Eviti Imaging: Central Nervous System Cancer

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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.

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.

Central Nervous System Cancer Imaging

Discussion

This imaging guideline provides a standardized framework for the use of diagnostic and surveillance imaging in the management of common adult malignancies, specifically central nervous system cancer. The goal is to ensure timely, evidence-based imaging that supports accurate staging, treatment planning, response assessment, and post-treatment surveillance.

Guiding Principles

- Follow evidence-based practices from major guidelines (e.g., NCCN, ESMO, ACR Appropriateness Criteria)
- Ensure imaging aligns with the clinical context and stage of disease
- Minimization of unnecessary radiation exposure
- Promote timely and cost-effective imaging utilization
- Incorporate multidisciplinary collaboration in imaging decisions

Imaging Guidelines

This guideline applies to the following patients:

1. At least 18 years of age with confirmed or suspected diagnoses of central nervous system cancers; AND
2. All phases of oncologic care, including one of the following:
   a) Initial staging
   b) Treatment response evaluation
   c) Post-treatment surveillance
   d) Detection of recurrence or progression; AND
3. All imaging modalities used in oncology care, including but not limited to the following:
   a) Computed Tomography (CT) (neck, chest, abdomen, pelvis, neck, or site-specific)
   b) Magnetic Resonance Imaging (MRI) (including site-specific protocols such as pelvis MRI, brain MRI, liver MRI)
   c) Fluorodeoxyglucose Positron Emission Tomography/CT (FDG-PET/CT)
   d) PET/MRI
   e) Somatostatin Receptor PET/CT (SSTR-PET/CT)
   f) Nuclear Medicine (e.g., bone scan, PSMA PET)
   g) Single Photon Emission Computed Tomography/CT (SPECT/CT) (e.g., octreotide SPECT/CT for neuroendocrine tumors)

Notes:

1. The concurrent utilization of multiple advanced imaging modalities—such as PET/CT and MRI—is not routinely warranted and should be considered only when each modality is expected to provide distinct and clinically relevant information that will directly impact patient management. The selection of the most appropriate imaging study should be individualized, taking into account tumor type, clinical presentation, prior imaging, and other patient-specific factors. Imaging requests will be evaluated on a case-by-case basis to

ensure clinical necessity, appropriateness, and the potential to influence therapeutic decision-making.
2. When PET imaging is clinically indicated, the appropriate radiotracer should be selected based on tumor type and clinical scenario.

Central Nervous System Cancer Imaging

Imaging for central nervous system tumors is indispensable for diagnosis, treatment planning, and longitudinal monitoring. MRI remains the gold standard due to its superior soft-tissue contrast, multiplanar capability, and sensitivity to post-treatment changes. Pre- and post-operative MRI establishes resection extent, informs radiation and chemotherapy planning, and serves as the foundation for all future comparisons.

Advanced MRI modalities—such as perfusion, spectroscopy, and diffusion tensor imaging (DTI) provide physiologic and metabolic insights that complement conventional sequences. These techniques help distinguish tumor progression from treatment-related effects such as pseudo progression or radio necrosis.

Amino acid PET tracers (e.g., FET, FDOPA) and SSTR PET (for meningiomas) further refine assessment when MRI findings are equivocal. Imaging intervals should align with tumor grade, histology, and NCCN recommendations, ensuring optimal balance between sensitivity and clinical necessity.

Radiologic review should follow RANO or mRANO criteria to standardize response interpretation and facilitate multidisciplinary decision-making.

Advanced MRI techniques:
Advanced magnetic resonance imaging (MRI) techniques are indicated in central nervous system (CNS) cancer management primarily for cases where conventional imaging is insufficient to answer key clinical questions, especially in differentiating tumor progression from treatment-related changes such as radiation necrosis, guiding biopsy, and providing additional diagnostic or prognostic information.

MR Perfusion: Used for diagnosis and treatment surveillance to identify biological aggressiveness of gliomas, identify biopsy targets, and differentiate between viable/progressive hyper vascular tumor from hypo vascular treatment-related changes (e.g., pseudo progression or radiation necrosis). Dynamic susceptibility contrast (DSC) perfusion is the most widely used method, but dynamic contrast-enhanced (DCE) and arterial spin labeling (ASL) techniques may be considered in select cases, such as when DSC is non-diagnostic or gadolinium-based contrast agents (GBCAs) are contraindicated.

MR Spectroscopy (MRS): Provides metabolic information to help predict tumor grade, select biopsy sites, and distinguish active tumor from treatment effects. MRS is not recommended for routine imaging but is reserved for cases where conventional imaging is inconclusive. It is limited by anatomical location, lesion size, and technical variability.

Functional MRI (fMRI): Primarily used for pre-surgical planning to map eloquent brain regions and their relationship to tumors, especially when resection is considered near critical

functional areas. Its use is limited by patient ability to perform tasks and availability of expertise.

PET Techniques:

PET Imaging: PET (often combined with MRI) is recommended for differential diagnosis, delineation of tumor extent, and distinguishing recurrence from treatment-related changes, and evaluation of anti-cancer therapy when conventional MRI is insufficient.

