ASNC/SNMMI Model Coverage Policy: Myocardial sympathetic innervation imaging: Iodine-123 *meta*-iodobenzylguanidine (^{123}I-mIBG)

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INTRODUCTION

This document is intended as a model coverage policy for ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies addressing those clinical presentations for which such study can provide additional prognostic information to aid in patient clinical management. This model coverage policy examines specific clinical presentations which support the use of ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies by cross-referencing each presentation with current peer-reviewed literature.

The Centers for Medicare and Medicaid Services (CMS) and medical societies promote the use of high level evidence-based indications. However, new technologies and novel isotope applications often lack the highest level of evidence and randomized prospective clinical trials, thus requiring the use of expert consensus in giving patients access to promising new technologies.

This document outlines the clinical applications of ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies on the basis of current evidence or supported by expert consensus opinion. The authors highlighted specific clinical scenarios and indications in which ^{123}I-*m*IBG imaging could provide incremental risk stratification and could guide patient management. We anticipate that future additions and revisions to the current indications will occur as higher levels of evidence become available.

PURPOSE OF THE POLICY

The intent and purpose of this policy are:

- To provide up to date information on the use of ^{123}I-*m*IBG myocardial sympathetic innervation imaging, with the ultimate goal of streamlining the process by which payers provide coverage for such studies.
- To serve as an educational resource for cardiologists, nuclear medicine specialists, primary care physicians, technologists, and patients regarding the clinical use of ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies.
- To provide the appropriate ICD-9 CM and ICD-10 CM, which reflect the diagnoses of the patient and all the clinical indications.

POLICY DISCLAIMERS

The Model Coverage Policy for ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies will serve as a general guide for clinicians and payers. However, clinical decision making regarding the application of ^{123}I-*m*IBG myocardial sympathetic innervation imaging for an individual patient with a given clinical condition should remain a shared process between the physician and the patient.

The authors' position is that when the patient presents with those indications noted in this policy, ^{123}I-*m*IBG myocardial sympathetic innervation studies should be covered by Medicare Administrative Contractor (MAC), Medicaid programs and private payers. In those patients who present with indications not captured within the scope of this model coverage policy, the physician may discuss with MAC or third party medical director.

American Medical Association Current Procedural Terminology (CPT)

CPT codes, descriptions, and other data only are copyright 2013 American Medical Association (or such other date of publication of CPT)/All Rights Reserved. Applicable FARS/DFARS Clauses Apply.

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Centers for Medicare and Medicaid Services

Title XVIII of the Social Security Act, Section 1862(a)[1] (A). This section allows coverage and payment for only those services that are considered to be medically reasonable and necessary. Title XVIII of the Social Security Act, Section 1833 (e). This section prohibits Medicare payment for any claim which lacks the necessary information to process the claim.

§4317(b), of the Balanced Budget Act (BBA), specifies that referring physicians are required to provide diagnostic information to the testing entity at the time the test is ordered.

42 Code of Federal Regulations (CFR) §410.32 and §410.33 indicates that diagnostic tests are payable only when ordered by the physician who is treating the beneficiary for a specific medical problem and who uses the results in such treatment.

Centers for Medicare and Medicaid Services (CMS) Publication 100-04, Medicare Claims Processing Manual Chapter 4

- 200.8—Billing for Nuclear Medicine Procedures
  CMS Publication 100-04, Medicare Claims Processing Manual Chapter12
- 20.4.4—Supplies
  CMS Publication 100-04, Medicare Claims Processing Manual Chapter 13
- 20—Payment Conditions for Radiology Services
- 50—Nuclear Medicine
  CMS Publication 100-02, Medicare Benefit Policy Manual Chapter 15
- 60—Services and Supplies
- 60.1—Incident to Physician's Professional Services
- 80—Requirements for Diagnostic x-ray, Diagnostic Laboratory, and Other Diagnostic Tests
- 80.6—Requirements for Ordering and Following Orders for Diagnostic Tests

INDICATIONS-LIMITATIONS AND MEDICAL NECESSITY

Heart failure (HF) represents one of the most important challenges in clinical cardiology.[1] Based on the American Heart Association-Heart Disease and Stroke Statistics-2014 Update,[1] an estimated 5.1 million Americans ≥20 years of age have HF and projections show that the prevalence of HF will increase 46% from 2012 to 2030, resulting in >8 million people ≥18 years of age. HF incidence approaches 10 per 1000 population ≥65 years of age. In 2012, total cost for HF was estimated to be $30.7 billion. Of this total, 68% was attributable to direct medical costs. Projections show that by 2030, the total cost of HF will increase almost 127% to $69.7 billion from 2012. This equals approximately $244 for every U.S. adult.

