

MEDICAL POLICY



MEDICAL POLICY DETAILS	
Medical Policy Title	CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY (CARDIAC/CORONARY CTA):CONTRAST-ENHANCED
Policy Number	6.01.34
Category	Technology Assessment
Effective Date	06/16/05
Revised Date	09/21/06, 09/20/07, 09/18/08, 09/17/09, 06/17/10, 06/16/11, 07/19/12, 10/17/13, 06/19/14, 01/22/15, 04/21/16, 06/15/17, 06/21/18, 07/18/19
Product Disclaimer	<ul style="list-style-type: none"> • <i>If a product excludes coverage for a service, it is not covered, and medical policy criteria do not apply.</i> • <i>If a commercial product (including an Essential Plan product) or a Medicaid product covers a specific service, medical policy criteria apply to the benefit.</i> • <i>If a Medicare product covers a specific service, and there is no national or local Medicare coverage decision for the service, medical policy criteria apply to the benefit.</i>

POLICY STATEMENT

1. Based upon our criteria and review of the peer-reviewed literature, cardiac computed tomographic angiography (CTA), using at least a 64-slice CT scanner, is considered **medically appropriate** for any of the following:
 - A. Cardiac CT for structure and morphology:
 1. Evaluation of native or prosthetic valve, cardiac mass, or pericardial mass and/or pericardial disease:
 - a. A prior cardiac CT angiogram, cardiac MRI or echocardiogram was performed for this indication and was uninterpretable.
 2. Pre-procedural preparation and structural assessment of patients being considered for Transcatheter Aortic-Valve Implantation (TAVI):
 - a. Post TAVR at one month and one year post-procedure and annually thereafter.
 3. Coronary vein mapping:
 - a. Biventricular pacemaker placement is planned.
 4. Pulmonary vein evaluation:
 - a. Radiofrequency ablation for atrial fibrillation is planned.
 5. Suspected arrhythmogenic right ventricular dysplasia (ARVD) with presyncope or syncope when clinical suspicion is supported by established criteria for ARVD.
 6. Recurrent laryngeal nerve palsy due to cardiac chamber enlargement.
 - B. Cardiac CT for congenital heart disease:
 1. Coronary artery anomaly evaluation:
 - a. A cardiac catheterization was performed and not all coronary arteries were identified.
 2. Thoracic arteriovenous anomaly evaluation:
 - a. A cardiac MRI or chest CT angiogram was performed and suggested congenital heart disease.
 3. Complex congenital heart disease evaluation:
 - a. No cardiac CT or cardiac MRI has been performed (e.g., there is a contraindication to MRI) or cardiac CT or cardiac MRI was performed one or more years ago.
 - C. Cardiac CT angiography:
 1. Evaluation of known coronary artery disease (CAD) documented by prior imaging stress test, cardiac catheterization, cardiac CT angiogram, coronary revascularization, carotid stenosis or stroke, peripheral artery disease or aortic aneurysm:
 - a. New chest pain or shortness of breath with prior coronary artery bypass grafting to evaluated post-graft patency when only graft patency is a concern and imaging of the native coronary artery anatomy is not needed and no exclusions to cardiac CT angiography; or

