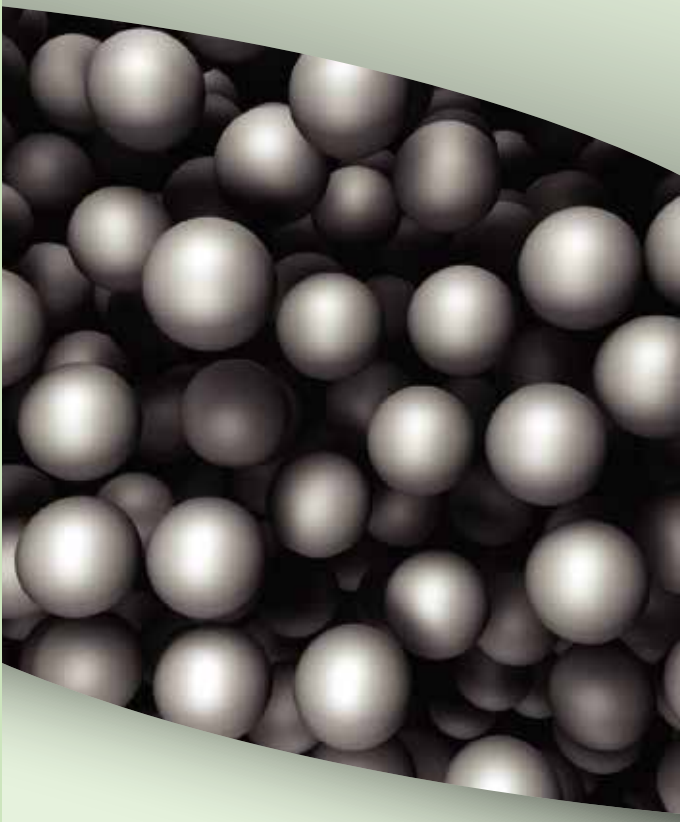
ParkwayHealth™ Radiology

Selective Internal Radiation Therapy (SIRT) (Y-90)



What Is Selective Internal Radiation Therapy?

Selective Internal Radiation Therapy (SIRT, also called radioembolization) is a targeted treatment for liver tumors that delivers millions of tiny radioactive beads called Y-90 microspheres directly to the liver tumors.

SIRT is an approved treatment of liver tumors that cannot be removed by surgery and for those who fail the inclusion criteria of other procedures. These may be tumors that start in the liver (also known as primary liver cancer), or tumors that have spread to the liver from another part of the body (also known as secondary liver cancer or metastases).

The SIRT procedure is conducted by a multidisciplinary treatment team that includes the attending physician, interventional radiologist, nuclear medicine specialist and others trained to work with radiation.

SIRT Pre-assessment Procedure

Before SIRT can be offered as treatment option for patients, the treatment team will need to know about the patient's current and past medical history. The team will conduct the following initial test to ensure that the patient is suitable for SIRT.

- HEPATIC ANGIOGRAM – also called as "mapping". This procedure involves injection of contrast media through an angiographic hepatic catheter to outline the vascular supply to the liver and tumour. This will enable the doctor to choose the best and safest route of administration and to block off any aberrant vessels if there are any.
- LIVER/LUNG SHUNTING SCAN (MAA SCAN) – this procedure involves injection of a very small amount of radioactive tracer into the liver via the angiogram catheter followed by a scan in the Nuclear Medicine department. This is to detect any migration of radioactive tracer from liver into the lung and whether the amount is significant.
- Multi-phasic CT Hepatic Angiography – this procedure involves bolus injection of contrast media that will show the blood supply to the liver in great detail. It also is used to calculate the liver and tumour volume.

What Are Y-90 Microspheres And How Does It Work?

Y-90 microspheres used in SIRT are extremely small (20-60 microns; about one-third the diameter of the strand of hair) resin beads which contain the radioactive substance yttrium-90 (Y-90). Y-90 is a pure beta emitter and has a half-life of approximately two-and-a-half days which travels over a relatively short distance: an average of of 2.4 mm in human tissue.

Due to the unique blood supply of the liver, Y-90 microspheres can be delivered directly to liver tumours. This targeted treatment allows maximum radiation dose to be administered to the liver tumour while reducing exposure to the remaining healthy liver tissue.

How Are Y-90 Microspheres Administered?

The Y-90 microspheres are administered by specially trained radiologists and nuclear medicine physicians experienced in SIRT. The procedure is usually performed under local anesthesia in the radiology suite. A small catheter is inserted through a tiny incision in the groin and guided into the liver until it reaches the hepatic artery and the Y-90 microspheres are infused through the catheter. The Y-90 microspheres are carried by the bloodstream directly to the tumors in the liver where they preferentially lodge in the small vessels feeding the tumor and deliver their dose of radiation.

What Will Happen After Receiving SIRT?

Patients are moved from the procedure room to a recovery area. The puncture wound is compressed to stop bleeding at the wound site. You will be monitored for a few hours after the procedure and stay overnight in the hospital and most patients are discharged the next day. Most patients usually, should be able to resume their normal daily activities two to three days after the treatment.

Contraindications

SIRT is contraindicated in patients who have:

- Had previous external beam radiation therapy to the liver
- Decompensating liver failure
- Pre-assessment angiogram that demonstrates abnormal vascular anatomy that would result in significant reflux of hepatic arterial blood to the stomach, pancreas or bowel
- Pre-assessment MAA scan shows a significant shunting to the lungs

Contraindication Of Hepatic Angiogram

- Severe allergy to IV contrast
- Severe impairment of renal function

What Adverse Effects Associated With SIRT?

Each person's reaction to SIRT is different. Some people have very few side effects, while others may experience more. The side effects described here won't affect everyone who has SIRT. Adverse effects are:

- postradioembolization syndrome (fatigue, nausea, vomiting, fever, abdominal discomfort) These symptoms are usually temporary.

Other adverse effect after SIRT:

- Radiation induced liver dysfunction or failure (very uncommon)
- Radiation induced pneumonitis (very uncommon)
- Radiation induced cholecystitis (very uncommon)
- Radiation induced gastric/duodenal ulcers (very uncommon)

Hepatic Angiogram Side Effects

- Contrast Allergy (Please inform doctors or technologist if you have had previous reaction to intravenous contrast medium.)
- Hematoma pain, infection at arterial puncture site in the groin (uncommon)
- Hepatic artery spasm or disection (uncommon)

SIRT is a treatment approved for use in many countries for unresectable liver tumours. Patients successfully treated with SIRT have response rates comparable to and sometimes higher than with other forms of treatment resulting in increased life expectancy and improved quality of life.

Reference:

1. (Mr RS Stubbs and Sk Wickremesekera. (2004). Selective Internal Radiation Therapy (SIRT): a new modality for treating patients with colorectal liver metastases. Wakefield Hospital, Wellington, New Zealand.
2. Sirtex Medical Inc. Reports 21 Percent Dose Sales Growth of SIR-Spheres® microspheres. Available at: http://www.businesswire.com/news/home/20130903006232/en/Sirtex-Medical-Reports-21-Percent-Dose-Sales. September 03, 2013.)

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Version: SIRT/November 2018