Please note: The new Category III Current Procedural Terminology (CPT) codes for cardiac computed tomography went into effect on Jan. 1. The seven codes plus one add-on (codes 0144T-1051T) are designed to facilitate data collection and assessment in order to help validate the widespread usage of new technologies, services, and procedures. For more on the codes, including when to use them, click here. *Questions on coverage should be directed to the Carrier Medical Director's office at http://www.cms.hhs.gov/mcd/index_contractorsites.asp.*

Model Local Coverage Determination*

Contractor Name

Contractor Number

Contractor Type

LCD Database ID Number

LCD Title
Cardiac Computed Tomography and Computed Tomography Coronary Angiography

AMA CPT / ADA CDT Copyright Statement

CMS National Coverage Policy

- Title XVIII of the Social Security Act, Section 1862 (a)(7)
  This section excludes routine physical examinations.
- Title XVIII of the Social Security Act, Section 1862 (a)(1)(A)
  This section allows coverage and payment for only those services considered 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.
- CMS Manual System, Pub 100-3, National Coverage Determination Manual, #9; Section 220.1. This section deals with diagnostic examination by CT scan.
- CMS Manual System, Pub 100-4, Medicare Claims Processing Manual, Chapter 13, Section 20. This section addresses payment conditions for radiology services.
- CMS Manual System, Pub 100-9, Contractor Beneficiary and Provider #9; Communication Manual, Chapter 5, Section 20). This section addresses standards of medical/surgical practice and the correct coding initiative (CCI).

Primary Geographic Jurisdiction

***Sources of Information and Basis of Decision**

Oversight Region
CMS Consortium
Original Determination Effective Date
Original Determination Ending Date
Revision Effective Date

Revision Ending Date

Indications of Coverage and/or Medical Necessity

Multislice or Multidetector Computed Tomography (MDCT) with its advanced spatial and temporal resolution has opened up new possibilities in the imaging of the heart and major vessels of the chest, including the coronary arteries.

The MDCT technology requires thin (up to 1mm) slices, 0.5 to 0.75 mm reconstructions, multiple simultaneous images (e.g. 16, 32, 64 or more slices) and cardiac gating (often requiring beta blockers for ideal heart rate). There is significant post processing, depending on the number of slices per second for image generation. For coronary artery imaging, the resulting images show a high correlation with stenotic lesions noted on diagnostic cardiac catheterization, but more importantly, with atheromas on intracoronary ultrasound.

CMS encourages the use of high level evidence-based indications. New technology, however, often lacks the highest level of supporting evidence, requiring the use of expert consensus in affording patient access to promising new technologies. As such, a chain of indirect evidence, using diagnostic performance data, decision models and a consensus base approach have been used to validate the current indications. It is anticipated that future additions and revisions to these indications will occur as higher level evidence-based studies become available.

Current available body of evidence demonstrate that coronary CTA (CCTA) can reliably rule out the presence of significant coronary artery disease (CAD) in patient with a low to intermediate probability of having CAD and can reliably achieve a high degree of diagnostic accuracy and technical performance necessary to replace conventional angiography.

In other circumstances, CCTA may be proposed instead of or in addition to other noninvasive cardiac tests. This is particularly useful in the commonly encountered clinical scenario of patients having an equivocal stress myocardial perfusion test. The information from CCTA may be used to guide further diagnostic evaluation and/or appropriate therapy (e.g., revascularization versus medical management) and this may over the long term influence morbidity of CAD (e.g., angina or subsequent MI rate), functional status, or mortality. The use of contrast-enhanced coronary CTA might have both short- and long-term effects on health outcomes depending on the clinical context. In the short term, CCTA may avoid the morbidity of invasive coronary angiography when CCTA provides reliable information that obviates the need for invasive coronary angiography. However, CCTA may be proposed in circumstances where invasive coronary angiography may not be clinically indicated. When CCTA is used instead of an alternative noninvasive test then the effect on health outcomes would be influenced by the relative morbidity of the tests, the relative diagnostic performance characteristics, and the ability of the test to guide subsequent diagnostic and therapeutic decisions.

Indications

1. Coronary CTA used as a first test to assess the cause of chest pain.

The rationale for using this test as a first test to assess chest pain is to see if a coronary artery blockage might be the source of chest pain. The added potential benefit of this approach is that information would be present about the coronary soft and hard plaque that may not currently obstruct blood flow. Even if no significant obstruction is found, recommendations about future prevention strategies could follow.

