

Patient information sheet – Ablation of atrial fibrillation (pulmonary vein isolation)

In over 95% patients, abnormal electrical “triggers” within pulmonary veins are responsible for initiating AF. These veins connect to the left atrium (the left, top chamber of the heart) and drain blood rich in oxygen from the lungs. Over the past decades, we have learned that if these veins could be “electrically isolated” from the atrium and the rest of the heart (while still allowing normal blood from the lungs), AF can be prevented. Such “electrical isolation” can be performed using radiofrequency ablation, cryoablation or pulsed field ablation (PFA) and the procedure is called a “pulmonary vein isolation” or “PVI”.

Radiofrequency ablation: Ablation using radiofrequency energy uses low power, high frequency energy that causes a very small part of the heart at the tip of the ablation catheter to increase in temperature, thus ablating (cauterising) it, resulting in the formation of a scar in a small targeted part of the heart. A scar does not allow electrical signals to pass through it and therefore the electrical overactivity in the pulmonary veins is “isolated” from the rest of the heart. The ablation in AF does not remove the triggers, but rather prevents them from spreading their abnormal electrical activity to the rest of the atria and the heart.

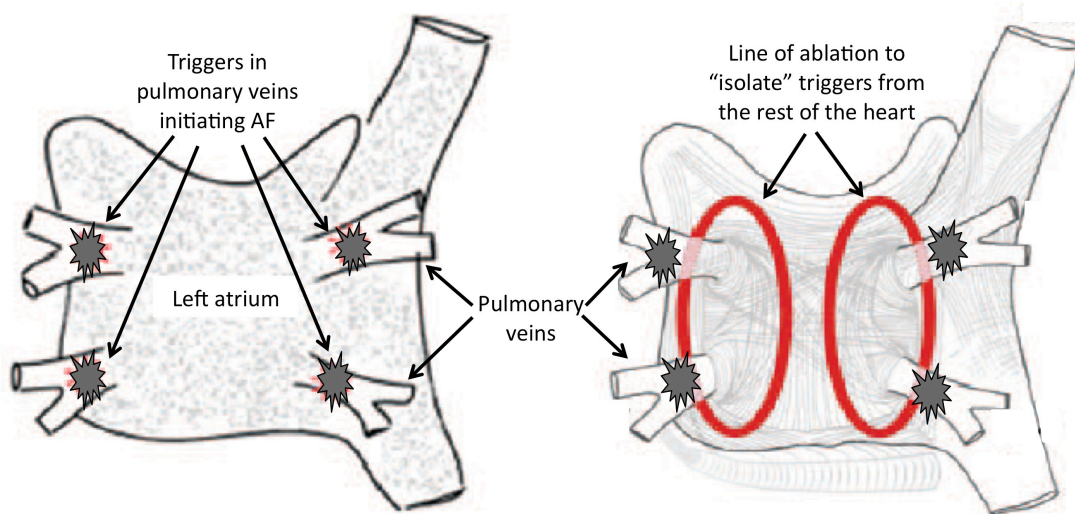


Diagram 1: In the diagram above, the (red) ovals represent schematic lines of ablation isolating the pulmonary veins – the source of triggers (stars) from the rest of the left atrium.

In patients with AF of a longer duration, ablation is sometimes also required to be performed in other parts of the atrium, because in these cases abnormalities in the atria (other than just “triggers” in pulmonary veins) are also responsible for initiating and maintaining AF.

Cryoablation: Ablation is an alternative ablation technique to radiofrequency. It utilises freezing rather than heating of the tissue to create a scar, in the desired location. Using this technique, a specialised catheter is inserted and inflated at the junction of the pulmonary veins and the atrium, a cooling fluid within the catheter causes a reduction of temperature (freezing) of the tissue, resulting in scar formation. This scarring prevents electrical signals from the pulmonary veins reaching the atrium. This also achieves a

pulmonary vein isolation. Cryoablation is an alternative method of ablation in patients having their 1st AF ablation. It isn't used for patients who may require a repeat procedures.

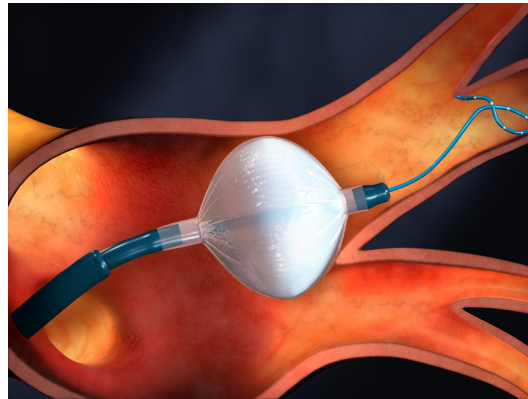


Diagram 2: Above, shows a cryoablation balloon inflated at the junction of the pulmonary vein and the atrium.

