MASSACHUSETTS

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Medical Policy

Myocardial Sympathetic Innervation Imaging in Patients with Heart Failure

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Policy Number: 576

BCBSA Reference Number: 6.01.56 (For Plan internal use only)
NCD/LCD: NA

Related Policies

- Homocysteine Testing in the Screening, Diagnosis, and Management of Cardiovascular Disease and Venous Thromboembolic Disease, #016
- Measurement of Lipoprotein-Associated Phospholipase A2 - Lp-PLA2 - in the Assessment of Cardiovascular Risk, #558

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity Medicare HMO Blue℠ and Medicare PPO Blue℠ Members

Myocardial sympathetic innervation imaging with ^{123}Iodine meta-iodobenzylguanidine (MIBG) is **INVESTIGATIONAL** for use in individuals with heart failure.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	This is **not** a covered service.
Commercial PPO and Indemnity	This is **not** a covered service.
Medicare HMO Blue℠	This is **not** a covered service.
Medicare PPO Blue℠	This is **not** a covered service.

CPT Codes / HCPCS Codes / ICD-10 Codes

The following codes are included below for informational purposes. Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

CPT Codes

CPT codes:	Code Description
0331T	Myocardial sympathetic innervations imaging, planar qualitative and quantitative assessment;
0332T	Myocardial sympathetic innervations imaging, planar qualitative and quantitative assessment; with tomographic SPECT

HCPCS Codes

HCPCS codes:	Code Description
A9582	Iodine I-123 iobenguane, diagnostic, per study dose, up to 15 millicuries

Diagnosis Codes

Investigational for all diagnoses.

DESCRIPTION

Heart Failure

An estimated 6.7 million adults in the U.S. have heart failure. In 2022, heart failure was mentioned on 457,212 death certificates in the U.S.[1] According to data in the 2022 Heart and Stroke Statistics Update, 1 in 6 patients with heart failure and reduced ejection fraction developed worsening disease within 18 months of diagnosis and these individuals were more likely to be Black, >80 years of age, and have increased comorbidity burden.[2] Black individuals also have the highest risk of developing heart failure in the future, followed by Hispanic, White, and Chinese American individuals, reflecting disparities in the incidence of hypertension, diabetes, and socioeconomic status among these populations. Black individuals also have the highest proportion of incident heart failure not preceded by myocardial infarction (75%). Underlying causes of heart failure include coronary artery disease, hypertension, valvular disorders, and primary cardiomyopathies. These conditions reduce myocardial pump function and decrease left ventricular ejection fraction (LVEF). An early mechanism to compensate for this decreased myocardial function is activation of the sympathetic nervous system. The increased sympathetic activity initially helps compensate for heart failure by increasing heart rate and myocardial contractility to maintain blood pressure and organ perfusion. However, over time, this places additional strain on the myocardium, increasing coronary perfusion requirements, which can lead to worsening of ischemic heart disease and/or myocardial damage. As the ability of the heart to compensate for reduced myocardial function diminishes, clinical symptoms of heart failure develop. Another detrimental effect of heightened sympathetic activity is an increased susceptibility to potentially fatal ventricular arrhythmias.

Overactive sympathetic innervation associated with heart failure involves increased neuronal release of norepinephrine (NE), the main neurotransmitter of the cardiac sympathetic nervous system. In response to sympathetic stimulation, vesicles containing NE are released into the neuronal synaptic cleft. The released NE binds to postsynaptic β_1, β_2, and α receptors, enhances adenyl cyclase activity, and brings about the desired cardiac stimulatory effects. Norepinephrine is then taken back into the presynaptic space for storage or catabolic disposal, terminating the synaptic response by the uptake-1 pathway. The increased release of NE is usually accompanied by decreased NE reuptake, thereby further increasing circulating NE levels.

