



**University Hospitals Birmingham**  
NHS Foundation Trust



# Catheter Ablation for Atrial Fibrillation

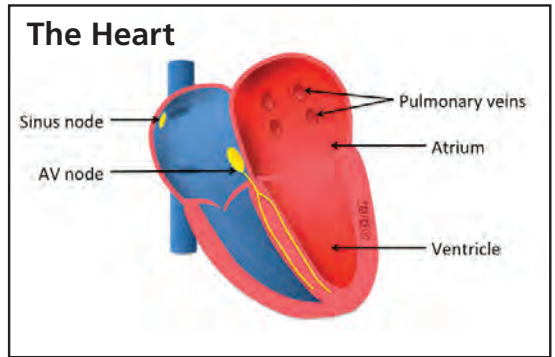
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## About this patient information leaflet

This patient information leaflet is about atrial fibrillation, one of the main heart rhythm problems we treat with catheter ablation procedures. It is one of a series of leaflets that we have produced, written in everyday language that explains what a particular heart rhythm condition is, what its symptoms are, why it occurs and how it is treated.

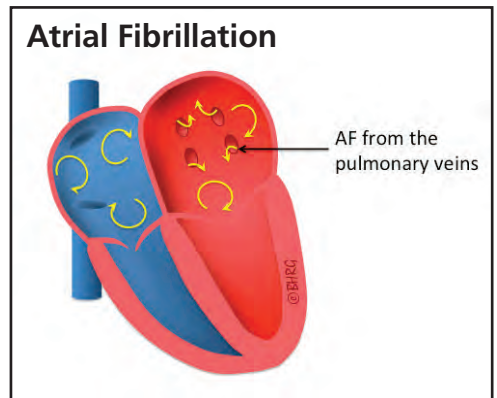


This booklet has been prepared for individuals preparing to undergo one of the procedures described or for individuals looking for more information about these procedures. The information provided within this booklet does not replace the consultation that takes place between the patient and the doctor.

## Atrial fibrillation

### What is atrial fibrillation?

During normal heart rhythm the heart beats in an organised and controlled way resulting in regular blood flow through the heart. Atrial fibrillation (AF) is an irregular and chaotic heart rhythm that occurs in the upper chambers of the heart (called atria). This abnormal heart rhythm disturbs the organised heart beat and produces irregular blood flow through the heart. In most cases patients experience palpitations, breathlessness, tiredness or light-headedness. Sometimes patients do not feel these symptoms and are unaware they have AF. Individuals can experience AF continuously or in periodic attacks lasting hours or days.



## Is atrial fibrillation dangerous?

AF is not life threatening. Individuals may feel unwell during the attacks or may also be breathless if the AF is continuous. Patients who are older or have other medical problems such as diabetes and high blood pressure have a higher chance of developing a stroke if they have AF.

## How is atrial fibrillation diagnosed?

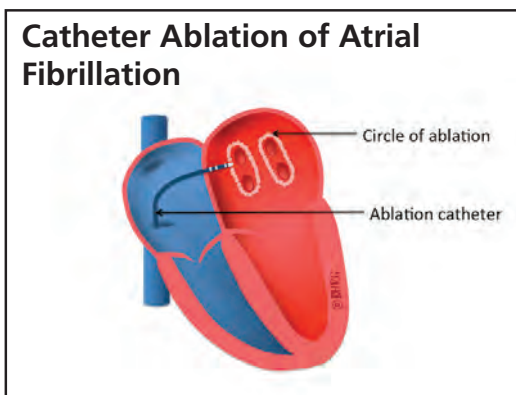
Individuals with palpitations often see their doctor or attend the emergency department where they have a recording of their heart rhythm (electrocardiogram or ECG) performed during their symptoms. The ECG may show that the heart has AF. Alternatively, your doctor may have arranged for you to take a heart rhythm monitor (Holter monitor or loop recorder) home to record your palpitations. Occasionally atrial fibrillation is also detected during a routine medical check at your GP surgery.

