| *National Imaging Associates, Inc.* | |
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| **Clinical guidelines**<br>**BONE MARROW MRI** | **Original Date: July 2008** |
| **CPT Codes: 77084** | **Last Revised Date: March 2023~~April 2022~~** |
| **Guideline Number: NIA_CG_059** | **Implementation Date: January 2024~~3~~** |

## 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.*
- *Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.*

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**INDICATIONS FOR BONE MARROW MRI (images entire body)**

- For the diagnosis, staging and follow-up of patients with multiple myeloma (MM), as well as leukemia and other related hematological malignancies[1-3]
- Suspected progression of smoldering multiple myeloma (SMM) to multiple myeloma (MM) or high risk SMM patients[3-5]
- 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/ processes (e.g., Waldenström macroglobulinemia) when the diagnosis is in doubt)[6-8]
- ~~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.~~

**NOTE:** If the request is for whole body MRI screening for a rare genetic predisposition syndrome (such as Li-Fraumeni syndrome (LFS) constitutional mismatch repair deficiency

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(CMMRD) syndrome, neurofibromatosis type 1 etc.) an unlisted MRI study may be more appropriate, please see NIA GL 063*.

## BACKGROUND

Magnetic Resonance Imaging (MRI) is currently used for the detection of metastatic disease to the bone marrow. Bone marrow 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 on CT. 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 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.”[9]

MRI findings are included as one of the International Myeloma Working Group (IMWG) diagnostic criteria of active myeloma.[2] Although MRI is not the only imaging tool for diagnosis, when "more than one focal lesion on MRI that is at least 5 mm 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".[4, 10] 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".[2] 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.[5]

~~**POLICY HISTORY**~~

| ~~**Date**~~ | ~~**Summary**~~ |
|---|---|
| | ~~Removed duplicate statement for treatment follow up~~<br>~~Updated references~~ |
| ~~April 2022~~ | • ~~Added statement for whole body MRI related to genetic predisposition syndromes~~ |
| ~~June 2021~~ | • ~~Clarified hematologic malignancies/ processes (e.g., Waldenström macroglobulinaemia)~~<br>• ~~Updated references~~ |
| ~~May 2020~~ | • ~~Added description of whole body~~whole body ~~bone marrow MRI in background section~~<br>• ~~Added Low dose CT in evaluation of myeloma, in background section~~<br>• ~~Updated references~~ |
| ~~April 2019~~ | • ~~Removed indication "vertebral fractures with suspected bone metastasis'~~<br>• ~~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)"~~<br>• ~~Added Background info to clarify when this study is indicated~~<br>• ~~Added Overview section to explain multiple myeloma and related conditions~~ |

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|---|---|
| | • ~~Updated references~~ |

## REFERENCES


1. Angtuaco EJ, Fassas AB, Walker R, Sethi R, Barlogie B. Multiple myeloma: clinical review and diagnostic imaging. *Radiology*. Apr 2004;231(1):11-23. doi:10.1148/radiol.2311020452
2. Dutoit JC, Verstraete KL. MRI in multiple myeloma: a pictorial review of diagnostic and post-treatment findings. *Insights Imaging*. 2016;7(4):553-569. doi:10.1007/s13244-016-0492-7
3. NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines): Multiple Myeloma Version 3.2023. National Comprehensive Cancer Network (NCCN). Updated December 8, 2022. Accessed December 29, 2022. https://www.nccn.org/professionals/physician_gls/pdf/myeloma.pdf
4. Criteria for the Diagnosis of Multiple Myeloma. International Myeloma Working Group (IMWG). Updated September 11, 2018. Accessed December 29, 2022. https://www.myeloma.org/international-myeloma-working-group-imwg-criteria-diagnosis-multiple-myeloma
5. Caers J, Fernández de Larrea C, Leleu X, et al. The Changing Landscape of Smoldering Multiple Myeloma: A European Perspective. *Oncologist*. 2016;21(3):333-342. doi:10.1634/theoncologist.2015-0303
6. 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*. Mar 2016;57:35-41. doi:10.1016/j.bcmd.2015.11.003
7. Simpson WL, Hermann G, Balwani M. Imaging of Gaucher disease. *World J Radiol*. 2014;6(9):657-668. doi:10.4329/wjr.v6.i9.657
8. Voit AM, Arnoldi AP, Douis H, et al. Whole-body Magnetic Resonance Imaging in Chronic Recurrent Multifocal Osteomyelitis: Clinical Longterm Assessment May Underestimate Activity. *J Rheumatol*. Aug 2015;42(8):1455-62. doi:10.3899/jrheum.141026
9. Navarro SM, Matcuk GR, Patel DB, et al. Musculoskeletal Imaging Findings of Hematologic Malignancies. *Radiographics*. May-Jun 2017;37(3):881-900. doi:10.1148/rg.2017160133
10. Kumar SK, Callander NS, Hillengass J, et al. NCCN Guidelines Insights: Multiple Myeloma, Version 1.2020. *J Natl Compr Canc Netw*. Oct 1 2019;17(10):1154-1165. doi:10.6004/jnccn.2019.0049


## ~~ADDITIONAL RESOURCES~~


~~Zhao Y, Wu EY, Oliver MS, et al. Consensus Treatment Plans for Chronic Nonbacterial Osteomyelitis Refractory to Nonsteroidal Antiinflammatory Drugs and/or With Active Spinal Lesions. *Arthritis Care Res (Hoboken)*. Aug 2018;70(8):1228-1237. doi:10.1002/acr.23462~~

~~Voit AM, Arnoldi AP, Douis H, et al. Whole-body Magnetic Resonance Imaging in Chronic Recurrent Multifocal Osteomyelitis: Clinical Longterm Assessment May Underestimate Activity. *J Rheumatol*. Aug 2015;42(8):1455-62. doi:10.3899/jrheum.141026~~

~~Andronikou S, Kraft JK, Offiah AC, et al. Whole-body MRI in the diagnosis of paediatric CNO/CRMO. *Rheumatology (Oxford)*. Oct 1 2020;59(10):2671-2680. doi:10.1093/rheumatology/keaa303~~

## POLICY HISTORY

| Date | Summary |
|---|---|
| March 2023 | • Removed duplicate statement for treatment follow up<br>• Updated references<br>• Removed additional resources<br>• Added statement on clinical indications not addressed in this guideline |
| April 2022 | • Added statement for whole body MRI related to genetic predisposition syndromes |
| ~~June 2021~~ | ~~Clarified hematologic malignancies/ processes (e.g., Waldenström macroglobulinaemia)~~<br>~~Updated references~~ |
| ~~May 2020~~ | ~~Added description of whole-body bone marrow MRI in background section~~<br>~~Added Low dose CT in evaluation of myeloma, in background section~~<br>~~Updated references~~ |
| ~~April 2019~~ | ~~Removed indication "vertebral fractures with suspected bone metastasis'~~<br>~~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)"~~<br>~~Added Background info to clarify when this study is indicated~~<br>~~Added Overview section to explain multiple myeloma and related conditions~~<br>~~Updated references~~ |

## ~~ADDITIONAL RESOURCES~~


~~1. 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.* Apr 2008;190(4):1097-104. doi:10.2214/ajr.07.2635~~

~~2. Long SS, Yablon CM, Eisenberg RL. Bone marrow signal alteration in the spine and sacrum. *AJR Am J Roentgenol.* Sep 2010;195(3):W178-200. doi:10.2214/ajr.09.4134~~


## ~~Reviewed / Approved by NIA Clinical Guideline Committee~~

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