SIRT: SELECTIVE INTERNAL RADIATION THERAPY

SIRT targets liver tumours

SIRT (also known as radioembolisation) is a special type of radiotherapy that targets liver tumours with high doses of radiation delivered inside the body. SIR-Spheres® Y-90 resin microspheres are a form of SIRT where millions of tiny radioactive resin 'beads' called microspheres are injected through a catheter into the hepatic artery that feeds liver tumours with the oxygen-enriched blood they need to grow. These resin beads are only about one-third the width of a human hair. They have about the same specific gravity as a red blood cell and flow easily in the blood that is supplying the tumour.

Carried like tiny "Trojan Horses" by the same blood that the tumours require to grow, the microspheres lodge themselves in and around liver tumours where they emit high doses of tumour-killing radiation. However, as the microspheres only emit this radiation over a small area, they can target the tumour with minimal damage to the healthy liver tissue around the tumour. The radiation destroys the tumour cells, causing the tumours to shrink. With SIR-Spheres Y-90 resin microspheres, there are a very high number of microspheres (30–60 million) administered which encourages distribution of the radiation to all the liver tumours.

The microspheres irradiate the tumour for about two weeks, after which only three per cent of the initial useful radiation remains. After one month, the radiation source has almost completely decayed, however, the effects of radiotherapy on cancer last much longer.

Features of SIRT

- Uses the same blood supply that feeds liver tumours to deliver radiation that can kill these tumours;
- Gives much higher doses of radiation to liver tumours over much longer periods of time than would be possible with external beam radiation;
- Delivers only a small dose of radiation to healthy liver tissue.

SIRT shrinks tumours that can't be removed by surgery

SIRT is used to treat liver tumours that can't be removed by surgery. The two commonest uses are to shrink **liver tumours that have spread from the bowel** and **primary liver tumours that started in the liver**. It is also possible to treat a variety of other cancers from other parts of the body that have spread to the liver, for example liver cancer that has spread from the breast, lung or the eye.

What are SIR-Spheres Y-90 resin microspheres?

SIR-Spheres Y-90 resin microspheres are tiny radioactive resin beads that are used in the SIRT procedure. Each microsphere has a radioactive substance called yttrium-90 (Y-90) attached to it.

How are SIR-Spheres Y-90 resin microspheres given?

Administering SIR-Spheres Y-90 resin microspheres is a relatively short and minimally invasive procedure. After a local anaesthetic is administered to the patient, a SIRT-trained interventional radiologist makes a small incision near the groin. A catheter is then inserted through the incision and guided to the hepatic artery that feeds the liver tumours. SIR-Spheres Y-90 resin microspheres are then administered through this catheter. The whole procedure may take around 60–90 minutes. After the procedure is completed, patients may be sent to have a scan to check the level of radioactivity in the liver tumours. Patients will be monitored for a few hours after the procedure. Depending on local regulations, SIRT can be given as an out-patient procedure or patients may remain in hospital for a day or two. Most patients soon resume their normal daily activities.

MEDIA BACKGROUNDER

SIR-Spheres Y-90 resin microspheres can extend life and can lead to potentially curative surgery

SIRT using SIR-Spheres Y-90 resin microspheres is currently mainly given to patients that are unresponsive to chemotherapy. In this setting, the therapy has been shown to extend life, and in some cases, shrink tumours so much that they can be surgically removed. A summary of the evidence is provided below.

- SIR-Spheres Y-90 resin microspheres are used to treat liver tumours and are generally well tolerated;[1,2]
- SIR-Spheres Y-90 resin microspheres can treat tumours in the liver that cannot be removed by surgery;[2–4]
- SIR-Spheres Y-90 resin microspheres can reduce the size of liver tumours;[3-6]
- SIR-Spheres Y-90 resin microspheres can improve survival by about five months in patients with bowel cancer that has spread to the liver and who have failed previous chemotherapy;[2,4]
- In some cases, SIR-Spheres Y-90 resin microspheres can reduce the size of tumours so much that they can be surgically removed;[7–9]

Although SIRT using SIR-Spheres Y-90 resin microspheres did not lead to a planned superiority difference in overall survival compared to the standard of care in the following studies, the results provided clinical signal that SIR-Spheres Y-90 resin microspheres may offer important treatment benefits such as:

- SIR-Spheres Y-90 resin microspheres was better tolerated with significantly fewer side effects than sorafenib in patients with advanced HCC;[10,11]
- Patients treated with SIR-Spheres Y-90 resin microspheres experienced a significantly better Quality of life compared to patients treated with sorafenib for advanced or inoperable HCC;[10]
- SIR-Spheres Y-90 resin microspheres caused a significantly better tumour response than sorafenib in patients with locally advanced HCC;[11]
- Although SIR-Spheres Y-90 resin microspheres in combination with standard 1st line mFOLFOX6 chemotherapy did not cause a superior OS in the studied group of patients with liver metastases from colorectal cancer, they did provide a significantly improved median OS by 4.9 months and reduced the risk of death at any given point in time by 36% when given first-line in combination with standard mFOLFOX6 chemotherapy for liver-only or liver-dominant mCRC in patients with right-sided primary (RSP) tumours. [12,13]

Side effects are generally mild, including tiredness, loss of appetite, mild fever, stomach pain, sickness, injection site soreness and diarrhoea. There is no hair loss with this treatment.

SIR-Spheres Y-90 resin microspheres are recommended in Europe and in the United States

The 2016 European Society for Medical Oncology (ESMO) guidelines for physicians recommend the use of SIR-Spheres Y-90 resin microspheres to treat liver tumours that have spread from the bowel and have failed to respond to chemotherapy.[14]

In the United States, the 2017 National Comprehensive Cancer Network® (NCCN) Clinical Practice Guidelines in Oncology for colon and rectal cancer recommend the treatment with SIR-Spheres Y-90 resin microspheres as an appropriate option for patients with liver-dominant, chemotherapy resistant colorectal disease (mCRC).[15,16]

For more information please visit www.sirtex.com

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