Amino Acid PET: [18F]-fluoroethyl tyrosine (FET), [11C]-methyl-L-methionine (MET), and [18F]-fluorodopa (FDOPA) are established for primary and secondary brain tumors.

Indications: Delineation of tumor extent, biopsy planning, radiotherapy planning, and differentiation of tumor progression from treatment-related changes. Amino acid PET tracers offer superior tumor-to-background contrast and diagnostic accuracy compared to FDG-PET, especially in gliomas.

Limitations: Not FDA-approved in the US (except FDOPA for other indications), but available at select centers.

Radiolabeled Somatostatin Receptor (SSTR) Ligands: Ga-68 DOTATATE, DOTATOC, and DOTANOC are used for meningiomas, which overexpress SSTRs.

Indications: Diagnosis, treatment planning (radiation or surgery), and detection of relapse. SSTR PET is superior to indium-111 octreotide scans and MRI alone for higher-grade meningiomas.

FDG-PET: Assesses glucose metabolism in tumor and normal tissue.

Indications: Differentiating tumor from radiation necrosis, but limited by high physiologic uptake in normal gray matter and low tumor-to-background contrast.

Central Nervous System Cancer Recommendations			
Clinical Scenario	**Recommended Modality**	**Frequency/Timing**	**Purpose/Notes**
Initial Diagnosis	MRI brain +/- spinal cord CT chest, abdomen, and pelvis Or PET scan (PCNSL)	At diagnosis	Defines tumor extent, edema, mass effect, and resectability. Imaging of spine indicated when cancer suspected in spinal cord (e.g. medulloblastoma, ependymoma, primary spinal cord tumors, leptomeningeal disease, positive CSF, or spinal symptoms).
Postoperative Baseline	MRI brain +/- spinal cord	Within 48–72 hours after surgery	Establish postoperative baseline.

Treatment Response Monitoring (Chemo/Radiation)	MRI brain +/- spinal cord	Every 2–3 months	Assess response and distinguish progression vs. pseudo progression
Surveillance (Separated by Tumor Type, See Below)			
Glioblastoma (IDH Wild-Type)	MRI brain	Every 2–3 months for 3 years, then every 2–4 months indefinitely	Additional indications: Pre- and post-op MRI (within 48 hours), pre-radiation planning MRI 3–5 weeks post-op, post-radiation MRI 3–6 weeks after RT, then every 2–3 months for 3 years, then every 2–4 months indefinitely.
IDH-Mutant Lower Grade Glioma (Oligodendroglioma, Astrocytoma, Grades 2/3)	MRI brain	Varies (See notes)	MRI every 3–4 months after surgery or adjuvant therapy until progression; after gross total resection, MRI every 6–9 months starting 5 years post-surgery until progression; after RT/chemotherapy, at least every 6–9 months (oligodendroglioma) or every 6 months (astrocytoma) until progression; recurrent disease: MRI as often as every 2–4 months depending on histology and grade
Primary CNS Lymphoma	MRI brain	Every 3 months until year 2, every 6 months until year 5, then annually indefinitely	Concurrent spine imaging and CSF sampling as clinically indicated
Medulloblastoma	MRI brain +/- spinal cord	Every 2–3 months until year 2	
Leptomeningeal Metastases	MRI brain+/- spinal cord	Every 2–3 months until year 2, every 6 months until year 5, then annually indefinitely	
Primary Spinal Cord Tumors	MRI spine	Varies (See notes)	Low-grade: Spine MRI every 3–6 months until 5 years, then annually indefinitely; High-grade:

			Spine MRI 2–6 weeks after treatment, then every 2–4 months for 2–3 years, every 3–6 months until 5 years, then every 6–12 months indefinitely
Meningioma	MRI brain	Varies (see notes)	Low-grade: MRI every 3 months in year 1, then every 6–12 months for 5 years, then every 1–3 years as clinically indicated; Malignant/recurrent: More frequent imaging as needed

Notes:

1. MRI is the preferred imaging method and should always be performed with and without IV injection of gadolinium-based contrast agent (GBCA) unless contraindicated (pregnancy, prior allergic reactions).
2. CT is reserved for emergent evaluation (hemorrhage, hydrocephalus) or MRI contraindications.
3. PET or amino acid PET (FET, MET) may help in equivocal recurrence cases.
4. Always compare serial imaging to baseline using RANO or mRANO criteria for response assessment.
5. For brain metastases, refer to guidelines for primary site of cancer
6. PET and advanced MRI techniques are adjuncts for specific diagnostic dilemmas or research settings (added separate bullet)
7. Safety and contraindications: MRI safety screening is essential, especially for patients with implants or shunts. Most ventricular shunts are MRI-compatible, but programmable shunts require special handling. GBCAs are generally safe, with group II agents preferred in patients with renal impairment due to low risk of nephrogenic systemic fibrosis.[1]

Revision and Review History

No.	Description	Date
1	Original Effective Date:	1/1/2026
2	Policy Annual Review Dates:	
3	Department Owner:	Medical Affairs
4	NH Advisory Committee Approval Dates:	
5	Revision Changes:	

References

[1] National Comprehensive Cancer Network Guidelines: Central Nervous System Cancers. https://www.nccn.org/professionals/physician_gls/pdf/cns.pdf. Accessed December 15, 2025.