Cohere Medicare Advantage Policy - Magnetic Resonance (MR) Spectroscopy

Clinical Policy for Medical Necessity Review

Version: 2
Cohere Health UMC Approval Date: September 18, 2025
Last Annual Review: September 18, 2025
Revision: Not Applicable
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Important Notices

Notices & Disclaimers:

GUIDELINES ARE SOLELY FOR COHERE'S USE IN PERFORMING MEDICAL NECESSITY REVIEWS AND ARE NOT INTENDED TO INFORM OR ALTER CLINICAL DECISION-MAKING OF END USERS.

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Other Notices:

Policy Information:

Specialty Area: Diagnostic Imaging
Policy Name: Cohere Medicare Advantage Policy - Magnetic Resonance (MR) Spectroscopy
Type: [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

Table of Contents

Medical Necessity Criteria

Service: Magnetic Resonance (MR) Spectroscopy

Related CMS Documents

Please refer to the CMS Medicare Coverage Database for the most current applicable CMS National Coverage.

- There are no applicable NCDs and/or LCDs for MR Spectroscopy.

Description

Magnetic resonance spectroscopy (MRS) is a noninvasive diagnostic test that measures biochemical changes in the brain, muscles, and other organs. It primarily evaluates metabolic disorders, tumors, and other lesions. MRS provides additional information to conventional MRI by measuring the concentration of specific metabolites, such as N-acetylaspartate (NAA), choline (Cho), creatine (Cr), and myoinositol (mI).[1,2]

MRS is particularly valuable in grading and assessing types of brain tumors and in assessing metabolic changes associated with tumor progression or response to therapy. For example, high choline levels can indicate increased cell membrane turnover associated with tumor growth, while reduced NAA levels may suggest neuronal loss or dysfunction.[2] Additionally, MRS can help differentiate between tumor recurrence, abscess, and radiation necrosis, aiding in treatment planning and monitoring.[2]

Medical Necessity Criteria

Indications

Magnetic resonance spectroscopy (MRS) is considered appropriate if **ANY** of the following is **TRUE**:

- **ALL** of the following:
  - Conventional imaging by magnetic resonance imaging (MRI) or computed tomography (CT) is inconclusive; **AND**
  - **ANY** of the following:
    - Neoplastic conditions (including masses or mass-like conditions) and **ANY** of the following:
      - Grading of primary glial neoplasm, particularly high-grade versus low-grade glioma[3-5]; **OR**
      - Evaluation of brain tumors, including differentiation between tumor recurrence and radiation necrosis[3-5]; **OR**
      - Intraaxial brain tumors, including primary neoplasms and metastatic disease[5]; **OR**
      - Post-treatment surveillance in a patient with a known history of brain tumor[5]; **OR**
    - Neonatal hypoxic ischemic encephalopathy[6]; **OR**
    - Congenital conditions as indicated by **ANY** of the following:
      - Diagnosis and evaluation of metabolic disorders such as mitochondrial diseases and inborn errors of metabolism[7]; **OR**
      - Inherited metabolic disorders (e.g., Canavan disease, mitochondrial encephalopathies, and other leukodystrophies)[8]; **OR**
- Repeat imaging (defined as a repeat request following recent imaging of the same anatomic region with the same or similar modality) will be considered reasonable and necessary if **ALL** of the following are **TRUE**:
  - There are no established guidelines; **AND**
  - **ANY** of the following:
    - There are new or worsening symptoms not addressed in the guidelines, such that repeat imaging would influence treatment; **OR**
    - There is need for a one-time clarifying follow-up of a prior indeterminate finding; **OR**
    - In the absence of change in symptoms, there is an established need for monitoring which would influence management.

Non-Indications

Magnetic resonance spectroscopy (MRS) is not considered appropriate if **ANY** of the following is **TRUE**:

- The patient has undergone advanced imaging of the same body part within 3 months without undergoing treatment or developing new or worsening symptoms[9].

Level of Care Criteria

Inpatient or Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
76390	Magnetic resonance spectroscopy

Disclaimer: S Codes are non-covered per CMS guidelines due to their experimental or investigational nature.

Evaluation of Clinical Harms and Benefits

Clinical determinations for Medicare Advantage beneficiaries are made in accordance with 42 CFR 422.101 guidance outlining CMS's required approach to decision hierarchy in the setting of NCDs/LCDs identified as being "not fully established". When clinical coverage criteria are "not fully established" Medicare Advantage organizations are instructed to create publicly accessible clinical coverage criteria based on widely-accepted clinical guidelines and/or scientific studies backed by a robust clinical evidence base. Clinical coverage criteria provided by Cohere Health in this manner include coverage rationale and risk/benefit analysis.

The potential clinical harms of using these criteria for magnetic resonance spectroscopy (MRS) may include:

- Adverse effects from delayed disease detection and diagnosis, including increased treatment delays.
- Malfunction of implanted medical devices (e.g., implanted pacemakers, cochlear implants).
- If sedation is used for the study (for anxiety or claustrophobia), there is a risk of over-sedation. The patient will be monitored during the procedure to reduce this risk.
- There is uncertain risk for MR imaging in pregnant patients. The decision to image in a pregnant patient should be made on an individual basis in consultation with the patient's obstetric provider.[10]
- Increased healthcare costs and complications from the inappropriate use of additional interventions.[11]

The clinical benefits of using these criteria for magnetic resonance spectroscopy (MRS) may include:

- Specificity: MRS is uniquely able to differentiate between primary brain tumors and clinical mimics; it can also predict the clinical course of a brain tumor by diagnosing high-grade versus low-grade tumors.[2] In addition, MRS plays a unique role following treatment by serving as one of the few imaging modalities that can delineate radiation necrosis from tumor tissue, thereby allaying a common diagnostic challenge.[2]
- Noninvasive: As an imaging modality, MR spectroscopy is noninvasive; it is widely accepted that noninvasive procedures are less costly, associated

with fewer complications, and preferred by both patients and providers. It also utilizes no injected contrast agent and no ionizing radiation, conferring an inherent safety benefit.
- Enhanced overall patient satisfaction and healthcare experience.
- Appropriate allocation of healthcare resources at the individual beneficiary and population levels.

