

Interventional Radiology

Selective internal radiation therapy (SIRT) for liver tumours

Selective internal radiation therapy (SIRT) is a treatment for liver tumours.

Selective internal radiation therapy involves delivering tiny radiation particles (microspheres) into your blood. The particles travel in your blood to your liver. Once in the liver, the particles kill off the tumour cells there.

We usually give selective internal radiation therapy before surgery or with other forms of cancer treatment, but we can give it alone.

How selective internal radiation therapy works

A tumour in the liver gets its blood supply from the liver artery and the portal vein. We deliver the radiation microspheres through the liver artery. The particles travel through the artery to the tumour and stick to the tumour.

The microspheres contain a radioactive element called Yttrium-90 (Y-90). Yttrium-90 releases radiation to the tumour tissues and kills the tumour cells. The particles have very little effect on healthy liver tissue.

Yttrium-90 emits beta radiation. Beta radiation only travels a short distance within the body. This means very little radiation travels outside your body.



Patient Information

The radiation does not affect people near you unless you are in very close contact. Almost all the radiation is delivered to the tumour in the first two weeks after treatment.

Who selective internal radiation therapy is for

Patients with a liver tumour that is relatively large or in a difficult location for surgery may benefit from selective internal radiation therapy.

Not all people are suitable for selective internal radiation therapy. This is because there is a risk of making your liver function worse.

We only offer you selective internal radiation therapy after discussions with your multidisciplinary team.

Benefits of selective internal radiation therapy

Studies have shown selective internal radiation therapy with Y-90 microspheres (the radiation particles used in this procedure) can cause liver tumours to shrink. This can allow surgery and liver transplantation to happen, which can improve survival.

Alternative treatment options

Your doctor has discussed other treatment options suitable for you. These options are based on your general health, other health conditions, extent of your disease and previous treatments.

Other treatment options for liver tumour include:

- **Surgical resection** – not all tumours can be removed by surgery. Surgery can be high risk for you because of other medical conditions or general fitness.
- **Transarterial embolisation (TAE) or chemoembolization (TACE)** – we deliver tiny particles with or without chemotherapy drugs through your liver artery to a tumour. This is more effective for treating smaller tumours. Selective internal radiation therapy is used to treat larger tumours.

Patient Information

- **Chemotherapy or immunotherapy** – we deliver specialised drugs into your vein to treat advanced liver tumour where the tumour has spread outside the liver. This involves several cycles and can cause a number of side effects. Selective internal radiation therapy is a one-off treatment with fewer side effects. Selective internal radiation therapy is not suitable when the tumour has spread outside the liver.

Consent

We will invite you for a consultation with the interventional radiologist. They will explain the procedure and its risk and benefit to you.

You will have a chance to ask questions before you consent for the procedure.

Before the procedure

We will invite you to attend a pre-assessment clinic. At this clinic, we will make sure you are fit enough to have the procedure.

At the clinic, we will:

- ask questions about your general health, medical history, and medicines you take
- take a blood test and swabs

If you take anticoagulants (medicine to thin your blood), we will give you instructions for stopping them before the procedure.

Patient Information

The procedure

We carry out selective internal radiation therapy in two stages:

1. Work-up – this is a step to plan the treatment procedure.
2. Treatment – this is normally carried out one to two weeks after the work-up procedure.

You will have the work-up and treatment procedures in the Interventional Radiology theatre.

You will have the work-up and treatment procedures under local anaesthesia or under conscious sedation.

On the day of procedure

We will admit you to hospital either the day before or on the morning of your selective internal radiation therapy work-up.

You may need to have a blood test. This depends on your pre-assessment blood test result.

We will place a small tube (cannula) into your vein. This is so we can give you any medicines or intravenous fluids you need during the procedure.

Selective internal radiation therapy work-up

1. The interventional radiologist inserts a flexible tube (catheter) through a small cut in your artery at the wrist or groin. They direct the catheter into your liver artery.
2. We then perform a liver angiogram. This maps out the blood vessels in and around your liver.
3. We then inject a radioactive agent into your liver artery.
4. You then have a nuclear medicine scan. This scan checks how much radiation the tumour and the background liver absorbs.

