# Cohere Commercial Policy - Magnetic Resonance (MR) Spectroscopy

*Clinical Guidelines for Medical Necessity Review*

**Version:** 2
**Effective Date:** October 30, 2024

# Important Notices

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## Guideline Information:

**Specialty Area:** Diagnostic Imaging
**Guideline Name:** Cohere Policy - Magnetic Resonance (MR) Spectroscopy

**Date of last literature review**: 8/14/2024
**Document last updated:** 10/30/2024
**Type:** [**X**] Adult (18+ yo) | [**X**] Pediatric (0-17 yo)

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# Medical Necessity Criteria

***Service: Magnetic Resonance (MR) Spectroscopy***

## Recommended Clinical Approach

Magnetic resonance spectroscopy (MRS) is a non-invasive 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 when **ALL** of the following are **TRUE**:
  - ◆ Conventional imaging by magnetic resonance imaging (MRI) or computed tomography (CT) is inconclusive; **AND**
  - ◆ **ANY** of the following is **TRUE**:
    - Neoplastic conditions (including masses or mass-like conditions) and **ANY** of the following is **TRUE**:
      - ○ Grading of primary glial neoplasm, particularly high-grade versus low-grade glioma[2]; **OR**
      - ○ Evaluation of brain tumors, including differentiation between tumor recurrence and radiation necrosis[2-4]; **OR**

- Vascular conditions, known or suspected, including **ANY** of the following:
    - Neonatal hypoxic ischemic encephalopathy[5]; **OR**
- Congenital condition as indicated by **ANY** of the following:
    - Diagnosis and evaluation of metabolic disorders such as mitochondrial diseases and inborn errors of metabolism[6]; **OR**
    - Inherited metabolic disorders (e.g., Canavan disease, mitochondrial encephalopathies, and other leukodystrophies)[7]; **OR**
- Repeat imaging (defined as repeat request following recent imaging of the same anatomic region with the same modality), in the absence of established guidelines, will be considered reasonable and necessary if **ANY** of the following is **TRUE**:
    - New or worsening symptoms, such that repeat imaging would influence treatment; **OR**
    - 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]; **OR**
- The patient has metallic clips on vascular aneurysms; **OR**
- Incompatible implantable devices (e.g., pacemakers, defibrillators, cardiac valves); **OR**
- Presence of metallic implants or devices such as pacemakers that are not MRI-compatible; **OR**
- Metallic foreign body in orbits/other critical area(s) or within the field of view and obscuring area of concern.

*NOTE: MRI in patients with claustrophobia should be requested at the

discretion of the ordering provider.
**NOTE: MRI in pregnant patients should be requested at the discretion of the ordering provider and obstetric care provider.
***NOTE: Patients with renal insufficiency where gadolinium contrast is contraindicated, and MRS requires contrast administration. Alternative imaging modalities should be considered in such cases.

## Level of Care Criteria

Inpatient or Outpatient

## Procedure Codes (CPT/HCPCS)

| CPT/HCPCS Code | Code Description |
|---|---|
| 76390 | Magnetic resonance spectroscopy |

# 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 state 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. It is recommended by the group to use MRS in conjunction with conventional MRI due to occasional overlap in the appearance of different conditions. In tumor grading, distinction between high and low grade gliomas can be achieved with MRS. Limitations of MRS use in brain tumor imaging include similarities in appearance of different diseases despite differentiation of tissue types. Image quality may be affected by equipment variability and artifact.[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 upon this review, with an additional 21 level III recommendations. The level II recommendations included use of diffusion-weighted images included with magnetic resonance images with and without contrast in diagnosis of patients with GBM as well as for surveillance. The other new level II recommendation 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 seemed to be the most clinically meaningful biomarker correlating with urine measurements obtained during the study.[7]

# References


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# Clinical Guideline Revision History/Information

| Original Date: August 15, 2024 | | |
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| **Review History** | | |
| Version 1 | 08/15/2024 | New policy development |
| Version 2 | 10/30/2024 | Edited repeat imaging criteria language. |
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