



INLAND EMPIRE HEALTH PLAN

**IEHP UM Subcommittee Approved Authorization Guidelines**  
***Selective Internal Radiation Therapy (SIRT)***

**Policy:**

Selective internal radiation therapy (SIRT) is considered **investigational and not medically necessary** for all indications including, but not limited to, the treatment of primary or metastatic tumors of the liver.

Reviews within the medical literature demonstrate variable findings in regards to its usefulness. SIRT, also known as Yttrium-90 (Y90) radioembolization or Y90 microsphere hepatic brachytherapy, should be considered for medical necessity on a case-by-case basis, depending upon such patient presentation circumstances as metastasis, failure of conservative/standard management, and other factors.

**ECRI's Health Technology Assessment Information Service:**

The evidence report provides a review of the literature through July 1, 2002. Updated literature searches for a Hotline Response cover the period from July 1, 2002 through August 29, 2008.

**Reported Patient Indications/Contraindications:**

Intrahepatic yttrium-90 microsphere therapy is indicated for adults (older than 18 years of age) with biopsy-proven unresectable hepatocellular carcinoma that is confined to the liver. Only those in whom appropriately positioned hepatic catheters can be placed are considered as candidates.

ECRI Institute searches identified one consensus guideline and one evidence report. A consensus panel from the Radioembolization Brachytherapy Oncology Consortium published *Recommendations for Radioembolization of Hepatic Malignancies using Yttrium-90 Microsphere Brachytherapy* in 2007. The panel concluded that patients receiving this treatment require multidisciplinary management to ensure safety and success.

The Canadian Agency for Drugs and Technologies for Health published *Yttrium-90 microspheres (TheraSphere and SIR-Spheres) for the treatment of unresectable hepatocellular carcinoma* in 2007. The report summary indicated that limited evidence from several case series shows that this treatment reduces tumor size and increases survival time. The treatment may result in enough tumor size reduction to allow resection or transplantation. Patient selection and the technical aspects of this

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ECRI concluded: Low Quality; Low Quantity; and Moderate Consistency in its literature search.

### **Aetna Clinical Policy Bulletin Number 0268:**

#### Intra-hepatic Microspheres

Aetna considers intra-hepatic microspheres (e.g., TheraSphere, MDS Nordion Inc., SIR-Spheres, Sirtex Medical Inc., San Diego, CA) medically necessary for members with unresectable HCC or unresectable liver tumors from primary colorectal cancer.

Aetna considers intra-hepatic microspheres experimental and investigational for other indications.

### **Anthem/Blue Cross (RAD.00033):**

Selective Internal Radiation Therapy (SIRT) of Primary or Metastatic Liver Tumors (i.e., SIR-Sphere and TheraSpheres)

At the time of diagnosis, most liver tumors, whether primary or from metastases, are unresectable and chemotherapy is generally only palliative. Consequently, various alternative therapies have been investigated for potential palliation or even cure of unresectable liver tumors. Some examples of such treatments include cryosurgery, radiofrequency ablation, and chemoembolization. One of these therapies, Selective Internal Radiation Therapy (SIRT), targets the delivery of small beads or microspheres containing yttrium-90 to the tumor since liver tissue is radiation-sensitive. This policy addresses the use of SIRT.

### **Cigna Healthcare Coverage Position:**

CIGNA HealthCare covers selective internal radiation therapy (SIRT) using SIR-Spheres<sup>®</sup> as medically necessary for the treatment of unresectable metastatic liver tumors from primary colorectal cancer.

CIGNA HealthCare covers selective internal radiation therapy (SIRT) using TheraSpheres<sup>®</sup> as medically necessary when provided in accordance with the Humanitarian Device Exemption (HDE) specifications of the U.S. Food and Drug Administration (FDA) for use in irradiation treatment or as a neoadjuvant to surgery or transplantation in patients with unresectable hepatocellular carcinoma (HCC).

### **Background:**

Hepatocellular carcinoma (HCC), or hepatocellular cancer, is the most common form of liver cancer in adults. It is also sometimes called hepatoma because it comes from the hepatocytes (i.e., the main type of liver cell). HCC accounts for about three out of four cancers that start in the liver. Some examples of risk factors that may make a person more likely to develop HCC include chronic viral hepatitis, cirrhosis, inherited metabolic diseases, diabetes, obesity, aflatoxins, vinyl chloride, thorium dioxide (Thorotrast), and anabolic steroids. Most of the time

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when cancer is found in the liver, it has spread (metastasized) from a cancer that started somewhere else in the body, such as the pancreas, colon, stomach, breast, or lung. These tumors are named after their primary site of origin and are called metastatic. For example, cancer that started in the lung and spread to the liver is called metastatic lung cancer with spread to the liver. In the United States and Europe, secondary (or metastatic) liver tumors are more common than primary liver cancer (ACS, 2007).