2. Coronary CTA used as a triage tool to invasive coronary angiography following a stress test that is equivocal or suspected to be inaccurate.

Coronary CTA might be chosen in select patients who have an equivocal or suspected inaccurate stress (or stress imaging) test. The rationale is that a noninvasive coronary anatomic test (CCTA) might permit a separate method of assessing the coronary arteries which is different from a stress test and limit the number of normal invasive coronary angiograms. It could also help avoid missing serious coronary disease in those suspected of having an inaccurate stress test result.

3. Coronary CTA to evaluate the cause of symptoms in patients with known coronary artery disease.

The use of coronary CTA in this setting would be to evaluate the extent of coronary artery disease which led to a prior cardiac event or symptoms. Patients with known disease may have been evaluated in the past with prior invasive angiography and/or stress testing. New or recurrent symptoms may or may not relate to a change in the coronary anatomy and could potentially be assessed with coronary CTA. (Its use here would be most appropriate in a limited number of special situations and would be less likely to provide unique value than in the other settings described above).

4. Coronary CTA to evaluate the cause of chest pain or dyspnea in patients with prior bypass surgery or intracoronary artery stent placement.

Coronary bypass grafts are relatively well seen with coronary CTA. The rationale for coronary CTA would be to determine the patency and severity of possible graft stenoses that may be the source of chest pain. Rarely, a coronary CTA would follow invasive angiography to help determine if a graft had been missed during the prior procedure.

Patients with prior intracoronary stents often present with recurrent chest pain. The rationale for a coronary CTA as an alternative to invasive angiography is to rule out stent restenosis as the cause of symptoms. (Accurate assessment of stent restenosis is somewhat limited by the artifact caused by the stent material itself and the quality of the scan and scanner).

5. Coronary CTA for suspected congenital anomalies of the coronary circulation.

Coronary CTA is used to assess patients suspected of having a congenital coronary anomaly. The cross-sectional nature of this technique allows one to definitively determine both the presence and possible future harm that could result from the anomaly. It is often used after an anomaly has been suspected following a different test such as prior invasive coronary angiogram. A coronary CTA is used to decide if surgery is indicated and for surgical planning.

6. Coronary CTA for evaluation of acute chest pain in the emergency room.

The rationale for the application of coronary CTA in this setting is to quickly triage patients in order to rule out coronary artery disease as a possible cause of symptoms. It is hoped that the application of coronary CTA in the emergency room would limit resource use in chest pain patients who do not have coronary artery disease.

7. CTA for the assessment of coronary or pulmonary venous anatomy

This application of CTA for the coronary and pulmonary veins is primarily for pre-surgical planning. Coronary venous anatomy can be useful for the cardiologist who needs to place a pacemaker lead in the lateral coronary vein in order to resynchronize cardiac contraction in patients with heart failure. This may be helpful to guide biventricular pacemaker placement.

Pulmonary vein anatomy can vary from patient to patient. Pulmonary vein catheter ablation can isolate electrical activity from the pulmonary veins and allow for the elimination of recurrent atrial fibrillation. The presence of a pulmonary venous anatomic map may help eliminate procedural complications and allow for the successful completion of the procedure.

8. Use of coronary CTA prior to non-coronary artery cardiac surgery.

Certain patients have non-coronary artery surgery (valve or ascending aortic surgery) and routinely have a pre-operative invasive coronary angiogram. The surgical planning may also depend upon the exact location of the coronary arteries. The rationale for the use of coronary CTA in low risk patient subsets is to avoid potentially unnecessary invasive testing and still provide appropriate pre-surgical information.

9. Quantitative evaluation of coronary calcium to be used as a triage tool in patients with typical chest pain and unknown Agatston score to determine appropriateness of coronary CTA vs. catheter coronary angiography.

10. Quantitative evaluation of coronary calcium to be used as a triage tool for lipid-lowering therapy in patients with moderate to high Framingham Risk score.

