



## Department of Radiology

# Selective Internal Radiation Therapy (SIRT) Your procedure explained

### Introduction

This leaflet tells you about the procedure known as Selective Internal Radiation Therapy, also called radio-embolisation. It explains what is involved and the benefits and risks. It may make you think of things you would like to discuss with your doctor/s.

### What is Selective Internal Radiation Therapy?

- **Selective Internal Radiation Therapy** or SIRT is a treatment that delivers targeted internal radiation directly to the tumour.
- It is a treatment that is approved for the treatment of liver tumours that cannot be removed by surgery. These may be cancers that start in the liver (primary liver cancer), or they may be tumours that have spread to the liver from another part of the body (secondary liver cancer or metastases).
- SIRT is a two stage procedure, usually 1 to 3 weeks apart. The first stage involves an angiogram and embolisation to ensure that any blood vessels that are not directly feeding the tumour are blocked off to protect other organs from damage by the therapy. Following this a small dose of radioactive tracer material is injected into the liver arteries to ensure that the treatment can be performed safely. This will help to maximise the effects of the treatment and minimise any unwanted side effects.
- During the second stage, the treatment is delivered using microspheres or tiny beads - less than the width of a human hair - containing a radioactive element [Yttrium-90 ( $Y^{90}$ ) or SIR-Spheres] to treat the liver tumours directly. At both stages the therapy is delivered via a catheter in your groin.
- The microspheres tend to lodge in the small vessels feeding the tumour and deliver their dose of radiation for a period of approximately two weeks.
- The microspheres with the radioactive  $Y^{90}$  are carried by the bloodstream directly to the tumours in the liver.
- It is a localised treatment and the effect of the treatment is concentrated in the liver.

### Why do I need Selective Internal Radiation Therapy?

You will probably already have had several other different treatments for example chemotherapy and/or surgery. These treatments may no longer be effective on your cancer and the doctors looking after you have decided to offer this option.

### **What to tell the doctor**

- If you have any allergies.
- If you have had a previous reaction to intravenous contrast medium (the dye used for some x-rays and CT scanning).
- It is important to tell the doctor or the radiology department **before attending for admission** if you are taking medication to prevent blood clots. Below is a list of some of the medications which are used to thin the blood and help to prevent blood clots.

**If you are currently taking any of these medications, please contact your referring doctor or the radiology department on 0161 446 3325 as soon as possible, as these may need to be stopped prior to your procedure. Failure to do so may result in your procedure being postponed.**

Apixaban	Dalteparin
Aspirin	Enoxaparin
Clexane	Fragmin
Clopidogrel	Rivaroxaban
Dabigatran	Warfarin

### **Who has made the decision?**

Your case will have been discussed and agreed at the multidisciplinary team (MDT) meeting, attended by oncologists (cancer specialists), radiologists, surgeons, physicists, pathologists and nurses. The doctors doing the treatment will have discussed the situation and feel this is the best treatment option. They will discuss the treatment with you.

### **Who will be doing the procedures?**

A specially trained doctor called a radiologist will carry out the procedure. Radiologists have special expertise in using x-ray and scanning equipment, and also in interpreting the images produced. They need to look at these images while carrying out the procedure.

### **Agreeing to treatment**

We will ask you to sign a consent form agreeing to accept the treatment that you are being offered. The basis of the agreement is that you have had The Christie's written description of the proposed treatment and that you have been given an opportunity to discuss any concerns. You are entitled to request a second opinion from another doctor who specialises in treating this cancer. You can ask your own consultant or your GP to refer you. Your consent may be withdrawn at any time before or during this treatment. Should you decide to withdraw your consent then a member of your treating team will discuss the possible consequences with you.

### **Where will the procedures take place?**

In the special procedure room in the department of radiology.

### **How do I prepare for Selective Internal Radiation Therapy?**

You will probably already have had CT and PET scans. You will need to be an inpatient in hospital for SIRT. Some patients are admitted the day **before** the procedure and can eat and drink normally on that day. However, on the day of the procedure we will ask you not to eat for six hours beforehand, though you may drink clear fluids up to two hours before the procedure. We will ask you to put on a hospital gown.

## **What actually happens at stage 1: the angiogram and embolisation?**

1. You will lie on the x-ray table, generally on your back. You will already have a needle in a vein in your arm, so that we can give you some painkillers and a sedative as needed. The sedative will make you feel sleepy. You will also have monitoring devices attached to you. You will have oxygen through small tubes in your nose.
2. The radiologist needs to keep everything as sterile as possible and will wear a theatre gown and gloves. The skin around the puncture site will be swabbed with antiseptic and the area covered with theatre towels.
3. The doctor will give you an injection of local anaesthetic in the skin in your groin area and deeper tissues over the artery which will cause some stinging initially, and then go numb.
4. The radiologist will insert a needle into the artery. Once the doctor is satisfied that this is in the correct position he will place a guide wire through the needle into the artery. Then the needle is withdrawn and a fine plastic tube called a catheter is placed over the wire into the artery.
5. The radiologist will use the x-ray equipment and small amounts of dye to make sure that the catheter is moved into the right position in the chosen artery. The radiologist will need to do this in several arteries to get a good idea of your anatomy (this is called an angiogram) to be able to deliver the treatment.
6. When the radiologist is satisfied with the angiogram, he will place tiny coils through the catheter to block the selected artery or arteries. This can be a very complex procedure and can take a number of hours to perform.
7. The radiologist will then give you an injection of technetium-99m. This is a radioactive 'dye' that allows detection by a gamma camera to check that the procedure can be safely performed without damaging other organs. You will be taken directly to the scanner in the nuclear medicine department after the injection to be scanned straight away. This can take up to an hour and you will remain on your back during the scan.