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 2 of 7

- b. To identify whether bypass grafts are located directly beneath the sternum, so that alternative ways to enter the chest can be planned.
 2. For symptomatic individuals who have a very low, low or intermediate pretest probability of coronary artery disease and:
 - a. Unable to perform either an exercise or pharmacologic imaging stress test.
 - b. Stress test (treadmill or imaging stress test) is normal, uninterpretable, equivocal, or a false positive is suspected.
 - c. Replace performance of invasive coronary angiogram.
 3. Abnormal treadmill with normal imaging.
 4. For symptomatic individuals with unsuccessful conventional coronary angiography.
 5. Evaluate coronary artery anomalies and other complex congenital heart disease of cardiac chambers or great vessels.
 6. Anomalous coronary arter(ies) suspected for diagnosis or to plan treatment and less than age 40 with history that includes one or more of the following:
 - a. Persistent exertional chest pain and normal stress test; or
 - b. Full sibling(s) with history of sudden death syndrome before age 30 or with documented anomalous coronary artery; or
 - c. Resuscitated sudden death and contraindications for conventional coronary angiography; or
 - d. Prior nondiagnostic coronary angiography in determining the course of anomalous coronary artery in relation to the great vessels, origin of a coronary artery or bypass graft location.
 7. New onset of congestive heart failure without known coronary artery disease to assess coronary arteries; and
 - a. Low or intermediate risk on the pre-test probability assessment, the ejection fraction is less than 50% and no exclusion to cardiac CT angiography; and
 - b. No cardiac catheterization, SPECT, cardiac PET, or stress echocardiograms has been performed since the diagnosis of congestive heart failure or cardiomyopathy.
 8. Unexplained new onset of heart failure.
 9. Ventricular tachycardia (6 beat runs or greater) if CCTA will replace conventional invasive coronary angiography.
 10. Equivocal coronary artery anatomy on conventional cardiac catheterization.
 11. Newly diagnosed dilated cardiomyopathy.
 12. Preoperative assessment of the coronary arteries in patients who are going to undergo surgery for aortic dissection, aortic aneurysm, or valvular surgery if CCTA will replace conventional invasive coronary angiography.
 13. Vasculitis/Takayasu's/Kawasaki's disease.
- D. Cardiac Trauma: to detect aortic and coronary injury and can help in the evaluation of myocardial and pericardial injury.
- II. Based on our criteria and review of the peer reviewed literature, it is **medically appropriate** for patients who are candidates for CTA to have calcium scoring performed as part of a CTA procedure, since pre-test knowledge of extensive calcification of the coronary segment in question may diminish the interpretive value of a cardiac CTA.
- III. Based upon our criteria and review of the peer-reviewed literature, cardiac computed tomographic angiography is considered **investigational** for all other indications.

Refer to Corporate Medical Policy #6.01.13 regarding Computed Tomography (EBCT, Spiral CT, MDCT) for Detection of Coronary Artery Calcification (cardiac calcium scoring).

Refer to Corporate Medical Policy #11.01.03 regarding Experimental or Investigational Services.

Refer to Corporate Medical Policy #11.01.10 regarding Clinical Trials.

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 3 of 7

POLICY GUIDELINES

- I. The following are examples of contraindications to the use of cardiac CT angiography:
 - A. Irregular heart rhythms (e.g., atrial fibrillation/flutter, frequent irregular premature ventricular contractions or premature atrial contractions, and high grade heart block);
 - B. Multifocal atrial tachycardia;
 - C. Inability to lie flat;
 - D. Body mass index of greater than 40;
 - E. Inability to obtain a heart rate of less than 65 beats per minute after beta blockers;
 - F. Calcium score of greater than 1000;
 - G. Inability to breath hold for greater than 8 seconds;
 - H. Renal insufficiency (creatinine greater than 1.8 mg/dl);
 - I. Evaluation of coronary stent patency if the vessel is less than 3.0 mm in diameter (metal artifact limits accuracy);
 - J. Asymptomatic patients and routine use in the evaluation of coronary arteries following heart transplantation;
 - K. Evaluation of left ventricular function following myocardial infarction or in chronic heart failure;
 - L. Evaluation of patients with postoperative native or prosthetic cardiac valves who have technically limited echocardiograms, MRI or TEE;
 - M. First test in evaluating symptomatic patients (e.g., chest pain);
 - N. High pre-test probability for coronary artery disease;
 - O. Identification of plaque composition and morphology;
 - P. Myocardial perfusion and viability studies;
 - Q. Preoperative assessment for non-cardiac, nonvascular surgery;
 - R. Repeat or routine follow-up of asymptomatic or stable symptoms of coronary artery disease with CCTA.
- II. Per appropriateness criteria from a multidisciplinary cardiac CTA and cardiac MRI work group (Hendel, et al., 2006) chest pain syndrome is defined as any constellation of symptoms that the physician feels may represent a complaint consistent with obstructive CAD. Examples of such symptoms include, but are not exclusive to:
 - A. Chest pain;
 - B. Chest tightness;
 - C. Chest burning;
 - D. Dyspnea;
 - E. Shoulder pain; or
 - F. Jaw pain.
- III. Pre-test probability of coronary artery disease can be categorized as low, intermediate or high. It is based upon the character of chest pain symptoms as well as age and gender. The character of chest pain is classified as either typical (or classical) angina, atypical angina or nonanginal. If the symptoms of substernal chest pain which is precipitated by exertion and relieved within 10 minutes with rest or nitroglycerin is present, it is considered typical (or classical) angina. Atypical angina occurs when only two symptoms are present. When one or no symptoms are present, it is considered nonanginal chest pain. Once the nature of the chest pain is determined, the following classifications can be estimated:
 - A. Low Probability (less than 10%):
 1. Asymptomatic men and women of all ages,
 2. Women less than 50 years with atypical chest pain.
 - B. Intermediate Probability (10%-90%):
 1. Men of all ages with atypical angina,
 2. Women greater than 50 years with atypical angina,
 3. Women 30-50 years with typical angina.
 - C. High Probability:
 1. Men greater than 40 years with typical angina,
 2. Women greater than 60 years with typical angina.

