

# Department of Cardiology

## **Procedure information leaflet: Atrial fibrillation ablation**

It has been recommended that you have an ablation of atrial fibrillation (AF). This leaflet is in two sections. The first section is a summary of the procedure, its risks and benefits. The second is more detailed information about the procedure and immediate time before and after the procedure including the risks and benefits.

### **Section one: summary information**

#### **Summary of the procedure itself**

Local anaesthetic is applied to the groin (usually on the right, occasionally both groins) and small tubes are placed in the vein at the top of the leg. Thin wires are then passed up to the right atrium of the heart. Sometimes an electrical study of the heart is performed to gather more information but this is not always necessary - this is done by using small electrical stimulations to pace the heart in a specific way to look at the heart's response.

A tiny needle is used to puncture a small hole from the right atrium to the left atrium as the left atrium is the area of the heart where we have to perform ablation for atrial fibrillation. Once the left atrium has been entered, x-ray dye is injected into the atrium to show where the pulmonary veins lie. Once their position is known, a small balloon (around 3cm diameter once inflated) is passed up through the groin, across the hole into the left atrium. The balloon is inflated with a gas and pushed up against one of the veins. Once the vein is sealed off from the atrium by the balloon, a very cold gas is pumped into the balloon to freeze the tissue around the vein. This freezing and subsequent thawing damages the electrical conduction property of the tissue such that any abnormal signals within the vein which might otherwise trigger AF no longer conduct to the heart. This process is repeated for all (typically 4) the veins draining into the left atrium. This reduces the risk of AF developing.

#### **Summary of the benefits**

The aim of the procedure is to prevent AF episodes; in some people it does not prevent all AF, but reduces the duration of the episodes or how frequently they occur. Unfortunately it is not effective in all patients, and it is difficult to predict who will benefit from the procedure.

#### **Summary of risks**

The procedure is overall reasonably safe but there are some serious complications which can occur.

#### **Very serious complications (1% risk)**

Death (1 in 1000 or 0.1%)

Stroke (1%)

**Serious complications (2-3% risk)**

Damage to a blood vessel at the top of the leg requiring further treatment (sometimes surgery) – around 0.5-1%

Bleeding around the heart requiring insertion of a small drain (around 1%)

Small risk of damaging a valve in the heart requiring open heart surgery (rare)

Damage to the nerve supplying the breathing muscle (the phrenic nerve, supplying the diaphragm) causing breathlessness (this will almost always recover but that can take several months) (around 0.5-1%)

Damage to the normal conduction system requiring pacemaker implantation (rare)

Blood clots in the veins at the top of the leg, or within the heart, that can occasionally pass to the lungs (embolus). (rare)

If you have a pacemaker, the procedure may rarely damage the system requiring a further procedure (around 1% if a pacemaker present)

## **Section 2: Detailed information about EP study and flutter ablation**

This leaflet explains some of the benefits and risks of the procedure. We want you to have an informed choice so that you can make the decision that is right for you. Please ask the cardiology team about anything you do not fully understand or want explained in more detail.

We recommend you read this leaflet carefully. You and a member of the cardiology team will need to record your agreement to the procedure by signing a consent form, which you will be given.

### **What is atrial fibrillation?**

Normal heart rhythm (sinus rhythm) is an organised, co-ordinated electrical activation of the top chambers (atria). Atrial fibrillation is an abnormal heart rhythm where chaotic impulses travel around the atria of the heart. This usually results in the ventricles beating too quickly and irregularly. There are three distinct problems caused by atrial fibrillation:

- 1) The heart beats too quickly; this can cause weakness of the heart in the longer term (heart failure). This can be prevented either by restoring normal heart rhythm, or by slowing the heart down whilst it is in AF.
- 2) Many patients feel a lot of symptoms whilst in AF. This is sometimes due to the rapid heart rate, but many patients still feel symptoms even when the rate is controlled, ie the abnormal rhythm itself is causing symptoms. For those people, the only way to improve their symptoms is to try to restore normal rhythm.
- 3) The risk of stroke is much higher in people who have had AF than in those who have never had AF. It is important to stress that the risk is higher in people with a history of AF, even when their heart rhythm is normal. On that basis, we do not recommend AF ablation to reduce stroke risk. We reduce the risk of stroke by giving anticoagulants (blood-thinning medications) – either warfarin or one of the newer direct oral anticoagulants (Apixaban, Dabigatran, Edoxaban or Rivaroxaban).