The work-up lets us calculate the right dose of radiation microspheres to give you during your treatment.

Selective internal radiation therapy treatment

The interventional radiologist inserts a catheter into your liver artery. They then inject the radiation microspheres. These start to kill the tumour cells.

You will then have another nuclear medicine scan. This scan checks how much radiation the tumour and the surrounding liver have received.

After the procedures

After the work-up or treatment procedure, we will move you to the Interventional Radiology Day Unit to observe you for a few hours.

If we need to observe you overnight, we will admit you to an isolation room. The room will have a private toilet and will be on an inpatient ward.

Side effects and potential complications

Side effects can be minor, but in a small number of cases they can be serious.

After the procedure, you may experience:

- abdominal pain
- fever
- fatigue
- loss of appetite
- diarrhoea
- nausea

These usually settle without treatment. You can take painkillers and anti-sickness medicine to relieve the symptoms.

Puncture site complication

A puncture site complication to the artery at your wrist or groin may happen. We explain this in the “Transfemoral and transradial artery access” information leaflet.

Ascites, worsened liver function, radiation hepatitis

There is a risk of causing ascites (4 in 100), worsened liver function (11 in 100) or radiation hepatitis (1 to 3 in 200). But severe liver failure is extremely rare.

Effect on other internal organs

It's possible that a small number of microspheres may reach the lungs causing inflammation or fibrosis. They can also reach other organs, such as gallbladder, pancreas, stomach and intestine. If this happens you can get abdominal pain or bleeding from the stomach or intestine (1 in 125). These often resolve with medical treatment. Permanent harm to these organs is rare.

The radiologist may not give you treatment

The interventional radiologist may decide not to give you the treatment if the risk of causing damage to your liver or other organs is too high.

If you experience a side effect or complication

Tell the doctor or nurse on your ward if you have any side effects after your treatment.

Tell your GP or the SIRT specialist nurse if you have mild side effects after you're discharged.

Go to A&E if you feel very unwell or if you have a more serious complication.

Precautions on contact with other people

The risk of the radiation in your body travelling to people around you is very low. But as a precaution, you must follow our advice on contact with other people. We will tell you how long to follow the precautions for.

Patient Information

Prolonged close contact is defined as contact time of more than 15 minutes per day with another person closer than 1 metre.

Sleep alone

Avoid sharing a bed with another person for up to 10 days.

Children under the age of 2 that you live with

Avoid prolonged close contact with children under the age of 2 you live with for up to 18 days.

All other children under the age of 5

Avoid prolonged close contact with all other children under the age of 5 for up to 8 days.

Pregnancy

Avoid prolonged close contact with people who are pregnant for up to 8 days.

Children between the age of 5 and 11

Avoid prolonged close contact with children between the ages of 5 and 11 for up to 1 day.

Working near others

Avoid being near (closer than 1 metre) the same person continuously over the next 7 days.

- Avoid situations where these contact precautions are difficult to follow.
- You can return to a home shared with other adults.
- If you look after children, plan for someone to look after them.
- If you have any questions relating to these, contact the Nuclear Medicine staff.

Patient Information

Other precautions

Personal hygiene

Your urine may be slightly radioactive in the first 24 hours after treatment.

Increase your level of personal hygiene **24 hours** after your procedure. This includes:

- remain seated when using the toilet
- flush the toilet twice after use
- wash your hands well with soap and water after touching any of your own body fluid

Selective internal radiation therapy and pregnancy

You must not have selective internal radiation therapy if you are pregnant.

You must not become pregnant within **4 months** of selective internal radiation therapy treatment.

Breastfeeding

If you breastfeed, you must stop for **at least 2 weeks** after selective internal radiation therapy treatment and must not use any milk expressed for bottle feeding your infant during this period. Nuclear medicine will test your milk to determine when it is safe to resume.