## Catheter ablation for atrial fibrillation

### What is catheter ablation for atrial fibrillation?

Catheter ablation is a term that describes the process of modifying the heart muscle so that it no longer transmits electrical signals. Catheter ablation for atrial fibrillation is an operation on the heart that aims to stop AF. This operation is sometimes called pulmonary vein isolation (PVI). In the majority of cases (about 90%) abnormal

electrical signals causing AF start within the pulmonary veins that are attached to the left atrium. Catheter ablation changes the heart muscle inside the atrium near these veins to block the signals. The ablation must completely encircle the entrance of the veins so that the abnormal electrical signals cannot enter the heart. In most cases this vein isolation is enough to prevent the AF from recurring in patients who suffer periodic attacks. Patients with continuous AF often require additional ablation in other areas of the heart to stop the AF.



## Should I have catheter ablation for atrial fibrillation?

Catheter ablation for atrial fibrillation is a very effective and successful procedure for patients suffering from the symptoms of AF. These patients can expect an improvement in their quality of life. In some cases where medication is effective but produces side effects then catheter ablation may be a better option than living with the side effects. Patients with AF who don't suffer from the symptoms of AF are unlikely to see any benefit from catheter ablation. At the moment there has been no conclusive research to show that performing catheter ablation for atrial fibrillation reduces the risk of a stroke or prolongs a person's life. It is possible that in the future research will show these added benefits to the procedure.

## How successful is catheter ablation for atrial fibrillation?

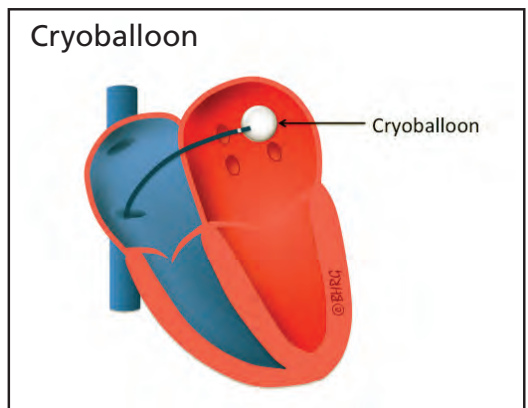
Individuals who have periodic AF attacks can expect a 60% chance of being cured after a first procedure and 90% after a second or rarely a third procedure. A small number of patients who are cured by the procedure may still need to take medication to prevent the attacks of AF.

Individuals who have continuous AF for more than 1 or 2 years can expect a 70% chance of being cured after 2 or 3 procedures and some may need to continue taking medication to prevent AF from returning.

## What methods are available for catheter ablation for atrial fibrillation?

There are a few methods used to isolate the pulmonary veins. All the methods require passing long fine wires (called catheters) from the groin into the heart via the blood vessels. These procedures are performed as keyhole operations through small punctures in the groin. Once in the heart, the catheter ends are placed in contact with the heart muscle.

The most common method uses radio-frequency (RF) energy that produces heat. The heat energy is applied to the heart muscle directly through the catheters. The catheter ends differ in shape and size and will determine whether the heat is applied as



multiple, small consecutive burns or as larger circular burns around the veins.

An alternative method is the use of freezing (called cryotherapy) energy. This is done with a balloon at the end of a catheter positioned at the entrance of the veins. The balloon is inflated with a cold gas which freezes the heart muscle around the entrance of the veins.

In a similar way, laser energy and ultrasound energy can be used to isolate the veins but these methods are less commonly used.

### **Which type of procedure will I have?**

The method and whether only vein isolation or more ablation will be needed depends on the type of AF you have, the number of years that you have had AF for and the expertise of the cardiologist doing the procedure.

### **Will I need a transoesophageal scan?**

This test is an ultrasound scan of the heart that takes pictures via the gullet. It involves swallowing a camera on the end of a small tube and takes approximately 10 minutes to perform. About 1 in 4 of our patients having catheter ablation for atrial fibrillation will need a transoesophageal echocardiogram at the start of the procedure. This is to check whether there is any blood clot in the heart. If a clot is seen in the heart then we will not continue with the ablation procedure.

