Selective Internal Radiation Therapy (SIRT)

Note: For Medicare members/enrollees, to ensure consistency with the Medicare National Coverage Determinations (NCD) and Local Coverage Determinations (LCD), all applicable NCDs, LCDs, and Medicare Coverage Articles should be reviewed prior to applying the criteria set forth in this clinical policy. Please refer to the CMS website at http://www.cms.gov for additional information.

Note: For Medicaid members/enrollees, circumstances when state Medicaid coverage provisions conflict with the coverage provisions within this clinical policy, state Medicaid coverage provisions take precedence. Please refer to the state Medicaid manual for any coverage provisions pertaining to this clinical policy.

DISCUSSION

Selective intra-arterial radiotherapy (SIRT) is the arterial delivery of microspheres impregnated with yttrium-90 via the hepatic artery. Arterially directed therapy involves the selective catheter-based infusion of particles targeted to the arterial branch of the hepatic artery feeding the portion of the liver in which the tumor is located. Arterially directed therapy is made possible by the dual blood supply to the liver; whereas the majority of the blood supply to normal liver tissue comes from the portal vein, blood flow to liver tumors is mainly from the hepatic artery. SIRT is often called radioembolization. Yttrium-90 is a pure beta-emitter with a relatively limited effective range and a short half-life that helps focus the radiation and minimize its spread. Candidates for radioembolization are initially examined by hepatic angiogram to identify and map the hepatic arterial system. At that time, a mixture of technetium 99-labeled albumin particles is delivered via the hepatic artery to simulate microspheres. Single-photon emission computed tomography detects possible shunting of the albumin particles into the gastrointestinal or pulmonary vasculature.[1,2]

Currently, two commercial forms of yttrium-90 microspheres are available: a glass sphere (TheraSphere) and a resin sphere (SIR-Spheres). The commercial products use the same radioisotope (yttrium-90) and have the same target dose (100 Gy), but they differ in microsphere characteristics.[1]

In general, radioembolization (RE) is used for unresectable hepatocellular carcinoma (HCC) that is >3 cm.
RE is indicated for patients with adequate functional status (Eastern Cooperative Oncology Group [ECOG] 0-2), adequate liver function and reserve, Child-Pugh score A or B, and liver-dominant metastases.[2]

Indications [2]:

- Primary hepatocellular carcinoma that is unresectable
- Hepatic metastases from neuroendocrine tumors
- Unresectable hepatic metastases from colorectal carcinoma, melanoma, or breast cancer, in patients with liver-dominant disease
- Primary intrahepatic cholangiocarcinoma
- Treatment of other radiosensitive tumors metastatic to the liver with liver-limited or liver-dominant disease for symptom palliation or prolongation of survival

DEFINITIONS

- **Eastern Cooperative Oncology Group (ECOG- ACRIN) -** is a membership-based scientific organization that designs and conducts cancer research involving adults who have or are at risk of developing cancer. It consists of a network of nearly 1,300 academic and community-based cancer centers and hospitals in the United States and globally. Approximately 15,000 oncology professionals are involved in Group research consisting of physicians, translational scientists, and associated research professionals from the member institutions, along with advocates. ECOG-ACRIN

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is a component of the National Institutes of Health's (NIH) and National Cancer Institute (NCI) through its National Clinical Trials Network (NCTN).

- **Eastern Cooperative Oncology Group (ECOG) Performance Status Scale -** The ECOG Performance Status Scale is a measurement that describes a patient's level of functioning in terms of their ability to care for themself, daily activity, and physical ability (walking, working, etc.). Researchers worldwide consider the ECOG Performance Status Scale when planning cancer clinical trials to study new treatments. This numbering scale is one way to define the population of patients to study in the trial and guide physicians who enroll patients into those studies.
- **National Comprehensive Cancer Network® (NCCN) -** An alliance of 32 leading cancer centers devoted to patient care, research, and education. The NCCN guidelines are utilized for Radiation Therapy and Medical Oncology standards. NCCN consensus clinical standards are periodically updated and NantHealth, Inc. reviews these and updates its policies within a timely manner.
- **Selective internal radiation therapy (SIRT) -** Selective internal radiation therapy, sometimes called radioembolization (RE), is an arterially directed treatment that's used to destroy liver tumors. During SIRT treatment, tiny radioactive beads are sent directly to the tumor through the arteries (blood vessels) in the liver. The beads give off radiation over a very short distance. The beads facilitate the transportation of the radiation inside the tumor, helping to reduce the amount of radiation that is transmitted to the remainder of the liver and of the body.
- **Yttrium-90 -** Radioactive particulars that are a pure beta-emitter with a relatively limited effective range and a short half-life that helps focus the radiation and minimize its spread. Yttrium-90 is used for patients with unresectable hepatocellular carcinoma (HCC).

POLICY

Please see the related anatomical policy that includes selective internal radiation therapy as a treatment for medical necessity. There are no standard dosing parameters, and it is based on the type of microspheres and radioisotopes utilized.

- Liver and Biliary Tract Cancer

REFERENCES

1. Michl M, Hoffmann R T, Laubender R, Haug A, Bartenstein P, Stemmler H. Selective internal radiation therapy (SIRT) for treatment of patients with breast cancer with metastatic liver disease. *Journal of Clinical Oncology.* 2010;28(15):1135.
2. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Hepatobiliary Cancers. (Version 1.2022). Available at https://www.nccn.org/professionals/physician_gls/pdf/hepatobiliary.pdf. ©National Comprehensive Cancer Network, 2022.
3. Dictionary of cancer terms. National Cancer Institute. https://www.cancer.gov/publications/dictionaries/cancer-terms/. Accessed May 20, 2022.

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CODING [CPT®, ICD-10, HCPCS] *

*Procedure codes appearing in medical policy documents are only included as a general reference. This list may not be all-inclusive and is subject to updates. In addition, the codes listed are not a guarantee of payment.

Code	Description
C22.0	Hepatocellular carcinoma
C78.7	Secondary malignant neoplasm of liver and intrahepatic bile duct
37243	Reported once per operative field; for radioembolization procedures, this code is usually reported only once. If the patient has separate liver tumors in the right and left lobes that are both being treated during the same encounter, it would be appropriate to bill two units of 37243.
77300	Represents the calculations performed to determine the radioembolization dose, either before or during treatment.

REVISION AND REVIEW HISTORY

No.	Description	Date(s)
1	Original Effective Date:	6/2/2022
2	Policy Review Dates:	6/2/2022, 6/7/2022, 6/7/2023
3	Policy Revision Dates:	6/2/2022, 6/7/2022
4	Department Owner:	Medical Affairs
5	NH Advisory Committee Approval Dates:	6/2/2022, 6/7/2022, 6/7/2023
6	Revision Changes:	6/7/2022 Grammatical non-material changes

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