

## Coronary Computed Tomography Angiography (CCTA)

### DESCRIPTION

Coronary computed tomography angiography (CCTA) is a noninvasive imaging test that requires the use of intravenously administered contrast material and high-resolution, high-speed computed tomography (CT) machinery to obtain detailed volumetric images of blood vessels. It has been suggested that CCTA may help rule out coronary artery disease (CAD) and avoid invasive coronary angiography in individuals with low-to-intermediate pretest probabilities of CAD.

Different types of CT technology that can achieve high-speed CT imaging:

- Electron beam computed tomography (EBCT, also known as ultrafast CT) uses a rotating electron gun rather than a standard x-ray tube.
- Helical CT scanning (also referred to as spiral CT scanning) can also capture images at a higher speed than conventional CT by continuously rotating a standard x-ray tube around an individual in a continuous spiral, rather than individual slices.
- Multidetector row helical CT (MDCT) or multi-slice CT scanning, is a technological evolution of helical CT, which uses CT machines equipped with an array of multiple x-ray detectors that can simultaneously image multiple sections of the individual during a rapid volumetric image acquisition. MDCT machines currently in use have 64 or more detectors.

### POLICY

- Coronary computed tomographic angiography is considered **medically necessary** if the medical appropriateness criteria are met. **(See Medical Appropriateness below.)**
- Coronary computed tomographic angiography for all other indications is considered **investigational**.

See also: [Computed Tomography to Detect Coronary Artery Calcification](#)

### MEDICAL APPROPRIATENESS

- Coronary computed tomographic angiography (CCTA) is considered **medically appropriate** if **ALL** of the following are met:
  - Indicated for **ANY ONE** of the following:
    - Evaluation of suspected coronary artery disease if **ALL** of the following are met:
      - Symptomatic individual
      - Very low to intermediate risk on the pre-test probability assessment **(See table below)**
      - Indicated for **ANY ONE** of the following:
        - Individual is unable to perform exercise or pharmacologic imaging stress test
        - Stress test is uninterpretable, equivocal, or a false positive is suspected
        - CCTA will replace invasive coronary angiogram
    - Evaluation of post-CABG graft patency if **ALL** of the following are met:
      - Symptomatic individual
      - Imaging of native coronary artery anatomy is not necessary
    - Evaluation of bypass graft location for planned CABG revision
    - Symptomatic individual with unsuccessful conventional coronary angiography
    - Coronary artery anomalies suspected and **ANY ONE** of the following:
      - Persistent exertional chest pain and normal stress test



- Full sibling(s) with history of sudden death syndrome
- Full sibling(s) with documented anomalous coronary artery
- Resuscitated sudden death and contraindications for conventional coronary angiography
- New diagnosis of congestive heart failure or cardiomyopathy if **ALL** of the following are met:
  - No prior history of coronary artery disease
  - Ejection fraction less than 50 percent
  - Low or intermediate risk on pre-test probability assessment (**see table below**)
  - **ABSENCE** of **ALL** of the following since diagnosis
    - Cardiac catheterization
    - SPECT
    - Cardiac PET
    - Stress echocardiogram
- Equivocal coronary artery anatomy on conventional cardiac catheterization
- Preoperative assessment of coronary arteries for **ANY ONE** of the following surgeries:
  - Aortic dissection
  - Aortic aneurysm
  - Valvular surgery
- Evaluation of coronary arteries in **ANY ONE** of the following conditions:
  - Unexplained new onset of heart failure
  - New diagnosis of dilated cardiomyopathy
  - Vasculitis
  - Takayasu's Disease
  - Kawasaki's Disease
  - Ventricular tachycardia (6 beat runs or greater)
  - Cardiac trauma
- **ABSENCE** of **ALL** of the following:
  - Use in asymptomatic individuals
  - Evaluation of coronary arteries following heart transplantation
  - Evaluation of coronary stent patency
  - Evaluation of left ventricular function following myocardial infarction or in chronic heart failure
  - Used to identify plaque composition and morphology
  - Used for myocardial perfusion and viability studies
  - Preoperative assessment for non-cardiac, non-vascular surgery
  - Repeat or for use in follow-up of CAD
  - BMI of 40 or greater
  - Multifocal atrial tachycardia
  - Renal insufficiency
  - Irregular heart rhythms (e.g., atrial fibrillation/flutter, frequent irregular premature ventricular contractions or premature atrial contractions, and high grade heart block)

