AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.*	
Clinical guidelines **BRAIN (HEAD) MRS**	**Original Date: April 2007**
CPT Codes: 76390	**Last Revised Date: February 2021**
Guideline Number: NIA_CG_003	**Implementation Date: January 2022**

INDICATIONS FOR BRAIN MRS
(ACR, 2019)

- For the evaluation of a recurrent or residual brain tumor from post-treatment changes, e.g., radiation necrosis (Chuang, 2016)
- For further evaluation of a brain lesion to distinguish a brain tumor from other non-tumor diagnoses (e.g., abscess or other infectious or inflammatory process) (Alam, 2011; Majóos, 2009)

BACKGROUND:
(Alam, 2011; Hellström, 2018)

Magnetic resonance spectroscopy (MRS) is a noninvasive imaging technique that determines the concentration of brain metabolites, such as N-acetylaspartate, choline, creatine, and lactate, within the body tissue examined. Radiofrequency waves are translated into biochemical composition of the scanned tissue; the resulting metabolic profile is useful in identifying brain tumors, e.g., differentiating neoplastic and non-neoplastic brain lesions. In selected cases, MRS may be a valuable supplement to MRI. It is sensitive, but nonspecific. This modality should be considered as an adjunct to conventional imaging rather than replacement for histopathological evaluation.

In terms ~~of imaging of~~ of brain tumor **evaluation and classification**, ~~s~~carefully designed~~,~~ multi-center trials complying with criteria of evidence-based medicine have not yet been completed (Horská~~a~~, 2010).

Tumor Recurrence vs. Radiation Necrosis – Differentiation between recurrent brain tumors and treatment related injury, e.g., radiation necrosis, is difficult using conventional MRI. The typical appearance of radiation necrosis is similar to that of recurrent brain tumors. MRS is a ~~new,~~ quantitative approach, measuring various brain metabolic markers, to help in the differentiation of recurrent

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tumors and radiation necrosis. This differentiation is important as additional radiation can benefit recurrent disease but can be detrimental to radiation necrosis. -MRS may help in determining treatment options and in preventing unnecessary surgery. In addition, a tumor recurrence diagnosed by MRS allows the surgeon to begin treatment early instead of having to wait for symptoms of recurrence or biopsy confirmation (Barajas, 2009; Chuang, 2016; Smith, 2009). However, no consensus exists regarding the value of this in clinical decision making, and no approach has yet been validated to be sufficiently accurate (Chuang, 2016; Sundgren, 2009; Walker, 2014).

Glioma – MRS has been proposed for pre-operative grading of gliomas and differentiating high-grade gliomas (HGGs) from low-grade gliomas. It has been found to have moderate diagnostic value and should be combined with other advanced imaging techniques to improve accuracy. Currently, the data is limited; more research is needed for a definite conclusion for the utility of MRS for this indication. Therefore, it remains experimental/investigational (Abrigo, 2018; Wang, 2016).

~~**Cystic lesions vs. cystic metastasis or cystic primary neoplasm –** MRS may determine the concentration of certain brain metabolites whose ratios help in distinguishing abscesses from cystic necrotic tumors. For example, an increased choline signal or the ratio of certain brain metabolites may indicate the presence of cancerous cells. MRS may be used to diagnose the disease and to determine appropriate treatment (Mishra, 2004).~~

MRS in other diseases - -A role for MRS has been suggested in the management of neurodegenerative disease, epilepsy, and stroke. However, to better define this role, it will be necessary to standardize the MRS methodology, as well as the collection, analysis, and interpretation of data so it can be consistently translated to the applicable clinical settings. Currently, these potential applications remain experimental/investigational (Oz, 2014).

POLICY HISTORY

Date	Summary
February 2021	Updated background information and references
May 2020	Updated references
July 2019	• Deleted therapeutic f/u indication • Added tumor versus non tumor indication • Updated background info and refs

~~July 2019~~
- ~~Deleted therapeutic f/u indication~~
- ~~Added tumor versus non tumor indication~~
- ~~Updated background info and refs~~

~~May 2020~~
- ~~Updated references~~

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Reviewed / Approved by NIA Clinical Guideline Committee

GENERAL INFORMATION

It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.

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