

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE



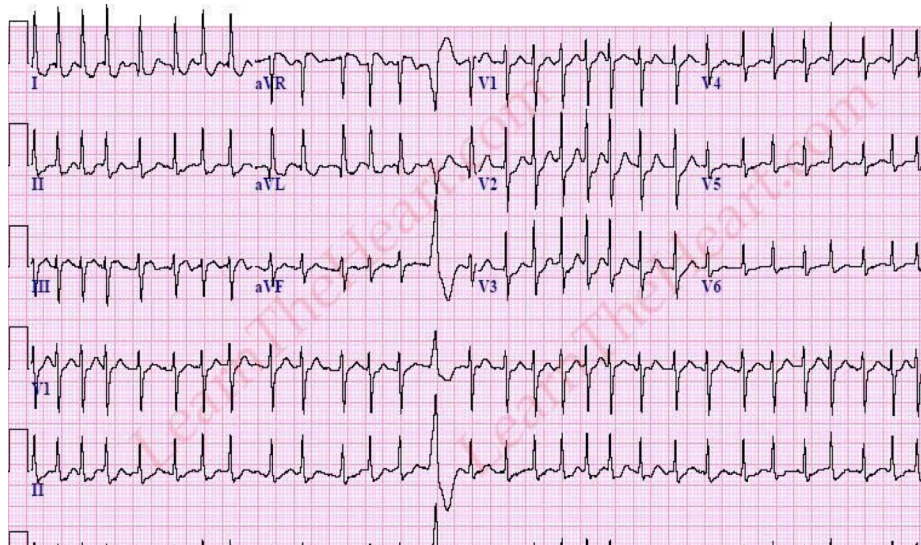
Care Warriors

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## Atrial Fibrillation with RVR

A 55-year-old African American female with a past medical history of hypertension and hyperlipidemia presents to the emergency department complaining of chest palpitations and shortness of breath x1 day. Patient states, “it feels like my heart is jumping out of my chest”. The shortness of breath is associated with the palpitations. These symptoms started and have been constant since yesterday and have not improved. She has experienced an incident with symptoms like this once before about a month ago. Rest does not help to alleviate her symptoms. She does not have any history of pulmonary or cardiac issues. Patient also states that she is feeling more fatigued than normal. She has not recently traveled or had any surgeries. Patient denies chest pain, syncope, diaphoresis, and dizziness. Vitals: B/P: 124/72mmHg, HR: 175 bpm, RR: 20 bpm. EKG is below.



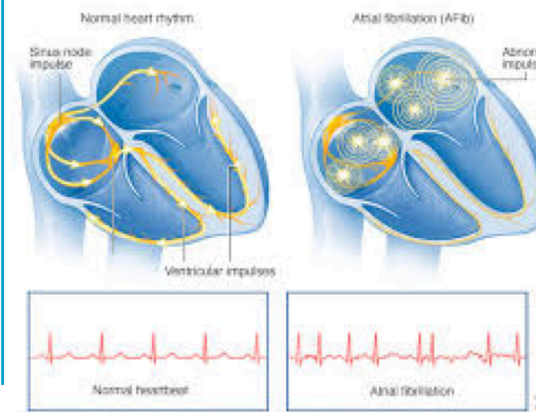
(Courtesy of online.epocrates.com)

*EM Case of the Week is a weekly “pop quiz” for ED staff.*

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

What’s the next best step in management of this patient?

- A. Immediate synchronized cardioversion.
- B. Rate control with metoprolol and consult cardiology for echocardiogram.
- C. Administer Amiodarone.
- D. IV fluids, rhythm will correct itself.



(Courtesy of mayoclinic.org)

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**The correct answer is B. Give the patient metoprolol to control the rate and consult cardiology for an echocardiogram.**

Discussion:

Atrial fibrillation is an irregularly irregular cardiac rhythm. On an EKG the rhythm strip will not have any discernable P waves, although sometimes, fibrillatory waves may look like a P wave. Also the QRS complexes are not equidistant to the neighboring complex. The rhythm can change beat to beat, thus making it irregular. Sometimes a patient with A-fib can develop A-fib with a rapid ventricular rate (RVR), which leads to the need for rate control to bring the rapid rate down. You cannot depend on obtaining an accurate heart rate from a monitor, because the number of QRS complexes that occur in 1 minute calculates it. Because A-fib is irregular, this reading is not accurate. To get the correct rate you must count how many heartbeats occur in one minute. A-fib patients that are experiencing RVR can often have rates above 140. A-fib also has an increased risk of forming blood clots or thrombi in the heart. These thrombi can be dislodged and travel through the body, which may lead to stroke or ischemia in other organs. These characteristics of A-fib are why the correct answer choice is to rate control with metoprolol, for the RVR, and to consult cardiology for an echocardiogram to look for thrombi in the heart.

