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Pathophysiology of Atrial Fibrillation
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Introduction

- Aging is an unavoidable human phenomenon which, throughout history, has some individuals age better than others. With the aging process, there comes increased health risks and a decline in one's health. Particularly, risk of heart disease and irregular heart rhythms (Heart.org, 2018) included in health risks associated with advanced age is the evidence in clinical practice that the elderly are at increased risk for falls (Shah, 2013).

- Atrial Fibrillation (AFib) is the most common cardiac arrhythmia and its prevalence increases with age (Shah, 2013). It is important for the nurse practitioner to recognize when arrhythmia and the potential adverse effects with increased risk of patients (Reddy et al., 2017).

- Risk for stroke is five times higher in those with AFib and advanced age, and accounts for 25% of stroke deaths (Amiridis et al., 2018). Additionally, advanced age and AFib have been linked as potential criteria to be on oral anticoagulation (AC) (Heart.org, 2018).

- CHA2DS2-VASc (Figure 2) is a scoring system utilized to assess the need for AC (oral warfarin) for stroke from AFib. AC is recommended for a CHA2DS2-VASc score of 2 or more (Hagerty and Rich, 2017). Once it has been determined patients should be treated with AC, then consideration of conformation or bleeding risks should be weighed.

- HAS-BLED (Figure 3) is a scoring system used for assessing bleeding risks in patients (Hagerty and Rich, 2017). The HAS-Bled score has been used more widely in recent years (Wong, 2018).

- A simple test should be weighed the options of treatment for the patient with AFib with its risk for falls (Shah, 2013). Other options should be considered for patients who are unable to tolerate AC. Atrioventricular (AV) block is typically seen in the left atrial appendage, left atrial appendage (LAA) has emerged as an alternative in selecting patients (Medy et al., 2017).

- Though education in clinical providers can provide patients and family members the knowledge of signs and symptoms, risk factors and the appropriate time for patients to consider treatment with AC or alternatives such as LAE if appropriate.

- AFib was also listed as one of the three risk factors for the prevention of this particular arrhythmia and the potential adverse effects with increased risk of stroke. It is important for the nurse practitioner to recognize when patients present with AFib and create the appropriate plan of care to reduce risk of stroke, while at the same time reduce adverse effects from AC.


Pathophysiology

- The heart’s natural pacemaker in the sino node (SA) makes electrical signals, which cause the heart to contract and pump blood (Heart.org, 2018). Unlike other cells, cardiac cells are capable of self-estimulation (Connolly, 2015).

- In AFib, multiple atrial cells self-stimulate, behaving as individual pacemakers and synchronizing with the SA for control of cardiac activity. AC is a random electrical activity, where multiple atrial cells self-stimulate, behaving as individual pacemakers and complete with the SA for control of cardiac activity (Connolly, 2015).

- Normal atrial contractions are replaced by rapid quivering movements and the atrio-striatal contracting effectively (Connolly, 2015). When the atria quiver, blood pools in the area. Pulsing of blood in atria can cause blood clots (Heart.org, 2018).


Signs and Symptoms

- Atrial fibrillation often presents with signs and symptoms of AFib.
- Risk Factors
- Prior heart attack or heart disease
- High blood pressure
- Diabetes
- Sleep apnea
- Excessive alcohol, smoking, stress

Figure 3. Scoring system to determine risk of clot formation with AFib (Hagerty, 2017)

Figure 4. Normal heart compared to heart in AFib (Hagerty, 2017).

Significance of Pathophysiology of AFib

- Atrial fibrillation patients have an increased stroke risk (Heart.org, 2018). Because AFib causes a lack of coordinated atrial contractions, it can result in one of the most common complications of atrial fibrillation, thrombus formation (Connolly, 2015).

- The formation of thrombus on the atrial walls and within the left atrial appendage (LAA) occurs (unless) ineffective emptying allows blood to pool in these chambers. Commonly referred as mural thrombi, these clots can dislodge and cause stroke and other systemic thrombosis (Connolly, 2015).

- Blood clots then dislodge and travel to the brain to cause a stroke (Spivak, 2015). Numerous large, randomized studies have shown that anticoagulation reduces the risk of stroke by about three-quarters in patients with AFib (Hagerty and Rich, 2017).

- Patients with AFib are often prescribed anticoagulation to decrease risk of blood clots (Spivak, 2015). Patients at risk for bleeding may be too high to use anticoagulation. Other options need assessed for high risk bleeding and high CHA2DS2-VASc score.

Pathophysiology of clot formation (Connolly et al., 2018)


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References

