Atrial Fibrillation Ablation

What is Atrial Fibrillation?

Atrial fibrillation (AF) often presents as a rapid and irregular heart rhythm. Patients may not show any physical signs of AF, and may not know they are in AF, until they are examined by a physician. However, some patients do show many symptoms of AF such as fatigue, shortness of breath, dizziness, and chest pain. Most of the time the symptoms should go away on their own. However, if AF persists beyond several days, symptoms generally become less intense. There is a chance that symptoms such as generalized fatigue and a reduced tolerance for physical exertion can remain with AF. Risk factors of AF may include high blood pressure, uncontrolled diabetes, sleep apnea, and obesity.

Treatment for Atrial Fibrillation?

For patients with little or no symptoms while in AF, a treatment strategy called “rate control” may be considered. Therapies for these patients may require blood thinners to reduce the risk of a stroke while in AF. Additional medications (beta blockers or calcium channel blockers) may be required to slow the heart rate to a more normal range.

For patients with symptoms at the onset of AF or while in AF, therapy is primarily guided to keep the patient in normal rhythm by suppressing or eliminating the recurrence of AF. This treatment strategy is termed “rhythm control”. Anti-arrhythmic drugs (Flecainide, Propafenone, Sotalol, Dofetilide or Amiodarone) are often prescribed and can be very effective in preventing the recurrence of AF after it converts spontaneously or with an electrical shock conversion to the normal sinus rhythm.

What is Catheter Ablation?

If a patient has tried at least one anti-arrhythmic agent and AF still recurs on maximal medication dosage, a procedure known as catheter ablation is generally offered as an alternative long therapy. This is the current recommendation from multiple cardiology and heart rhythm societies.

Patients with no other structural abnormality of the heart and who also have AF that can convert to normal sinus rhythm spontaneously, are known as “lone paroxysmal AF” or lone PAF. Catheter ablation is most successful in this group and is around 75-80% successful after 2 yrs. AF may progress from sporadic to persistent AF over time and electrical shock conversion may be necessary to restore normal sinus rhythm.

In patients with persistent AF, the success rate with catheter ablation is lower and the degree of success decreases significantly with the duration in AF. Those with long, persistent AF, that has been continuously present for over a year, have the poorest success rate, which is currently around 50%. For patients who are not as ideal for catheter ablation, a more invasive approach with surgery may be considered known as “thorascopic maze” or a “mini-maze” surgery. The surgery is done on the outside of the heart, through multiple small incisional portals on both sides of the chest wall. Success rates may still be limited to around 60% over the long term.

Where does ablation take place?

Most AF results from electrical triggers that come from a region of the heart where the four pulmonary veins attach to the left atrium. The four pulmonary veins take blood away from the lungs and deliver it to the left atrium. The goal of ablation is to completely isolate the electrical signals around the pulmonary vein by stopping the electrical signals just outside the mouth of each vein.

There are two different energy sources that are used to isolate pulmonary veins. Radiofrequency is the traditional energy source. Heat created by an electrical current is applied to the tissue in order to eliminate the heart tissue responsible for causing recurrent atrial fibrillation.

The most recently developed energy source is freezing or “cryo”. Cryoballoon ablation utilizes a special catheter with a balloon attached to the tip. This is most effective for patients with the early phase of AF (lone paroxysmal AF) and is the preferred method as a first procedure. The catheter is placed with the balloon at the mouth of each pulmonary vein. Nitrous oxide is then infused into the balloon creating a freezing effect, and as a result, tissue in contact with the balloon is frozen. A more even ablation around the opening of the pulmonary vein is created which isolates the electrical activity in the region responsible for causing AF.
Occlude and Ablate (Medtronic-Artic Front Advanced Cardiac CryoAblation)
The cryo-balloon ablates where the balloon is in contact with the tissue. Arctic Front
Advance’s anatomical shape and large surface area creates circumferential lesions
with minimal energy applications.

Radiofrequency Ablation requires point by point ablation with an irrigated catheter. This technique is useful for more advanced stages of AF and is also preferred in second redo procedures, where additional atrial tissue outside the area of the pulmonary veins can be targeted as well.

Complications of Surgery

With any type of surgery, there is a chance of potential serious complications. The incidence of these complications are about 2%. Complications can include bleeding from the groin sites where catheters are inserted; heart perforation that may require treatment to drain blood from the chest or even cardiac surgery; collateral damage to the esophagus, lung or diaphragmatic nerve; stroke; heart attack, or even death.

Treatment After Surgery

It is not uncommon to develop recurrent AF within the first 3 months after the ablation. For half of these patients, long term success is still possible despite the early recurrence. Usually, anti-arrhythmic medication is continued for at least 3 months and blood thinning medication is continued for up to 6 months after the ablation. As stated before, most patients will have their AF treated successfully with catheter ablation on the first procedure. In some patients, despite recurrent atrial fibrillation after six months, medications that were previously ineffective are now more effective and the procedure may still be considered a partial success.

Within a week after the ablation, our office nurse or nurse practitioner will contact you to see how you are doing. At 3 months, if you have no symptoms of AF, a 24-hour Holter monitor will be ordered. If no AF is seen, anti-arrhythmic agent can be stopped. At 6 months, if AF is not present on a 30-day event monitor, blood thinning medication can be stopped unless there is a compelling reason (i.e. a prior history of stroke).

It is very important to remember that AF is a progressive syndrome and there are risk factors that can attribute to the progression of AF. Despite a successful ablation, it is still very important to have any of these risk factors (high blood pressure, uncontrolled diabetes, sleep apnea, and obesity) properly addressed by working with your primary physician. This way, your chance for long term success with freedom from AF can be maximized.