### **How can AF be treated?**

For people who have been found to have AF without any symptoms, it is often not necessary to treat the AF specifically. In those people, the heart rate is controlled with medication and the stroke risk is managed with anticoagulants.

For people with symptoms from the AF, often it is necessary to restore normal sinus rhythm to improve / prevent those symptoms. This can be achieved by means of a very quick electrical shock across the chest (cardioversion); however, whilst this is almost always successful, AF usually recurs quite soon afterwards. For those people in whom AF recurs, the options for maintaining normal sinus rhythm are medications (ie anti-arrhythmic drug therapy) or AF ablation.

Anti-arrhythmic drugs are reasonably effective at maintaining sinus rhythm in many patients, but they have some disadvantages:

- 1) They are only moderately effective (eg 50% chance of normal sinus rhythm one year after starting for the most powerful medication)
- 2) They can cause significant side effects

- 3) For people with no other medical problems, it is inconvenient to take medications every day
- 4) There are some risks to long term anti-arrhythmic drug therapy.

For these reasons, a proportion of patients prefer to have AF ablation to try to help their symptoms.

### **What is an AF ablation?**

Ablation is the process of deliberately destroying the electrical conduction properties of a specific area of tissue within the heart.

The left atrium receives oxygen-rich blood from the lungs via (usually four) pulmonary veins. Extensive research and practical experience has shown that in the majority of people with AF, abnormal electrical signals originating from within the pulmonary veins and conducting into the left atrium are responsible for triggering episodes of AF. Procedures that isolate those electrical signals from the left atrium reduce the amount of AF that those people experience. For this procedure, a balloon is used to freeze around each vein in turn.

### **Why do I need this procedure?**

This procedure is recommended for the control of symptoms when this cannot be achieved with medications, or where medications are not tolerated or not desirable. It should be stressed that AF ablation is an option for the control of symptoms, and it is rarely 'necessary': it is a good option for some people when the other options have been considered and found to be less attractive. There are almost always alternative strategies so it is important you discuss the available options with your cardiologist if you are not certain you want to undergo this procedure.

### **How is the procedure performed?**

Prior to the procedure, all patients must have been taking an adequate regime of anticoagulant (blood thinners) – if this is not the case the procedure cannot go ahead for safety reasons, and you must inform your cardiologist.

Before the procedure you will have a cannula (thin plastic tube) inserted in a vein in your arm. You will be taken to the procedure room (known as the cath lab) and will lie on the bed. Light sedation is given to make you feel more comfortable during the procedure. After pre-procedure final checks, the top of your leg will be cleaned with antiseptic. Local anaesthetic will be injected using a small needle.

3 tubes will be placed in the femoral vein at the top of the leg and thin wires will be passed through these into specific areas of the heart. You should not feel much when the wires are passed; the local anaesthetic stings but typically you will not feel much after that.

A small needle is used to puncture from the left atrium into the right atrium. You will not feel anything when this is done. A tube is then passed through the hole into the left atrium.

X-ray dye is injected into the veins draining into the left atrium to visualise their course. You may feel a warm flushing feeling during this part of the procedure. Once the veins have been located, the balloon is passed into the atrium and inflated around the vein; once the position is satisfactory, the balloon is cooled to around -40 to -60°C. Each freeze lasts for typically 3 –

4 minutes; during the freeze, you may experience a headache or some chest pain. This is usually easily managed by painkillers and sedation, and the pain does not last long. You should let the nurse or doctor know if you are in discomfort as it is usually easy to give you more medication.

The procedure is then repeated for each vein in turn. Sometimes more than one freeze is required for a vein because the electrical signals haven't been obliterated by the first freeze.