Limitations

1. The test is never covered for screening, i.e., in the absence of signs, symptoms or disease.
2. The selection of the test should be made within the context of other testing modalities such as stress myocardial perfusion images or cardiac ultrasound result so that the resulting information facilitates the management decision, not merely adds a new layer of testing.
3. The test may be denied, on post-pay review, as not medically necessary when used for cardiac evaluation of a patient where there is a pre-test knowledge of sufficiently extensive calcification of the coronary segment in question that would diminish the interpretive value.
4. Coverage of this modality for coronary artery assessment is limited to devices that process thin, high resolution slices (1 mm or less). The multidetector scanner must have at least 16 slices per rotation capability.
5. The administration of beta blockers and the monitoring of the patient during MDCT by a physician experienced in the use of cardiovascular drugs are included here in and are not separately payable services.
6. All studies must be ordered by a physician or a qualified non-physician practitioner similar to any other medical testing such as the stress myocardial perfusion imaging or ultrasound evaluation.

7. For contrast enhanced examinations a physician must be present for direct supervision during testing similar to the stress myocardial perfusion imaging.
8. The electron beam tomography (EBT) technology or Ultrafast CT is not covered by this LCD for coronary artery examination.

Coverage Topics
Diagnostic tests, X-rays, and Lab services

Type of Bill Codes
Not Applicable

Revenue Codes
Not Applicable

CPT/HCPCS Codes

Category III CPT Codes for CCT and CCTA will be in effect on January 01, 2006. Select the name of the procedure or service that accurately identifies the service performed. Do not select a CPT code that merely approximates the service provided.

These codes replace all CPT codes previously used for these procedures. The use of Category III CPT Codes is mandatory to report cardiac CT and coronary CTA.

0144T Computed tomography, heart, without contrast material, including image post processing and quantitative evaluation of coronary calcium.

0145T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; cardiac structure and morphology.

0146T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; computed tomographic angiography of coronary arteries (including native and anomalous coronary arteries, coronary bypass grafts), without quantitative evaluation of coronary calcium

0147T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; computed tomographic angiography of coronary arteries (including native and anomalous coronary arteries, coronary bypass grafts), with quantitative evaluation of coronary calcium

0148T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; cardiac structure and morphology and computed tomographic angiography of coronary arteries (including native and anomalous coronary arteries, coronary bypass grafts), without quantitative evaluation of coronary calcium

0149T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; cardiac structure and morphology and computed tomographic angiography of coronary arteries (including native and anomalous coronary arteries, coronary bypass grafts), with quantitative evaluation of coronary calcium

0150T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; cardiac structure and morphology in congenital heart disease

+0151T Computed tomography, heart, without contrast material followed by contrast material(s) and further sections, including cardiac gating and 3D image post processing; function evaluation (left and right ventricular function, ejection fraction and segmental wall motion)

Category III Code Vignettes

0144T- A 42 year-old male is otherwise healthy, exercises daily, and has no complaints but has elevated LDL cholesterol level of 164 mg/dl. He has no other risk factors except a father with a recent myocardial infarction at age 64. Framingham Risk score places him at moderate cardiovascular risk. He is referred to determine whether his Agatston Score, calcified volume and mass of calcium would support initiation of therapy with lipid-lowering agents. ***Do not report in conjunction with 0147T and 0149T***

0145T- A 67 year-old female with a long history of hypertension and no other structural heart disease has had recurrent episodes of atrial fibrillation for about 5 years, and since age 65 is in permanent atrial fibrillation. Drug therapy including calcium channel blockers, beta-blockers, and digoxin have not resulted in sufficient rate control, with heart rates up to 150 beats per min under light physical exercise. An electrophysiologic procedure to isolate the pulmonary veins is planned (ablation of the focus of atrial fibrillation) and the treating electrophysiologist requires information about the location, number and morphology of the pulmonary venous ostia in the left atrium.

Note that the vignette describes a CT study being performed prior to an electrophysiology procedure. Except for 0149T, each code that specifies "structure and morphology" is specific to a pre-electrophysiology CT study, either an ablation in which the atria and pulmonary veins are being evaluated by CT or cardiac resynchronization therapy in which the cardiac venous system is being characterized by CT in anticipation of biventricular pacemaker placement.

