

Central Nervous System (CNS) Cancers

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

Brain and spinal cord tumors are masses of abnormal cells in the brain or spinal cord that have grown in an uncontrolled manner. Unlike other tumors, brain tumors rarely spread to other parts of the body, but most of them do spread through the brain tissue. Even benign brain tumors, as they grow, can press on and destroy normal brain tissue, which can lead to serious or sometimes even life-threatening damage.¹

In the year 2020, an estimated 23,890 people in the United States were diagnosed with a malignant primary central nervous system (CNS) tumor, and these tumors will be responsible for approximately 18,020 deaths. The incidence of primary brain tumors has been increasing over recent decades, especially in older adults. The growth in incidence rates may be explained by an increased use of CT and MRI used in diagnosing and changes in the World Health Organization (WHO) classification of CNS tumors.²

Principles of Management

Primary brain tumors are a heterogeneous group of neoplasms with varied outcomes and management strategies. Primary malignant brain tumors range from pilocytic astrocytoma, which is very uncommon, noninvasive, and surgically curable, to glioblastoma, the most common malignant brain tumor in adults, which is highly invasive and virtually incurable.²

Patients with metastatic brain disease may have rapidly progressing systemic disease or no systemic cancer at all. These patients may have one or more brain metastases, and they may have a malignancy that is highly responsive or, alternatively, highly resistant to radiation therapy (RT) or chemotherapy. Because of this marked heterogeneity, the prognostic features and treatment options for primary and metastatic brain tumors must be carefully reviewed on an individual basis and sensitively communicated to each patient. In addition, these CNS tumors are associated with a range of symptoms such as seizures, fatigue, psychiatric disorders, impaired mobility, neuro-cognitive dysfunction, difficulty speaking, and short-term memory problems as well as complications such as intracerebral edema, endocrinopathies, and venous thromboembolism that can seriously impact the patient's quality of life.²

Treatment Principles

Several important principles guide surgical management and treatment with RT and systemic therapy for adults with brain tumors. Regardless of tumor histology, neurosurgeons generally provide the best outcome for their patients if they remove as much tumor as safely possible (ideally achieve a gross total resection [GTR]) and thereby provide sufficient representative tumor tissue to ensure an accurate diagnosis.²

Radiation oncologists use several different treatment modalities in patients with primary brain tumors, including fractionated stereotactic radiation therapy (SRT) and stereotactic radiosurgery (SRS). Standard fractionated external beam radiation therapy (EBRT) is the most common approach.²

Hypofractionated radiation is an appropriate option for select patients (such as older adults and patients with poor performance status).

RT for patients with primary brain tumors is administered within a limited field (covering tumor or surgical cavity and a small margin of adjacent brain tissues), while whole-brain radiation therapy (WBRT) and SRS are used primarily for the treatment of brain metastases. SRS is generally preferred over WBRT for limited brain metastases.²

The dose of RT administered varies depending on the pathology. Fractionated radiosurgery is used for tumors larger than 2 cm. Post-operative radiosurgery after resection of brain metastases is supported by randomized data to improve local control over observation and to offer similar overall survival and superior cognitive preservation to postoperative whole brain radiation therapy.²

Meningiomas

General Treatment Information:

Treatment for meningiomas is typically treated using SRS or fractionated SRS. Highly conformal fractionated RT techniques (for example, 3D conformal RT [3DCRT], IMRT, and volumetric modulated arc therapy [VMAT]) are recommended to spare critical structures and uninvolved tissue. Stereotactic or image-guided therapy is recommended when using tight margins or when close to critical structures.²