Usually, two of the veins in the left atrium run very close to the nerve (phrenic nerve) that supplies the diaphragm (the breathing muscle). If the phrenic nerve is damaged, the diaphragm will stop working on that side, often for several months. Whilst this is not very dangerous, it can cause breathlessness and so the operator will try to avoid this. One of the wires in the heart is repositioned to the right shoulder area and electrical impulses passed down the wire; if the wire is close to the phrenic nerve, the nerve is stimulated and the diaphragm will 'twitch'. You will feel this a bit like hiccups on one side. It is a bit uncomfortable but not usually painful. The diaphragm is paced in this way during the freeze on that side; if the phrenic nerve is stressed by the freezing, the strength of twitch will diminish (or stop) and the freeze is abandoned. This reduces the risk of a significant phrenic nerve injury to around 1%.

Once all the veins have had freezing treatment, the electrical signals should have been abolished. The veins are rechecked at the end to ensure the electrical signals have not recurred. If all is well, the equipment is all pulled back from the left atrium to the right atrium, and then out of the holes at the top of the leg. A stitch is placed in the groin puncture site to prevent excessive bleeding. You will have a heart scan (echocardiogram) whilst still in the procedure room to ensure there is no significant bleeding around the heart. You will then be taken to the recovery area for further care. The whole procedure typically takes about 2 hours, but is occasionally a bit longer or shorter than this.

About 3 – 4 hours after the procedure you should be able to walk; further advice and aftercare will be given to you in the recovery area. Most people can go home about 6 hours after the procedure finishes.

### **Intended benefits of the procedure**

The aim of the procedure is to ablate the pulmonary veins in order to prevent AF with the primary aim of improving symptoms.

### **Limitations of an AF ablation**

The success rate for an AF ablation depends on the type of AF and any underlying conditions. Quoted success rates for most patients range from 50% up to about 80%. A substantial minority (30%) of people require a second ablation for AF after a first procedure doesn't have an adequate impact on the AF.

Generally speaking, there is no 'cure' for AF and it is preferable to think about success rates over the medium term rather than the concept of being free from AF forever: a successful AF ablation will result in disappearance of AF symptoms for a number of years, but AF may recur many years later.

## **Serious or frequent risks**

As with any invasive procedure, there are some risks, although these are fairly small. It is important to balance the benefits against those risks: if you are unsure it is much better to pause and consider the options rather than go ahead with a procedure you are not completely comfortable with. Complications can generally be treated and are very rarely life-threatening, although the most serious complications can have a significant effect on quality of life.

### **At the time of the procedure, there may be –**

- Death. This is extremely rare (up to 0.1% or 1 in 1000).
- Stroke. This is one of the most serious complications because full recovery is rare. There is damage to part of the brain, typically caused by a small blood clot either forming in the left atrium during the procedure and travelling up to the brain, or a pre-existing clot within the atrium being dislodged during the procedure and travelling to the brain. This starves part of the brain of oxygen resulting in damage. There is usually some recovery of the damaged area, but some function is usually permanently lost. (approximately 1% risk of stroke)
- Accidental damage to blood vessels (most commonly at the top of the leg); this may require surgery to repair (approximately 1%)
- Discomfort or pain during the procedure. It is done under local anaesthetic and sedation and pain relief is given so you should tell the nurse if you are finding the procedure uncomfortable so more pain relief or sedation can be given.
- Bleeding around the heart requiring emergency insertion of a small plastic tube (drain) through the upper abdomen to remove the blood that accumulates and allow the leak to heal (approximately 1%)
- Reaction to the drugs used to sedate you.
- Changes in heart rhythm requiring emergency treatment (there will always be adequate equipment and staff available to deal with this during the procedure).
- Damage to your normal electrical system requiring insertion of a pacemaker (approximately 1 in 500)
- Blood clots in the legs that can then embolise (move to the lungs) is a rare but serious complication.
- If you have an electronic pacemaker, it is possible for the pacing wires to become dislodged by the procedure. This would require a further procedure to rectify. (1% if you have a pacemaker)
- Damage to the phrenic nerve (the nerve supplying the diaphragm) causing breathlessness. This can persist for a few months. (0.5% risk)

### **After the procedure there may be –**

- Bleeding from the groin; it is common to have minor oozing but if a blood vessel has been damaged then there may be significant bruising and / or swelling around the site of the punctures.
- Chest pain. Discomfort is common after ablation procedures but is not usually severe and responds well to standard painkillers.
- Palpitation. Whilst the ablation abolishes the triggers for AF, immediately after the procedure there is usually some inflammation within the atrium due to the ablation. This can itself trigger some rhythm disturbances – either short-lived or even full episodes of AF. AF in the first few weeks after an AF ablation does not imply the procedure has failed.

