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Atrial Fibrillation

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Atrial Fibrillation

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Introduction

Atrial fibrillation is one of the most common heart arrhythmias (Schumacher et al., 2018). From diagnosis to treatment, some risk factors that are common causes of heart arrhythmias is atrial fibrillation. So many patients are not knowledgeable about some of the risk factors and causes of atrial fibrillation. The practitioner can further assist patients by educating patient's on actions of fatty acids, calcium contributions, PR interval prolongation, and how sinus node dysfunction can contribute to atrial fibrillation (Schumacher, et al., 2018).

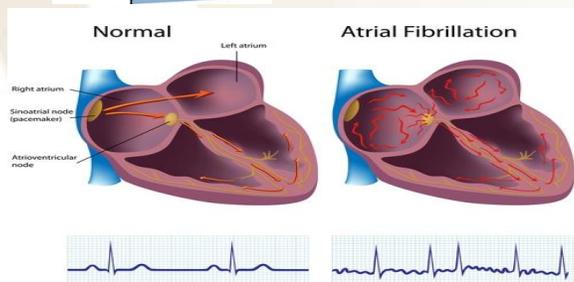
Presentation of Case

A 45-year-old male with no prior history of cardiovascular disease comes to the emergency department with complaints of shortness of breath and bilateral lower extremity edema for one month. He stated what brought him in today was his chest pain that did not go away after he rested today. He is afebrile with a heart rate of 160, respirations 16, blood pressure 120/88, and pulse ox 100%. His lungs have some faint crackles at the bases. There is noted pitting edema +2 bilateral extremities in ankles and feet. His EKG reveals atrial fibrillation. The physician orders an IV line and to start a Cardizem drip titrating until his heart rate is under 100. Also, a bolus of 10mg of Cardizem administered. Cardizem is an antiarrhythmic drug to help control the heart rate and keep the rhythm under control by keeping the heart rate under 100 beats per minute (Jackson, 2017). The patient is admitting to the cardiac floor, where the cardiologist will further evaluate him. Echocardiogram and series of troponin labs ordered. The patient is at risk for blood clots the physician orders Lovenox based per patients' weight will be administered. The cardiologist considers cardioversion to shock the rhythm back into a sinus rhythm. Cardiologist decides to wait one month on blood thinners to do cardioversion to ensure that a stroke will not happen. Other surgical treatments with chronic atrial fibrillation that may be considered in the future. Permanent pacemaker may be considered to administer antiarrhythmic or ventricle rate controlling medication. Another surgical possibility is left atrial ablation to fix the mix firing of the electrical system (Zaman, 2017) (Zaman, 2017) (Zaman, 2017). This surgery works by scarring the tissue to disrupt the malfunctioning electrical signals causing the arrhythmia (Jackson, 2017).

Pathophysiological Process

Pathophysiology

Atrial Fibrillation occurs when the atria become so irritable that it no longer is beating, but mostly quivering ineffectively. Electrical impulses typically start in the sinoatrial node, and a cardiac action potential travels throughout the atrial muscle and down to atrioventricular node. Action potential slows considerably at the atrioventricular node because of the fiber's smaller diameter. This delay gives the atria time to complete the contraction and adds the volume of blood in ventricles before ventricle contraction begins. Action potential enters the atrioventricular bundle, and conduction is rapid again. The entire ventricular myocardium undergoes depolarization after the action potential rises in the sinoatrial nodes. In atrial fibrillation, the atrioventricular node must be blocked by some of the impulses to keep ventricle rate reasonable. The cardiac rhythm of atrial fibrillation is grossly irregular. The atria's waves are conducting chaotically (Zaman, 2017).



https://www.cdc.gov/dhosp/data_statistics/fact_sheets/fs_atrial_fibrillation.htm

Underlying Pathophysiology

Depolarization facilitates a small amount of calcium in each cell from the calcium channel at the beginning of each contraction. Calcium enters atrial cells with each action potential. When atrial rates are rapid and chaotic, this increases the calcium loading. Homeostasis is initiated by protective mechanisms that reduce calcium entry and decrease calcium production and collapsing potassium current (Denham et al., 2018). Calcium remodels atrial stimulation by signaling calcium to remain silent in the channels. Calcium remodeling is a protective reaction that can eventually develop atrial fibrillation. This action shows the strong influence of calcium remodeling abilities to initiate atrial fibrillation (Denham et al., 2018). Calcium and other electrolytes can affect the conduction by prolonging the PR interval. Prolonging of the PR interval happens with the result of delays in impulse conduction. When PR interval prolongation happens, it can lead to a miss firing of the electoral system can cause atrial fibrillation or other heart conditions (Schumacher et al., 2018).

