

04-78000-21

Original Effective Date: 10/15/16

Reviewed: 03/28/24

Revised: 04/15/24

Subject: Multiple-Gated Acquisition (MUGA) Scan

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Position Statement	Billing/Coding	Reimbursement	Program Exceptions	Definitions	Related Guidelines
Other	References	Updates			

DESCRIPTION:

Multiple-gated acquisition (MUGA) scanning is a radionuclide ventriculography technique used to evaluate the pumping function of the ventricles of the heart. During this noninvasive nuclear imaging test, a radioactive tracer is injected into a vein and a gamma camera detects the radiation released by the tracer, providing moving images of the heart. From these images, the health of the heart's pumping chamber (left ventricle) can be assessed. MUGA scanning is used to evaluate the left ventricular ejection fraction (LVEF), a measure of overall cardiac function. It may also detect areas of poor contractility following an ischemic episode and it is used to evaluate left ventricular hypertrophy. This guideline addresses the use of multiple-gated acquisition (MUGA) scan in the outpatient setting.

Summary and Analysis of Evidence: Multigated acquisition (MUGA) scanning is a nuclear medicine imaging modality that aids providers evaluate the heart's structural and dynamic properties. They are imaging modalities with many names, including radionuclide ventriculography (RVG) and gated equilibrium radionuclide angiography (ERNA). However, all of these have the same goal of imaging the heart non-invasively. The idea behind MUGA scans is to take multiple pictures of the heart at various time points to create a composite film of multiple cardiac cycles and present it in two dimensions on the computer. This aids the in evaluating certain heart parameters at rest and/or while under stress. An awareness of these parameters is extremely beneficial, especially in cancer and cardiac patient populations, as cardiotoxic chemotherapy and heart disease carry a high mortality. With an enhanced view of cardiac structure and dynamics, the MUGA scan allows for a better understanding of patients' cardiac function, increased diagnostic and prognostic accuracy, and cardiac function tracking before, during, and after chemotherapy. Several techniques are employed in MUGA imaging. These include first pass, equilibrium radionuclide angiography (ERNA), and single-photon emission computed tomography (SPECT). The first pass technique involves delivering a radioactive isotope bolus and imaging the tagged blood path as it completes initial transit through the heart. This technique is ideal for determining right ventricular ejection fraction (RVEF) and examining intracardiac shunts. In ERNA, the

isotope is tagged to red blood cells (RBCs) and is given approximately 30 minutes to reach equilibrium in the patient, after which the patient is imaged with a camera. SPECT is a technology that builds upon ERNA as it eliminates the need for manual background signal noise reduction. ERNA and SPECT are preferred modalities when evaluating left ventricular ejection fraction (LVEF), size, and wall motion. As with many nuclear medicine tests, MUGA scans rely on radioactive isotopes administered and tagged to RBCs. The goal behind tagging RBCs with radioisotopes or tracers is to capture photons emitted by these isotopes using a gamma camera. These cameras are equipped with a sodium iodide crystal coupled to photomultipliers, which help convert the captured photon's energy into an image. Technetium-99m (Tc-99m) is the preferred radioisotope used in MUGA scans because it has a half-life of six hours, and the heart receives adequate radiation to be picked up by the gamma camera. The radioisotope is also cleared by the kidneys and excreted in the urine. The camera illuminates the tagged blood, and in the process, the provider can evaluate the filling and pumping properties of the heart and can evaluate physical structures by comparing the illuminated blood pool to the darkened walls on the image (Odak, Kayani, 2023).

POSITION STATEMENT:

Multiple-gated acquisition (MUGA) scan **meets the definition of medical necessity** for the following indications:

Evaluation of left ventricular function in a member with coronary artery disease, valvular heart disease, myocardial disease or congenital heart disease in any of the following:

- When ventricular function is required for management, and transthoracic echocardiography (TTE) or other imaging has proven inadequate
- When there are conflicting results between other testing in the measurement of ejection fraction (EF), and the results of the MUGA will help in the management of the member
- Prior TTE has demonstrated systolic dysfunction (EF < 50%) and management will change based on the results of the MUGA scan.

In the course of cardiotoxic chemotherapy when TTE images are inadequate to evaluate left ventricular systolic function:

- Previous low LV ejection fraction was < 50% and receiving potentially cardiotoxic chemotherapy.
- Prior to cardiotoxic chemotherapy, and subsequently for monitoring and follow-up.

BILLING/CODING INFORMATION:

CPT Coding:

78472	Cardiac blood pool imaging, gated equilibrium; planar, single study at rest or stress (exercise and/or pharmacologic), wall motion study plus ejection fraction, with or without additional quantitative processing
78473	Cardiac blood pool imaging, gated equilibrium; multiple studies, wall motion study plus ejection fraction, at rest and stress (exercise and/or pharmacologic), with or without additional quantification

78494	Cardiac blood pool imaging, gated equilibrium, SPECT, at rest, wall motion study plus ejection fraction, with or without quantitative processing
78496	Cardiac blood pool imaging, gated equilibrium, single study, at rest, with right ventricular ejection fraction by first pass technique (List separately in addition to code for primary procedure)

REIMBURSEMENT INFORMATION:

Refer to section entitled [POSITION STATEMENT](#).

Re-imaging due to technically limited exam is the responsibility of the imaging provider.

LOINC Codes:

The following information may be required documentation to support medical necessity: physician history and physical, physician progress notes, plan of treatment and reason for multiple-gated acquisition (MUGA) scan.

Documentation Table	LOINC Codes	LOINC Time Frame Modifier Code	LOINC Time Frame Modifier Codes Narrative
Physician history and physical	28626-0	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Attending physician progress note	18741-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Plan of treatment	18776-5	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology reason for study	18785-6	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study-date and time	18779-9	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology comparison study observation	18834-2	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim

Radiology-study observation	18782-3	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology-impression	19005-8	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim
Radiology study-recommendation (narrative)	18783-1	18805-2	Include all data of the selected type that represents observations made six months or fewer before starting date of service for the claim

PROGRAM EXCEPTIONS:

Federal Employee Plan (FEP): FEP is excluded from the National Imaging Associates (NIA) review; follow FEP guidelines.

Medicare Advantage products: No National Coverage Determination (NCD) and/or Local Coverage Determination (LCD) was found at the time of the last guideline reviewed date.

DEFINITIONS:

No guideline specific definitions apply.

RELATED GUIDELINES:

[Cardiac Nuclear Imaging \(Myocardial Perfusion Imaging\), 04-78000-19](#)

OTHER:

Other names used to report multiple-gated acquisition (MUGA) scan:

Blood pool scan

Equilibrium radionuclide angiogram

First pass

Multi-gated acquisition (MUGA) scan

REFERENCES:

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COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy and Coverage Committee on 03/28/24.

GUIDELINE UPDATE INFORMATION:

10/15/16	New Medical Coverage Guideline.
05/15/18	Revision; revised position statement. Updated references.

08/15/20	Review/revision. Revise and expand indication and criteria for MUGA scan. Delete combination studies. Updated references.
05/15/22	Review/revision. Revised and expanded criteria. Updated references.
07/01/22	Revision to Program Exceptions section.
07/08/23	Review: position statements and references updated.
04/15/24	Review; no change in position statement. Updated program references.