Diagnostic Imaging
Guanethidine is a false neurotransmitter that is an analogue of NE; it is also taken up by the uptake-1 pathway. Iodine 123 meta-iodobenzylguanidine (^{123}I-MIBG or MIBG) is chemically-modified guanethidine labeled with radioactive iodine. Iodine 123 meta-iodobenzylguanidine moves into the synaptic cleft and then is taken up and stored in the presynaptic nerve space in a manner similar to NE. However, unlike NE, MIBG is not catabolized and thus concentrates in myocardial sympathetic nerve endings. This concentrated MIBG can be imaged with a conventional gamma camera.[3] The concentration of MIBG over several hours after injection is thus a reflection of sympathetic neuronal activity, which in turn may correlate with the severity of heart failure.

Iodine 123 meta-iodobenzylguanidine myocardial imaging has been in use in Europe and Japan, and standardized procedures for imaging have been proposed by European organizations.[4] Administration of MIBG is recommended by slow (1 to 2 minute) injection. Planar images of the thorax are acquired 15 minutes (early image) and 4 hours (late image) after injection. In addition, optional single photon emission computed tomography (SPECT) can be performed following the early and late planar images. Iodine 123 meta-iodobenzylguanidine uptake is semi-quantified by determining the average count per pixel in regions of interest drawn over the heart and the upper mediastinum in the planar anterior view. There is no single universally used myocardial MIBG index. The most commonly used myocardial MIBG indices are the early heart to mediastinum (H/M) ratio, late H/M ratio, and the myocardial MIBG washout rate. The H/M ratio is calculated by taking the average count per pixel in the myocardium divided by the average count per pixel in the mediastinum. The myocardial washout rate is expressed as the rate of decrease in myocardial counts over time between early and late imaging (normalized to mediastinal activity).

Iodine 123 meta-iodobenzylguanidine activity is proposed as a prognostic marker in patients with heart failure, to be used in conjunction with established markers or prognostic models to identify heart failure patients at increased risk of short-term mortality. Iodine 123 meta-iodobenzylguanidine activity could also be used to guide treatment decisions or to monitor the effectiveness of heart failure treatments.

Summary

Description
In individuals with heart failure, activation of the sympathetic nervous system is an early response to compensate for decreased myocardial function. The concentration of iodine 123 meta-iodobenzylguanidine (MIBG) over several hours after the injection of the agent is a potential marker of sympathetic neuronal activity. Iodine 123 meta-iodobenzylguanidine activity is proposed as a prognostic marker in individuals with heart failure to aid in the identification of individuals at risk of 1- and 2-year mortality. The marker could also be used to guide treatment decisions or to monitor the effectiveness of heart failure treatments.

Summary of Evidence
For individuals with heart failure who receive imaging with iodine 123 meta-iodobenzylguanidine (MIBG) for prognosis, the evidence includes numerous studies that MIBG cardiac imaging findings predict outcomes in individuals with heart failure. Relevant outcomes are overall survival, disease-specific survival, functional outcomes, health status measures, quality of life, hospitalizations, and medication use. While the available studies vary in their patient inclusion criteria and methods for analyzing MIBG parameters, the highest quality studies have demonstrated a significant association between MIBG imaging results and adverse cardiac events, including cardiac death. Moreover, MIBG findings have been shown to improve the ability of the Seattle Heart Failure Model (SHFM) and other risk models to predict mortality. However, there is no direct published evidence on the clinical utility of MIBG (ie, whether findings of the test would lead to patient management changes that improve health outcomes) and no chain of evidence can be constructed to support clinical utility. Management changes made as a result of MIBG imaging are uncertain, and it is not possible to determine whether management changes based on MIBG results lead to improved health outcomes compared with management without MIBG imaging. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Policy History

Date	Action
11/2024	Annual policy review. Policy updated with literature review through August 5, 2024; no references added. Minor editorial refinement to policy statement; intent unchanged.
11/2023	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
11/2022	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2021	Annual policy review. Policy statements unchanged.
10/2019	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2018	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2017	Annual policy review. New references added.
10/2016	Annual policy review. New references added.
8/2015	Annual policy review. New references added.
9/2014	Annual policy review. New references added.
12/2013	New medical policy describing investigational indications. Effective 12/1/2013.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:
Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

References

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