These risks are all uncommon but it is our duty to make you aware of them before you sign the consent form. Please do not hesitate to ask the doctor any questions you may have to help allay any concerns prior to signing the consent form.

You will be cared for by a skilled team of doctors, nurses and other professionals. If problems arise, we will be able to assess them and deal with them appropriately.

### **Other procedures that are available**

Electrical cardioversion (where a shock is passed through the chest using pads attached to the chest wall) under heavy sedation is very effective at terminating AF and is often used in the short term. However, it does nothing to prevent the rhythm problem occurring in future which it is very likely to do.

Medications (tablets) or an alternative approach of implanting a pacemaker followed by a very simple ablation can be used to control the rate when in AF, and this may be effective at preventing excessive symptoms. Some medications can be used to control the rhythm (ie prevent episodes of AF / maintain normal sinus rhythm), and if you do not want to go ahead with the procedure then it is usually possible to achieve a reasonable result with medications. There is always a balance between the risks of long term medications and the risk of a single procedure with reasonably low complication rates and relatively high success rates.

If you do not want to have an AF ablation, the other options available can be discussed with you by your cardiologist.

### **Before you come into hospital**

You will receive a letter from the hospital explaining your admission date and where to go.

You should be invited to a pre-assessment appointment where the procedural details will be discussed and any concerns highlighted / dealt with.

### **Instructions for eating and drinking**

It is important that you follow the instructions we give you about eating and drinking.

If your planned procedure is early in the morning (admission time before 9am), you should have nothing to eat that morning before the procedure. If your planned procedure is later (morning admission after 9am), please have a normal breakfast no later than 7am on the day of the procedure. If your admission is 12pm or later, please have a normal breakfast and nothing to eat or drink after 10am.

### **Your usual medicines**

We will usually ask you to continue with your normal medication (except as instructed below), so please bring it with you. You may have sips of water with any medications you have to take on the morning of the procedure.

### **Clopidogrel / Prasugrel / Ticagrelor / Dipyridamole (antiplatelet drugs)**

If you are taking these types of blood thinners, you should continue them including on the day of the procedure. **Please do not stop taking any of these medications unless specifically instructed to.**

### **Warfarin / Dabigatran / Rivaroxaban / Apixaban / Edoxaban (anticoagulants)**

It is critical that your blood is fully anticoagulated for at least three weeks prior to the ablation. You must not stop any of these medications in the three weeks before the procedure. If you do miss any doses, please let the team know immediately so we can advise whether it is safe to proceed or better to postpone the procedure.

If you take warfarin, please ensure you have a blood test for your INR done weekly for three weeks prior to the ablation, and then 24-48 hours prior to the date of your procedure. If you are able to find out the results and bring them with you it is helpful.

### **Medications to control your heart rhythms**

You should receive clear instructions on what to do. Generally speaking we will not advise you to stop any anti-arrhythmic drugs prior to the AF ablation procedure. **Please ensure you ask what to do if you are not sure.**

### **Diabetes**

If you are **diabetic**, you should follow the appropriate instructions below.

#### ***Diabetes treated with a special diet:***

You do not need to follow any specific instructions other than the above.

#### ***Diabetes treated with tablets:***

Take all your diabetic tablets as normal (with a sip of water).

#### ***Diabetes treated with insulin:***

If you take insulin you should not take your usual dose on the morning of your procedure. The nurses will do regular checks on your blood sugar levels. You will be able to have some food and drink after your procedure. Please bring your insulin with you so that you can have your usual dose at this time.

If you have any questions or concerns about your diabetic treatment please contact whoever normally advises you about your diabetes.

### **What to do if you feel unwell before attending for your procedure**

If you don't feel well and have a cough, a cold or any other illness when you are due to come into hospital for your procedure, we need to know. Depending on your illness and how urgent your procedure is, we will advise you whether or not your procedure should be delayed.

