Schematic of AFib Anticoagulation Algorithm

Initial Emergency Room Workflow

1. Does the ECG confirm AFib or AFL?
2. Obtain and review baseline clinical tests.*
   **Refer to appropriate medical guidelines or center protocols to treat abnormal results.*
   - Comprehensive Metabolic Panel
   - Magnesium
   - CBC
   - Troponin I
   - TSH
   - T4
   - CXR
3. Begin initial AFib/AFL workflow:
   - Document any previous history of AFib/AFL
   - Document current anticoagulation status (agent, compliance, INR if warfarin used, presence/utilization of antiplatelet agents
   - Document CHA2DS2-VASc score and assess bleeding risk (one possible tool is the ACC AnticoagEvaluator which provides CHADS2, CHA2DS2-VASc and HAS-BLED scores)
   - Document any anticoagulant-defining patient characteristics (prosthetic heart valve, hypercoagulability, hypertrophic cardiomyopathy, history of recent heparin-induced thrombocytopenia, etc.)
   - Hemodynically unstable patients should be cardioverted if decompensation is a concern
   - NPO (until potential need for cardioversion is ruled out)
   - Avoid rhythm control agents /cardioversion until intracardiac thrombus risk is defined/mitigated
   - Telemetry + pulse oximeter monitoring, q15m vitals for first hour, q2h thereafter
4. Begin initial AFib/AFL rate control therapy:
   - If HR ≥ 100bpm and SBP ≥ 90mmHg, diltiazem* IV 0.25mg/kg IV push over 2 minutes. If diltiazem is contraindicated, IV metoprolol 2.5-5mg bolus over 2 minutes up to 3 doses.
   - At next vital check: If HR ≥ 100bpm and SBP ≥ 90mmHg, diltiazem IV 0.35mg/kg IV push over 2 minutes and/or diltiazem PO 30-60mg.
     **Consult the prescribing information (PI) documents for the agents used at your facility for contraindicated use.*

No → **Disclaimer**

CDU vs Admit Decision

5a. Sustained systolic blood pressure <100mmHg or >170mmHG?

- **Yes** → **At many centers, a sustained systolic BP ≤ 100mmHg or ≥ 170mmHg typically requires inpatient management.**
- **No** ↓

CDU vs Admit Decision

5b. Concerning symptons after HR < 100bpm: marked dyspnea, angina, near syncope, possibility of ACS/MI?

- **Yes** → **If after rate control to HR < 100 bpm, the patient still has concerning symptoms, such as marked dyspnea, angina, near syncope, or if formal evaluation for ACS/MI is clinically needed, it is reasonable to place the patient in observation status or to admit the patient for further management.**

  If IV administration of rate control medicine is necessary, many centers will admit the patient for stabilization and management.
- **No** ↓

CDU vs Admit Decision

5c. Intravenous rate control medication (diltiazem or metoprolol) deemed necessary after initial rate control attempt?*

**Infusion can be managed in the ED or CDU at some centers.*

- **Yes** → **At most centers, ongoing IV rate control medication will require admission. However, some centers allow such care in the ED/CDU. Clinicians should consult their own institutional protocols and applicable nursing regulations about such care.**
- **No** ↓

CDU vs Admit Decision

5d. Acute comorbidities: ACS/MI, HF, CVA/TIA/SE, PE, renal failure, thyrotoxicosis, sepsis?

- **Yes** → **Patients with acute comorbidities, such as ACS/MI, HF, CVA/TIA/SE, PE, etc., should be admitted to the hospital for further diagnostic testing and management.**
- **No** ↓

CDU vs Admit Decision

5e. Recent comorbidities: CVA/TIA past 3 months, ACS/MI past 1 month, anemia (Hgb < 10) past 3 months?

- **Yes** → **If the patient has had recent comorbidities, such as CVA/TIA in the past 3 months, ACS/MI in the past 1 month, or anemia (Hgb <10) in the past 3 months, it is reasonable to place the patient in observation status or to admit the patient for further diagnostic testing and management.**
- **No** ↓

CDU vs Admit Decision

5f. Has Electrophysiology declined ED/CDU management of the patient?

- **Yes** → **Admit to observation or inpatient status per the Electrophysiologist's request.**
- **No** → **ED/CDU Management Possible**

ED/CDU Management Possible

Based on the patient characteristics and assuming no abnormal lab results, it is reasonable to manage the patient in the ED/CDU.

