AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.*	
Clinical guidelines **BONE MARROW MRI**	**Original Date: July 2008**
CPT Codes: 77084	**Last Revised Date: May 2020**
Guideline Number: NIA_CG_059	**Implementation Date: ~~January 2021~~TBD**

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. All prior relevant imaging results, and the reason that alternative imaging (gold standard, protocol, contrast, etc.) cannot be performed must be included in the documentation submitted.

INDICATIONS FOR BONE MARROW MRI (images entire body):

- For the diagnosis, staging and follow-up of patients with multiple myeloma, as well as, leukemia and other related hematological malignancies (Angtuaco, 2004~~disorders (~~; Dutoit, 2016~~, Angtuaco, 2004~~).

- Suspected progression of smoldering multiple myeloma (SMM) to multiple myeloma (MM) or high risk SMM patients (Caers, 2016; IMWG, 2015).
- Diagnosis and assessment of treatment response in diffuse or multifocal marrow disorders (e.g., Chronic Recurrent Multifocal Osteomyelitis; marrow involvement in storage diseases such as Gaucher's,~~;~~ or hematologic malignancies when the diagnosis is in doubt) (Laudermann, 2016; Simpson, 2014; Voit, 2015).
- A follow-up study may be needed to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed for the type and area(s) requested.

---

* National Imaging Associates, Inc. (NIA) is a subsidiary of Magellan Healthcare, Inc.

BACKGROUND:

Magnetic Resonance Imaging (MRI) is currently used for the detection of metastatic disease ~~in~~ to the bone marrow. ~~Whole~~ Bone marrow~~body~~ MRI, using moving tables and special coils to survey the whole body, is used for screening to search for primary tumors and metastases. The unique soft-tissue contrast of MRI enables precise assessment of bone marrow infiltration and adjacent soft tissues allowing detection of alterations within the bone marrow earlier than with other imaging modalities. MRI results in a high detection rate for both focal and diffuse disease, mainly due to its high sensitivity in directly assessing the bone marrow components: fat and water bound protons.

When bone marrow MRI is indicated it is a single CPT code study with large field of view images covering the osseous structures, usually in two planes. The study covers from the vertex to the heels. Individual CPT codes corresponding to multiple separate studies of portions of the axial and appendicular skeleton are not necessary for bone marrow MRI.

Some conditions with diffuse marrow infiltration are not confined to the musculoskeletal system. Additional dedicated organ MRI exams may also be required for these patients.

OVERVIEW:

MRI allows bone marrow components to be visualized and is the most sensitive technique for the detection of bone marrow pathologies. The soft-tissue contrast of MRI enables detection of alterations within the bone marrow before osseous destruction becomes apparent ~~in~~ on CT. ~~Whole body~~Whole body bone marrow MRI has been applied for bone marrow screening of metastasis, as well as for systemic primary bone malignancies such as multiple myeloma (MM). Sensitive detection is mandatory in order to estimate prognosis and to determine adequate therapy.

Multiple myeloma and related conditions include: “1. Multiple myeloma- monoclonal proliferation of plasma cells with myeloma-defining CRAB (Calcium level elevation, Renal failure, Anemia, or Bone lesions) findings; 2. MGUS (monoclonal gammopathy of undetermined significance) - monoclonal proliferation of plasma cells without myeloma-defining CRAB; 3. Solitary plasmacytoma – monoclonal plasma cells manifesting as a single tumor; and 4.

Smoldering myeloma - monoclonal proliferation of plasma cells in bone marrow and/or serum/urine with abnormal levels of monoclonal protein" (Navarro, 2017).

