

1 **Amiodarone for new-onset atrial fibrillation in critical illness (NAFCI): Old phenomenon, new perspectives**

KELLY NGUYEN, PHARM D
PGY1 PHARMACY RESIDENT

2 **Objectives**

3 **Epidemiology**

- Atrial Fibrillation (AF) is the most common arrhythmia encountered in the ICU
- Incident of NAFCI is 5-15%
- In a study investigating patients with sepsis, those who developed NOAF had a hospital mortality rate of 44% versus 22% for those who did not
- Associated with increased mortality and morbidity
- AF recurrence rates of ~50% within 1 year following hospital discharge
-

4 **What is NAFCI?**

- AF with a rapid ventricular response (RVR) of >100 beats per minute (bpm) in patients without a previous history of AF
- Triggered by accelerated atrial remodeling and arrhythmogenic triggers encountered during critical illness
- Characterized by acute loss of atrial systole and onset of rapid ventricular rates
- Marker of disease severity
- Associated with both short and long term increases in risk of stroke, HF, and death
-

5 **Why NAFCI?**

- Guidance on management of AF is based on the evidence obtained in the general population and does not include patients in intensive care
- Therapeutic strategies extrapolated from studies involving non-critically ill patients may not be generalizable
- Substantial practice variation in the choice of strategies for management of NAFCI

6 **Patient Case**

7 **Patient case – Background**

- 89 year-old female presenting with strangulated femoral hernia s/p femoral hernia repair with small bowel resection with primary anastomosis
- Post-op c/b aspiration and acute respiratory failure requiring reintubation in PACU
- PMH:
 - COPD
 - CKD III
 - HFpEF
- NKA

8 **Patient Case - Medications**

- 1 XHome medications:
 - ✎ Atorvastatin 40 daily
 - ✎ Furosemide 40 mg daily

✂ Calcium and Vitamin D 600-200

2 ✂ Current medications:

- ✂ Albuterol 0.083% inhalation solution 2.5 mg 3 mL Neb every four hours
- ✂ Famotidine 20 mg IV daily
- ✂ Heparin 5000 units three times daily
- ✂ Norepinephrine 0.1 mcg/kg/min
- ✂ Fentanyl 25mcg/hr
- ✂ RR 100 mL/hr
- ✂ Metronidazole 500 mg IV every 8 hours
- ✂ Cefazolin 1 g IV every 8 hours

9 **Patient Case**

✂ Cardiovascular

- Irregularly irregular, tachycardic

✂ Respiratory

- Bibasilar Crackles
- Ventilation: PSV

✂ Abdomen/GI

- Distended
- Surgical wound dressing to the L inguinal area

✂ Extremities

- Edema

✂ Neurologic

- Glasgow Coma Scale 11T

✂ Richmond Agitation-Sedation Scale

- (RASS): Alert and calm 0

10 **Patient Case – ICU Day One Labs**

- WBC: 7.4
- Na = 147
- K = 3.9
- Mg = 1.9
- Scr = 1.1
- Lactate = 2.3

11 **Patient Case – ICU Day One**

- ECG 12-Lead
 - QTc 487
 - QRS 118
 - Atrial fibrillation with RVR
 -
 -

- ECHO
 - Left ventricle is normal in size
 - 65-70%
 -

12 **NAFCI**

13 **Patient Factors**

- Advanced age
- Male sex
- Obesity
- Fluid overload
- Hypoxemia
- Hypotension
- Anemia
- Acid-base abnormalities
- Electrolyte abnormalities
- Disease severity

14 **AF: Mechanisms**

15 **Critical Illness and Atrial Remodeling**

- Infection
 - ✖
- Inflammation
 - ✖Sepsis
 - ✖Post-operative

16 **AF Triggers during Critical Illness**

- Vasopressor agents
- Electrolyte derangements
- Greater disease severity
- Volume overload

17

18 **Clinical Consequences of NAFCI**

- Coordinated depolarization and contraction of the heart is disrupted
 - Loss of "atrial kick"
 -
- Impaired cardiac output

19 **Acute Management of NAFCI**

20 **Treatment Outline**

21 **Proposed NAFCI Treatment Algorithm**

22 **Address Modifiable Risk Factors**

- Electrolyte abnormalities
- Hypoxemia
- Fluid overload
- Dehydration
- Underlying conditions
- Adrenergic overstimulation
- Hemodynamic instability

23 **Rate versus Rhythm Control**

- 1 Rate Control
- 2
 - Persistent AF
 - Oligosymptomatic
 - Age \geq 65
 - Hypertension
 - No history of HF
 - Previous failure of an antiarrhythmic drug
 - Patient preference
 -
- 3 Rhythm Control
- 4
 - Paroxysmal AF
 - NOAF
 - Ongoing symptoms
 - Age <65
 - HF exacerbated by AF
 - Tachycardia-mediated cardiomyopathy
 - Difficulty achieving rate control

24

25 **NAFCI Antiarrhythmic Practice Variability**

- 1 United States (2010-2013)
 - 2
 - CCB (36%)
 - BB (28%)
 - Digoxin (20%)
 - Amiodarone (16%)
 - 3 United Kingdom (2017)
 - 4
 - Amiodarone (>80%)
 - BB (12%)
 -
 -

26 **Anticoagulation in NAFCI**

- CHADS2, CHA2DS2-VASc and HAS-BLED have not been validated in ICU populations
- Lack of clear benefit and the potential for harm
 - In NAFCI during sepsis without planned cardioversion, we don't currently recommend routinely initiating parenteral anticoagulation thromboembolism

prophylaxis during the acute phases of critical illness

27 **Amiodarone in NAFCI**

CHOICE OF AMIODARONE IN ICU PATIENTS IS CHALLENGING DUE TO INTERPATIENT HETEROGENEITY AND LIMITED KNOWLEDGE OF OPTIMAL DOSING IN THIS SETTING

28 **Amiodarone**

29 **Amiodarone – 3 Compartment Model**

30

31

32

33

34 **Patient Case**

NAFCI WITH SEPTIC SHOCK

35 **Patient Case – Afib with RVR**

36 **Patient Case – AF with RVR**

37 **Patient Case – Heart Rate**

38 **Conclusion**

- Patients with NAFCI increases the risk of recurrent AF, which then increases the risk of long-term poor outcomes
- Lack of high-quality evidence to guide the management of critically ill patient with NOAF
- Prompt treatment of underlying medical conditions and correction of modifiable risk factors is the first step
- Currently unclear whether non-cardiac critically ill patients with new-onset AF should be anticoagulated to prevent arterial thromboembolic events
-
-

39