CDU Management of AFib/AFL

6a. Anticoagulation: Assess Current Status and Provide Appropriate Therapy

- **No Anticoagulation:**
  - Initiate anticoagulation based on CHA_2DS_2-VASc score, anticoagulant-defining patient characteristics and bleeding risks (Consult ACC AnticoagEvaluator tool)
  - If clinically appropriate, consider NOAC* use to potentially reduce hospital resource utilization and improve patient outcomes
- **Subtherapeutic Anticoagulation:**
  - For warfarin: any INR < 2.0 in the last 21 days
  - For NOAC: at least 1 missed dose in the last 21 days
  - Reinforce need for therapeutic anticoagulation
  - Resume NOAC anticoagulation
  - If clinically appropriate and if current anticoagulant prescriber agrees, transition to NOAC from warfarin, else resume warfarin with parenteral bridging until INR 2.0-3.0 (can be done as outpatient)
- **Therapeutic Anticoagulation:**
  - For warfarin: INR ≥ 2.0 in the last 21 days
  - For NOAC: no missed dose in the last 21 days
  - Continue therapeutic anticoagulation regimen

**Consult the hyperlinks on the right for additional information on NOAC selection, prescribing, and dosing considerations as well as drug-drug interactions.*

CDU Management of AFib/AFL

6b. Rate Control:

- Titrate/finalize PO rate control with goal of HR ≤ 100bpm at rest but with SBP > 100mmHg
  Therapeutic options: beta blockers, diltiazem, digoxin

Additional information on beta blockers, calcium channel antagonists, and digoxin can be found at: http://resources.hrsonline.org/practical-management.html

CDU Management of AFib/AFL

6c. Rate Control vs Rhythm Control:
Immediate cardioversion can be considered.

- Assess symptoms after rate controlled; consider cardioversion
- Pharmacologic or electrical cardioversion should be considered if symptoms persist despite provision of rate control or if rate control is difficult to establish
- Propafenone or flecainide (in absense of severe LVH and LV dysfunction) may be considered for oral pharmacologic conversion. Ibutilide or amiodarone are useful intravenous conversion agents.
- Four weeks' anticoagulation should be provided following pharmacologic or electrical cardioversion regardless of CHA_2DS_2-VASc score
- If AFib is certain to be < 48h, pharmacologic or electrical cardioversion can be performed immediately.
- If AFib duration is ≥ 48h or is uncertain, see below:
- **No Anticoagulation:**
  - AFib duration uncertain or ≥ 48h: TEE or 3 weeks' anticoagulation required prior to cardioversion
- **Subtherapeutic Anticoagulation:**
  - For warfarin: INR < 2.0
  - For NOAC: at least 1 missed dose in the last 21 days
  - AFib duration uncertain or ≥ 48h: TEE or 3 weeks' anticoagulation required prior to cardioversion
- **Therapeutic Anticoagulation:**
  - For warfarin: INR ≥ 2.0 over the last 21 days
  - For NOAC: no missed dose in the last 21 days
  - AFib duration uncertain or ≥ 48h: immediate cardioversion can be considered

Disposition After Rate vs Rhythm Control

7. Are all criteria met?

- Rhythm: AFib /AFL or sinus brady/normal sinus
- Heart Rate: 50 – 100bpm at rest
- Systolic blood pressure: 100-160mmHg
- Symptoms: Minimal or none
- Anticoagulation: appropriately anticoagulated

→ **If the patient exhibits 1 or more of the criteria listed, it is preferable to admit the patient to the hospital for observation and management.**

Prior to Discharge

8. Was patient seen by cardiology / EP in ED / CDU?

- Schedule close interval (< 96h) cardiology / EP follow up per protocol
- Provide printed AFib and anticoagulant education
- Rx for new anticoagulant and other medications as needed
- Consider provision of anticoagulation discount card for patient compliance
- Consider directing patient to affiliated/adjacent pharmacy if available for patient compliance

- Schedule follow up with consulting cardiology / EP per their instructions
- Provide printed AFib and anticoagulant education
- Rx for new anticoagulant and other medications as needed
- Consider provision of anticoagulation discount card for patient compliance
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Bleeding Considerations

	Warfarin (Coumadin)	Dabigatran (Pradaxa)	Apixaban (Eliquis)	Edoxoban (Savaysa)	Rivaroxaban (Xarelto)
Anticoagulant mechanism	Vitamin K antagonist	Thrombin inhibitor	Factor Xa inhibitor	Factor Xa inhibitor	Factor Xa inhibitor
Half-life	Variable	12-17h	12h	10-14h	5-9h
Recommended therapy cessation prior to a low risk procedure	5 days	1-2d (CrCL>50) 3-5d (Crcl<50)	24h	24h	24h
PT/INR can accurately assess anticoagulation state	Yes	No	No	No	No
Test result indicating lack of anticoagulation	Normal PT/INR	Normal aPTT	Normal factor Xa	Normal factor Xa	Normal factor Xa
Rapid reversal agent	Multiple, including fresh frozen plasma (FFP) and prothrombin complex concentrate (PCC)	Idarucizumab (Praxbind)	Not yet available*	Not yet available*	Not yet available*
Reversal agent mechanism	Replacement of depleted coagulation factors	Humanized monoclonal antibody targeted to dabigatran			
Reversal agent dosing	Product dependent	5g IV			

**consider PCC usage on a case by case basis as there is no prospective outcomes data for use of PCC agents for Xa inhibitor reversal*

The AFib Anticoagulation Algorithm was developed in part by the HRS AFib Anticoagulation Algorithm Working Group:

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