The American College of Cardiology Foundation/American Heart Association (ACCF/AHA) 2013 Guideline for the Management of Heart Failure[2] has made recommendations for implantable cardioverter-defibrillator (ICD) therapy for primary prevention of sudden cardiac death (SCD). These include:

- Class I indication, ICD therapy for primary prevention of SCD to reduce total mortality in selected patients with non-ischemic dilated cardiomyopathy or ischemic heart disease at least 40 days post-MI with left ventricular ejection fraction (LVEF) of 35% or less and NYHA class II or III symptoms on chronic guideline-directed medical therapy (GDMT), who have reasonable expectation of meaningful survival for more than 1 year.
- Class I indication, ICD therapy for primary prevention of SCD to reduce total mortality in selected patients at least 40 days post-MI with LVEF of 30% or less, and NYHA class I symptoms while receiving GDMT, who have reasonable expectation of meaningful survival for more than 1 year.

Currently, risk stratification for primary prevention ICD placement, is LVEF.[3-10] One of the challenges of more refined risk stratification is the fact that different pathophysiological processes contribute to ventricular tachyarrhythmias and subsequently SCD and risk cannot be entirely defined by a single variable such as LVEF. Despite proven survival benefits, ICD treatment has drawbacks, one of the most important being inappropriate shocks delivered for causes other than potentially life-threatening arrhythmias.[11,12] Of importance, the number of ICD implantations/year is significant, as demonstrated by the National ICD Registry Report: Version 2.1 (collected from 2010 to 2011): a total of 194,263 were implanted for primary prevention which corresponds to 73.8% of total ICD implantations and, 104,801 (39.8%) generator replacement procedures were performed.[13] Furthermore, data analysis showed that only 25.2% of patients of those who received a generator replacement had ever received either anti-tachycardia pacing or shock therapy during the life of the device that was being replaced.[13] However, in one study which examined patients who had a cardiac arrest, approximately 65% of the study subjects would not have qualified for a primary prevention ICD prior to the event.[14] Therefore, there is a substantial need for improved risk stratification tools beyond LVEF to identify patients most and least likely to benefit from ICD for primary prevention of SCD.

In addition, ICD infection is another important reason why better risk stratification for ICD therapy is needed. ICD infection is a serious complication associated with substantial morbidity, mortality and costs.[15-17] For many years, infection rates were presumed to be similar for different types of cardiovascular implantable electronic devices (CIEDs). However, results from some studies suggest that ICDs are associated with a greater risk of infection than are permanent pacemakers.[15-17] Recent published data from the National ICD Registry Report showed that relative to all procedure types, infection leading to reoperation occurred in 1.47%.[13]

In 2010, the AHA published a scientific statement,[18] that addressed the diagnosis, treatment, and has made the following recommendations for removal of infected CIED and for new CIED implantation. These include:

- Class I: For complete device and lead removal for all patients with definite CIED infection, as evidenced by valvular/or lead endocarditis or sepsis, for all patients with device pocket infection as evidenced by abscess formation, device erosion, skin adherence, or chronic draining sinus without clinically evident involvement of the transvenous portion of the lead system, for all patients with valvular endocarditis without definite involvement of the lead(s) and/or device and for patients with occult staphylococcal bacteremia.
- Class I: After Removal of an infected CIED, each patient should be evaluated carefully to determine whether there is a continued need for a new device.

Currently, there are no precise data regarding the actual healthcare burden of ICD infections. However, it is not surprising that the economic consequences, including healthcare resource utilization of ICD infections are substantial. The financial impact is due to multiple factors, including but not limited to medical evaluations, medical therapy of infection, diagnostic procedures, costs of device removal, cost of a new device implantation, surgical interventions for infected device removal and new device placement and critical care stays that are often prolonged. Some of these health cost burdens could be substantially reduced if the treating physician could apply additional markers of individual patients' risk for cardiac arrest and sudden death, such as ^{123}I-mIBG myocardial sympathetic innervation imaging results, as an aid to determine the risk/benefit ratio of ICD replacement.