DEFINITIONS

- **Adjuvant radiation therapy** - Additional radiation therapy given after the primary treatment to lower the risk of cancer recurrence.
- **Conformal radiation therapy (CRT)** - Conformal radiation therapy shapes the radiation beams to closely fit the area of the cancer. It is also called 3D conformal radiotherapy or 3DCRT. It is a very common type of radiotherapy. Intensity-modulated radiotherapy (IMRT) is a type of conformal radiotherapy.
- **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 is used to aim high-energy rays (or beams) from outside the body into the tumor.
- **Fractions** – A way of dividing a total dose of radiation into separate doses to be administered over a period of time.
- **Gray (Gy)** – One of the two units used to measure the amount of radiation absorbed by an object or person, known as the absorbed dose. One gray (Gy) is the international system of units (SI) equivalent of 100 rads, which is equal to an absorbed dose of 1 Joule/kilogram.
- **Image-guided radiation therapy (IGRT)** - Image-guided radiation therapy (IGRT) is the use of imaging during radiation therapy to improve the precision and accuracy of treatment delivery. Radiation therapy machines are equipped with imaging technology to allow your doctor to image the tumor before and during treatment. By comparing these images to the reference images taken during simulation, the patient's position and/or the radiation beams may be adjusted to more precisely target the radiation dose to the tumor. To help align and target the radiation equipment, some IGRT procedures may use fiducial markers, ultrasound, MRI, X-ray images of bone structure, CT scan, 3D body surface mapping, electromagnetic transponders, or colored ink tattoos on the skin.
- **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.
- **Palliative radiation therapy** - Treatment given to help relieve the symptoms and reduce the suffering caused by cancer or other life-threatening diseases. Palliative therapy may help a person feel more comfortable, but it does

not treat or cure the disease. Palliative therapy may be given with other treatments from the time of diagnosis until the end of life.

- **Stereotactic body radiation therapy (SBRT)** - Treatment outside the brain is called stereotactic body radiation therapy (SBRT). SBRT may be used for certain lung, spine, and liver tumors.
- **Stereotactic radiosurgery (SRS)** - Stereotactic radiosurgery (SRS) uses many precisely focused radiation beams to treat tumors and other problems in the brain, neck, lungs, liver, spine, and other parts of the body.
- **Stereotactic radiation therapy (SRT)** - Stereotactic radiation therapy (SRT) is a type of external radiation therapy that uses special equipment to precisely position the patient in order to deliver radiation to a well-defined cancerous tumor. With SRT, the total dose of radiation is divided into several smaller doses given over several days.
- **Volumetric modulated arc therapy (VMAT)** - Volumetric modulated arc therapy is an advanced form of intensity-modulated radiotherapy (IMRT) that delivers a targeted three-dimensional dose of radiation to a tumor in one or more treatments.
- **Whole brain radiation therapy (WBRT)** - Whole brain radiation therapy is a type of external radiation therapy used to treat patients who have cancer in the brain. It is often used to treat patients whose cancer has spread to the brain, or who have more than one tumor or tumors that cannot be removed by surgery. Radiation is given to the whole brain over a period of many weeks.

POLICY

The following table outlines the criteria that needs to be met for the number of fractions and dosing relative to Central Nervous System cancer radiation treatments. This dosing table represents evidence-based doses and fractions for the designated type of cancer treatment. Variations outside of the ranges may indicate a deviation from standard treatment.

Primary Brain Tumors			
Meningioma (Conventional Treatment)	Number of Fractions	Total Dose	Technique
		25-33	50-60 Gy
Meningioma Radiosurgery	1	12-16 Gy	SRS, SBRT
	3-5	21-30 Gy	
Low-Grade Glioma	23-33	45-60 Gy	3D-CRT, IMRT, IGRT
Glioblastoma	5-15	25-40.5 Gy	3D-CRT, IMRT, IGRT
	30-33	54-60 Gy	
Ependymoma, Adjuvant	30-33	54-60 Gy	3D-CRT, IMRT, IGRT
Primary Brain Tumors, Recurrent	1 -5	16-30 Gy	SRS, SBRT
Brain Metastases			
Radiosurgery	1-5	15-30 Gy	SRS, SBRT
Whole Brain	5-10	20-30 Gy	3D-CRT, IMRT, IGRT
CSI (Cranio-spinal irradiation)	15-20	30-36 Gy	3D-CRT, IMRT, IGRT

REFERENCES

1. What are adult brain and spinal cord tumors? American Cancer Society Web site. <https://www.cancer.org/cancer/brain-spinal-cord-tumors-adults/about/what-are-brain-spinal-tumors.html>. Accessed May 17, 2022.
2. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) for Central Nervous System Cancers. (Version 2.2021). Available at https://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. ©National Comprehensive Cancer Network, 2022.
3. Louis DN, Perry A, Wesseling P, et al. The 2021 WHO classification of tumors of the central nervous system: a summary. *Neuro-Oncology*. 2021;23(8):1231-1251.

