Atrial Fibrillation

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Atrial Fibrillation
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Introduction
- Atrial Fibrillation (AF) is the most diagnosed heart arrhythmia with future projections estimating that 12.1 million people in the United States will be diagnosed with AF by 2030 (Goff et al., 2013).
- Patients who develop AF are at increased risk for stroke, heart failure, hospitalization, and death (Gami & Spry, 2021).
- 15% to 25% of stroke patients have AF as a risk factor (McCance & Huether, 2018).
- Cardiologist rate AF as one of the most difficult arrhythmias to treat (Jach, 2017).
- AF was selected as a poster topic as education for clinicians and patients is in vital in diagnosing, treating, and preventing AF.

Diagnosis
- Diagnosis of AF is based off confirmed ECG characteristics. ECG Characteristics include:
  - No p waves
  - Low-amplitude fibrillatory waves
  - Irregularly irregular R-R interval (McCance & Huether, 2018)

Underlying Pathophysiology
- In normal physiology, electrical transduction from the heart starts in the SA node and travels down to the AV node before conducting an impulse across the ventricles. In AF, the electrical transduction in the atria is chaotic and unorganized due to several possible reasons such as atrial remodeling, elevated atrial pressures, and inflammation of the atria (Gami, 2021).
- Atrial remodeling can be divided into three different types including structural, electrical, and autonomic (Wysokiński et al., 2020).
- Structural remodeling of the atria is caused when there is a disconnection between the electric activity of the atria and the muscle fibers. This can be caused by fibrosis and cellular hypertrophy of the cardiomyocytes (Wysokiński et al., 2020).
- Electrical remodeling in the atria can cause AF by shortening the resting membrane potential and refractory periods of the cardiomyocytes (Wysokiński et al., 2020).
- One of the main "triggers" of rapidly discharging and unorganized electrical impulses can come from the pulmonary veins (Hassanabad et al., 2019).
- Increased levels of atrial natriuretic peptide, angiotensin II, and transforming growth factor are all neurohormonal changes related to the pathophysiology of AF (Wysokiński et al., 2020).

Signs and Symptoms
- Irregular heartbeat and pulse
- Heart palpitations
- Dizziness
- Lightheadedness
- Fatigue
- Shortness of breath
- Chest Pain
- Possibly asymptomatic (CDC, 2020)

Risk Factors
- Advanced age
- Hypertension (most common risk factor) (Jach, 2017)
- Obesity
- European ancestry
- Diabetes
- Heart failure
- History of myocardial infarction
- Hyperthyroidism
- Chronic-lung disease
- Alcohol abuse
- Smoking

Reference Table

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<th>CHA2DS2-VAS Score</th>
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Figure 1 retrieved from https://my.clevelandclinic.org/health/diseases/16763-atrial-fibrillation-af

Figure 2 adapted from (Bielecka et al., 2021)

Table 1: CHA2DS2-VAS score and stroke risk factors

There are four classifications of AF diagnosis based on how often the rhythm occurs and how it responds to treatment: (National Heart, Lung, and Blood Institute, 2020)
- Paroxysmal AF: brief occurrences of AF that may last up to a week but go away on their own. Patient may display symptoms or be asymptomatic.
- Persistent AF: continuous AF that lasts greater than a week. This may last for several months or years but go away on their own.
- Permanent AF: does not go away even after treatments.

Significance of Pathophysiology
- Due to blood not flowing as well as it should because of the chaotic and quivering atria, a patient with AF is at a significantly increased risk to develop an atrial thrombus which could cause stroke (JC, 2020).
- Assessing the need for oral anticoagulation to decrease risk of stroke is essential. The CHA2DS2-VAS score can be used to evaluate this risk (Bielecka et al., 2021).
- Neurohormonal changes that attribute to AF are due to a number of reasons including hypertention. Prevention of hypertention leads to decreased risk of developing AF (Wysokiński et al., 2020).

Conclusion
- Overall, AF has a huge impact on healthcare and the importance of education for the prevention, diagnosis, and treatment for clinicians and patients cannot be overstated.
- Prevention of thromboembolism is essential in preventing stroke since patients with AF are at a significantly increased risk.
- Risk factor management is key in decreasing the incidence of AF and for preventing complications caused by AF. Nurse-led community clinics have been found to prevent hospitalizations from AF by allowing for improved risk factor management, improved coordination among healthcare providers, and improved management of patients with the diagnosis (Jach, 2017).

References

Nursing Implications
- It is important to be able to identify AF on telemetry and to make clinical decisions that decrease the risks associated with the diagnosis.
- Educate patients on decreasing health risk factors that could lead to the development of AF.
- Understate that prevention of thromboembolism with anticoagulants is important in patients with AF.
- Studies have not determined whether rate control vs rhythm control produces better outcomes in patients with AF (Depoorter et al., 2019).

Figure 4 shows catheter ablation technique to isolate the pulmonary veins on the left and AF node ablation on the right for the treatment of AF. Images retrieved from https://www.mayoclinic.org/disease-conditions/atrial-fibrillation/diagnosis-treatment/dr-20350630