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 4 of 7

IV. The Federal Employees Health Benefit Program (FEHBP/FEP) requires that procedures, devices or laboratory tests approved by the U.S. Food and Drug Administration (FDA) may not be considered investigational and thus these procedures, devices or laboratory tests may be assessed only on the basis of their medical necessity.

DESCRIPTION

Computed tomographic angiography or CTA is a non-invasive imaging test that requires the use of intravenously administered contrast material and high-resolution, high-speed CT machinery to obtain detailed volumetric images of blood vessels. CTA can be applied to image blood vessels throughout the body; however to apply CTA in the coronary arteries, several technical challenges must be overcome to obtain high-quality diagnostic images. Very short image acquisition times are necessary to avoid blurring artifacts from the rapid motion of the beating heart. In some cases, premedication with beta-blocking agents is used to slow the heart rate below 60-65 beats per minute to facilitate adequate scanning, and electrocardiographic triggering or retrospective gating is used to obtain images during diastole when motion is reduced. Rapid scanning is also helpful so that the volume of cardiac images can be obtained during breath-holding. Very thin sections (less than 1 mm) are important to provide adequate spatial resolution and high-quality 3D reconstruction images.

Cardiac CTA has been proposed as a noninvasive alternative to invasive coronary angiography. Applications include but are not limited to evaluation of obstructive coronary artery disease (CAD), coronary artery bypass graft patency, coronary artery stent patency, coronary artery aneurysm, delineation of coronary artery anomaly and functional cardiac assessment.

It is recognized that calcium scoring is an integral part of CTA to determine the risk-benefit of dye infusion.

RATIONALE

Contrast-enhanced cardiac CT angiography can be performed using either multidetector-row CT (MDCT) or electron beam CT (EBCT). Multiple manufacturers have received FDA 510(k) clearance to market MDCT machines equipped with at least 16 detector rows and at least two models of EBCT machines have been cleared through FDA 510(k) clearance, Intravenous iodinated contrast agents used for cardiac CTA have also received FDA approval.

Prospective studies with small sample sizes conclude that cardiac CTA is a promising noninvasive method for assessment of coronary stents, detection of in-stent restenosis and occlusion, and for evaluating bypass patency. Studies with small sample sizes conclude that the presence of myocardial hypoenhancement on cardiac CTA in acute chest pain patients has a high positive predictive value and specificity but only moderate sensitivity for presence of acute or healed MI.

