

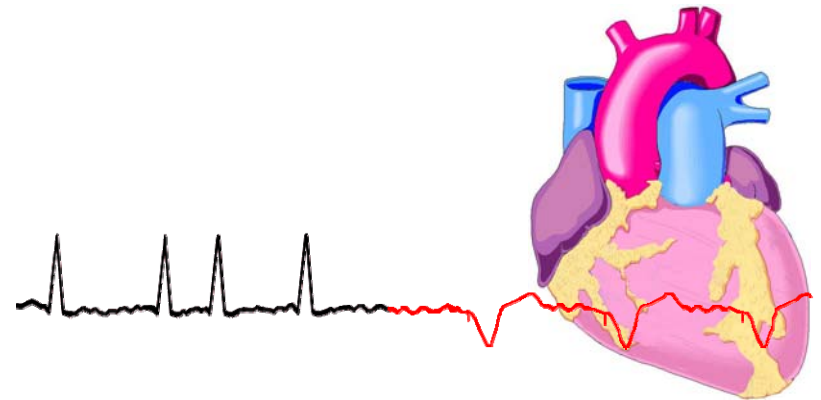


calgary health region

This information is of a general nature and may vary according to your special circumstances. If you have specific questions, please contact your physician or appropriate health care professional.

**CARDIAC ARRHYTHMIA CLINIC
FOOTHILLS HOSPITAL**

RADIOFREQUENCY ABLATION OF THE AV JUNCTION



A booklet prepared to answer some of the most common questions about AV nodal ablation

Patient Information Pamphlet

This booklet was designed to give you information about the procedure known as **RADIOFREQUENCY ABLATION**. It will help explain what Atrial Fibrillation is, why radiofrequency ablation has been recommended for you and what this procedure involves.

Please read this booklet carefully and ask us any questions that remain unanswered.

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Radiofrequency Ablation of the AV Junction for Atrial Fibrillation

You have been diagnosed with an irregular heart rhythm called atrial fibrillation. This booklet has been written to explain one of the treatments for atrial fibrillation; radiofrequency ablation of the AV junction, or **RFA**. Radiofrequency energy is applied to destroy the AV junction. This means that you will require a permanent pacemaker.

This procedure will be discussed in more detail in this booklet.

Contents:

1. Description of the normal heart conduction system
2. Description of atrial fibrillation
3. Description of Radiofrequency Ablation
 - What it is
 - Potential risks
 - Pacemaker implant
 - What to expect following the ablation
4. Glossary

Echocardiogram

- Uses sound waves (ultrasound) to determine the heart's size and how well the valves and muscle are working. A transesophageal echo (TEE) is an echo test used to obtain clearer images of parts of your heart from a tube that is passed into your esophagus. The esophagus lies directly behind the heart.



Muga Scan

- Using a tracer in the blood, the heart is scanned to see how efficiently it is pumping blood.



Electrophysiology Study

- A study of the heart's electrical activity done by placing special catheters inside the heart.

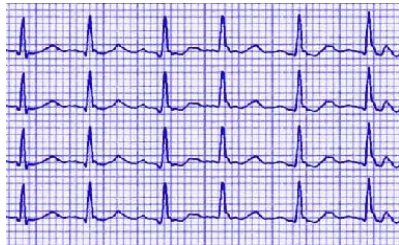
Electrophysiologist

- A cardiologist (heart doctor) specially trained to treat abnormalities of the heart rhythm.

Glossary

Electrocardiogram (ECG)

- A tracing of the electrical activity of the heart. Sometimes an ECG is done while you exercise on a treadmill (**stress ECG**).



Holter Monitor

- An on-going recording of the heart's electrical activity on a cassette or digital tape done while the patient is doing regular, daily activities.



Tachycardia Event Monitor (King of Hearts)

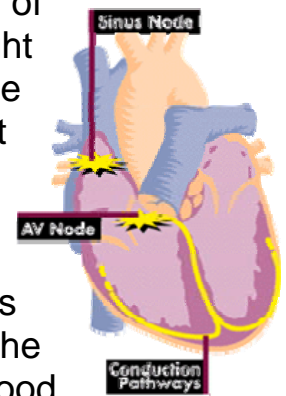
- A monitor the patient takes home with them but only applies when experiencing a tachyarrhythmia, or fast heart rate

Normal Heart Conduction System

The normal heart conduction system consists of the parts described below.

Sinus Node

The sinus node, also known as the sino-atrial node, or the SA node, is a group of specialized cells within the right atrium responsible for setting the heart rate. Electrical signals sent out by this node travel through the atria, or the top chambers of the heart, in an orderly and regular fashion. When all the cells in the atria have been activated the atria will contract which pushes blood from the upper chambers in to the lower chambers. The SA node normally discharges at a rate of 50-100 beats per minute in a resting adult.