### **Are there alternatives to catheter ablation for atrial fibrillation?**

As catheter ablation is not able to cure all patients of their symptoms and some patients may choose not to have ablation, alternatives are available:

- Continuing to find a medication that is effective at controlling the atrial fibrillation
- Continuing with medication that is controlling the AF but is producing side effects
- Inserting a permanent pacemaker after catheter ablation of the AV node
- Alternative non-medical therapies such as hypnotism or aromatherapy

### **What happens before the procedure?**

Once you have decided to have catheter ablation, your cardiologist will

explain the procedure to you in detail, go through the potential risks and answer all your questions. If you are not already taking warfarin or an alternative oral anticoagulant (blood thinner) then we will ask that you commence this medication ideally 6 weeks before the procedure. Your GP or the hospital anti-coagulation clinic should arrange this medication for you. As you start to take the warfarin you will have regular blood tests to measure your INR level (International Normalisation Ratio is a way of measuring how fast your blood clots) to establish what dose of warfarin you need to thin the blood adequately. Your INR level should be between 2.5 and 3.5, preferably nearer 3.5.

During the week before your scheduled procedure you will be asked to attend a pre-admission clinic at the Queen Elizabeth Hospital. At this visit you will be asked what medication you are taking, your heart will be examined briefly and bloods tests will be done. You will be given further instructions to prepare for your procedure and you will have the opportunity to ask any questions. This is also a good time to inform the medical team of any of your allergies.

On the day before your procedure it is helpful if you can prepare the right groin area by carefully shaving an area of about 15cm x 15cm (6in x 6in) as in the diagram. If you are unable to do this then we will do it either beforehand on the ward or at the time of the procedure.

It is important that you continue to take your warfarin on this day at the usual time that you would be taking it. You may be nervous but try and get some good rest when you go to bed.



## **What happens on the day of my procedure?**

On the day of your procedure you should go to the Ambulatory Care Ward unless your appointment letter has requested you go to a different ward. We ask you to be there early, usually between 07:30 and 08:00. If you have not previously signed the consent form then you will have the opportunity to read it and ask questions before you sign it.

Unless you have been instructed differently, please ensure that you do

not eat anything after 04:00 on the morning of your procedure. You may drink water up to 06:00.

Once you are at your bed and changed into a hospital gown, a small cannula (or tube) will be inserted into the back of your hand or arm veins. This is used to administer the sedative and any other medication needed before, during and after the procedure.

We are unable to give you an exact time your procedure will start as procedures are undertaken throughout the day and we cannot predict how long each will take. Although you may be admitted in the morning, you might only have your procedure in the afternoon. The team on the ward will keep you updated while you wait for your procedure.

### **What happens at the start of my procedure?**

A nurse or doctor will come and fetch you from the ward and either walk with you or take you on your bed to the operating room. You will notice that the theatre has large-scale X-ray equipment and many computer screens that are used for the procedure. The theatre staff will introduce themselves and help you onto the operating table. Usually a nurse, a radiographer, a cardiac physiologist and one or two doctors are present in the room with you. When you are lying down you will be attached to a heart monitoring system (ECG).

### **What if I need a transoesophageal scan at the start of my procedure?**

If you need a transoesophageal scan we will ask you to sit up and we will spray some local anaesthetic in the back of your throat to make it numb. You will then be asked to lie down and turn to your left side. A soft bite guard will be placed into your mouth to protect your teeth. Sedation will be administered and as you start to fall asleep we will place the camera in your mouth and ask you to swallow it. We will take ultrasound pictures of the heart. Once this is complete, the camera and mouth guard will be removed and we will help you move onto your back and continue with the ablation procedure. If any blood clot is seen in the heart then we will not continue with ablation and you will return to the ward. In the vast majority of cases the warfarin has been effective in thinning the blood and there will be no clot in the heart.

If you do not need a transoesophageal scan the nurse will begin to give you the pain control medication and sedation using the cannula in your arm. An oxygen mask will be placed over your mouth and nose. The skin over the top of the right leg where you shaved will be exposed and cleaned with alcohol fluid. A sheet will be draped over you, which will cover you from the neck to your feet and only the small shaved area will be exposed. Local anaesthetic will be injected into your right groin as the sedative begins to take effect. The nurse will remain with you throughout the procedure ensuring that you are as comfortable as possible. You will more than likely sleep through most of the procedure following the sedation that was given to you.

Once your skin in the groin is numb, two or three tiny punctures will be made with a needle into your vein. This will allow the insertion and movement of the catheters up into the heart under X-ray guidance. When all the wires are positioned in the heart we will start to identify the abnormal heart tissue and ablate it. We will check that you are free from pain at regular intervals during the procedure.

