Stereotactic Radiosurgery (SRS)

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

Stereotactic radiosurgery (SRS) is used in lieu of a surgical knife. This distinct discipline generates ionizing radiation to inactivate or eradicate definite target(s) in the head without the need to make an incision. To assure the quality of patient care, a multidisciplinary team consisting of a neurosurgeon, radiation oncologist, and medical physicist is required. SRS is delivered in one to five fractions via stereotactic guidance. The adjective “stereotactic” describes a procedure during which a target lesion is localized relative to a known three-dimensional reference system that allows for a high degree of anatomic accuracy.[1]

SRS couples anatomic accuracy and reproducibility with very high doses of highly precise, externally generated, ionizing radiation, thereby maximizing the ablative effect on the target(s) while minimizing collateral damage to adjacent tissues. Examples of devices used in SRS for stereotactic guidance may include a rigid head frame affixed to a patient, fixed bony landmarks, a system of implanted fiducial markers, or other similar systems.[1]

This treatment is only possible due to the development of highly advanced radiation technologies that permit maximum dose delivery within the target while minimizing the dose to the surrounding healthy tissue. The goal is to deliver doses that will destroy the tumor and achieve permanent local control. SRS relies on several technologies including, three-dimensional imaging and localization techniques that determine the exact coordinates of the target within the body, systems to immobilize and carefully position the patient and maintain the patient’s position during therapy, and highly focused gamma-ray or x-ray beams that converge on a tumor or abnormality.[2]

All SRS procedures include the following components [1]:

- Position stabilization (attachment of a frame or frameless)
- Imaging for localization (CT, MRI, angiography, PET, etc.)
- Computer-assisted tumor localization (i.e., “image guidance”)
- Treatment planning – number of isocenters; number, placement, and length of arcs or angles; number of beams, beam size and weight, etc.
- Isodose distributions, dosage prescription, and calculation
- Setup and accuracy verification testing
- Simulation of prescribed arcs or fixed portals
- Radiation treatment delivery

While being irradiated, the patient is immobilized when appropriate. The patient and target positioning are verified to ensure accurate treatment delivery. The target is defined by high-resolution stereotactic imaging. Stereotactic localization of the lesion uses an appropriate imaging modality to identify a reference point for positioning the individual treatment beams. This localization procedure allows physicians to perform image guided procedures with a high degree of anatomic accuracy and precision. Traditionally, a rigid frame that included a fiducial system for precisely locating coordinate positions within the frame was attached to the patient’s head. Alternatively, “frameless” approaches can be used. SRS typically is performed in a single session; however, it can be performed in a limited number of sessions, up to a maximum of five.[1]

Several different types of technology deliver radiation using stereotactic radiosurgery in the brain. Linear accelerator (LINAC) machines use X-rays (photons) to treat cancer. LINAC machines are also known by the brand name of the manufacturer, such as CyberKnife® and TrueBeam®. These machines can perform SRS in a single session or over three to five sessions for larger tumors. Gamma Knife® machines use 192 or 201 small beams of gamma rays to target and treat cancerous and noncancerous brain abnormalities. Gamma Knife® machines are less common than LINAC machines and are used primarily for small to medium tumors and lesions in the brain associated with a variety of conditions.[3]

Indications for Cranial Radiosurgery [3]

- Acoustic Neuromas
- Meningioma
- Pituitary Adenoma
- Craniopharyngioma
- Pineal Gland Neoplasms
- Arteriovenous Malformation
- Ocular Melanoma
- Primary Brain Tumors
- Metastatic Brain Tumors
- Spinal Cord Metastasis

DEFINITIONS

- **Computed tomography (CT) -** Computed tomography (CT) is an imaging procedure that uses special X-ray equipment to create detailed pictures, or scans, of areas inside the body. It is sometimes called computerized tomography or computerized axial tomography (CAT).
- **External beam radiation therapy (EBRT) -** External radiation (or external beam radiation) is the most common type of radiation therapy used for cancer treatment. A machine aims high-energy rays (or beams) from outside the body into the tumor.
- **Icon™ -** The Leksell Gamma Knife® Icon™ (LGKI) gives clinicians the option to perform single or fractionated frame-based or frameless radiation therapy treatments, allowing more individualized delivery without sacrificing precision and accuracy. Gamma Knife® radiosurgery (GKRS) may be used in place of, or in addition to, traditional brain surgery or whole-brain radiation therapy. During GKRS, up to 192 radiation beams from cobalt-60 sources converge with high accuracy on the target. At the isocenter where the beams merge, the radiation dose is concentrated powerfully at the target, sparing healthy brain tissue. The target volume and shape determine the number of beams used, and each beam can be individually modulated, further enhancing accuracy.
- **Linear accelerator (LINAC) -** A machine that uses electricity to form a stream of fast-moving subatomic particles. This creates high-energy radiation that may be used to treat cancer. Also called mega-voltage linear accelerator and MeV linear accelerator.
- **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.

- **Three-dimensional conformal radiation therapy (3D-CRT) -** A procedure that uses a computer to create a three-dimensional picture of the tumor. This allows doctors to give the highest possible dose of radiation to the tumor, while sparing the normal tissue as much as possible.

POLICY

Please see the related anatomical policy that includes stereotactic radiosurgery (SRS) as a treatment for dosing parameters and medical necessity.

- Central Nervous System Cancers

REFERENCES

1. Stereotactic radiosurgery (SRS). ASTRO Model Policies. https://www.astro.org/uploadedFiles/_MAIN_SITE/Daily_Practice/Reimbursement/Model_Policies/Content_Pieces/ASTROSRSModelPolicy.pdf. Accessed May 16, 2022.
2. Stereotactic radiosurgery (SRS) and Stereotactic body radiotherapy (SBRT). RadiologyInfo.org. https://www.radiologyinfo.org/en/info/stereotactic. Accessed May 16, 2022.
3. Stereotactic radiation (SRS, SBRT, SABR). ASTRO. https://www.rtanswers.org/RTAnswers/media/RTAnswers/patient%20materials/PDFs/Stereotactic.pdf. Accessed May 16, 2022.
4. Dictionary of Cancer Terms. National Cancer Institute. https://www.cancer.gov/publications/dictionaries/cancer-terms/. Accessed May 16, 2022.
5. Stereotactic Radiation Therapy. RTAnswers.org. https://www.rtanswers.org/How-does-radiation-therapy-work/Stereotactic-Radiation-Therapy. Accessed May 18, 2022.

CODING [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. CPT codes are available through the AMA.

Code	Description
C69.20 – C69.22	Retinoblastoma
C71.0 – C71.9	Malignant neoplasm brain
C72.0	Spinal tumors
C79.31 – C79.49	Secondary malignant neoplasm brain and spinal cord
C83.3	Primary CNS lymphoma
D33.0 – D33.2	Benign brain lesions

REVISION AND REVIEW HISTORY

No.	Description	Date(s)
1	Original Effective Date	5/24/2022
2	Policy Review Dates:	5/24/2022, 6/2/2022, 6/7/2022, 6/7/2023
3	Policy Revision Dates:	5/24/2022, 6/2/2022, 6/7/2022
4	Department Owner	Medical Affairs
5	NH Advisory Committee Approval Dates:	5/24/2022, 6/2/2022, 6/7/2022, 6/7/2023
6	Revision Changes:	6/2/2022 & 6/7/2022 Grammatical non-material changes