### **On the day of the procedure**

You will be admitted to the cardiac cath lab unit on the day of your procedure so that we can prepare for your procedure. We will welcome you to the ward and check your details. We will fasten an armband containing your name and hospital information to your wrist. We will ask you to change into a gown ready for your procedure. You will have an ECG (heart trace) performed.

Before your procedure you will be seen by a member of the cardiology team who will check that everything has been arranged correctly for you to have your treatment. A cannula (fine plastic tube) will be inserted into a vein in your arm so that we can give you any treatments required during the procedure. Please let us know in advance if you are allergic to any medications.



Very occasionally it may be necessary to cancel your procedure at the last minute (ie after you have arrived in the hospital); this may occur due to equipment failure or unexpected complications from an earlier procedure. We will do our best to minimise the risk of this happening and if it does we will rebook you at the earliest opportunity.

## **During the AF ablation**

The procedure is undertaken in a Cardiac Catheter Laboratory equipped with an X-ray camera facility, monitoring equipment and a table on which you will be asked to lie for the duration of the procedure. The procedure (or parts of it) may be carried out by a suitably qualified trainee doctor but all parts will always be directly supervised by a consultant.

You will be taken from the ward by a nurse or healthcare assistant and will be handed over to the care of a nurse or support worker who will stay with you throughout your procedure.

The procedure usually takes around two hours, during which time you will be given a sedative injection into the tube in your arm to make you feel pleasantly drowsy. You will also be attached to a heart monitor throughout the procedure. After this, the top of your right leg (or in some cases both legs) may be shaved if necessary, cleaned with a skin disinfectant preparation and injected with a local anaesthetic.

A number (usually 3) of tubes will be inserted into the vein at the top of the leg. Thin wires are passed through the tubes up to the heart – it is unusual to feel anything as the wires pass up through the body. They are positioned in the relevant areas of the heart.

A small needle is used to puncture the wall separating the right atrium from the left atrium, and the equipment (tube and balloon) is passed into the left atrium. Each pulmonary vein is frozen in sequence. It is common to feel chest pain and develop a headache during these freezes and it is important that you tell the nurse or doctor if the pain is severe so that more medication can be given to control the symptoms.

Once the ablation is completed, the operator will usually wait for 30 minutes with continuous testing to ensure conduction does not recover across the ablated tissue. If it does, further ablation will be necessary.

## **After your procedure**

You will return to the cath lab day unit. The nurse will check your pulse and blood pressure and monitor groin site(s) for any signs of bleeding or swelling. If you have had sedation you will need to rest in bed for a couple of hours, depending on how sleepy you are. You will be required to stay in bed for 2 hours to allow the vein punctures to heal up. A nurse will perform an ECG on the ward.

You will then be able to get up and dressed and walk around. You can eat and drink as soon as you feel like it so long as the nurses are confident you are sufficiently awake.

## **Leaving hospital**

Most patients having this procedure will be in hospital most of the day, but will not need to stay overnight. You may find that you feel slightly drowsy for a couple of days, while you are recovering from your procedure and particularly from the effects of the sedation. It is,

therefore, wise not to make any important life changing decisions until these feelings have worn off.

You will have some bruising around the wound area and this is quite normal, but the wound itself should not be actively bleeding or swollen. If you have any concerns, please contact us – contact details are on the advice sheet given immediately after the procedure. It is generally much better to contact us rather than your GP or practise nurse as we deal with these procedures all the time.

You are advised not to do any heavy lifting, such as carrying shopping bags or moving heavy furniture for 48 hours after the procedure. Don't be afraid to ask for help from your family and friends and take it when it is offered.

We advise that there is a responsible adult present with you for 24 hours following the procedure. If this will not be possible, please ensure you discuss it with the team prior to the day of admission.

You cannot, by law, drive for **at least** two days after the procedure and so you cannot drive yourself home; after that time, it is ok to resume driving so long as you are confident that your leg has healed to the extent that you would have no difficulty performing an emergency stop if required.

### **Medication when you leave hospital**

You must continue your blood thinner (Warfarin, Apixaban, Rivaroxaban, Dabigatran or Edoxaban) for at least one month after the ablation. Missing doses in this time period increases the risk of complications.