**Pre-Test Probability of CAD by Age, Gender, and Symptoms**

Age in Years	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-anginal Chest Pain	Asymptomatic
39 and younger	Men	Intermediate	Intermediate	Low	Very low
	Women	Intermediate	Very low	Very Low	Very low
40-49	Men	High	Intermediate	Intermediate	Low
	Women	Intermediate	Low	Very low	Very low
50-59	Men	High	Intermediate	Intermediate	Low



	Women	Intermediate	Intermediate	Low	Very low
60 and over	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low
<b>High:</b> Greater than 90% pre-test probability	<b>Intermediate:</b> Between 10% & 90% pre-test probability		<b>Low:</b> Between 5% & 10% pre-test probability		<b>Very low:</b> Less than 5% pre-test probability
<b>Typical angina (definite):</b> 1) Substernal chest pain or discomfort generally described as pressure, heaviness, burning or tightness that is 2) Generally brought on by exertion or emotional stress and 3) May radiate to the left arm or jaw.					
<b>Atypical angina (probable):</b> Chest pain or discomfort (arm or jaw pain) that lacks one of the characteristics of definite or typical angina.					
<b>Non-anginal chest pain:</b> Chest pain or discomfort that meets one or none of the typical angina characteristics.					

## IMPORTANT REMINDERS

- Any specific products referenced in this policy are just examples and are intended for illustrative purposes only. It is not intended to be a recommendation of one product over another, and is not intended to represent a complete listing of all products available. These examples are contained in the parenthetical e.g. statement.
- We develop Medical Policies to provide guidance to Members and Providers. This Medical Policy relates only to the services or supplies described in it. The existence of a Medical Policy is not an authorization, certification, explanation of benefits or a contract for the service (or supply) that is referenced in the Medical Policy. For a determination of the benefits that a Member is entitled to receive under his or her health plan, the Member's health plan must be reviewed. If there is a conflict between the Medical Policy and a health plan, the express terms of the health plan will govern.

## SOURCES

American College of Cardiology Foundation, Society of Cardiovascular Computed Tomography, American College of Radiology, American Heart Association, American Society of Echocardiography, American Society of Nuclear Cardiology, North American Society for Cardiovascular Imaging, Society for Cardiovascular Angiography and Interventions, Society for Cardiovascular Magnetic Resonance. (November 2010). 2010 ACCF/SCCT/ACR/AHA/ASE/ASNC/NASCI/SCAI/SCMR appropriate use criteria for cardiac computed tomography. Retrieved September 8, 2016 from <http://content.onlinejacc.org>

Andreini, D., Pontone, G., Pepi, M., Ballerini, G., Magini, A., Quaglia, C., et al. (2007). Diagnostic accuracy of multidetector computed tomography coronary angiography in patients with dilated cardiomyopathy. *Journal of American College of Cardiology*, 49 (20), 2044-2050. Abstract retrieved October 30, 2017 from PubMed database.

Berberie, R., Dockery, W., Johnson, K., Rosenthal, R., Stoler, R., & Schussler, J. (2006). Use of multislice computed tomographic coronary angiography for the diagnosis of anomalous coronary arteries. *American Journal of Cardiology*, 98 (3), 402-406. Abstract retrieved October 30, 2017 from PubMed database.

Budoff, M., Achenbach, S., Blumenthal, R., Carr, J., Goldin, J., Greenland, P., et al. (2006). Assessment of coronary artery disease by cardiac computed tomography. A scientific statement from the American Heart Association committee on cardiovascular imaging and intervention, council on cardiovascular radiology and intervention, and committee on cardiac imaging, council on clinical cardiology. *Circulation*, 114, 1761-1791.



**BlueCross BlueShield  
of Tennessee**

***Policy***

Medical Policy Manual

**Approved: Do Not Implement Until 2/21/18**

Schlosser, T., Konorza, T., Hunoid, P., Kuhl, H., Schermund, A., & Barkhausen, J. (2004). Noninvasive visualization of coronary artery bypass grafts using 16-detector row computed tomography. *Journal of American Cardiology*, 44 (6), 1224-1229. (Level 4 evidence)

**EFFECTIVE DATE**                      2/21/2018

ID\_EC/BT