Sustained activation of the sympathetic nervous system is thought to be a major contributor for the progression of heart failure and adverse outcomes including sudden cardiac death. Myocardial ^{123}I-*m*IBG imaging provides a noninvasive method to assess cardiac sympathetic function and risk stratify patients with heart failure. ^{123}I-*m*IBG is a norepinephrine analogue and ^{123}I-*m*IBG uptake reflects preservation of cardiac innervation and function of the norepinephrine uptake-1 transporter. Reduced ^{123}I-*m*IBG uptake or accelerated ^{123}I-*m*IBG washout rate from the heart predicts heart failure progression and death[19,20] as well as an indicator of risk of sudden cardiac death and appropriate ICD discharge.[20,21] After ^{123}I-*m*IBG injection, planar and SPECT images are acquired at 15 to 20 minutes (early image) to assess initial ^{123}I-*m*IBG - mIBG cardiac uptake, and at approximately 3 to 4 hours (late image) to assess ^{123}I-*m*IBG retention in the heart as well as ^{123}I-*m*IBG washout rate. Myocardial sympathetic neuronal integrity is quantified as the heart/mediastinum uptake ratio [H/M], which is measured on early and late planar anterior projection images.

In March 2013, the Food and Drug Administration approved ^{123}I-*m*IBG based on the results of the AdreView™ Myocardial Imaging for Risk Evaluation in Heart Failure (ADMIRE-HF) trial,[19] for use in patients with New York Heart Association (NYHA) class II or III HF and a LVEF $\leq$35%, to help identify patients with 1 to 2 year mortality risk as indicated by H/M ratio $\geq$1.6.

Several clinical studies[22,23] have demonstrated the use of ^{123}I-*m*IBG for stratifying risk in patients with heart failure (HF). In ADMIRE-HF, an international multicenter phase III clinical trial,[19] 961 subjects with NYHA functional class II/III HF and left ventricular ejection fraction (LVEF) $\leq$35% were imaged. Patients underwent ^{123}I-mIBG myocardial imaging and resting myocardial perfusion imaging with technetium-99 m Tetrofosmin and were then followed for up to 2 years. Time to first occurrence of NYHA functional class progression, potentially life-threatening arrhythmic event, or cardiac death was correlated with the late H/M ratio, either in relation to the prospectively determined estimated lower limit of normal [1.60] or as a continuous variable. Survival analysis revealed two-year cardiac event rates of 15% for patients with an H/M greater than or equal to 1.60, compared to 38% for patients whose H/M was below 1.60. Hazard ratios for individual events, based on an H/M threshold of 1.60, were as follows: heart failure progression, 0.49 (95% CI 0.32 to 0.77; $P = .002$); arrhythmic events, 0.37 (95% CI 0.16 to 0.85; $P = .02$); and cardiac death, 0.14 (95% CI 0.03 to 0.58; $P = .006$). Sub-analyses also demonstrated a modest but statistically significant positive correlation between LVEF and H/M. The two-year cardiac event rate for individuals with LVEF <30% and H/M greater than or equal to 1.60 was less than half that of all patients with LVEF <30% (17.6% vs 40.3%, respectively). There were two cardiac deaths among the

81 patients (2.5%) with LVEF <30% and H/M greater than or equal to 1.60, as compared with 39 cardiac deaths among the 409 (9.5%) patients with LVEF <30% and H/M <1.60. There were no cardiac deaths among the 120 patients with LVEF greater than or equal to 30% and H/M greater than or equal to 1.60.[19]

Improved prediction of cardiac risk in patients with HF and LVEF ≤35%, is needed in the following clinical situations:

1) HF patients with LVEF ≤35%, NYHA class II, III who meet established ACCF/AHA Class I indication for ICD placement and have not received ICD due to uncertainty on the part of the treating physician or the patient.
2) Patients who originally received an ICD for primary and or secondary prevention of SCD, who presented with any of the clinical scenarios described above as a infected CIED, which require complete device and lead extraction, and there is uncertainty on the part of the treating physician to proceed with device replacement.

The authors' recommendation for MIBG use is as follows[1]: a specific clinical indication and[2] as a potential or emerging indication.