Any drugs for controlling your heart rhythm will be re-assessed prior to discharge; in many cases the doses will be reduced or medications stopped altogether, but in some circumstances we may recommend continuing them: please ensure you know what you are supposed to be taking before you leave hospital.

### **Convalescence**

How long it takes for you to recover fully from your procedure varies from person to person. Once home, it is important to rest quietly for the remainder of the day.

Most people feel some discomfort at the top of the leg for the first few days. You can take a simple pain killer such as paracetamol. We recommend that you are not alone at home the night after your procedure.

### **Groin wound**

If you experience any obvious bleeding from the groin or any swelling or troublesome pain around where the tubes were inserted, you should seek further help and advice (see below). It is usually better to contact the hospital team rather than your GP as we are more familiar with problems that may arise from these procedures.

### **Exercise**

**For the first 48 hours after the procedure** you should avoid any strenuous exercise – limit yourself to gentle walking.

**For the following 7 days**, you can gradually increase your exercise levels up to normal.

**Work**

When you return to work will depend on your job. If your job involves heavy manual work you may be advised to take some time off. If your job does not include manual work or lifting you may be able to return to work within a few days of your procedure.

**Communication**

A report of your procedure will be sent to your doctor (GP) within a few days.

**Follow-up arrangements**

You will receive a follow-up appointment in the arrhythmia clinic, typically 3 months after the procedure unless stated otherwise. If you have not received an appointment within 5 months of the procedure, please telephone Dr Foster's secretary on 01905 760217 to explain the situation.

**Contact details**

If you have any specific concerns that you feel have not been answered and need explaining please contact the following:

Arrhythmia team secretary (Lauren Neathway), telephone 01905 760217

Coronary care unit (Worcester) – for out of hours emergencies, telephone 01905 760561

**Additional Information**

The following Internet websites contain additional information that you may find useful:

[www.patient.co.uk](http://www.patient.co.uk)

Information fact sheets on health and disease.

[www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk)

On-line Health Encyclopaedia and Best Treatments website.

[www.bhf.org.uk](http://www.bhf.org.uk)

British Heart Foundation website.

[www.heartrhythmcharity.org.uk](http://www.heartrhythmcharity.org.uk)

Arrhythmia alliance website

**If your symptoms or condition worsens, or if you are concerned about anything, please call your GP, 111, or 999.**

## **Patient Experience**

We know that being admitted to hospital can be a difficult and unsettling time for you and your loved ones. If you have any questions or concerns, please do speak with a member of staff on the ward or in the relevant department who will do their best to answer your questions and reassure you.

## **Feedback**

Feedback is really important and useful to us – it can tell us where we are working well and where improvements can be made. There are lots of ways you can share your experience with us including completing our Friends and Family Test – cards are available and can be posted on all wards, departments and clinics at our hospitals. We value your comments and feedback and thank you for taking the time to share this with us.

## **Patient Advice and Liaison Service (PALS)**

If you have any concerns or questions about your care, we advise you to talk with the nurse in charge or the department manager in the first instance as they are best placed to answer any questions or resolve concerns quickly. If the relevant member of staff is unable to help resolve your concern, you can contact the PALS Team. We offer informal help, advice or support about any aspect of hospital services & experiences.

Our PALS team will liaise with the various departments in our hospitals on your behalf, if you feel unable to do so, to resolve your problems and where appropriate refer to outside help.

If you are still unhappy you can contact the Complaints Department, who can investigate your concerns. You can make a complaint orally, electronically or in writing and we can advise and guide you through the complaints procedure.

## **How to contact PALS:**

**Telephone Patient Services: 0300 123 1732 or via email at: [wah-tr.PET@nhs.net](mailto:wah-tr.PET@nhs.net)**

## **Opening times:**

The PALS telephone lines are open Monday to Thursday from 8.30am to 4.30pm and Friday: 8.30am to 4.00pm. Please be aware that a voicemail service is in use at busy times, but messages will be returned as quickly as possible.

If you are unable to understand this leaflet, please communicate with a member of staff.

Name of leaflet: EP study and atrial flutter ablation

Date: \_\_\_\_\_

Comments:

Thank you for your help.



Corporate member of  
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