Pulsed Field Ablation (PFA): An ablation method using high voltage electrical pulses of very short duration. These impulses create pores within the affected myocardial cells, leading to cell death and scar formation in the desired location. As with other methods, the scarring results in electrically isolating the pulmonary vein from the rest of the atrium, which prevents abnormal signals from the pulmonary veins reaching the atrium and causing AF. PFA is non thermal ablation technique with reported lower rates of complications to surrounding structure.

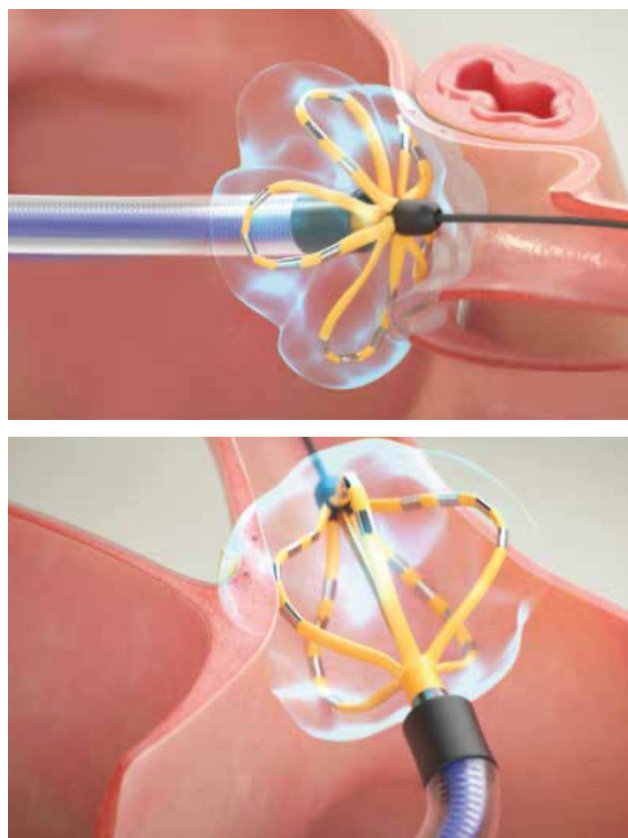


Diagram 3: Above, shows a PFA catheter at the junction of the pulmonary vein and the atrium, in 2 different orientation (so called flower and basket).

Who may benefit from ablation of atrial fibrillation?

In the majority of patients with AF, a trial of medical therapy is recommended in the first instance. Patients may improve or stabilise with medications alone.

Ablation is a useful procedure for those patients who remain symptomatic (e.g. palpitations, effort intolerance, fatigue etc.) from AF despite medications, or in those who are intolerant of medications used to control the heart rhythm. It can also be considered in symptomatic patients who do not wish to take medications on a long term basis.

Who is unlikely to benefit from ablation of atrial fibrillation?

Patients who have had AF for **long periods of time** (usually many years) are less likely to benefit from AF due to extensive irreversible abnormalities in the atria, that are not able to be fixed by ablation. Those with very large atria also have a reduced success rate.

Patients who have **no symptoms** are generally not likely to benefit from the ablation and in these patients the potential benefits of the procedure are likely to be outweighed by the potential risks associated with the procedure.

The procedure is **not thought of as an alternative to long term blood thinners.**

What is the potential outcome/benefit of ablation of atrial fibrillation?

The majority of patients obtain an improvement in their symptoms following the ablation. This occurs in approximately 70%-80% of patients following the first procedure. In approximately 30% of patients a repeat procedures may be required to obtain a benefit if AF recurs after the first procedure. The meaning of "symptomatic improvement" varies between patients but can range from a reduced frequency or severity of AF episodes to complete abolition of symptoms. Some patients may still require medications to control AF, however in many patients improvement in symptoms can be achieved without ongoing medications. In a proportion of patients the procedure(s) may not provide the desired outcome. The beneficial effect can last a number of years, though world wide experience suggests that over an increasing number of years AF can recur.

It must be remembered that, the procedure is used primarily to reduce symptoms due to AF and to improve your quality of life. It is not generally recommended for those who do not have any symptoms. In the majority of patients, ablation will not eliminate the need for blood thinning medications – this is determined by your cardiologist in relation to your overall long term risk of a stroke due to AF.

Data is from clinical trials also supports the notion that a PVI can be of significant benefit (compared to medications alone and also compared to AV node ablation+pacemaker) in patients with AF and heart failure.

