Heart Rhythm Society℠

Atrial Fibrillation and Stroke Prevention: Anticoagulants

Stroke prevention is the cornerstone of AFib treatment.

More than three million Americans have Atrial Fibrillation (AFib), which is the most common heart rhythm disorder. AFib is caused by chaotic electrical signals, which make the upper chambers of the heart (the atria) quiver, instead of properly contracting. During AFib, blood pools in the atria, which can allow a clot to form. If a blood clot breaks free, it can enter the bloodstream and block an artery. Most seriously, this happens in an artery that leads to the brain causing a stroke.

People with AFib have a stroke risk five times higher than those who do not have AFib. AFib causes approximately 120,000 strokes each year. A stroke related to AFib happens when a clot breaks free, lodges in a blood vessel, and blocks the flow of blood and oxygen to the brain. One out of every 4 strokes is due to AFib. Because of the adverse effects a stroke can have on quality and duration of life, stroke prevention is a primary treatment goal in AFib. There are a variety of treatments to prevent stroke, but a medication called an anticoagulant is the most common "first-line" treatment. Anticoagulants are highly effective at lowering the likelihood of stroke related to AFib.

What is an Anticoagulant?
Anticoagulants, which are sometimes called blood thinners, interrupt the blood's normal clotting (coagulation) process. This complex system, which is called the coagulation cascade, involves many cell proteins that work together to stop bleeding.

Anticoagulant Types

There are several oral medications available for patients with AFib. Anticoagulants target different parts of the coagulation cascade so blood clots cannot form.

Vitamin K antagonists

Many of the cell proteins involved in the coagulation cascade rely on vitamin K for synthesis. Vitamin K antagonists (VKAs) interrupt the production of these clotting proteins. VKAs have the longest track record of use in AFib-related stroke prevention. The first VKA was approved in 1954. Warfarin (Coumadin) is a vitamin K antagonist.

Direct thrombin inhibitors

Thrombin is one of the enzymes involved in clot formation. By inhibiting thrombin, the coagulation cascade is interrupted, so blood clots form less readily. Dabigatran (Pradaxa) is a direct thrombin inhibitor.

Factor Xa inhibitors

Factor Xa is another enzyme involved in the coagulation cascade. By inhibiting Factor Xa, the coagulation cascade is interrupted. Rivaroxaban (Xarelto), apixaban (Eliquis), and edoxaban (Savaysa) are Factor Xa inhibitors.

Benefits and Risks

When taken as prescribed, all anticoagulants significantly reduce the risk of stroke due to blood clots. Patients taking anticoagulants are at risk for excess bleeding because the medications interrupt coagulation and prevent clotting. Each type of anticoagulant has its own benefits and risks.

DID YOU **know**

AFib-related strokes have double the mortality rate of non-AFib-related strokes.

Vitamin K antagonists (VKAs)

Benefits. Most doctors are experienced with managing patients taking VKAs. If there is an emergency (such as a car accident) or a planned medical procedure, healthcare professionals can reverse a VKA so that the body's normal clotting abilities return. In addition, VKAs are the least expensive type of anticoagulant.

Risks. Certain foods—particularly green, leafy vegetables—have a lot of vitamin K. Eating too many foods that are rich in vitamin K can make VKAs ineffective at stroke prevention. In addition, some medications also interfere with VKAs. Because of this, patients taking a VKA must have their blood tested routinely to make sure it is adequately thinned, but not too thinned. The test measures the International Normalized Ratio (INR), which in general should be maintained between 2.0 and 3.0. If the INR is less than 2, the patient is at risk for the formation of blood clots and stroke. If the INR exceeds 3, there is an increased risk of bleeding.

Direct thrombin inhibitors

Benefits. Direct thrombin inhibitors may be easier for some patients to use than VKAs. Direct thrombin inhibitors have fewer dietary restrictions and fewer drug-to-drug interactions than VKAs. Direct thrombin inhibitors do not require frequent blood tests. In addition, direct thrombin inhibitors have a lower risk of bleeding in the brain than VKAs. Praxbind has been recently approved to reverse the effects of dabigatran/Pradaxa in emergency bleeding situations.

Risks. Healthcare professionals are less experienced managing patients taking these drugs in emergency situations. Direct thrombin inhibitors offer stroke protection for a certain period of time, so patients cannot skip a dose. Direct thrombin inhibitors may also have a higher risk of major bleeding in the gastro-intestinal organs, including the stomach and intestines.

Factor Xa inhibitors

Benefits. A Factor Xa inhibitor may be easier for some patients to use than VKAs. Similar to direct thrombin inhibitors, Factor Xa inhibitors have fewer dietary restrictions and fewer drug-to-drug interactions than VKAs. Frequent blood tests are not needed. Factor Xa inhibitors also have a lower risk of bleeding in the brain compared to VKAs.

Risks. Healthcare professionals are less experienced managing patients taking Factor Xa inhibitors in emergency situations, and there is no approved drug to reverse the anticoagulation effects of Factor Xa inhibitors. However reversal drugs are being developed. Similar to direct thrombin inhibitors, Factor Xa inhibitors offer stroke protection for a certain period of time, so it's important to take the medication as prescribed by the doctor and not skip doses.

Determining the Appropriate Treatment

Stroke prevention is a primary goal of AFib treatment. Patients should discuss their risk of stroke with their electrophysiologist (a doctor who specializes in heart rhythm disorders), cardiologist or primary care physician. If an anticoagulant is needed, patients should discuss the risks and benefits of the different anticoagulants with their doctor and together, determine which treatment is the best choice.

	Vitamin K Antagonists (Warfarin/Coumadin)	**Direct thrombin Inhibitors** (Dabigatran/Pradaxa)	**Factor Xa Inhibitors** (Rivaroxaban/Xarelto Apixaban/Eliquis Edoxaban/Sayaysa)
Dosing frequency	Once/day	Twice/day	Once or twice/day*
Effective at preventing strokes	Yes	Yes	Yes
Risk of excess bleeding	Yes	Yes	Yes
Time to peak effectiveness	Days	0.5-2 hours	2-4 hours
Interaction with food	Yes	No	No
Interaction with other medications	Yes	Fewer	Fewer
Need for frequent blood tests	Yes	No	No
Reversal drug for emergencies	Yes	Yes (Praxbind)	No**
Need to stop taking drug before medical procedures	Depends	Depends	Depends

*Some Factor Xa inhibitors only need to be taken once a day with the evening meal. Other Factor Xa inhibtiors need to be taken twice a day.
**Currently not all oral anti-coagulants have a reversal agent. It is expected that in the future there will be a reversal agent for each oral anti-coagulant.
The type of medical or dental procedure will determine whether anticoagulation medication must be stopped. Patients should discuss the planned procedure with their doctor to determine appropriate anticoagulation dosing before and after.