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Blood Thinning and Atrial Fibrillation

Introduction

Atrial Fibrillation is a heart rhythm disorder that causes the pulse to be irregular. This type of condition is known as a 'cardiac arrhythmia'. Atrial Fibrillation is the most common form of cardiac arrhythmia. Although it can occur in young people, it becomes more common with age. It is thought that one in 12 people over the age of 65 have Atrial Fibrillation.

Atrial Fibrillation can include symptoms of palpitations (being consciously aware of the heart beating), shortness of breath, chest discomfort, light-headedness, fainting or fatigue. Some patients experience no symptoms at all.

Whether or not Atrial Fibrillation causes symptoms, it raises the risk of stroke. A person with Atrial Fibrillation has a one in three life-time risk of suffering a stroke.

There are three goals for the treatment of Atrial Fibrillation: 1) reducing symptoms (if experiencing), 2) keeping the average heart rate below ~100 beats per minute and 3) reducing the risk of stroke.

Stroke and Atrial Fibrillation

Under normal circumstances the heart rhythm is controlled by pacemaker cells called the Sinus Node (located in the right upper chamber of the heart). This pacemaker triggers a smooth contraction of the heart. Contraction starts in the upper chambers (atria) of the heart, forcing the blood smoothly into the lower pumping chambers (ventricles). While the ventricles are contracting the atria relax; this allows the blood returning to the heart to be stored for a moment until the lower chamber is ready to receive it.

In Atrial Fibrillation the contraction of the upper chambers becomes disorganized such that blood flows poorly. The atria appear to quiver rather

than vigorously pump. In some cases blood can "clump" together forming clots particularly in a pouch-like area in the left atrium called the 'Left Atrial Appendage'.

When clots have formed in the atrium there is a chance that they will move in to the blood flow. When this happens they are carried in the circulation to smaller blood vessels of the brain. When an artery in the brain becomes blocked by a clot, the part of the brain that artery supplies no longer receives blood; this is the cause of a stroke.

Blood Clotting

The clotting of the blood is a complex process; Blood must clot rapidly when there is damage to a blood vessel but remain fluid at other times. The process of clot formation is called the 'Clotting Cascade' which ultimately produces the blood clotting enzyme - Thrombin. Thrombin changes a protein called Fibrinogen (which is dissolved in the blood) into Fibrin. Fibrin is a stringy protein that forms a web across blood vessels catching small cells called platelets and producing clots. When platelets are instructed to repair a leak in the circulation they become tacky and stick together. As they join together they trigger yet more platelets to become active and come together in this way to form a clot.

Stroke Prevention

There are three ways to reduce the risk of stroke in Atrial Fibrillation.

Interfere with Clotting Cascade: Medication can affect various parts of the clotting cascade. To reduce the risk of clot formation, medications that affect the clotting cascade are called Anti-Coagulants. The best known medication in this area is Warfarin (see AFA sheet on Warfarin Therapy). A newly released anti-coagulant called



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Dabigatran can thin the blood and does not require the frequent blood tests that Warfarin use requires. People on anti-coagulants have an increased risk of bleeding but a decreased risk of clot related strokes.

Reduce Platelet Stickiness: One way to prevent clots is to use medication which reduces the ability of platelets to become stimulated. The most common medication used for this purpose is Aspirin (rarely a medication called Clopidogrel is used).

Block Left Atrial Appendage: This pouch off the left atrium is a common area for blood clot formation. The left atrial appendage can be physically blocked off (using a device delivered during a catheter-based procedure called a Left Atrial Appendage Occluder) or in extreme cases surgically removed to reduce the risk of clots forming here.

Who requires treatment?

Patients with Atrial Fibrillation are at higher risk of stroke than if they had not had Atrial Fibrillation. However, not every patient with Atrial Fibrillation has the same risk. The treatments used to reduce the risk of stroke are associated with their own risks. When choosing the appropriate treatment for reducing stroke risk one must

balance the risk of a medication against the risk of stroke; patients at higher risk for stroke require more potent treatments (Warfarin or Left atrial Appendage Occlusion) while patients at lower risk can safely take Aspirin.

Personal stroke risk

By looking at large groups of people with AFib and seeing who develops stroke it has become possible to identify certain factors that increase the risk of stroke. These have been made into scoring systems such as the CHADS-VASc score below:

Your annual risk of stroke rises from under 2% a year with no risk factors to over 15% a year for nine. Most experts who have looked at this scoring scheme would suggest that the tipping point for your benefits on taking anti-coagulation medication over its risks, is at a score of 2 or above.

However, there are situations where your doctor may recommend the use of anti-coagulants despite what appears to be a low score (eg score of 1) using the above system. They will discuss this if it is the case.

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Assess your personal risk score		
Question	Points	Your Score
Are you over 75?	2	
Are you between 65 and 74?	1	
Do you have high blood pressure?	1	
Do you have diabetes?	1	
Do you have heart failure?	1	
Do you have vascular disease?	1	
Have you suffered a stroke (even a mild stroke)?	2	
Are you female?	1	
Total		



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