0146T A 52 year-old female is presenting with complaints of chest pain which during the last 2 months has occurred sometimes, but not always, on physical exertion. The chest pain is typical in character (pressure and shortness of breath) and duration (about 3 minutes), but not strictly related to exercise and sometimes occurs at rest. She has awoken from sleep twice because of the pain. Nitrates have not been used. Risk factors include hypertension, and smoking. The resting ECG shows left ventricular hypertrophy. Patient is referred for cardiac CT angiography to diagnose coronary artery disease.

0147T A 52 year-old female is presenting with complaints of chest pain which during the last 2 months has occurred sometimes, but not always, on physical exertion. The chest pain is typical in character (pressure and shortness of breath) and duration (about 3 minutes), but not strictly related to exercise and sometimes occurs at rest. She has awoken from sleep twice because of the pain. Nitrates have not been used. Risk factors include hypertension, and smoking. The resting ECG shows left ventricular hypertrophy. Patient is referred for cardiac CT angiography and evaluation of her Agatston Score, calcified volume and mass.

0148T A 72-year-old male with congestive heart failure, history of previous bypass surgery and ischemic cardiomyopathy referred for biventricular pacemaker and automatic implanted cardiac defibrillator (AICD) placement. ECG demonstrates sinus rhythm with an intraventricular block. Symptoms include dyspnea on exertion and intermittent chest pain. He is referred for assessment of

structure and morphology of the coronary vein anatomy in relation to left ventricular lead placement and CT coronary angiography.

Note as in 0145T, structure and morphology refers to the evaluation prior to an electrophysiologic procedure, in this case of the coronary venous system.

0149T A 42-year-old male with congestive heart failure of unknown etiology referred for biventricular pacemaker and automatic implanted cardiac defibrillator (AICD) placement. ECG demonstrates sinus rhythm with an intraventricular block. He is referred for assessment of structure and morphology of the coronary vein anatomy in relation to left ventricular lead placement, CT coronary angiography, and evaluation of his Agatston Score, calcified volume and mass.

*Again, as in **0145T and 0148T, structure and morphology refers to that of the coronary venous system.***

0150T A 2 day-old male with tetralogy of Fallot and pulmonary artery atresia requires evaluation of his pulmonary arterial supply to aid surgical planning. Echocardiography is performed but images of the pulmonary arteries, their relationship to the heart, the right ventricular outflow tract, and systemic to pulmonary artery collaterals are inadequate. Computed tomography of the heart is ordered.

0151T A 57 year-old morbidly obese diabetic female with known coronary artery disease has complaints of palpitations, aching chest pain, and shortness of breath when climbing stairs. Assessment of ventricular function and calculation of left ventricular ejection fraction is performed in addition to cardiac CT angiography.

Provisional CPT Code Relationship to Indications

0144T: 9, 10

0145T: 7

0146T: 1, 2, 3, 4, 5, 6, 7, 8

0147T: 1, 2, 3, 4, 5, 6, 7, 8

0148T: 1, 2, 3, 4, 5, 6, 7

0149T: 1, 2, 3, 4, 6, 7

0150T: 5

0151T: 1, 2, 3, 4, 6, 7

ICD-9 Codes that Support Medical Necessity
TRUNCATED DIAGNOSIS CODES ARE NOT ACCEPTABLE.

ICD-9-CM code listings may cover a range and include truncated codes. It is the provider's responsibility to avoid truncated codes by selecting a code(s) carried out to the highest level of specificity and selected from the ICD-9-CM book appropriate to the year in which the service was performed.

It is not enough to link the procedure code to a correct, payable ICD-9-CM code. The diagnosis or clinical signs/symptoms must be present for the procedure to be paid.

411.1	Intermediate coronary syndrome
412	Old myocardial infarction
413.0	Angina pectoris
413.1	Angina decubitus
413.9	Other unspecified angina pectoris
414.0	Coronary atherosclerosis
414.00	Coronary atherosclerosis, unspecified type of vessel, native or graft
414.01	Coronary atherosclerosis of native coronary artery
414.02	Coronary atherosclerosis of autologous vein bypass graft
414.03	Coronary atherosclerosis of nonautologous biological bypass graft
414.04	Coronary atherosclerosis of artery bypass graft
414.05	Coronary atherosclerosis of unspecified type of bypass graft
414.06	Coronary atherosclerosis of native coronary artery transplanted heart
414.07	Coronary atherosclerosis of bypass graft (artery) (vein) transplanted heart
414.11	Aneurysm of coronary vessels
414.12	Dissection of coronary artery
414.8	Other specified forms of chronic ischemic heart disease
414.9	Chronic ischemic heart disease, unspecified
427.3-427.42	Atrial and Ventricular fibrillation
745.1-746.9	Congenital anomalies of the heart
747.0	Other congenital anomalies of circulatory system, patent ductus arteriosus
747.41	Total anomalous pulmonary venous connection
747.42	Partial anomalous pulmonary venous connection
747.49	Other anomalies of great veins
786.05	Shortness of breath
786.50	Chest pain, unspecified