When the ablation is complete the catheters will be withdrawn from the heart and removed from the groin. It is at this stage that you may start to wake up and feel us putting gentle pressure on the puncture sites. This is done for a few minutes to stop the bleeding. When the bleeding has stopped a small plaster will be placed on the groin. From this point onwards we ask that you lie on your back for a few hours and avoid bending your legs, particularly the right leg as the groin punctures may still bleed. We will help you move back onto your bed from the operating table by sliding you on a sheet so that you don't need to bend your leg.

### **What happens after the procedure?**

You will be returned to the ward where you were admitted. It is possible that you may not remember anything from the operating room and might only wake up fully when you are back on the ward. This is normal. The person who accompanied you to the hospital can visit you as soon as you get back to the ward. You may feel sleepy for the rest of the evening as the sedative continues to wear off. We can give you more pain relief medication if you have any pain.

Once you are back on the ward you should lie on your back for 2 hours and after this, if there is no bleeding from the groin, we will allow you to sit up for a further 2 hours. If all has gone well you will be able to walk 4



hours after the procedure. You can drink water (through a straw) within the first hour after the procedure and then you can eat and have other drinks after that as long as you are not too drowsy.

During the first 4 hours after the procedure you will be attached to a heart monitor and regular checks of your blood pressure and groin will be carried out. Your doctor will come and talk to you about the outcome of your procedure and check your recovery. You will be asked to continue your warfarin (or other oral anticoagulation) in the evening after the procedure unless you have had a bleeding complication.

The following day you may have a heart scan to check for fluid around the heart. Your doctor will advise you about your medication and answer any questions you may have about the procedure.

You will be able to go home the following morning after your procedure if you are well enough to be discharged. A discharge letter with an updated list of your medication will be given to you to take to the GP. We will give you a supply of any new medication. One of the nursing team will discuss your medication with you again before you leave. We will make arrangements for a follow up consultation.

## What can I expect when I go home?

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If your puncture site starts to ooze, then lie down to help slow the bleeding, and press firmly on the puncture site for 10 minutes. If the wound continues to bleed after 10 minutes of firm pressure, go to your nearest Emergency Department.

**If your puncture site starts spurting a lot of blood, lie down and call an ambulance immediately.**

You may notice a small pea-sized lump develop under the puncture to the skin – this is normal. If the lump becomes larger than this, becomes tender or starts to develop a redness or discharge, contact Ambulatory Care on 0121 371 3125.

You can have a shower the day after you get home, and can remove your dressing at this point. You will only need to put a dressing back on if the wound starts to bleed. Avoid taking a hot bath for 2–3 days as this could cause further bleeding.

## **What can I do when I get home?**

Once you get home you can go about your normal routine but there are a number of activities that should be avoided to allow the groin to heal.

- Avoid lifting heavy objects for 7 days
- Avoid rigorous exercise for 5 days. We suggest walking if you wish to exercise
- The DVLA recommends that you do not drive for 2 days
- You should not fly within 7 days

During this recovery period patients complain of feeling lethargic and tired. We expect that it will take up to 2 weeks to feel back to normal after the procedure.

## **What if I have atrial fibrillation after my procedure?**

Within the first 6 weeks after the procedure the AF may return. This may be due to the inflammation caused by the ablation in the heart and does not mean the procedure has not worked. If you think you will be more comfortable then you can restart the AF medication that was stopped before you went home. If your medication was not stopped then it may be possible to increase the dose or add a different medication to control the symptoms during this healing phase. To change the dose or add other medication you will have to discuss this with your GP or local hospital.

There is no need to seek emergency medical help unless you have severe symptoms, like breathlessness or dizziness. If you are admitted to hospital they will often just wait for the heart rhythm to return to normal. If the heart rhythm does not spontaneously return to normal then your doctors will decide whether to use medication to control the AF or shock your heart back to a normal heart rhythm (cardioversion). Further catheter ablation early after your procedure is not an option.

## **What about chest pain after the procedure?**

Chest pain or chest discomfort is very common after catheter ablation. Often breathing or moving makes it worse and is due to the inflammation around the heart caused by the ablation. If taking paracetamol does not control the pain then a stronger anti-inflammatory tablet such as ibuprofen may help. If you decide to take anti-inflammatory tablets and you also suffer from indigestion or stomach ulcers then you will need to take an antacid tablet to protect the stomach.