Additional studies conclude that the presence and size of early perfusion defects and late enhancement on cardiac CTA is closely related to follow-up segment myocardial dysfunction and myocardial functional recovery. Available studies recommend further studies to evaluate the clinical value of these preliminary findings in larger patient populations.

Current studies consist of patient populations with a high pretest probability of CAD. Patients providing suboptimal images are often excluded from calculations of test accuracy. Future studies will need to examine these tests in larger, less selected populations representing the clinical settings in which they are actually expected to be used.

However, appropriateness criteria for cardiac computed tomography and cardiac magnetic resonance imaging has been published. It is a report of the American College of Cardiology Foundation Quality Strategic Directions Committee Appropriateness Criteria Working Group, the American College of Radiology, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, American Society of Nuclear Cardiology, North American Society for Cardiac Imaging, Society for Cardiovascular Angiography and Interventions, and Society of Interventional Radiology. The working group acknowledges that clinical evidence is limited regarding the clinical application of cardiac CT angiography in patient care algorithms and that there is little expert consensus. Although the appropriateness criteria are not specific guidelines, it is hoped that they may serve as an initial guide for this rapidly-evolving technology. The working group rates cardiac computed tomography as an appropriate test and a reasonable approach for the indications listed as medically appropriate in this medical policy.

In 2008, a scientific statement, “Noninvasive Coronary Artery Imaging. Magnetic Resonance Angiography and Multidetector Computed Tomography Angiography,” was published by the American Heart Association Committee on

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 5 of 7

Cardiovascular Imaging and Intervention of the Council on Cardiovascular Radiology and Intervention, and the Councils on Clinical Cardiology and Cardiovascular Disease in the Young. The scientific statement recommends criteria for cardiac CTA similar to the above Appropriateness Criteria, and specifically recommends against screening asymptomatic individuals for coronary artery disease.

CODES

- *Eligibility for reimbursement is based upon the benefits set forth in the member's subscriber contract.*
- **CODES MAY NOT BE COVERED UNDER ALL CIRCUMSTANCES. PLEASE READ THE POLICY AND GUIDELINES STATEMENTS CAREFULLY.**
- *Codes may not be all inclusive as the AMA and CMS code updates may occur more frequently than policy updates.*

CPT Codes

Code	Description
75572	Computed tomography, heart, with contrast material, for evaluation of cardiac structure and morphology (including 3D image postprocessing, assessment of cardiac function, and evaluation of venous structures, if performed)
75573	Computerized tomography, heart, with contrast material, for evaluation of cardiac structure and morphology in the setting of congenital heart disease (including 3D image postprocessing, assessment of LV cardiac function, RV structure and function and evaluation of venous structures, if performed)
75574	Computed tomographic angiography, heart, coronary arteries and bypass grafts (when present), with contrast material, including 3D image postprocessing (including evaluation of cardiac structure and morphology, assessment of cardiac function, and evaluation of venous structures, if performed)

Copyright © 2019 American Medical Association, Chicago, IL

HCPCS Codes

Code	Description
No specific code(s)	

ICD10 Codes

Code	Description
Numerous	

REFERENCES

BlueCross BlueShield Association. Contrast-enhanced computed tomographic angiography (CTA) for coronary artery evaluation. Medical Policy Reference Manual #6.01.43. 2018 Sep 13.

*BlueCross BlueShield Association. Technology Evaluation Center (TEC). Contrast-enhanced cardiac computed tomography angiography. 2005 Feb 8.

*BlueCross BlueShield Association. Technology Evaluation Center (TEC). Contrast-enhanced cardiac computed tomographic angiography in the diagnosis of coronary artery stenosis or for evaluation of acute chest pain. 2006 Aug.

BlueCross BlueShield Association. Technology Evaluation Center (TEC). Fractional flow reserve and coronary artery revascularization. 2011 Jul.