### **Selective Internal Radiation Therapy (SIRT):**

SIRT, also known as “Yttrium-90 (Y90) radioembolization” or “Y90 microsphere hepatic brachytherapy,” uses established interventional techniques to deliver radioactive particles directly to tumors in the liver. Radioembolization is a type of transcatheter therapy, as is embolization and chemoembolization, and is used to describe the infusion of radioactive substances including but not limited to microspheres containing yttrium Y90, and iodine I 131 iodized oil. Y90 radioembolization is a radiology-guided procedure, in which a small catheter is placed in the femoral artery and advanced into position in the hepatic artery. Thousands of tiny, radioactive particles (resin or glass microspheres containing the isotope, Y90) are then injected into the artery. These particles are carried into the capillary bed of the tumors and emit radiation to this localized area. SIRT can usually be performed in an outpatient setting, as there is no radiation exposure to others once the microspheres have been infused. Goals of therapy include decreased tumor burden, palliation of symptoms, and increased time to disease progression. It is quite common for patients undergoing Y90 microsphere therapy to experience mild postembolization syndrome on the day of treatment and for up to three days after treatment. Symptoms include fatigue, nausea, and abdominal pain. Radioembolization to nontarget organs can also cause other acute damage, resulting in gastrointestinal ulceration, pancreatitis, and radiation pneumonitis. Clinical management of this patient population is complex and requires collaboration between interventional radiology, medical oncology, radiation oncology, and nuclear medicine departments (Greiner, 2004; Brown, et al., 2007; Kennedy, et al., 2007). The liver has a dual blood supply: the hepatic artery and the portal vein. Kennedy et al. (2007) states that the concept that metastatic hepatic tumors > 3 mm derive 80–100% of their blood supply from the arterial rather than the portal hepatic circulation, “is the foundation for the intra-arterial administration of brachytherapy with microspheres embedded with the beta-emitting isotope, yttrium-90 (Y90)”. In the United States, Y90 therapy is regulated by the Nuclear Regulatory Commission, as a brachytherapy device (not a drug) used for permanent brachytherapy implantation therapy.

There are two components to this radioembolization procedure: embolization and brachytherapy. Radioembolization is defined as the injection of embolic particles loaded with a radioisotope using percutaneous transarterial techniques. There are two distinct aspects to the procedure: the first being the injection of embolic particles (“embolization”) as the vehicle and the second being the delivery and administration, via this embolic vehicle, of radiation (“radio”). Fluoroscopic guidance, angiographic end points of embolization and stasis, and the need to modify this based on angiographic findings make this treatment a true embolization procedure. Furthermore, the administration and delivery of radiation, modification of dose based on tumor and hepatic volume, and required knowledge of radiation effects on tissue make this a brachytherapy procedure as well. It is the varying number of microspheres, embolic effect, and possible

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vascular saturation that makes fluoroscopic observation necessary. With radioembolization, tumors receive a much higher dose of radiation given the direct arterial deliver of the microspheres, as well as the hypervascularity of the tumors and target tissue. Hence, radiation doses that are significantly higher can be delivered directly to the tumor with minimal irradiation of normal liver tissue (Lewandowski, et al., 2007; Kennedy, et al., 2007).

**Effective Date:** *November 20, 2008*

**Reviewed Annually:** *November 9, 2016*

**Revised:**

**Bibliography:**

1. Aetna Policy Bulletin: Cryoanalgesia and Therapeutic Cold. Number 0297 (May 15, 2008).
2. Cigna HealthCare Coverage Position for Selective Internal radiation Therapy (0081), (May 15, 2008).
3. ECRI Institute Hotline Response on Intrahepatic Yttrium-90 Microsphere Therapy for Primary Liver Cancer (2008).
4. Anthem Blue Cross Clinical Practice Guideline: Selective Internal Radiation Therapy (SIRT) of Primary or Metastatic Liver Tumors (i.e., SIR-Sphere and TheraSpheres)Musculoskeletal,
5. (RAD.00033) Currently Effective Date: 01/28/2008. Accessed on 11/03/08 at 11:00 AM.

This guideline was developed using the following information: Anthem Blue Cross Guidelines (2008), ECRI's Health Technology Assessment Information Service (2008), and Aetna Clinical Policy Bulletin (2008) and Cigna's HealthCare Coverage Position (2008).

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