786.51	Chest pain, precordial pain
786.59	Other chest pain
794.30	Cardiovascular, abnormal function study, unspecified
794.31	Cardiovascular, abnormal electrocardiogram

Diagnoses that Support Medical Necessity
Not applicable

ICD-9-CM Codes that DO NOT Support Medical Necessity
Use any ICD-9-CM code not listed in the "ICD-9-CM Codes that Support Medical Necessity" section of this policy will be denied.

Diagnoses that DO NOT Support Medical Necessity
Not applicable

Acceptable Levels of Competence for Performance and Interpretation

While it is not the Carrier's intention or jurisdiction to credential providers, Medicare does expect a satisfactory level of competence from providers who submit claims for services rendered. It is well known that substandard studies often lead to preventable repetition of studies and overutilization of services.

The acceptable levels of competence, as defined by the American College of Cardiology (ACC)/American Heart Association (AHA) Clinical Competence Statement on Cardiac Imaging with Computed Tomography and Magnetic Resonance (2005) and the American College of Radiology (ACR) Clinical Statement on Noninvasive Cardiac Imaging (2005), are outlined as follows:

For the technical portion, a recommended level of competence is fulfilled when the image acquisition is obtained under all of the following conditions:

a. The service is performed by a radiologic technologist who is credentialed by a nationally recognized credentialing body (American Registry of Radiologic Technologists or equivalent) and meets state licensure requirements where applicable.
b. If intravenous beta blockers or nitrates are to be given prior to a CT coronary angiogram or calcium score, the test must be under the *direct supervision* of a certified registered nurse and physician (familiar with the administration of cardiac medications) who are available to respond to medical emergencies and it is strongly recommended that the certified register nurse and physician be ACLS certified.
c. When contrast studies are performed, the physician must provide *direct supervision* and the radiologic technologist or registered nurse administering the contrast must have appropriate training on the use and administration of contrast media.

For the professional portion, a recommended level of competence is fulfilled when the interpretation is performed by a physician meeting the following requirements:

a. The physician has appropriate additional training in CT Coronary Angiography and cardiac CT imaging equivalent to the guidelines set forth by the ACC or ACR (for example: the ACCF/AHA Clinical Competence Statement on Cardiac Imaging with Computed Tomography and Magnetic Resonance (2005) and the ACR Clinical Statement on Noninvasive Cardiac Imaging (2005)), or
b. The physician has appropriate medical staff privileges to interpret CT Coronary Angiograms at a hospital that participates in the Medicare program, and is actively training in cardiac CT (as in paragraph a). A grace period of 24 months should be allowed to acquire the necessary training.

Documentation Requirements

1. Each claim must be submitted with ICD-9-CM codes that reflect the condition of the patient, and indicate the reason(s) for which the service was performed. Claims submitted without ICD-9-CM codes will be returned.
2. The documentation of the study requires a formal written report, with clear identifying demographics, the name of the interpreting provider, the reason for the tests, an interpretive report and copies of images. The computerized data with image reconstruction should also be maintained.
3. Documentation must be available to Medicare upon request

Appendices

Not applicable

Utilization Guidelines

The frequency of the studies exam must be reasonable and justified by the course of the patient's illness.

Sources of Information and Basis for Decision

This document was prepared as a collaborative effort of the American College of Cardiology (ACC) Carrier Advisory Committee (CAC), American College of Radiology (ACR), American Society of Nuclear Cardiology (ASNC), North American Society for Cardiac Imaging (NASCI) Society of Cardiac Angiography and Intervention (SCAI) and Society of Cardiovascular CT (SCCT). Additional contributors include Empire Blue Cross Blue Shield Medicare Services and United Healthcare.

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Advisory Committee Meeting Notes