**Please see the related radiation therapy modalities for additional information on treatment.
(3D-CRT, EBRT, IGRT, IMRT, SBRT, and SRS)**

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
C69.20 – C69.22	Retinoblastoma
C71.0 – C71.9	Malignant neoplasm brain
C79.31 – C79.49	Secondary malignant neoplasm brain and spinal cord
C83.3	Primary CNS Lymphoma
D33.0 – D33.2	Benign brain lesions
G6015	Intensity-modulated treatment delivery, single or multiple fields/arcs, via narrow spatially and temporally modulated beams, binary, dynamic MLC, per treatment session
G6016	Compensator-based beam modulation treatment delivery of inverse planned treatment using 3 or more high resolution (milled or cast) compensator convergent beam modulated fields, per treatment session
G0339	Image-guided robotic linear accelerator-based stereotactic radiosurgery, complete course of therapy in one session or first session of fractionated treatment
G0340	Image-guided robotic linear accelerator-based stereotactic radiosurgery, delivery including collimator changes and custom plugging, fractionated treatment, all lesions, per session, second through fifth sessions, maximum 5 sessions per course of treatment
61796	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 simple cranial lesion
61797	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, simple
61798	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); 1 complex cranial lesion
61799	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional cranial lesion, complex
61800	Application of stereotactic headframe for stereotactic radiosurgery
63620	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); one spinal lesion
63621	Stereotactic radiosurgery (particle beam, gamma ray, or linear accelerator); each additional spinal lesion
77295	3-dimensional radiotherapy plan, including dose-volume histograms

Code	Description
77301	Intensity-modulated radiotherapy plan, including dose-volume histograms for target and critical structure partial tolerance specifications (Listed once only)
77316	Brachytherapy isodose plan; simple (1-4 sources or 1 channel), includes basic dosimetry calculations
77317	Brachytherapy isodose plan; intermediate (5-10 sources or 2-12 channels), includes basic dosimetry calculation
77318	Brachytherapy isodose plan; complex (over 10 sources or over 12 channels), includes basic dosimetry calculations
77338	Multi-leaf collimator (MLC) device(s) for intensity modulated radiation therapy (IMRT), design and construction per IMRT plan
77370	Special medical radiation physics consultation
77371	Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; multi-source Cobalt 60 based
77372	Radiation treatment delivery, stereotactic radiosurgery (SRS) complete course of treatment of cranial lesion(s) consisting of 1 session; linear accelerator based
77373	Stereotactic body radiation therapy, treatment delivery, per fraction to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77386	Intensity-modulated radiation treatment delivery (IMRT), includes guidance and tracking, when performed; complex
77432	Stereotactic radiation treatment management of cranial lesion(s) (complete course of treatment consisting of 1 session)
77435	Stereotactic body radiation therapy, treatment management, per treatment course, to 1 or more lesions, including image guidance, entire course not to exceed 5 fractions
77470	Special treatment procedure
77778	Interstitial radiation source application, complex, includes supervision, handling, loading of radiation source, when performed
77790	Supervision, handling, loading of radiation source

REVISION AND REVIEW HISTORY

No.	Description	Date(s)
1	Original Effective Date:	5/20/2022
2	Policy Review Dates:	5/20/2022, 5/23/2022, 8/16/2022
3	Policy Revision Dates:	5/20/2022, 5/23/2022, 8/16/2022, 5/5/2023
4	Department Owner:	Medical Affairs
5	NH Advisory Committee Approval Dates:	5/20/2022, 5/23/2022, 8/31/2022, 5/5/2023
6	Revision Changes	5/23/2023 - Grammatical non-material changes 8/16/2022- Changed Brain Mets, Radiosurgery in chart: min from 12Gy to min of 15Gy. Changed GBM Hypofractionation chart in policy from 34-40.5 to 25Gy-40.5Gy and from 10-15 fx to 5-15 Fx. 5/5/2023 - Whole brain max dose changed from 37.5 Gy to 30 Gy and Max fractions from 15fx to 10 fx 5/5/2023 - Grammatical non-material changes