## **What symptoms should make me seek urgent medical help?**

If you experience any of the following then we urge you to contact your local NHS hospital or GP:

- Increased swelling, pain or bleeding from the groin
- Increased shortness of breath
- Severe chest pain
- Fever and nausea
- The signs of a stroke (weakness on one side of the body, loss of speech or loss of vision)

If these occur you may need to be admitted to hospital for tests and observation. Your local hospital or GP should be able to deal with these in the first instance but particularly for the last two points listed we would like you or your doctor to contact us urgently (the numbers are listed at the end of this booklet).

If you get admitted to another hospital we would be very happy to give any advice to the doctors who are treating you at the time, and we encourage them to contact our team to let us know what has happened to you.

## **Can I stop my warfarin or oral anticoagulation?**

After catheter ablation for atrial fibrillation we recommend that warfarin or other oral anticoagulants be continued for a minimum of 6 weeks. This is to reduce the risk of stroke. Ideally we would suggest that the anticoagulant medication be continued until your follow up appointment. At this appointment we will discuss whether you should continue with the medication until further notice or whether it can be stopped.

## **What are the possible complications of catheter ablation for atrial fibrillation?**

Although this procedure can be considered a “keyhole” procedure, it involves the heart and unfortunately, sometimes things can go wrong. Common complications are not dangerous but can be uncomfortable for a period of time. Dangerous complications are rare. If something goes wrong you may need to stay in hospital for a few more days.

# Common but not dangerous complications

## **Pain**

Pain in the centre of the chest can occur during the procedure as a result of the heat produced by the catheter. Usually this is adequately controlled by the pain relief medication given to you before and during the procedure. Pain in the chest can also start after the procedure and remain for a few days. This is because there may be inflammation around the heart caused by the ablation. The groin area where the punctures were made can also be painful after the procedure. Chest and groin pain can be controlled with paracetamol or anti-inflammatory medication such as ibuprofen.

## **Bleeding (haemorrhage)**

A small amount of blood oozing from the groin immediately after the procedure is common. Very rarely when the bleeding takes a little longer to stop we may need to push on the groin to stop the bleeding. By the time you are discharged the bleeding should have stopped.

## **Groin bruising and swelling (haematoma)**

Bruising is common because the anticoagulation medication makes the bleeding from the puncture sites in the groin take longer to stop. The bruise may increase in size after you have been discharged. If you have a large bruise then the whole thigh may become black and blue and look unsightly. It may take up to 3 weeks to improve or disappear and the bruising may change colour as time passes, usually to green and yellow. If you are worried about your bruise then contact your GP who will be able to advise you.

## **Allergic reactions (anaphylaxis)**

During the procedure some patients may develop a rash from the medication or from the monitoring stickers that have been placed on the skin. If this happens then we can give you medication during the procedure to counteract the allergic reaction.

## Uncommon but more serious complications

### **Groin problems (haematoma and false aneurysm)**

In about 1 in 100 (1%) of cases there is more bleeding than we would expect in the groin at the site of the punctures. We may need to place tight bandages or a pressure clamp to control the bleeding until it stops. This may be because the anticoagulation medication is causing the blood to take longer to clot or because the artery next to the vein was inadvertently punctured. The bleeding may also spread under the skin and form a blood clot making a lump under the skin. Very rarely an operation, in less than 1 in 1000 (0.1%) cases, is needed to repair the blood vessels in the groin. Although these groin problems are noticed and treated before you go home, a swelling can occur once you are back home. You will need to be seen by a doctor should this happen.

### **Stroke**

This is by far the most feared complication of catheter ablation for atrial fibrillation and occurs because a small clot or a small bubble of air blocks the blood supply to a part of the brain. During the procedure small clots can form on the catheters or become dislodged from inside the heart. The clots travel in the blood circulation to the brain. At the start of the procedure you are given heparin (an anticoagulant). All the anticoagulation medication keeps the risk of stroke low. The risk of developing a stroke is about 1 in 200 (0.5%).

Should you develop a stroke, in most cases, it will get better within 24 hours to a week. However, it can have permanent effects such as reduced mobility on the one side of the body or difficulty with speech. In some cases it may lead to coma or even death. If a stroke occurs we will ask stroke specialists to help with your treatment and recovery.

