Anthem

Medical Policy

Subject: PET/MRI
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Description/Scope

This document addresses combination positron emission tomography/magnetic resonance imaging (PET/MRI) technology with dedicated scanners, such as the Biograph™ mMR System (Siemens Medical Solutions U.S.A., Inc., Malvern, PA). The Biograph mMR System is a combined Magnetic Resonance Diagnostic Device (MRDD) and Positron Emission Tomography (PET) scanner that provides a combined approach to imaging anatomical, functional and biochemical characteristics of disease.

Position Statement

Investigational and Not Medically Necessary:

The use of combined PET/MRI imaging technology is considered **investigational and not medically necessary** for all indications.

Rationale

PET/MRI has become increasingly investigated as an alternative to PET/CT imaging. This procedure involves less radiation exposure than PET/CT imaging, which is an important factor to consider, especially when radiation-sensitive populations are involved.

In 2012, exploratory analysis was conducted that evaluated the outcomes of PET/MRI in 21 subjects with soft tissue sarcoma (STS) in different treatment settings: (a) neoadjuvant setting, (b) metabolic-driven local therapy in metastatic sarcoma, and (c) palliative treatment. An Ingenuity PET/MR system (Philips Healthcare) was used. It combines a 3-Tesla MRI and a PET scanner with time-of-flight technology. Results were reported as the first such analysis of STS examined with whole-body-PET/MRI. Results showed high contrast imaging without significant artifacts or distortions. Four subjects with high-risk sarcoma (3 rhabdo, 1 pleomorphic) completed their planned neoadjuvant therapy. Change in tumor size did not correlate with pathologic response, whereas surgical outcome was well predicted in metabolic changes. Due to this finding, the preplanned course of chemotherapy for 1 subject was changed, and in 3 individuals, with a remnant metabolic activity in a single spot, surgical resection of a single metastatic lesion was performed or local radiotherapeutic treatment was given. In 3 subjects who had stable disease after first-line treatment, persisting metabolic activity on the PET/MRI resulted in a change in the treatment regimen which ultimately resulted in decreased metabolic activity and tumor regression. The authors concluded that whole-body PET/MRI is feasible in STS and may provide valuable information in treatment, monitoring and prognosis of STS. Additional prospective studies of PET/MRI for STS are needed (Richter, 2012).

To date, few studies have focused on this combined PET/MRI technology (Gatidis, 2016; Heusch, 2013; Malone, 2011; Martinez-Moller, 2009; Ponisio, 2016; Ruhlmann, 2016; Schleyer, 2010; Schmidt, 2013; Sekine, 2017; Sher, 2016; Xin, 2016). Additional hybrid imaging technologies are under investigation, such as multiparametric magnetic resonance imaging (mpMRI) and three-dimensional T1-weighted high-resolution isotropic volume examination (3D-THRIVE) with some preliminary trials data that has shown comparable or superior diagnostic performance to PET/CT (Gődény, 2016; Yoo, 2018).

At the present time, additional research from large, robust, randomized prospective trials is needed to resolve the technical issues and inform regarding the most appropriate applications for combined PET/MRI imaging technologies.

Background/Overview

Potential clinical applications for PET/MRI imaging technology include the early identification and staging of malignancies, therapy planning, and treatment. Proposed advantages of PET/MRI combined imaging include reduced total radiation dose and increased soft-tissue contrast visualization. Although the PET component will still require the injection of a radioactive contrast agent to obtain the scan, there is no ionizing radiation used during the MRI scan. It is reported that PET/MRI will allow for imaging at a significantly lower total radiation dose compared to PET/CT (computed tomography) which is particularly advantageous for children and also adults undergoing multiple scans, as part of the diagnostic workup of certain conditions. Another purported advantage involves minimizing changes in the subject's position between the PET and MRI test segments, which will potentially improve accuracy in the comparative interpretation of scanned images.

Definitions

Attenuation: Refers to the decrease or loss in energy of radiation strength that occurs as the distance from the source increases and the radiation passes through matter. This is due to absorption or scattering in three dimensions.

Magnetic resonance imaging (MRI): A diagnostic imaging modality that uses magnetic and radiofrequency fields to image the anatomy of body tissue non-invasively.