## **What actually happens at stage 2: the treatment?**

You will have been given some medication called a Proton Pump Inhibitor (PPIs) to take for two weeks before this stage. PPIs reduce acid in your stomach. This is because the treatment can irritate your stomach as the liver is close to your stomach.

You will have been given some antibiotics on the ward to prevent infection and an anti-sickness medicine to prevent you feeling sick.

**Stage 2** will be the same as steps 1 to 5 of stage 1 above, then:

6. It is possible that the radiologist may have to put further coils in selected arteries, as 6 above. If you do not need any additional coils, your treatment will be delivered at this stage through a fine catheter which is guided into the liver.
7. You will need to go to the Isotopes department following the treatment for another scan, usually the next day. This can take up to an hour.

## **Will it hurt?**

**Stage 1** of the procedure is usually painless. Some patients may feel uncomfortable due to the length of time they are lying on the x-ray table. If so, let the nurse know so you can be given some painkillers or sedatives to help.

**In stage 2** of the procedure most people experience some pain or discomfort (usually a bloated feeling) when the SIR-Spheres are delivered. However, you will be given painkillers and sedation. There will be a nurse looking after you so, if you find the procedure uncomfortable, you will be given more painkillers. We cannot predict who might get pain, but if you experience any, ask the nurses looking after you for some painkillers to keep it under control.

## **How long will it take?**

Every patient's situation is different and it is not always easy to predict how long it will take. The procedure will probably take between 2 to 3 hours. As a guide, expect to be in the radiology department for up to four hours.

## **What will happen afterwards?**

You need to stay **flat on your back**. Routine observations, such as your blood pressure and pulse, will be carried out in the department and continued on the ward. You need to stay flat on your back for six hours and remain in bed overnight.

## **How soon can I eat and drink?**

Most patients are able to drink fluids and have something to eat when they are fully awake.

## **Are there any special precautions?**

Because the treatment is radioactive, there are some simple precautions that need to be taken following the SIRT procedure. These precautions include:

### **For the first 24 hours**

- Wash your hands thoroughly after going to the toilet.

### **At home**

- To reduce any radiation dose to your partner we suggest that, when possible, you sleep in a separate bed for two days after returning home.
- We also recommend that you do not spend long periods in close contact with children for two days after returning home.

We will give you more information about these precautions and any travel arrangements you may need. Please ask for more advice if you have any concerns.

## **Are there risks or complications?**

As with any operation or procedure, there are some risks and complications that can arise. There are two groups of possible complications:

### **1. Vascular:**

- a. Bruising or bleeding may occur around the site where the needle has been inserted.
- b. Very rarely, some damage can be caused to the artery by the catheter. This may need treatment by surgery or another radiological procedure. If vessels supplying the organs are blocked then organ damage can occur but this is unlikely.

- c. You may develop 'post-embolisation syndrome' (flu-like symptoms). This is caused by the body's response to tumour tissue dying and may consist of sickness, tiredness, pain and fever. The ward staff will give you painkillers and medicine to control any symptoms. You may have some loss of appetite for several days. This will improve over time.

## **2. Radiation:**

- a. Radiation damage to organs outside the liver, eg stomach, intestine, skin, pancreas and lung. We check for uptake in these organs during the planning angiogram so these complications should be unlikely. However, if there is excessive uptake by the stomach or other organs the consequences could be serious. This is why we spend a great deal of time planning the procedures and undertaking the treatments.
- b. Radiation Induced Liver Disease (RILD): this is caused by radiation to the liver itself. The SIR-Spheres tend to distribute mainly to the tumours and less so to normal liver tissue, but there is probably a 20% risk of some form of RILD. Most cases are very mild and won't be noticed. We do our best to choose the correct dose of treatment to allow adequate treatment of the tumour without damaging the liver.

## **What are the benefits?**

**You must read the latest NICE (National Institute of Health and Clinical Excellence) Guidelines on SIRT before you agree to have the procedure performed. This is available on the NICE website and we will give you a copy when we see you to discuss the procedure. NICE has NOT approved SIRT for general use in the NHS so you need to understand what SIRT can do for you before you decide to have it.**

- The SIRT technique allows us to target and access the tumours within the liver via the hepatic artery. The exposure of the remaining healthy liver tissue is minimised.
- Used in combination with chemotherapy, SIRT may shrink liver tumours more than chemotherapy alone and life expectancy can increase.
- For a small number of patients, treatment can shrink the liver tumours enough to make it possible to surgically remove the tumours at a later date.
- Quality of life may also improve.
- In patients whose liver tumours are no longer responding to chemotherapy, SIRT has been used successfully to shrink these tumours and extend patients' survival.

## **What are the alternatives?**

You will probably already have had surgery and/or chemotherapy. These may no longer be options for you.

## **What happens next?**

Your doctors will see you at a follow up clinic for regular blood tests and scans.

## **Further information is available from the following:**

British Liver Trust

Tel: **01425 463 080**

**[www.britishlivertrust.org.uk](http://www.britishlivertrust.org.uk)**

