Medical Policy Reference Manual
Medical Policy

6.01.035 Cardiac Computed Tomography (CT) and Coronary CT Angiography (CTA)

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Description

Computed Tomography (CT) of the heart has been proposed for use in the evaluation of cardiac structure and morphology. This test is specific to a pre-electrophysiology CT study for evaluation of the atria and pulmonary veins prior to an ablation, for congenital heart disease, or prior to cardiac resynchronization therapy. It has been developed as a possible alternative to cardiac echography.

Computed tomographic angiography (CTA) is a non-invasive, contrast CT scan designed to provide detailed images of the blood vessels of the heart. CTA differs from calcium scoring electron beam computed tomography (EBCT) scanning in that the latter is primarily used as a screening test to identify calcifications in the coronary vessels and assess risks for coronary artery disease (CAD) in asymptomatic patients. CT angiography has been developed as a possible alternative to traditional catheter based coronary angiography (CA) and is intended as a diagnostic test for CAD.

The CT angiography scan takes about 15 minutes to perform, during which the heart rate must be maintained at 80 beats per minute or less, which may be accomplished with medications if necessary. The patient must also be able to hold his/her breath for short periods. The rapidly accumulated images are then processed into a 3-D reconstruction for interpretation and analysis. CT angiography has been proposed as a diagnostic test to identify and assess areas of coronary artery stenosis, as well as coronary artery bypass graft patency, coronary artery aneurysms, and vessel anomalies.

Limitations to CT angiography that have been identified include its inability to produce reliable images where arteries are heavily calcified, where cardiac arrhythmias may be present, and in patients with elevated heart rates.

NOTE: This policy does not address Coronary Computed Tomography Angiography and Selective Noninvasive Fractional Flow Reserve. (See Coronary Computed Tomography Angiography and Selective Noninvasive Fractional Flow Reserve, Policy #6.01.047).

Policy

Computed tomography (CT) of the heart and CT angiography (CTA) are considered **medically necessary** (see Policy Guidelines.).

Policy Guidelines

The following indications for use of CT of the heart and CTA are based on the Appropriateness Criteria established by the American College of Cardiology Foundation.

Computed tomography (CT) of the heart, with or without angiography, to evaluate cardiac structure and morphology for:

- Congenital heart disorders.
- Evaluation of pulmonary veins prior to a pulmonary vein isolation procedure for atrial fibrillation.
- Identification of coronary veins prior to insertion of a biventricular pacemaker.

Computed tomography angiography (CTA) using scanners of 64 slices or greater for evaluating coronary circulation:

- As an alternative to conventional invasive coronary angiography in patients who have had an equivocal stress ECG.
- For the evaluation of suspected congenital anomalies of the coronary circulation.
- For the evaluation of symptoms consistent with cardiac ischemia in patients determined to be at low to intermediate risk (Framingham criteria) for coronary artery disease.
- Not recommended for screening in asymptomatic patients

Update 2022:
A search of the peer-reviewed literature was performed from September 2019 through October 2022. Findings in the literature do not change the medically necessary indications for cardiac computed tomography and coronary CT angiography; therefore, the policy statement remains unchanged.

Update 2019:
A search of the peer-reviewed literature was performed from October 2017 through September 2019. Findings in the literature do not change the medically necessary indications for cardiac computed tomography and coronary CT angiography. Therefore, the policy is unchanged.

Update 2017:
A search of the peer-reviewed literature was performed from August 2015 through September 2017. Findings in the literature do not change the medically necessary indications for cardiac computed tomography and coronary CT angiography. Therefore, the policy is unchanged.

Update 2015:
A search of the peer-reviewed literature was performed from August 2013 through July 2015. Findings in the literature do not change the medically necessary indications for cardiac computed tomography and coronary CT angiography. Therefore, the policy is unchanged.

Update 2013:
A search of the peer-reviewed literature was performed from July 2011 through July 2013. Findings in the literature do not change the medically necessary indications for cardiac tomography and coronary CT angiography. Therefore, the policy is unchanged.

Update 2011:
A search of the peer-reviewed literature was performed from May 2009 through June 2011. Findings in the literature do not change the medically necessary indications for cardiac computed tomography and coronary CT angiography. Therefore, the policy is unchanged.