SPECIFIC INDICATION

Clinical studies have demonstrated the prognostic value of ^{123}I-*m*IBG myocardial sympathetic innervation imaging *i*n assessing patients with HF and depressed left ventricular function.[5-8] ^{123}I-*m*IBG H/M ratio ≥1.6 has been shown to identify patients with low 1 to 2 year mortality risk.[19] Therefore, the following ^{123I}-*m*IBG clinical application is recommended:

(1) For patients with NYHA class II or III heart failure with LVEF ≤35% to help stratify risk and to promote more informed clinical decision-making when the result of ^{123}I-*m*IBG study is likely to influence the decision regarding ICD implant.

POTENTIAL/EMERGING INDICATION

Frequently, the practicing physicians have to care for individual patients who are not included or not well represented in major clinical trials. As a result, information from smaller studies, and/or expert statements could assist to weigh the potential clinical benefits of ICD implantation, against potential risks of the procedure. ^{123}I-*m*IBG myocardial sympathetic innervation imaging is an emerging technology and forthcoming data may well support its application for other specific indications in HF and in those patients with ICD complications such as device infection. Therefore, the following could be considered as a potential/emerging ^{123I}-*m*IBG clinical application:

(1) For patients who received an ICD for primary and or secondary prevention of SCD who subsequently underwent complete device and lead removal due to definite infection and there is uncertainty on the part of treating physician to proceed with ICD replacement, when the result of ^{123}I-*m*IBG study is likely to influence the decision regarding device replacement.

As mentioned above, it is the authors recommendation that for other potential indications payers consider detailed patient clinical information and the impact that ^{123}I-*m*IBG results could have in patient treatment, management and potential cost savings and, that payment decisions be made on a case by case basis.

RADIATION EXPOSURE FROM ^{123}I-*MIBG*

Iodine-123 physical half-life is 13.2 hours. The standard Iodine-123 radioactivity administered in adult patients with systolic heart failure for the assessment for H/M ratio is 10 mCi (370 MBq) ±10%.[19-24] The estimated effective radiation dose in adults is 0.507 mSv per mCi of radioactivity administered, or 5.07 mSv for a study with 10 mCi ^{123}I-*m*IBG dose.[24] As a benchmark comparison, the effective dose from a standard 1-day rest (10 mCi) stress (30 mCi) ^{99m} Tc Sestamibi SPECT study is approximately 12 mSv.[11]

The urinary bladder wall is the critical organ for ^{123}I-*m*IBG and the majority of the administered ^{123}I-*m*IBG dose is excreted unchanged by the kidneys via glomerular filtration and it is not dialyzable. For minimizing the radiation exposure to the bladder, ample hydration should be encouraged prior to and following the drug administration as well as frequent urinary voiding should be also encouraged in the first 48 hours following administration.[24]

Iodine-123 accumulates in the thyroid, causing an increased long-term risk for thyroid neoplasia. This risk can be minimized by administering a thyroid blocking agent, such as potassium iodide oral solution, Lugol's solution, or potassium perchlorate, at least 1 hour prior to ^{123}I-*m*IBG dose.[24]

ICD-9-CM Codes-ICD 10-CM codes

ICD-9-CM codes and ICD-10-CM codes must be coded to the highest level of specificity. For a complete list of ICD-9-CM, ICD-10-CM that supports medically necessity and clinical indications see Tables 1 and 2, respectively.

CPT/HCPCS Codes

Category III Codes
Drugs other than oral
Medical and surgical supplies
Medicine

Bill Type Codes for Hospital Use

Contractors may specify Bill Types to help providers identify those Bill Types typically used to report this service. The absence of a Bill Type does not guarantee that the policy does not apply to that Bill Type. Complete absence of all Bill Types indicates that coverage is not influenced by Bill Type and the policy should be assumed to apply equally to all claims.

Revenue Codes for Hospital Use

Contractors may specify Revenue Codes to help providers identify those Revenue Codes typically used to report this service. In most instances, Revenue Codes are purely advisory; unless specified in the policy, services reported under other Revenue Codes are equally subject to this coverage determination. The complete absence of all Revenue Codes indicates that coverage is not influenced by Revenue Code and the policy should be assumed to apply equally to all Revenue Codes. The below Revenue Codes are purely advisory and not an exhaustive listing.