Atrio-Ventricular Node

The atrio-ventricular node, also known as the AV node acts as the electrical link between the atria and the lower chambers of the heart, the ventricles. Located in the centre of the heart, the AV node

transmits electrical impulses sent by the SA node in an orderly and regular fashion down to the ventricles. It also delays the conduction rate briefly to allow the blood-filled atria to empty into the ventricles.

Because of this property the AV node can block a sudden, rapid heart rate generated by the sinus node or other atrial cells. If a heart rate increase is generated gradually, by exercise or emotion for example, the AV node can recognize this and will conduct at an appropriate rate.

Bundle of His

This group of cells is a continuation of the AV node or a tail that extends down into the ventricles.

Right and Left Bundle Branches

As the electrical impulse travels into the ventricles, the conduction system divides into two branches, one for each of the two lower chambers.

From this point, the conduction system continues to divide into smaller branches and then into fine strands called the Purkinje fibres, not unlike a tree dividing into smaller and smaller branches. These conducting branches are embedded within the ventricular muscle tissue and their function is to

If you had your pacemaker implant just prior to the ablation, the pacemaker nurses will instruct you to avoid raising the affected arm and to avoid heavy lifting for 6 to 8 weeks after the implant. They will also give you instructions regarding incision care as well as a follow-up appointment date.



You will be advised to avoid dental work for three months following the ablation. If dental work or bowel or bladder surgery is necessary during this time, please discuss this with your physician as you may require antibiotics prior to your dental appointment.

Please notify your electrophysiologist if you experience any recurrence of symptoms. You will be notified of any follow-up appointments or tests prior to leaving the hospital.

times. The risk of death, heart attack or stroke related to this procedure is less than 1/1000.

With present technology some ablation procedures involve significant x-ray exposure. The long-term effects of this exposure are not known today but have been predicted to increase the lifetime risk of cancer by an additional 0.05%.

If the ablation is not successful initially, another procedure may be arranged at a later date.

If you have any concerns or questions, the doctors and nurses from the Cardiac Arrhythmia Clinic will be seeing you before the ablation. Please write your questions down for them to answer.

What to Expect Following the Ablation

Your length of stay in hospital following this procedure will depend on your doctor's decision to change or add medications. If you are to continue the blood thinner medication you may be kept in hospital for up to 5 days while this medication takes effect.

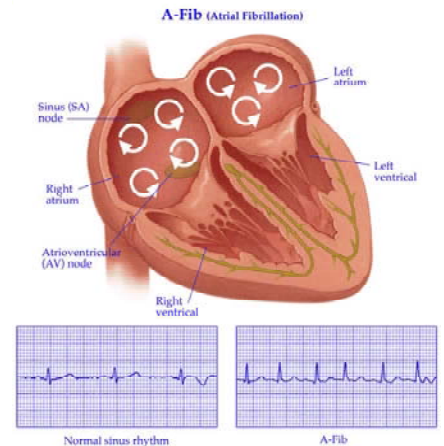
You should avoid prolonged sitting, straining, and heavy lifting (no more than 10 pounds) for a week after the procedure to allow the access site to heal.



activate the cells of the ventricles. When all the cells in the lower chambers have been activated, the ventricles pump, pushing blood out to the lungs and all parts of the body.

Atrial Fibrillation and Flutter

Normally, an electrical impulse will travel down from the sinus node in the right atrium, through the AV node and into the ventricles. In atrial fibrillation (hereafter called **AF**), electrical impulses are generated from multiple sites in the atria in a chaotic and extremely rapid fashion (400 to 600 beats per minute.) As a result, the atria do not contract efficiently. Furthermore, although some of these impulses are blocked in the AV node, many are conducted through to the ventricles via the AV node at a rapid and irregular rate.



In atrial flutter, the atrial rate is rapid (around 300 beats per minute) and some, usually only half, of these impulses actually reach the ventricles.

In both AF and atrial flutter, the AV node is responsible for slowing down the electrical signal before it reaches the ventricles. However, in some people, the AV node is capable of conducting these signals from the fibrillating or fluttering atria at very rapid rates. The patient may experience this as a very rapid pulse, palpitations or flutterings in the chest, dizziness, or light-headedness, shortness of breath, chest pain, anxiety, or, very rarely, fainting spells. There are many patients who have no symptoms while in AF.

AF can occur intermittently, lasting a few minutes or a few days at a time. It may disappear for a while but will usually occur again later. This is called paroxysmal AF. When AF lasts for longer periods of time it is called persistent. If AF becomes continuous it is called permanent. For many patients there are no obvious behaviors that will trigger an episode of AF. For others, caffeine, nicotine, alcohol, fatigue or indigestion may precipitate an episode.

