Cohere Medical Policy - Magnetic Resonance (MR) Elastography

Clinical Guidelines for Medical Necessity Review

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Guideline Information:

Specialty Area: Diagnostic Imaging
Guideline Name: Cohere Medical Policy - Magnetic Resonance (MR) Elastography

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

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Service: Magnetic Resonance (MR) Elastography

Recommended Clinical Approach

Magnetic resonance elastography (MRE) is a non-invasive imaging technique that measures the mechanical properties of tissues, particularly stiffness, which can indicate the presence of fibrosis and other pathologies. This technique is primarily used in the assessment of liver diseases, but it also has applications in diagnosing conditions affecting the brain, muscles, and other organs. MRE provides a quantitative measure of tissue elasticity, which is valuable in evaluating the extent of disease, monitoring disease progression, and guiding treatment decisions.[1]

The clinical journey leading to MRE typically starts with the detection of risk factors or symptoms suggestive of liver fibrosis, such as elevated liver enzymes or clinical signs of chronic liver disease. Initial imaging studies like ultrasound or CT may indicate abnormalities, prompting further evaluation with MRE to assess the degree of fibrosis. MRE is particularly useful in patients for whom a liver biopsy is contraindicated or who require a non-invasive method to monitor treatment response over time.[2]

MRE is a valuable tool in tumor diagnosis by measuring tissue stiffness across various cancers. MRE can detect changes in tissue stiffness before clinical symptoms appear, making it essential for early tumor detection, treatment planning, and assessing resistance to chemoradiotherapy.[3]

Medical Necessity Criteria

Indications

- ➔ **Magnetic resonance elastography (MRE)** is considered appropriate if **ANY** of the following is **TRUE**[1-4]:
  - ◆ The patient has nonalcoholic fatty liver disease (NAFLD), and hepatic fibrosis or cirrhosis known or suspected; **OR**
  - ◆ **ALL** of the following are **TRUE**:

- The patient has a chronic liver disease (e.g., chronic hepatitis C virus infection, chronic hepatitis B virus infection) and hepatic fibrosis or cirrhosis is known or suspected; **AND**
- Ultrasound elastography cannot be performed or is nondiagnostic; **OR**

◆ Repeat imaging of a specific area or structure using the same imaging modality (in the absence of an existing follow-up guideline) is considered appropriate when **ALL** of the following is **TRUE**:

- There is documented clinical necessity; **AND**
- Prior imaging results of the specific area or structure, obtained using the same imaging modality, must be documented and available for comparison; **AND**
- **ANY** of the following is **TRUE**:
  - A change in clinical status, such as worsening symptoms or the emergence of new symptoms, that may influence the treatment approach; **OR**
  - The requirement for interval reassessment, which may alter the treatment plan; **OR**
  - One-time follow-up of a prior indeterminate finding to assess for interval change; **OR**
  - The need for re-imaging either before or after performing an invasive procedure.

Non-Indications

➔ **Magnetic resonance elastography (MRE)** 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; **OR**

◆ If contrast is used, history of anaphylactic allergic reaction to gadolinium contrast media with detailed guidelines for use in patients with renal insufficiency; **OR**

◆ The patient has metallic clips on vascular aneurysms; **OR**

◆ Incompatible implantable devices (e.g., pacemakers, defibrillators, cardiac valves); **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.

Level of Care Criteria

Inpatient or Outpatient

Procedure Codes (CPT/HCPCS)

CPT/HCPCS Code	Code Description
75565	Cardiac magnetic resonance imaging for velocity flow mapping (List separately in addition to code for primary procedure)
76391	Magnetic resonance (eg, vibration) elastography

Medical Evidence

Feuille et al. (2024) analyzed clinical situations where magnetic resonance elastography (MRE) of the liver is indicated. A total of 96 MRE exams and respective follow-ups were included over 14 months. The primary indication for all MREs was non-invasive assessment of liver fibrosis with one additional indication identified in every case . Liver biopsy decreased after MRE however, when liver biopsy was indicated the patient was very likely to undergo the procedure. MRE is a safe alternative for patients however, rare but serious risks may occur.[2]

Yang et al. (2021) review the advances of MRE as a non-invasive method to diagnose tumors. Tissue stiffness due to pathological changes may be visible sooner with MRE than with other imaging modalities. MRE is often utilized for tumors of the brain, breast, colon, gallbladder, liver, prostate, and uterus. Early detection of tumor changes and resistance to chemoradiotherapy are noted benefits of MRE.[3]

Venkatesh et al. (2013) review the utilization of magnetic resonance elastography (MRE) of the liver. While adequate to detect and stage liver fibrosis, its use is for additional applications. The authors note that future research is needed to improve three-dimensional imaging quality and resolution to aid in characterizing liver lesions and fibrosis. MRE also shows promise for evaluating patient response to antifibrotic treatments.[1]

The diagnostic performance of MRE for advanced (≥F3) fibrosis is excellent, with most studies reporting greater than 80% sensitivity and greater than 90% specificity.[3]

In a large meta-analysis by Singh et al including 12 studies and 697 individual patients with different chronic liver diseases from Europe and the United States, the area under the receiver operating characteristic curve values for discriminating any (≥F1), significant (≥F2), or advanced fibrosis (≥F3) or cirrhosis (≥F4) were 0.84, 0.88, 0.93, and 0.92, respectively.[4]

References

1. Venkatesh SK, Yin M, Ehman RL. Magnetic resonance elastography of liver: Clinical applications. *J Comput Assist Tomogr*. 2013 Nov-Dec;37(6):887-96. doi: 10.1097/RCT.0000000000000032. PMID: 24270110; PMCID: PMC4075049.
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3. Moura Cunha G, Fan B, Navin PJ, Olivié D, Venkatesh SK, Ehman RL, Sirlin CB, Tang A. Interpretation, Reporting, and Clinical Applications of Liver MR Elastography. Radiology. 2024 Mar;310(3):e231220. doi: 10.1148/radiol.231220. PMID: 38470236; PMCID: PMC10982829.
4. Singh S, Venkatesh SK, Wang Z, Miller FH, Motosugi U, Low RN, Hassanein T, Asbach P, Godfrey EM, Yin M, Chen J, Keaveny AP, Bridges M, Bohte A, Murad MH, Lomas DJ, Talwalkar JA, Ehman RL. Diagnostic performance of magnetic resonance elastography in staging liver fibrosis: a systematic review and meta-analysis of individual participant data. Clin Gastroenterol Hepatol. 2015 Mar;13(3):440-451.e6. doi: 10.1016/j.cgh.2014.09.046. Epub 2014 Nov 20. PMID: 25305349; PMCID: PMC4333001.

Clinical Guideline Revision History/Information

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Review History		