0340 Nuclear medicine—general classification
0341 Nuclear medicine—diagnostic procedure
0343 Nuclear medicine—diagnostic radiopharmaceutical
0480 Cardiology-General Classification
0489 Other Cardiology
0636 Pharmacy-Drugs Requiring Detailed Coding
0960 Professional Fees—General Classification
0969 Professional Fees—Other Professional Fee
0974 Professional Fees—Radiology Nuclear
0982 Professional Fees—Outpatient Services

If Healthcare Common Procedure Coding System (HCPCS) Level II code is used to describe the drug, enter the HCPCS code in Form Locator 44 on the 1500 claim form. The specified units of service to be reported are to be in hundreds (100 s) rounded to the nearest hundred (no decimal).

0960 Professional Fees—General Classification
0969 Professional Fees—Other Professional Fee
0982 Professional fees—Outpatient Services

CPT/HCPCS Codes

0331T *Myocardial sympathetic innervation*, imaging, planar qualitative and quantitative assessment;
0332T *Myocardial sympathetic innervation*, imaging, planar qualitative and quantitative assessment; with tomographic SPECT
A9582 Iodine I-123 iobenguane, diagnostic, per study dose, up to 15 millicuries

GENERAL INFORMATION

- When performing both the early and delay planar ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies for any one of the covered indications, a 0331T should be billed.
- When performing both the early and delay planar plus SPECT ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies for any one of the covered indications, a 0332T should be billed.
- Injection procedures are considered inherent to ^{123}I-*m*IBG cardiac sympathetic innnervation PET imaging studies. The edits in CMS's current correct coding initiative list all the administration codes as component codes for CPT 0331T and 0332T, and therefore they are not additionally reportable. This is true for most nuclear medicine imaging procedures.
- HCPCS Level II codes describe the radiopharmaceuticals used for ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies. Please note that HCPCS does not describe the quantity of ^{123}I-*m*IBG myocardial sympathetic innervation imaging studies by mCi, but by ''per study dose'' regardless of the actual administered injected radioactive dose for each imaging study; the up to amount is a general guide, the billing unit of these HCPCS codes is the ''per study dose'' (PSD)
- If other non-radioactive drugs are utilized, refer to the current Level II series HCPCS manual (typically J codes) for codes

Disclosure

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APPENDIX

See Tables 1 and 2.

Table 1. ICD-9-CM/ICD-10-CM that support medical necessity

Clinical Application	ICD-9-CM	ICD-10-CM	
Cardiomyopathy	425.0	I42.3	Endomyocardial (eosinophilic) disease
	425.2	I42.8	Other cardiomyopathies
	425.3	I42.4	Endocardial fibroelastosis
	425.4	I42.5	Other restrictive cardiomyopathy
		I42.8	Other cardiomyopathies
	425.5	I42.6	Alcoholic cardiomyopathy
	425.7	I43	Cardiomyopathy in diseases classified elsewhere
	425.9	I42.7	Cardiomyopathy due to drug and external agent
Dilated cardiomyophthy	429.3	I51.7	Cardiomegaly
Ischemic cardiomyopathy	414.8	I25.5	Ischemic cardiomyopathy
		I25.89	Other forms of chronic ischemic heart disease
		I25.9	Chronic ischemic heart disease, unspecified
Non-ischemic cardiomopathy	425.4	I42.5	Other restrictive cardiomyopathy
		I42.8	Other cardiomyopathies
	425.5	I42.6	Alcoholic cardiomyopathy
	425.9	I42.7	Cardiomyopathy due to drug and external agent
	428.0	I50.9	Heart failure, unspecified
	428.20	I50.20	Unspecified systolic (congestive) heart failure
	428.1	I50.1	Left ventricular failure
	428.21	I50.21	Acute systolic (congestive) heart failure
	428.22	I50.22	Chronic systolic (congestive) heart failure
	428.23	I50.23	Acute on chronic systolic (congestive) heart failure
	428.40	I50.40	Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
	428.41	I50.41	Acute combined systolic (congestive) and diastolic (congestive) heart failure
	428.42	I50.42	Chronic combined systolic (congestive) and diastolic (congestive) heart failure
	428.43	I50.43	Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
Acute decompensated heart failure	428.9	I50.9	Heart failure, unspecified
	428.21	I50.21	Acute systolic (congestive) heart failure
	428.23	I50.23	Acute on chronic systolic (congestive) heart failure
Chronic heart failure	428.0	I50.9	Heart failure, unspecified
	428.22	I50.22	Chronic systolic (congestive) heart failure
Cardiac arrest	427.5	I46.9	Cardiac arrest, cause unspecified
		146.2	Cardiac arrest, due to underlying cardiac condition code first underlying cardiac condition
		146.8	Cardiac arrest, due to other underlying conditions code first underlying condition
Non-sustained ventricular tachycardia	427.1	I47.2	Ventricular tachycardia
Ventricular tachycardia	427.1	I47.2	Ventricular tachycardia
Abnormal cardiovascular study- Echo	793.2	R93.1	Abnormal findings on diagnostic imaging of heart and coronary circulation
Implantable cardioverter defibrillator (ICD)	V45.02	Z95.810	Presence of automatic (implantable) cardiac defibrillator
ICD Infection	996.61	T82.7XXA	Infection and inflammatory reaction due to other cardiac and vascular devices, implants and grafts, initial encounter
Chronic ischemic heart disease	414.8	I25.5	Ischemic cardiomyopathy
		I25.89	Other forms of chronic ischemic heart disease
	414.9	I25.9	Chronic ischemic heart disease, unspecified
Left ventricular aneurysm	414.10	I25.3	Aneurysm of heart