*Bluemke DA, et al. Noninvasive coronary artery imaging. Magnetic resonance angiography and multidetector computed tomography angiography. A scientific statement from the American Heart Association Committee on Cardiovascular

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 6 of 7

Imaging and Intervention of the Council on Cardiovascular Radiology and Intervention, and the Councils on Clinical Cardiology and Cardiovascular Disease in the Young. Circulation 2008 Jul 29;118(5):586-606.

*Earls JP, et al. ACR Appropriateness Criteria® chronic chest pain – high probability of coronary artery disease. J Am Coll Radiol 2011 Oct;8(10):679-86.

*Fihn SD, et al. 2012 ACCF/AHA/ACP/AATS/PCNA/SCAI/STS Guideline for the diagnosis and management of patients with stable ischemic heart disease: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines, and the American College of Physicians, American Association for Thoracic Surgery, Preventive Cardiovascular Nurses Association, Society for Cardiovascular Angiography and Interventions, and Society of Thoracic Surgeons. J Am Coll Cardiol 2012; 60(24):e44-e164.

*Gershin E, et al. 16-MDCT coronary angiography versus invasive coronary angiography in acute chest pain syndrome: a blinded prospective study. AJR Am J Roentgenol 2006 Jan;186(1):177-84.

*Goldstein JA et al. The CT-STAT (Coronary Computed Tomographic Angiography for Systematic Triage of Acute Chest Pain Patients to Treatment) trial. J Am Coll Cardiol 2011 Sep;58(14):1414-22.

*Hamilton-Craig C, et al. Diagnostic performance and cost of CT angiography versus stress ECG- a randomized prospective study of suspected acute coronary syndrome chest pain in the emergency department (CT-COMPARE). In J Cardiol 2014 Oct 22;177(3):867-73.

*Hoffmann U et al. Coronary computed tomography angiography for early triage of patients with acute chest pain. J Am Coll Cardiol 2009;53(18):1642–50.

*Hulten E, et al. Outcomes after coronary computed tomography angiography in the emergency department; a systematic review and meta-analysis of randomized, controlled trials. J Am Coll Cardiol 2013;61(8):880-92.

*Hulten EA, et al. Prognostic evaluation of cardiac computed tomography angiography: a systematic review. J Am Coll Cardiol 2011;57(10):1237-47.

*Jones, RL, et al. Safe and rapid disposition of low-to-intermediate risk patients presenting to the emergency department with chest pain: a 1-year high-volume single-center experience. J Cardiovasc Comput Tomogr 2014 Sep-Oct;8(5):375-83.

Jørgensen ME, et al. Functional testing or coronary computed tomography angiography in patients with stable coronary artery disease. J Am Coll Cardiol 2017;69(14):1761-70.

*Linde JJ, et al. Cardiac computed tomography guided treatment strategy in patients with recent acute-onset chest pain: results from the randomised, controlled trial: CARDiac cT in the treatment of acute CHEst pain (CATCH). Int J Cardiol 2013 Oct 15;168(6):5257-62.

McKavanagh P, et al. A comparison of cardiac computerized tomography and exercise stress electrocardiogram test for the investigation of stable chest pain: the clinical results of the CAPP randomized prospective trial. Eur Heart J Cardiovasc Imaging 2015 Apr;16(4):441-8.

*Muhlestein JB, et al. Effect of screening for coronary artery disease using CT angiography on mortality and cardiac events in high-risk patients with diabetes: the FACTOR-64 randomized clinical trial. JAMA 2014 Dec 3;312(21):2234-43.

*Nielsen LH, et al. The diagnostic accuracy and outcomes after coronary computed tomography angiography vs conventional functional testing in patients with stable angina pectoris: a systematic review and meta-analysis. Eur Heart J Cardiovasc Imaging 2014 Sep;15(9):961-71.

*Park GM, et al. Coronary computed tomographic angiographic findings in asymptomatic patients with type 2 diabetes mellitus. Am J Cardiol 2014 Mar 1;113(5):765-71.

