrow therapeutic index
  - Digoxin peak effect is 1 to 6 hours
- Amiodarone and Magnesium also improve rate control

### Acute Rhythm Control

Given the risk of acute thromboembolism with acute rhythm control of AF, any decision to proceed with a rhythm control strategy will also need to consider the risk of stroke and the need for adjunctive short- and long term anticoagulation.

- In hemodynamically unstable patients, immediate electrical cardioversion with direct current cardioversion (DCCV) using biphasic upfront 200 J is the treatment of choice.
- In hemodynamically stable patients intolerant of atrioventricular dyssynchrony, acute rhythm control can be achieved either with electrical cardioversion or pharmacologically with antiarrhythmic medications.
- Rhythm control should also be considered for patients unable to attain clinically adequate rate control despite optimal use of atrioventricular node–blocking agents and identification and management of acute triggers.

In the critically ill patient, cardioversion is effective, but relapse is common.

- Concurrent with electrical cardioversion, administration of rate or rhythm control therapy should be given when cardioversion is attempted.
- In patients with a longer duration of AF, antiarrhythmic medications may also be administered as a pretreatment to facilitate electrical cardioversion.
- Similarly, relapse would likely be common after pharmacological cardioversion until the underlying acute illness subsides or adequate drug levels of rhythm control agent have been achieved.

Thromboembolic risks and considerations of anticoagulation apply to both pharmacological cardioversion and electrical cardioversion.

### Medications for rhythm control

- Most often include amiodarone and magnesium, both of which have rhythm and rate-controlling properties.

- A main advantage of amiodarone, unlike several other antiarrhythmic agents, is that it is not contraindicated in patients with structural or coronary heart disease.
- The strong safety profile of magnesium and its effect on rhythm and rate control makes magnesium a reasonable drug in acute AF.

### Anticoagulation

After rate and rhythm management of AF during critical illness, there is uncertainty when to initiate anticoagulation in patients with acute AF.

- Decision regarding anticoagulation of critically ill patients with acute AF is complex because they have an increased risk of in-hospital ischemic stroke, but they also have higher bleeding risk and often require invasive procedures.
- Given the lack of clear benefit and the potential for harm, in critically ill patients with acute AF who do not have planned cardioversion, most do not recommend routinely initiating anticoagulation during the acute phases of critical illness.
- Following critical illness, decisions to initiate anticoagulation to reduce thromboembolic risk depend on the persistence of arrhythmia, thromboembolic and bleeding risks, and goals of care.
  - >50% of patients with acute AF during a hospitalization for sepsis has recurrence within 5 years, with higher rates of ischemic stroke, heart failure, and death compared with findings in patients without this complication

In general, the main indication for anticoagulation in the absence of contraindications and significant bleeding risks is a CHA<sub>2</sub>DS<sub>2</sub>-VASc score of  $\geq 2$  for men or  $\geq 3$  for women.

Once a decision for anticoagulation is made, the feasibility and timing for initiation of anticoagulation will likely depend on the context of the acute illness.

- In the setting of acute cardioversion, the prior concept of safe to cardiovert without further assessment or anticoagulation if AF duration has been no more than 48 hours has been challenged.
  - When early cardioversion is planned, in the absence of 3 weeks of pre cardioversion anticoagulation, TEE before cardioversion is recommended by current guidelines.
  - Cardiac computed tomography, especially with delayed contrast-enhanced image acquisition protocol, has emerged as an alternative imaging modality to exclude intracardiac thrombus.
- Anticoagulation is recommended to be initiated as soon as possible before AF cardioversion.
  - When intracardiac thrombus is excluded, cardioversion may proceed with the patient on therapeutic anticoagulation.
- After cardioversion, uninterrupted anticoagulation is recommended for 4 weeks.
  - Only in patients with CHA<sub>2</sub>DS<sub>2</sub>-VASc of 0 in men or 1 in women with very low associated thromboembolic risks may omission of such uninterrupted post cardioversion anticoagulation be considered.
  - The decision to cardiovert a hemodynamically stable patient with acute AF should include care team discussions and patient counseling of anticoagulation compliance over the 4 weeks after acute.
- If interruption of anticoagulation is anticipated in a hemodynamically stable patient with acute AF, a focus on rate control first and deferring cardioversion until no further interruption of anticoagulation is anticipated may be preferable.

