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 arising from these abnormal “triggers” can be prevented. Such “electrical isolation” can be performed using radiofrequency ablation or cryoablation and the procedure is called a “pulmonary vein isolation” or “PVI”.

**Radiofrequency ablation:** Ablation using radiofrequency energy is the most common means of ablation used around the world today. It is 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. The procedure is called pulmonary vein isolation (PVI) – see diagram below.

![Diagram 1](image)

**Diagram 1:** In the diagram above, the red ovals represent lines of ablation isolating the pulmonary veins from the rest of the left atrium.

In patients with AF of a longer duration, ablation is 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. It utilises freezing rather than heating of 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 is not used for patients requiring repeat procedures.

Information in this sheet is of a general nature only. Specific details of the procedure will be discussed with you, prior to the procedure.
Diagram 2: Above, shows a cryoablation balloon inflated at the junction of the pulmonary vein and the atrium.

**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. Many patients will improve or stabilise with medications alone.

Ablation is a useful procedure for those patients who remain significantly 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 mild or 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 an alternative to long term blood thinners** such as warfarin, pradaxa, xarelto, eliquis and others.

**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% of patients following the first procedure. In approximately 30-40% of patients repeat procedures are 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 others such improvement in symptoms can be achieved without 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 a 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 or those who have only have very mild or very infrequent 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.

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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 on blood thinners (most commonly warfarin, xarelto, eliquis, pradaxa) at least 4-6 weeks prior to the ablation. The blood levels of these medications will need to be stable during this time. Approximately five days prior to the ablation you may be switched to a different blood thinner (administered via injections), though whether this occurs varies in individual patients and this will be discussed with you. In some cases these medications are stopped only a few days prior to the procedure, and in others they are not ceased. A few days 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 procedure.

How the ablation is performed?

The procedure is in most (though not all) cases 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.

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 the right and left side 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 2-4 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 two 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.

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 longer) after the ablation. A pain killer and anti inflammatory medications will typically 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.

If you feel unwell, develop fevers or require an admission to hospital within the first three months, it is very important that you notify the doctor who performed your AF ablation.

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What are the risks of the procedure?

AF ablation is one of the most 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 minor variations depending on the technique used. The most common / serious of these are listed here:

- Bleeding (usually in groin, but can occur elsewhere) - 5%
- Cardiac perforation/tamponade (bleeding around the heart) 1-1.5%
- Stroke - 1%
- Death - 0.1%
- Pericarditis (inflammation around the heart causing pain) – fairly common
- Atrio-esophageal fistula – 0.05%
- Gastroptosis (due to damage to gastric nerve - vagal plexus/nerve injury) <1%
- Weakening the diaphragm (due to damage to phrenic nerve) ~ 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.

AF ablation should only be performed after a patient carefully considers and understands the risks, benefits and alternatives to the procedure.