Table 2. Indications for 123I-mIBG for diagnostic/risk stratification purposes

Clinical Indications for performing a ^{123}I-*m*IBG study	Diagnostic literature supporting ^{123}I-*m*IBG study	ICD-9-CM code
For patients with NYHA class II or III HF with LVEF $\leq$ 35% to help stratify risk and to promote more informed clinical decision-making, when the result of 123I-mIBG study is likely to influence the decision regarding ICD implan	19. Jacobson AF et al Myocardial Iodine-123 Meta-Iodobenzylguanidine imaging and Cardiac Events in Heart Failure. Results of the Prospective ADMIRE-HF (AdreView Myocardial Imaging for Risk Evaluation in Heart Failure) Study. J Am Coll Cardiol. 2010; 55(20): 2212–2221 20. Tamaki S, Yamada T, Okuyama Y, Morita T, Sanada S, Tsukamoto Y, Masuda M, Okuda K, Iwasaki Y, Yasui T, Hori M, Fukunami M. Cardiac iodine-123 metaiodobenzylguanidine imaging predicts sudden cardiac death independently of left ventricular ejection fraction in patients with chronic heart failure and left ventricular systolic dysfunction: results from a comparative study with signal-averaged electrocardiogram, heart rate variability, and QT dispersion. J Am Coll Cardiol 2009;53:426–35 21. Nagarahara D, Nakata T, Hashimoto A; Predicting the need for an implantable cardioverter defibrillator using cardiac metaiodobenzylguanidine activity together with plasma natriuretic peptide concentration or left ventricular function. *J Nucl Med*. 2008 49 2008:225–233. 22. Agostini D, Verberne HJ, Burchert W, Knuuti J, Povinec P, Sambuceti G, Unlu M, Estorch M, Banerjee G, Jacobson AF. I-123-mIBG myocardial imaging for assessment of risk for a major cardiac event in heart failure patients: insights from a retrospective European multicenter study. Eur J Nucl Med Mol Imaging. 2008 Mar; 35 (3): 535–46 23. Nakata T, Nakajima K, Yamashina S, Yamada T, Momose M, Kasama S, Matsui T, Matsuo S, Travin MI, Jacobson AF. A pooled analysis of multicenter cohort studies of (123) I-mIBG imaging of sympathetic innervation for assessment of long-term prognosis in heart failure. JACC Cardiovasc Imaging. 2013 Jul; 6 (7): 772–84.	425, 425.4, 425.5, 425.7, 425.9, 429.3, 418.8, 428.0, 428.20, 428.22, 428.9, 428.1, 428.41, 428.43, 428.42, V45.02
For patients who received an ICD for primary and/ or secondary prevention of SCD who underwent complete device and lead removal due to definite device infection and, there is uncertainty on the part of treating physician to proceed with ICD replacement, when the result of 123I-mIBG study is likely to influence the decision regarding device replacement	18. Baddour L et al Update on Cardiovascular Implantable Electronic Device Infections and Their Management. A Scientific Statement From the American Heart Association *Endorsed by the Heart Rhythm Society. Circulation*. 2010; 121: 458–477.	V45.02, 999.61

For conversion of ICD-9-CM code to ICD-10-CM code see Table 1

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