What happens prior to the procedure?

You will have a detailed consultation with your specialist about the procedure to explain the process, benefits and risks of the procedure. Cardiac monitoring and evaluation of your heart rhythm will be required to confirm that your symptoms are due to AF and not due to other heart irregularities. In the majority of cases you will need to be commenced

Information in this sheet is of a general nature only. Specific details of the procedure will be discussed with you, prior to the procedure.

on blood thinners (most commonly warfarin, xarelto, eliquis, pradaxa) at least 4-6 weeks prior to the ablation, to ensure that you tolerate them. The blood levels of these medications will need to be stable during this time. In some cases these medications are stopped only a few doses prior to the procedure, and in others they are not ceased – this will be discussed with you on an individual basis. About a week (or earlier) before the procedure you will need to have a CT scan/MRI to fully evaluate the anatomy of the heart and the pulmonary veins. You will be admitted to the hospital on the day of the ablation procedure.

How the ablation is performed?

The procedure is performed under general anaesthesia in the catheter laboratory. Once you are anaesthetised, a transoesophageal echocardiogram (to evaluate for clots in the heart) will be performed in most cases. A temperature measuring probe is also inserted into the oesophagus. **Please notify your doctor if you had had issues with your oesophagus or swallowing problems.**

Thin tubes (sheaths) will then be inserted into the vein in your groin(s). Catheters (specialised flexible wires) will be passed through the tubes into specific locations within both sides of the heart. Blood thinners will be administered to reduce the risk of blood clots forming during the procedure. Once the catheters are in place, a detailed anatomical map of your heart will be created which will be used to guide the ablation. At the end of the procedure, the catheters and sheaths will be removed. The anaesthetic is then reversed and you will be transferred to the recovery area. The procedure time can vary from 1.5-4 hours.

What happens after the procedure?

Once you fully wake up, you will be given something to eat and drink. You will need to remain on bed rest for approximately 4 hours after the procedure to reduce the risk of bleeding from your groin. Blood thinners will be restarted after the procedure. You will remain on a cardiac monitor overnight. You will be kept in hospital until the next day (though occasionally longer). Some patients can experience chest pain for a few days after the procedure due to irritation/inflammation caused by the ablation. This can be managed with pain medication and generally improves over a few days. You will need to rest for a week or two after the procedure. Most people require approximately 1-2 weeks off work, but this can vary.

Recurrence of AF is not uncommon, early after the ablation, especially in the first month. This does not necessarily mean that the procedure was not effective. It is not usually possible to judge the effectiveness of the procedure in the first 3 months. It may sometimes be necessary to perform a cardioversion to restore your heart to a normal rhythm during this period.

What happens after I go home?

Your usual medications to control the heart rhythm will typically be continued for a number of months. The blood thinner will usually be continued for at least 3-6 months (or permanently – especially if they were used before) after the ablation. A pain killer and anti-inflammatory medications may also be prescribed for a few weeks/months. Sometimes other medications may also be prescribed. You will require a review at 6 weeks following the ablation.

What are the risks of the procedure?

AF ablation is a relatively common, but technically one of the more complex electrophysiological ablation procedures performed. In the majority of cases the procedure is uncomplicated however a number of complications can occasionally occur (overall the risk of any complication is approximately 5-6%). The overall complications rates are similar in patients having radiofrequency ablation and cryoablation, with some variations depending on the technique used. The most common / serious of these are listed here:

- Bleeding / blood vessel damage (usually in groin, but can occur elsewhere) - 5%
- cardiac perforation/tamponade (bleeding around the heart) 1%
- stroke - 1%
- death - 0.1%
- pericarditis (inflammation around the heart causing pain) – fairly common
- atrio-esophageal fistula – 0.05%
- damage to stomach / bowel - gastroparesis (due to damage to gastric nerve - vagal plexus/nerve injury) <1%
- weakening the diaphragm (due to damage to phrenic nerve), most often transient, but can be permanent ~ 1%
- heart attack <1%
- need for a pacemaker <1%
- blood clots in legs/lungs <1%
- pulmonary vein (narrowing) stenosis <1%
- damage to heart valves <1%
- urgent cardiac surgery <1%
- serious infection/allergic reaction <0.1%
- anaesthetic complications – variable depending on your overall health.
- increased risk of other arrhythmias – such as atrial flutter– 5%

- The above is not an exhaustive list and other complications can also occur.

If you feel unwell, develop fevers, difficult swallowing, or require an admission to hospital especially within the first few days / 6 weeks of the procedure, it is very important that you notify the doctor who performed your AF ablation.