MRI findings are included as one of the International Myeloma Working Group (IMWG) diagnostic criteria of active myeloma (Dutoit, 2016). Although MRI is not the only imaging tool for diagnosis, when "more than one focal lesion on MRI that is at least 5mm or greater in size" in addition to >10% clonal bone marrow plasma cells the diagnosis of active myeloma can be made. For smoldering multiple myeloma (SMM), defined as asymptomatic patients with increased levels of M protein and increased bone marrow plasma cells, "The IMWG now recommends that one of **following-:** PET-CT, ~~[~~Low dose whole body CT~~]~~ (LDWBCT), or MRI of the whole body or spine **(Bone marrow MRI)** be done in all patients with suspected smoldering myeloma, with the exact imaging modality determined by availability and resources" (IMWG, 2015**; Kumar, 2020**). ~~Joe Mazzie will send NCCN reference.~~ The importance of imaging in the diagnosis of active myeloma is highlighted as "The IMWG consensus statement now recommends that SMM patients with more than one unequivocal focal lesion (diameter > 5 mm) should be considered to have symptomatic myeloma that requires treatment" (Dutoit, 2016). Recent advances have allowed the identification of a subset of SMM patients with a greater than 80% risk of progression to MM in 2 years based on biomarkers (Caers, 2016).

POLICY HISTORY:
Review Date: April 2019
Review Summary:

- Removed indication "vertebral fractures with suspected bone metastasis'
- Added indication: "Diagnosis and assessment of treatment response in diffuse or multifocal marrow disorders (e.g. Chronic Recurrent Multifocal Osteomyelitis; marrow involvement in storage diseases such as Gaucher's; or hematologic malignancies when the diagnosis is in doubt)"
- Added Background info to clarify when this study is indicated
- Added Overview section to explain multiple myeloma and related conditions
- Updated references

Review Date: May 2020
Review Summary:

- **Added description of Whole body bone marrow MRI in background section**
- **Added Low dose CT in evaluation of myeloma, in background section**
- **Updated references**

REFERENCES:

Baur-Melnyk A, Buhmann S, Becker C, et al. Whole-body MRI versus whole-body MDCT for staging of multiple myeloma. *AJR AM J Roentgenol.* 2008; 190:1097-1104. doi: 10.2214/AJR.07.2635.

Caers, J, Fernandez de Larrea C, Leleu X, et al. The changing landscape of smoldering multiple myeloma: a European perspective. *Oncologist*. March 2016; 21(3):333-342. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4786351/. Retrieved January 10, 2018.

Dutoit JC, Verstraete KL. MRI in multiple myeloma: A pictorial review of diagnostic and post-treatment findings. *Insights Imaging*. August 2016; 7(4):553-569. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4956620/. Retrieved January 10, 2018.

International Myeloma Working Group (IMWG). *Criteria for the Diagnosis of Multiple Myeloma.* http://imwg.myeloma.org/international-myeloma-working-group-imwg-criteria-for-the-diagnosis-of-multiple-myeloma/. Published October 29, 2015. Retrieved January 10, 2018.

Kumar SK, Callander NS, Hillengass J, et al. NCCN Guidelines Insights: Multiple Myeloma, V1.2020.

Laudemann K, Moos L, Mengel E, et al. Evaluation of treatment response to enzyme replacement therapy with Velaglucerase alfa in patients with Gaucher disease using whole-body magnetic resonance imaging. *Blood Cells Mol Dis.* 2016 Mar; 57:35-41. https://www.ncbi.nlm.nih.gov/pubmed/26852653.

Long SS, Yablon CM, Eisenberg RL. Bone marrow signal alteration in the spine and sacrum. *AJR Am J Roentgenol*. 2010; 195:W178-200. doi: 10.2214/AJR.09.4134.

Navarro S, Matcuk GR, Patel DB, et al. Musculoskeletal imaging findings of hematologic malignancies. RadioGraphics. 2017; May-Jun; 37(3):881-900. Epub 2017 Apr 7. https://pubs.rsna.org/doi/full/10.1148/rg.2017160133.

Simpson WL, Hermann G, Balwani M. Imaging of Gaucher disease. *World J Radiol.* 2014 Sep 28; 6(9):657–68. doi: 10.4329/wjr.v6.i9.657. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4176783/.

Voit AM, Amoldi AP, Douis H, et al. Whole-body magnetic resonance imaging in chronic recurrent multifocal osteomyelitis: Clinical longterm assessment may underestimate activity. *J Rheumatol.* 2015 Aug; 42(8):1455-62. https://www.ncbi.nlm.nih.gov/pubmed/25979713.

Reviewed / Approved by M. Atif Khalid MD M. Atif Khalid, M.D., Medical Director, Radiology

~~Reviewed / Approved by~~ ~~Patrick Browning, VP, Medical Director~~