Semen

Some of the radioactive element from the microspheres (Yttrium-90) may be in your semen after selective internal radiation therapy.

Do not conceive children or donate sperm for 4 months after selective internal radiation therapy. During the 4 months, use effective barrier contraception.

Why you need to take precautions

The radiation microspheres in your body can stay there for a few weeks. They release radiation that may escape your body. This exposes people around you to radiation.

You must take precautions until the level of radioactivity in your body and your urine is low. This is to protect your family, young children and pregnant people from radiation.

Radiation information card

When you leave hospital, we will give you a yellow “Radiation instruction card”. Carry this card with you at all times until the date on the card (1 month after your treatment).

This card tells people who may come into contact with you (such as healthcare workers) that you’ve had a radioactive treatment.

The card also has a summary of the precautions we will ask you to follow and the exact dates these precautions apply to.

- Do not drive on the day before or after your procedure.
- You can travel by private car or taxi as the **only** backseat passenger.
- Do not travel with children or pregnant women.
- You can travel by public transport or walk accompanied if the journey takes less than 1 hour.

Going back to work

Do not return to work for at least **7 days** following your treatment.

When you can return to work depends on your job. We’ll discuss this with you before your treatment. We’ll consider if your work needs you to be near others or if you work with children.

Airports and stadiums

You may trigger radiation alarms at an airport or stadium for up to **3 months** after treatment.

If you travel during these 3 months, you may need to explain your treatment and the reason for the alarm to the authorities.

Take this letter and the yellow “Radiation instruction card” we give you as evidence.

Medical emergency or death

In case of a medical emergency within **20 days** of treatment:

- Make sure your next of kin tell your doctor you have been given Y-90 selective internal radiation therapy.
- Your doctor should contact Nuclear Medicine for radiation protection advice. Nuclear Medicine’s details are on the yellow “Radiation instruction card”.

In the event of death within **20 days** of treatment:

- Make sure your next of kin will tell your responsible doctor you have been given Y-90 selective internal radiation therapy.
- The doctor is advised to contact the coroner and provide contact details of Nuclear Medicine.
- Nuclear Medicine may advise a delay for burial or cremation until the Y-90 has decayed. This is to protect workers and the public.

Follow-up

The selective internal radiation therapy specialist nurse will follow-up with you by telephone at 1 week and 4 weeks.

We will arrange a CT or MRI scan of your liver for around 3 months after the procedure to look at the tumour response. You will then see your Interventional Radiologist in clinic to look at the result.

Patient Information

Your liver specialist or oncologist will follow-up. They will discuss any more treatment you may need after selective internal radiation therapy.

Contact details

Interventional Radiology contact details

Interventional Radiology Department

Phone: 024 7696 7115

And ask for:

SIRT Specialist Nurses – Yossi Sahin or Aisa Abel-Enache

Or

Interventional Radiology Secretaries

Phone: 024 7696 7082

Or

University Hospital Coventry Switchboard

Phone: 024 7696 4000

And ask for Interventional Radiology Department

Ask for the Interventional Radiology Department. Make sure your contact details are taken so an interventional radiology responder can call you back.

Nuclear Medicine contact details

Phone: 024 7696 8212 (Monday to Friday, 8am to 5pm)

Or

University Hospital Coventry Switchboard

Phone: 024 7696 4000

Ask for a “Radiation Incident – Emergency Call Out” and say that it’s related to Nuclear Medicine. Make sure your contact details are taken so a Nuclear Medicine responder can call you back.

Patient Information

The Trust has access to interpreting and translation services. If you need this information in another language or format, please contact 024 7696 8212 and we will do our best to meet your needs.

The Trust operates a smoke-free policy.

Did we get it right?

We would like you to tell us what you think about our services. This helps us make further improvements and recognise members of staff who provide a good service.

Have your say. Scan the QR code or visit:

www.uhcw.nhs.uk/feedback



Document History	
Department:	Interventional Radiology
Contact:	28212
Updated:	15/12/2023
Review:	15/12/2025
Version:	1
Reference:	HIC/LFT/2823/23