The underlying pathophysiology of A-fib is the 2 atria beating chaotically. The atria are receiving chaotic signals and instead of these signals forming a normal single beat; they cause the atria to quiver. Not all of these signals make it through the AV node to reach the ventricles. Thus the ventricles also beat fast, but not as rapid of a rate as the atria. This leads to a fast and irregular rhythm. A-fib heart rates range from 100-175 bpm, where as a normal heart rate is between 60-100 bpm.



Treatment: (Courtesy of drbenzur.com)

The first step in the management of A-fib is to control the heart rate. This is done using a rate control medication like a beta-blocker or non-dihydropyridine calcium channel blocker. The next step is to try and establish the time of onset. This is often difficult to establish. This is done to avoid dislodging a formed thrombus from the atria if cardioversion is done. New onset A-fib less than 48 hours can be cardioverted without anticoagulation.<sup>3</sup> Cardioversion after a 48-hour window should not be done without anticoagulation. This is why it is helpful to rule out thrombus using an echo. The CHADS<sub>2</sub>Vasc score can also be used to help determine if a patient with A-fib needs anticoagulation by calculating stroke risk.

Cardioversion can be done electrically or medically. Synchronized electrical or antiarrhythmic medical cardioversion are both acceptable options. Patients are often cardioverted and sent home on a drug to control their rate and also given anticoagulation medication to prevent thrombosis. Rate control medications were as listed above, and anticoagulation medications are warfarin (Coumadin), dabigatran (Pradaxa), rivaroxaban (Xarelto), and apixaban (Eliquis). Warfarin is the only approved anticoagulation medication for patients that have Afib with valvular issues.

A-fib can be paroxysmal, persistent, or permanent. Patients with persistent or permanent A-fib may also undergo a procedure known as catheter ablation. This procedure terminates hot spots that are forming the erratic signals causing the irregular rhythm. This procedure can correct the A-fib and eliminate the need for medications or implantable devices to control the arrhythmia.

For a list of educational lectures, grand rounds, workshops, and didactics please visit [BrowardER.com](http://BrowardER.com) and click on the **"Conference"** link.

*All are welcome to attend!*



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## Chads2Vasc Score

Risk factors		
<b>C</b>	Congestive Heart Failure	<b>+1 point</b>
<b>H</b>	Hypertension	<b>+1 point</b>
<b>A<sub>2</sub></b>	Age ≥75	<b>+2 point</b>
<b>D</b>	Diabetes	<b>+1 point</b>
<b>S<sub>2</sub></b>	Stroke/TIA History	<b>+2 point</b>
<b>V</b>	Vascular Disease	<b>+1 point</b>
<b>A</b>	Age 65-74	<b>+1 point</b>
<b>S</b>	Sex (Female)	<b>+1 point</b>

Stroke risk per year	
SCORE	% RATE PER YEAR
0	0%
1	1.3%
2	2.2%
3	3.2%
4	4.0%
5	6.7%
6	9.8%
7	9.6%
8	6.7%
9	15.2%

Reference: European Heart Rhythm Association. Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). *Eur Heart J.* 2010;31(19):2369-2429.

(Courtesy of medpagetoday.com)

A score of 1 elicits consideration for anticoagulation. A score of 2 or greater makes the patient an anticoagulation candidate. The patient from this case receives a score of 2 for sex and hypertension, and would thus receive anticoagulation.

### Causes of Atrial Fibrillation:

Underlying causes of A-fib stem from damage to the structure of the heart. Some examples being; hypertension, abnormal valves, CAD, hyperthyroidism, lung disease, stimulant use, previous MI's, or viral illness. Lone atrial fibrillation is not as common, but can also occur without a known underlying pathology.

### Take Home Points

- Atrial fibrillation is a condition that is usually asymptomatic and uncomplicated.
- Symptoms of A-fib, if a patient experiences them, are typically palpitations, weakness, dizziness, light-headedness, fatigue, and shortness of breath.
- Atrial fibrillation of unknown onset needs anticoagulation before cardioversion due to risk of dislodging a thrombus.
- Patients with A-fib will typically be prescribed a rate controlling agent and anticoagulation medication as stroke prophylaxis.
- Patients with persistent A-fib may be candidates for catheter ablation.
- Patients should follow up with a cardiologist to manage their A-fib to reduce their increased risk of developing heart failure.



### About The Author

This month's case was written by Mckenna Duquette. Mckenna is a 2<sup>nd</sup> year physician assistant student from NSU. She did her emergency medicine rotation at BHMIC in April 2018. Mckenna plans on pursuing a career in Emergency Medicine after graduation.

### REFERENCES

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2. CHA<sub>2</sub>DS<sub>2</sub>-VASc Score for Atrial Fibrillation Stroke Risk. MDCalc. <https://www.mdcalc.com/cha2ds2-vasc-score-atrial-fibrillation-stroke-risk>. Accessed April 23, 2018.
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