Update 2009:
The evidence in the peer reviewed medical literature for use of CTA (computed tomographic angiography) has continued to accumulate rapidly. The newer generation scanners employing 64-slice views have demonstrated a high degree of diagnostic accuracy in properly selected patients. A systematic review and meta-analysis by Mowatt and colleagues (2008) concluded that the 64-slice scanner showed high sensitivity and negative predictive value (NPV) across studies where the patient was the basis for the determination rather than the analyzable segments. The authors observed that the scanner is almost as good as the reference standard of invasive coronary angiography in detecting true positives for CAD (coronary artery disease), and not as good at false positives. It is estimated by some authors that a significant number of coronary angiograms can be avoided by the judicious use of CTA. Danciu et al (2007) studied 421 patients at intermediate risk for CAD with symptoms. All were given CTA and of that group, 78 were selected for CA (coronary angiography), 343 were medically managed. Of those that went for CA, 50 underwent immediate revascularization. The follow-up period was 15 months, during which another 3 revascularizations were done. The authors concluded that CTA can identify up to 80% of patients at low risk for cardiac events, in whom invasive CA can be avoided. A recent multi-center study by Miller et al (2008) reported NPV of 83%, with sensitivity of 85% and specificity of 90%. The cutoff point for calcium scores in this population, however, was 600, and it was not reported how many of the patients had these high calcium scores, which tends to lower the accuracy of coronary CT scanning. Gilard and colleagues (2007) conducted a prospective study evaluating the safety of ruling out CAD based solely on a normal CTA. The authors followed 141 "normal" patients for a mean 14.7 months, and reported that clinical endpoints (death, subsequent CA, and myocardial infarction) compared favorably with patients who had an invasive CA. The authors concluded that CTA safely rules out suspected CAD and allows patients to be managed less invasively. A similar conclusion was arrived at by Hausleiter, and colleagues (2007) based on the results of a large prospective trial (n=243). The patient population was divided between 16- and 64-slice scanners. The authors noted

a higher specificity for the 64-slice unit, based on a significantly lower number of inconclusive segments. When CTA is used to screen for heart disease in asymptomatic patients there is therefore a risk that a false positive finding may pose risk for harms from inappropriate invasive follow-up care. Its application as a screening procedure is therefore not supported. The American Heart Association (AHA) has determined that there is substantial exposure to ionizing radiation so as to constitute a very small, but present source of possible cancer. The AHA does not recommend CTA for screening in asymptomatic patients even though there may be risk factors but does allow that the benefits outweigh the risk in symptomatic patients. (Hendel et al, 2006) Therefore, there is an improvement in net health outcomes by triaging patients with chest pain using a non-invasive imaging procedure that reduces the number of invasive cardiac catheterizations.

Coronary computed tomography is appropriate for evaluation of pulmonary veins prior to a pulmonary vein isolation procedure for atrial fibrillation, congenital heart disorders, and for coronary vein mapping prior to placement of a biventricular pacemaker.

Ravipati and colleagues (2008) comparatively studied sensitivity, specificity, positive and negative predictive values of CTA as compared with stress testing in a cohort of 145 patients. The authors concluded that CTA demonstrated better results than stress testing on all measures.

Therefore, the recent peer-reviewed literature supports the medical necessity of computed tomographic angiography in a select group of patients. Other applications for CTA remain experimental / investigational.

Rationale (2005):
The most significant evidence for the technology would be expressed in terms of its specificity and negative predictive values. A number of studies have been undertaken to validate CTA, using methodologies which focused on either individual coronary vessels as the unit of analysis, or on the more clinically significant patient-based analysis. More recent studies have been conducted employing apparatus with 16 detector rows, but only four of these use the patient as the unit of analysis. Using evaluable coronary artery segments yields very high specificity and negative predictive values, whereas when the patient is the unit of analysis figures of specificity and negative predictive value fall significantly to ranges of 75-86% and 81-97% respectively. A further weakness of the current studies is that some of them eliminate vessels that are not evaluable from the data. These are arteries that create blurred images from calcification, which were not considered in calculations of sensitivity and specificity. Such vessels may or may not be significant for stenosis but excluding them from the dataset would skew values more in favor of the technology and obscure conclusions as to the effect on health outcomes. When this latter aspect has been addressed, one study found that only 74% of patients had all vessels evaluable by CTA. This would indicate that approximately one fourth of patients undergoing CTA would have results limited by technical considerations that could conceivably miss significant disease.

There is preliminary evidence that CTA is promising as an effective diagnostic tool, especially in light of the fact that more precise CT scanning devices are becoming available. It is predicted that this next generation of devices and those in the developmental stages will increase specificity and negative predictive values significantly, but this has yet to be documented in published studies. At the present time, there is insufficient evidence that CTA is equal to the current gold standard of catheter based coronary angiography.

Benefit Applications

NOTE: For FEP business, check the member's contract for benefits.

Provider Guidelines

These procedures should be reported with CPT® Category I codes for coronary CTA studies. The CPT® code for CTA of the chest (noncoronary), should not be reported for these procedures. CTA of the chest (noncoronary) would include procedures such as evaluation of the pulmonary arteries for a suspected pulmonary embolus or evaluation of a suspected aortic dissection.

Cross References to Related Policies and Procedures

6.01.003 Electron Beam Computed Tomography to Detect Coronary Artery Calcification, Policy
6.01.047 Coronary Computed Tomography Angiography and Selective Noninvasive Fractional Flow Reserve, Policy

References

The following were among the resources reviewed and considered in developing this policy. By reviewing and considering the resources, CareFirst does not in any way endorse the contents thereof nor assume any liability or responsibility in connection therewith. The opinions and conclusions of the authors of these resources are their own and may or may not be in agreement with those of CareFirst.

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