Positron emission tomography (PET): An imaging technique that measures the concentration of chemicals injected into the body and provides images of the chemical function of body parts of interest.

Coding

The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

When services are Investigational and Not Medically Necessary:
When the code(s) describes a procedure indicated in the Position Statement section as investigational and not medically necessary.

CPT

78999	Unlisted miscellaneous procedure, diagnostic nuclear medicine [when specified as mMR combination PET/MRI imaging]

ICD-10 Diagnosis

All diagnoses

References

Peer Reviewed Publications:

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primary tumors: comparison of three-dimensional THRIVE MRI, two-dimensional spin-echo MRI, and contrast-enhanced CT. Clin Radiol. 2018; 73(4):410.e9-410.e15.

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    - Anal Carcinoma V2.2023). Revised April, 28, 2023.
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    - Hodgkin Lymphoma (V2.2023). Revised November 8, 2022.
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    - Occult Primary (V3.2023). Revised December 21, 2022.
    - Ovarian Cancer Including Fallopian Tube Cancer and Primary Peritoneal Cancer. (V2.2023). Revised June 2, 2023.
    - Pediatric Hodgkin Lymphoma (V2.2023). Revised March 9, 2023.
    - Pediatric Aggressive Mature B-Cell Lymphomas (V1.2023). Revised April 4, 2023.
    - Prostate Cancer (V1.2023). Revised September 16, 2022.

Index

mpMRI, Multiparametric Magnetic Resonance Imaging
3D-THRIVE, Three-dimensional T1-weighted High-resolution Isotropic Volume Examination
PET/MRI, Positron Emission Tomography/Magnetic Resonance Imaging
Siemens Biograph mMR

The use of specific product names is illustrative only. It is not intended to be a recommendation of one product over another, and is not intended to represent a complete listing of all products available.

Document History

Status	Date	Action
Reviewed	08/10/2023	Medical Policy & Technology Assessment Committee (MPTAC) review. Revised Rationale and References sections.
Reviewed	08/11/2022	MPTAC review. References were updated
Reviewed	08/12/2021	MPTAC review. References were updated.
Reviewed	08/13/2020	MPTAC review. References were updated.
Reviewed	08/22/2019	MPTAC review. The Rationale, Index and References sections were updated.
Reviewed	11/08/2018	MPTAC review.
Reviewed	10/31/2018	Hematology/Oncology Subcommittee review. The Description/Scope, Rationale and References sections were updated.
Reviewed	11/02/2017	MPTAC review.
Reviewed	11/01/2017	Hematology/Oncology Subcommittee review. The document header wording was updated from “Current Effective Date” to “Publish Date.” The Rationale and References sections were updated.
Reviewed	11/03/2016	MPTAC review.
Reviewed	11/02/2016	Hematology/Oncology Subcommittee review. References were updated.
Reviewed	11/05/2015	MPTAC review.
Reviewed	11/04/2015	Hematology/Oncology Subcommittee review. References were updated. Removed ICD-9 codes from Coding section.
Reviewed	11/13/2014	MPTAC review.
Reviewed	11/12/2014	Hematology/Oncology Subcommittee review. References were updated.
Reviewed	11/14/2013	MPTAC review.
Reviewed	11/13/2013	Hematology/Oncology Subcommittee review. References were updated.
Reviewed	11/08/2012	MPTAC review.
Reviewed	11/07/2012	Hematology/Oncology Subcommittee review. References were updated.
New	11/17/2011	MPTAC review. MPTAC approved new policy.
New	11/16/2011	Hematology/Oncology Subcommittee review. Initial document development.

Applicable to Commercial HMO members in California: When a medical policy states a procedure or treatment is investigational, PMGs should not approve or deny the request. Instead, please fax the request to Anthem Blue Cross Grievance and Appeals at fax # 818-234-2767 or 818-234-3824. For questions, call G&A at 1-800-365-0609 and ask to speak with the Investigational Review Nurse.

Federal and State law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over Medical Policy and must be considered first in determining eligibility for coverage. The member’s contract benefits in effect on the date that services are rendered must be used. Medical Policy, which addresses medical efficacy, should be considered before utilizing medical opinion in adjudication. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.