### **Fluid around the heart (pericardial effusion)**

Inflammation caused by ablation results in a small amount of fluid build-up around the outside of the heart. This fluid disappears during the weeks of recovery.

Sometimes blood leaks out of the heart through a puncture made by one of the catheters. The blood accumulates around the heart. If the puncture does not seal off spontaneously and the blood leak is large then the blood must be removed. A thin tube is introduced through the skin in the front

of the chest using local anaesthetic and placed near the heart to drain the accumulated blood. This drain can be removed 24–48 hours later. Should we recognise that blood has leaked out during the ablation procedure we will insert the drain while you are asleep. In most cases we are able to complete the ablation despite this leak.

Occasionally the blood leak is noticed later when you are back on the ward and a drain will be inserted then. The risk of needing a drain around the heart is about 1 in 100 (1%).

## **Nerve damage**

The nerves that control the breathing muscle and the stomach are found close to where the pulmonary veins need to be ablated. During ablation these nerves can be damaged. The risk of damaging either of these nerves is 1 in 1000 (0.1%). Depending on which nerve is injured, you may be short of breath or your bowel pattern may change. It can take up to 6 months for these nerves to recover. When using the freezing balloon, the risk of damaging the breathing nerve is slightly higher at around 1 in 100 (1%).

## **Gullet injury**

Injury to the gullet can occur during the transoesophageal scan (if you are having one) as the camera is swallowed. The ablation can also cause injury to the gullet because the gullet lies directly behind and in contact with the heart. The heat or freezing energy when applied to the heart can be transmitted through to the gullet. If the gullet has been injured then this will cause pain in the chest, especially when swallowing food. In most cases this will get better within a week of the procedure. We may suggest that you take a short course of antacid tablets to improve your symptoms.

If the chest pain does not improve, gets worse or you start to experience fevers and/or signs of a stroke then you need to seek help immediately. You will need further tests to make sure the gullet has not developed a hole. If a hole has developed an operation will be needed to repair it. The risk of a dangerous gullet injury needing an operation is around 1 in 1000 (0.1%).

## **Pulmonary vein narrowing (pulmonary vein stenosis)**

Very rarely the ablation may cause the pulmonary veins to become narrowed. This problem is less likely to happen if the freezing balloon is used. If it occurs it may cause you to feel short of breath and may require a further operation to repair it. The risk of this complication is about 1 in 1000 (0.1%).

## **Permanent pacemaker**

Rarely, during catheter ablation for atrial fibrillation, the normal electrical system of the heart that controls the heartbeat becomes damaged. The electrical system may recover during the following days but in other cases implanting a pacemaker will be necessary to prevent the heart from beating too slowly. The risk of needing a pacemaker following catheter ablation is about 1 in 200 (0.5%).

## **Death**

The risk of dying from this procedure or from one of the above complications is less than 1 in 1000 (0.1%). Although all the complications can be treated, in very rare cases the treatment may not be successful.

## **Making comments or complaints**

We hope that you have no cause for complaint during your stay at the Queen Elizabeth Hospital, however, should you have any problems please do not hesitate to tell the nurse, and we will try to resolve the matter there and then.

Alternatively, the Patient Advice and Liaison Service (PALS) will be happy to resolve any problems, concerns or complaints that you might have. The contact details for PALS are printed at the end of this booklet.

## How to contact us

### Queen Elizabeth Hospital Birmingham

Ambulatory Care Ward	0121 371 3115 0121 371 3125
Ward 304	0121 371 3049
Patient Advice and Liaison Service (PALS)	0121 371 3280
Cardiology Booking Clerk	0121 371 4037

## Where can I get more information?

Arrhythmia Alliance	<a href="http://www.arrythmiaalliance.org.uk">www.arrythmiaalliance.org.uk</a>
Atrial Fibrillation Association	<a href="http://www.afa.org.uk">www.afa.org.uk</a>
The British Heart Foundation	<a href="http://www.bhf.org.uk">www.bhf.org.uk</a>
Age UK	<a href="http://www.ageuk.org.uk">www.ageuk.org.uk</a>
British Cardiac Patients Association	<a href="http://www.bcpa.co.uk">www.bcpa.co.uk</a>
DVLA Medical Enquiries	0300 790 6806 (car, motorcycle) 0300 790 6807 (bus, coach, lorry) 0845 850 0095 (fax)



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