Treatment of Atrial Fibrillation

The first treatment for AF is usually medication. There are special medications called antiarrhythmic drugs that doctors can use to help prevent AF from occurring frequently. Some of these medications may have side effects



- Other risks include damage to heart muscle, rhythm disturbances requiring cardioversion, and infection post-procedure.
- Rarely, puncture of internal organs by the needles or catheters used may occur. This may cause leaks requiring immediate air or fluid removal. This would be done by placing a needle to the appropriate site to drain the air or fluid, or it may require a surgical procedure.
- Damage to a heart valve caused by the insertion of the catheters is another very rare potential complication. In this event, surgical repair may be necessary.
- Dislodgment of the pacemaker wire by the ablation catheter occurs infrequently.

The likelihood of any of these complications is approximately 1 to 2%. The risk of a complication is increased slightly if ablation is performed via the artery.

As with any invasive procedure there is the remote possibility of death resulting from the complications mentioned above, or from a life-threatening rhythm that may be induced during the procedure. Keep in mind that the procedure is done under very controlled circumstances with medical personnel trained in emergency procedure in the room at all

Questions regarding the pacemaker will be answered by your doctor, by a pacemaker nurse, and in pacemaker literature that you will receive.

It will be required for you to sign a consent form for a Total AV Nodal Ablation prior to the procedure.



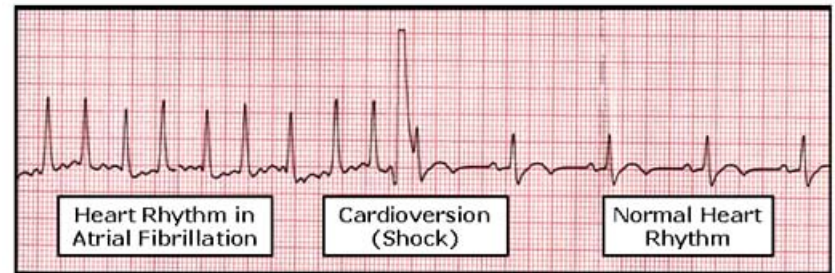
Potential Risks

The main risks involved in this procedure include:

- Bruising, bleeding or damage to the blood vessels caused by catheter insertion. Bed rest for a few hours following the ablation greatly reduced this risk.
- Clots may form at the ablation site within the veins where the catheters are placed, within your heart and/or around the catheters. If clots break free they may potentially cause damage to the lungs, or cause a stroke. The anticoagulant, Heparin, given during the procedure greatly reduces this risk. Your doctor may prescribe additional blood-thinner, warfarin or coumadin, for you to take regularly following the ablation.

and your doctor may want to test for these side effects by doing additional blood tests or tests such as an electrocardiogram (ECG) or a Holter monitor. (See glossary for explanation of tests).

If you are in AF continually, there are medications that are used to help prevent your heart rate from going too rapidly. It is always important to take medications prescribed for you regularly and consistently to keep a constant level of the drug in your body.



In some situations, the doctor may recommend a cardioversion. This procedure is usually done for persistent AF (when AF does not spontaneously stop). A cardioversion is an electrical shock delivered to the outside of your chest through paddles. You will be put to sleep for a few minutes while the shock is delivered. If this treatment fails, the shock may be delivered through temporary wires placed into your heart through a vein.

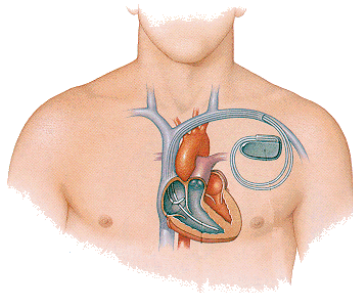
There are surgical and other invasive options as well. These options, however, are rarely used and are only available for a few patients.

Sometimes, a combination of these treatments is necessary for treatment of AF. For some patients, medications have not been effective in controlling the fibrillation, or they have not been tolerant of the drug(s) and its side effects.

A common alternative to the above treatments is a Total AV Nodal Ablation with implantation of a permanent pacemaker.

Permanent Pacemaker Implantation

Pacemakers work to restore a heart rhythm to a regular, normal rate. As mentioned above, once the AV node has been ablated your heart will beat at 30 – 40 beats per minute. Pacing will be required to bring the heart rate up to between 60 to 80 beats per minute.



A pacing system consists of the pacemaker generator and one or more pacing leads. The generator contains the battery and the electrical circuitry that controls the timing of the impulses. The pacing lead(s) deliver the electrical impulses to the

Additional Preparations

While you are in the ablation procedure and for the four hour period afterwards, it is necessary for you to lie flat in bed. You will be receiving intravenous fluids during these times.