Significance of Underlying Pathophysiology

The exact mechanisms by which cardiovascular risks predispose patients to atrial fibrillation are unknown. Some common risks factors associate with atrial fibrillation is neurotransmitter excess, hemodynamic stress, atrial ischemia, atrial inflammation, metabolic stress, and neurohumoral cascade activation is thought to cause this arrhythmia. The risks are conclusive that the grouping of fatty acids plays a part in risk factors of atrial fibrillation. Fatty acids patterns in adipose tissue share dietary sources and metabolic pathways. These increase the chances of atrial fibrillation to develop (Dinesen et al., 2018). Generally, with atrial fibrillation will develop congestive heart failure (Carlisle, 2019).

AFib: Wait-and-See or Early Cardioversion to Obtain Normal Sinus Rhythm?



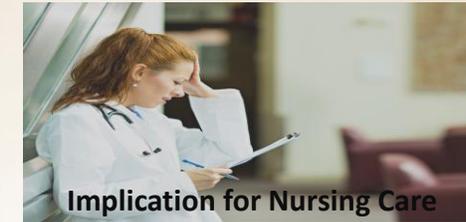
<https://rebelem.com/afib-wait-and-see-or-early-cardioversion-to-obtain-normal-sinus-rhythm/>

Signs and Symptoms

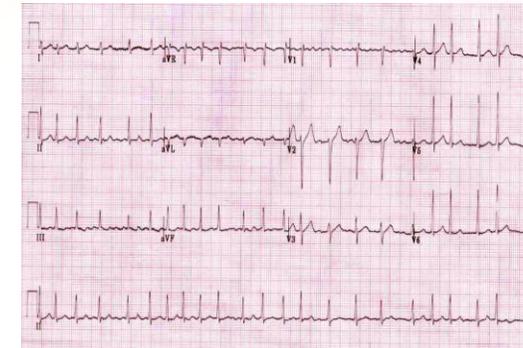
Most common symptom is quivering or fluttering heartbeat

- ✓ Rapid or irregular heartbeat (rapid, fluttering, or pounding)
- ✓ General fatigue
- ✓ Dizziness
- ✓ Shortness of breath
- ✓ Weakness
- ✓ Faintness or confusion
- ✓ Fatigue when exercising
- ✓ Sweating
- ✓ Chest pain or pressure (CDC, 2017)

Different types of Atrial fibrillation
Paroxysmal- less than seven days (over time may become more often and last longer leading to chronic).
Persistent- lasts longer than seven days
Permanent- does not go away no matter the treatment
Long standing- heart rate is irregular and lasts longer than twelve months
Nonvalvular- not caused by the heart valve issue.
All types can increase risk for stroke. (Association, 2019)



- Education and reinforcement of knowledge
- Knowing risk factors of atrial fibrillation. – modifiable risk factors *smoking cessation, exercises, weight management.
- Helping patient implement these and the importance of follow up with physician.
 - Preventing thromboembolism and controlling heart rate
 - Stressing follow up with physician and medication management.
 - Signs and symptoms of acute flare ups and stroke symptoms.
 - Being physically fit can help defer atrial fibrillation. It can stabilize the atrial fibrillation in paroxysmal type of atrial fibrillation (Turagam, Flaker, Velagapudi, Vadali, & Alpert, 2015).



AF-rapid-ventricular-response.jpg file

Conclusions

Atrial fibrillation can have a range of symptoms and treatment. Best results of atrial fibrillation are knowledge of what to look for to minimize symptoms. Atrial fibrillation is not fatal but needs treatment when uncontrolled. Best treatment is to get patient back into a sinus rhythm by medications, cardioversion and/or surgical intervention if chronic atrial fibrillation.

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