*Park JK, et al. Multidetector computed tomography for the evaluation of coronary artery disease; the diagnostic accuracy in calcified coronary arteries, comparing with IVUS imaging. Yonsei Med J 2014 May 1;55(3):599-605.

**Medical Policy: CARDIAC/CORONARY COMPUTED TOMOGRAPHIC ANGIOGRAPHY
(CARDIAC/CORONARY CTA): CONTRAST-ENHANCED**

Policy Number: 6.01.34

Page: 7 of 7

*Sara L, et al. Accuracy of multidetector computed tomography for detection of coronary artery stenosis in acute coronary syndrome compared with stable coronary disease: A CORE64 multicenter trial substudy. Int J Cardiol 2014 Dec 15;177(2):385-91.

Shah AB, et al. ACR Appropriate Criteria Chronic Chest Pain-Noncardiac Etiology Unlikely-Low to Intermediate Probability of Coronary Artery Disease. J Am Coll Radiol 2018 Nov;15(11S):S283-S290.

Sharma A, et al. Stress testing versus CT angiography in patients with diabetes and suspected coronary artery disease. J Am Coll Cardiol 2019 Mar;73(8):893-902.

*Sun Z, et al. Coronary CT angiography: current status and continuing challenges. Br J Radiol 2012 May;85(1013):495-510.

*Taylor AJ, et al. ACCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR 2010 appropriate use criteria for cardiac computed tomography: A report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, the Society of Cardiovascular Computed Tomography, the American College of Radiology, The American Heart Association, the American Society of Echocardiography, the American Society of Nuclear Cardiology, the North American Society for Cardiovascular Imaging, the Society for Cardiovascular Angiography and Interventions, and the Society for Cardiovascular Magnetic Resonance. J Am Coll Cardiol 2010;56:1864-94.

Truong QA, et al. Coronary computed tomography imaging in women: an expert consensus statement from the Society of Cardiovascular Computed Tomography. J Cardiovasc Comput Tomogr 2018 Nov-Dec;12(6):451-466.

*Wever-Pinzon O, et al. Coronary computed tomography angiography for the detection of cardiac allograft vasculopathy: a meta-analysis of prospective trials. J Am Coll Cardiol 2014;63(19):1992-2004.

*Wolk MJ, et al. ACCF/AHA/ASE/ASNC/HFSA/SCAI/SCCT/SCMR/STS 2013 multimodality appropriate use criteria for the detection and risk assessment of stable ischemic heart disease: a report of the American College of Cardiology Foundation Appropriate Use Criteria Task Force, American Cardiology, Heart Failure Society of America, Heart Rhythm Society, Society for Cardiovascular Angiography and Interventions, Society of Cardiovascular Computed Tomography, Society for Cardiovascular Magnetic Resonance, and Society of Thoracic Surgeons. J Card Fail 2014 Feb;20(2):65-90.

*Zeb I, et al. Coronary computed tomography as a cost-effective test strategy for coronary artery disease assessment- a systematic review. Atherosclerosis 2014 Feb 24;234(2):426-435.

*Key Article

KEY WORDS

Cardiac CTA, Coronary artery CTA, calcium scoring.

CMS COVERAGE FOR MEDICARE PRODUCT MEMBERS

After examining the medical evidence, the Centers for Medicare and Medicaid Services (CMS) determined no national coverage determination (NCD) is appropriate at this time (March 12, 2008). Section 1862(a)(1)(A) of the Social Security Act decisions should be made by local contractors through a local coverage determination process or case-by-case adjudication.

There is currently a Local Coverage Determination (LCD) for Cardiac Computed Tomography (CCT) and Coronary Computed Tomography Angiography (CCTA). Please refer to the following LCD website for Medicare members: https://www.cms.gov/medicare-coverage-database/details/lcd-details.aspx?LCDId=33559&ContrId=298&ver=14&ContrVer=1&CntrctrSelected=298*1&Cntrctr=298&s=41&DocType=2&bc=AAgAAAQAAAA&