The day of the procedure you will be asked to restrict eating and drinking. The nurses on the ward will start an intravenous in your arm and shave and cleanse your groin area.



You may receive intravenous sedation during the ablation procedure. This includes drugs such as

Valium (a sedative), Fentanyl (a narcotic), and Gravol to prevent nausea. Many people sleep through part of the procedure.

Because we are destroying the only electrical connection between the atria (upper chambers) and ventricles (lower chambers), your ventricles will no longer receive any impulses from the atria. The ventricles on their own can beat only at a rate of 30-40 beats per minute. A permanent pacemaker is required to restore a regular heart rate. If you do not already have a pacemaker in place, one will be implanted prior to the ablation.

Where are RF Ablations done?

Since careful monitoring of the heart's activity is necessary, you will be admitted to a cardiac ward in the hospital. The ablation itself will be performed in a special room equipped with x-ray and special heart monitoring systems. An electrophysiologist will perform the procedure with specially trained nurses in attendance.



What about Medications?

If you are on a blood thinner called warfarin or coumadin, this will likely be stopped 3 to 5 days prior to the ablation and/or pacemaker insertion. You may be admitted to hospital for this period of time if your doctor wants you to be treated with an intravenous form of blood thinner called heparin in preparation for the procedure(s).

Other medications, including your antiarrhythmic drugs should be continued unless your doctor instructs you otherwise.

heart muscle that cause the heart to beat. The pacemaker is capable of continuously monitoring or sensing the heart's own rhythm and will deliver a pacing impulse when the heart rate is too slow or irregular.

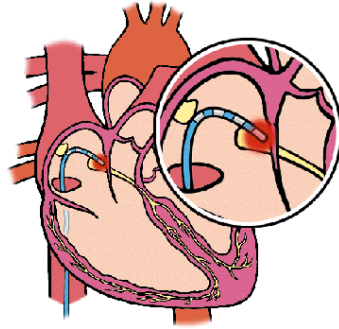
Pacing leads are most often placed into a heart chamber through a vein under your collarbone or clavicle. The pacing generator, about 3.5 centimeters in diameter and 1 centimeter thick, will be placed under the skin or a layer of muscle in the upper chest area. The generator housing is made of sealed metal with a plastic header for lead connection.

The surgery to implant the pacemaker system takes 1 – 2 hours and is done with a local anaesthetic. You may receive intravenous sedation during the pacemaker implant. Implants are rarely done under general anaesthetic.

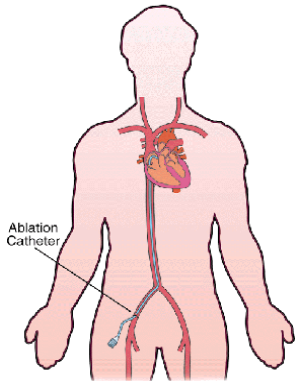
The Pacemaker Clinic nurses will contact you to answer any questions you may have regarding pacing and surgery.

What is Radiofrequency Ablation of the AV Node?

Radiofrequency Ablation of the AV node, or **RFA** is a treatment used for the management of AF when drugs fail to control this rhythm disorder or when drugs cause side effects. A specially trained doctor called an electrophysiologist (a specialist in abnormalities of the heart rhythm) inserts one or more catheters into blood vessels, usually in the groin, and threads them under x-ray guidance into the heart.



The catheters are then positioned in the heart. The ablation catheter delivers a mild electrical current produced by high-frequency waves (radiofrequency waves) from the tip of the ablation catheter through to the target site.



These waves are similar to microwaves. The energy from this catheter generates about a 30 degree centigrade increase in temperature and is usually applied for 30-60 seconds to an area about the size of a pen tip.

The heat is sufficient to destroy the small but critical amount of heart tissue. Some patients may

experience some chest discomfort or “heart burn” with the heat application; this is usually mild. It often takes more than one application to successfully ablate the pathway. The procedure is done under local anaesthetic with moderate intravenous sedation and takes on average one to two hours.

The catheters are removed immediately following the procedure and you will be asked to lie flat for three to four hours to help prevent bleeding at the insertion site in your groin.

It is important to realize that ablation of the AV node is a **non-reversible, permanent procedure**. You will be dependent upon the pacemaker to keep your heart rate constant and comfortable. Success rate for this procedure done at Foothills Medical Centre is 99%.

Although ablation of the AV node is usually accomplished by positioning the ablation catheter in the right heart, sometimes this is not successful. If that is the case, a catheter will need to be inserted into the artery in the groin. The catheter is advanced to cross the aortic valve into the left pumping chamber. Ablations will then be delivered from the left heart.