Medical Evidence

Weinberg et al. (2021) conducted a systematic review of the literature regarding the clinical applications of magnetic resonance spectroscopy (MRS) in brain tumors. The writers stated that MRS is utilized in clinical practice as well as research applications. The diagnostic clinical relevance of MRS includes its use as a type of virtual biopsy, as well as distinguishing gliomas from other types of diagnoses such as edema, necrosis, infection, or lymphoma. The group recommended using MRS in conjunction with conventional MRI due to occasional overlap in the appearance of different conditions. In tumor grading, the distinction between high and low-grade gliomas can be achieved with MRS. Limitations of MRS use in brain tumor imaging include similarities in the appearance of different diseases despite the differentiation of tissue types. Image quality may be affected by equipment variability and artifacts.[2]

In a 2022 systematic review of the literature, Germano et al. updated the 2014 Congress of Neurological Surgeons evidence-based guidelines on the management of progressive glioblastoma (pGBM) in adults. The literature search range was between 2012 to 2019, with 237 full-text articles extracted from 8786 total abstracts. The group made two new level II recommendations based on this review, with an additional 21 level III recommendations. The level II recommendations included the use of diffusion-weighted images included with magnetic resonance images with and without contrast in the diagnosis of patients with GBM as well as for surveillance. The other new level II recommendation is related to surgical procedures.[4]

Feldmann and colleagues (2022) examined MR-spectroscopy in metachromatic leukodystrophy (MLD) in a controlled cohort study consisting of 29 patients (10 infants, 19 juveniles) and 12 controls in 53 MRS datasets. MLD spectra were found to differ from the control group. White matter revealed the greatest differences compared to gray matter. Infant patients were found to have more severe changes when compared to later-onset patients in N-acetylaspartate (NAA), aspartate, glutamine, and choline intervals. It was concluded that NAA was the most clinically meaningful biomarker correlating with urine measurements obtained during the study.[8]

References

1. Wang J, Lin L, Gong T, et al. Editorial: Brain metabolic imaging by magnetic resonance imaging and spectroscopy: Methods and clinical applications. *Front Neurosci*. 2023;17:1239243. doi:10.3389/fnins.2023.1239243
2. Weinberg BD, Kuruva M, Shim H, Mullins ME. Clinical applications of magnetic resonance spectroscopy in brain tumors: From diagnosis to treatment. *Radiol Clin N Am.* 2021:59;349-362. doi.org/10.1016/j/rcl.2121.001.004
3. National Comprehensive Cancer Network (NCCN). NCCN clinical guidelines in oncology: Central nervous system cancers. Updated July 25, 2024. https://www.nccn.org/professionals/physician gls/pdf/cns.pdf
4. Germano IM, Johnson DR, Glenn CA, Javan R, Olson JJ. Congress of Neurological Surgeons systematic review and evidence-based guidelines update on the role of imaging in the management of progressive glioblastoma in adults. *J Neurooncol* 2022;158(2):139-165. doi:10.1007/s11060-021- 03853-0
5. Shih, RY, Utukuri PS, Ajam AA, et al. Brain tumors. ACR appropriateness criteria [Internet] American College of Radiology (ACR). Updated 2024. http://www.acr.org
6. Azzopardi D, Edwards AD. Magnetic resonance biomarkers of neuroprotective effects in infants with hypoxic ischemic encephalopathy. *Semin Fetal Neonatal Med*. 2010 Oct;15(5):261-9. doi:10.1016/j.siny.2010.03.001
7. Distelmaier F, Klopstok T. Neuroimaging in mitochondrial disease. *Handb Clin Neurol*. 2023:194:173-185. doi:10.1016/B978-0-12-821751-1.00016-6
8. Feldmann J, Martin P, Bender B, et al. MR-spectroscopy in metachromatic leukodystrophy: A model-free approach and clinical correlation. *Neuroimage Clin*. 2023:37:103296. doi:10.1016/j.nicl.2022.103296
9. Wasser EJ, Prevedello LM, Sodickson A, Mar W, Khorasani R. Impact of a real-time computerized duplicate alert system on the utilization of computed tomography. *JAMA Intern Med*. 2013;173(11):1024-1026.

doi:10.1001/jamainternmed.2013.543

10. American College of Obstetricians & Gynecologists (ACOG). Guidelines for diagnostic imaging during pregnancy and lactation. *Obstet Gynecol*. 2017;130(4):e210-e216. doi:10.1097/AOG.0000000000002355
11. Kjelle E, Brandsæter IØ, Andersen ER, et al. Cost of low-value imaging worldwide: A systematic review. *Appl Health Econ Health Policy*. 2024;22(4):485-501. doi:10.1007/s40258-024-00876-2

Policy Revision History/Information

Original Date: September 15, 2024		
Review History		
Version 2	09/18/2025	Annual review. Added indications on intraaxial tumors and post-treatment surveillance.