

2011 Imaging Criteria

Computed Tomography (CT), Coronaries^(1, 2, 3*MDR, 4*RIN, 5, 6, 7)

ICD-9-CM: 87.41
 CPT: 75571
 I/O Setting: Outpatient

INDICATION(S)

100 Cardiac risk assessment/coronary calcium measurement

100 Cardiac risk assessment/coronary calcium measurement **[All]**^(8, 9)

110 Asymptomatic patient

120 Intermediate CAD risk **[One]**⁽¹⁰⁾

121 CAD risk by scoring algorithm **[One]**⁽¹¹⁾

-1 Predicted 10 yr risk by Framingham score $\geq 10\%$ and $< 20\%$ ⁽¹²⁾

-2 PROCAM total risk score > 54 ⁽¹³⁾

-3 Predicted 10 yr risk by SCORE $\geq 5\%$ ⁽¹⁴⁾

122 Risk factors for CAD **[Two]**^(15*RIN, 16)

-1 DM

-2 Family Hx of CAD at age < 60 ⁽¹⁷⁾

-3 Dyslipidemia

-4 HTN⁽¹⁸⁾

-5 Cigarette smoking

-6 Woman age > 55 /postmenopausal⁽¹⁹⁾

-7 Male age > 45

-8 Cocaine abuse⁽²⁰⁾

130 Send for secondary medical review^(21*MDR)

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Notes

(1)

These criteria include the following procedures:
Computed Tomography (CT), Cardiac, Ultrafast
Electron-Beam Computed Tomography (EBCT), Coronaries
Fast Computed Tomography (CT)
Multi-Detector Computed Tomography (MDCT), Coronaries

(2)

McKesson consultants identify this procedure as:
Secondary Medical Review Mandatory

(3)-MDR:

This is a procedure or indication that requires secondary medical review. These criteria have been developed to provide reviewers with a basis for proactively gathering and documenting patient specific clinical information that will facilitate secondary medical review.

(4)-RIN:

In situations where CT of the coronaries demonstrates an elevated coronary artery calcium score, further evaluation of the coronaries with CTA may be requested. For approval of CTA, see the "Computed Tomography Angiogram (CTA), Coronaries" criteria subset.

(5)

Coronary CT scanning has been advocated as a noninvasive screening procedure for detecting calcification representative of coronary atherosclerosis. Sensitivity in predicting obstructive disease is good (estimate of 95%), while specificity is low (66%) (Greenland et al., J Am Coll Cardiol 2007; 49(3): 378-402).

(6)

Coronary artery calcium scoring by CT is a noninvasive method used to screen patients for CAD. Cardiac calcification may be a surrogate marker for CAD and is usually encountered in advanced atherosclerotic disease. A score ≥ 400 places the patient in the high-risk category and risk-reducing therapy, including the use of statins and lifestyle changes, should be initiated. Not all calcified lesions obstruct the coronary artery or result in clinically significant stenosis, however. The concept that absence of coronary calcification excludes the possibility that a patient has obstructive coronary artery disease has also been challenged. The coronary calcium score is, therefore, an imperfect measure of atherosclerotic burden and the risk of CAD (Gottlieb et al., J Am Coll Cardiol 2010; 55(7): 627-634; Greenland et al., J Am Coll Cardiol 2007; 49(3): 378-402). Criticisms of the use of coronary artery calcium scores in practice has been the lack of a standardized protocol; the fact that data gathered is derived from studies using electron beam tomography, while multidetector computed tomography is used in practice; and the use of two different scoring systems, the Agatston score and volume scores. A variety of other factors including heart rate control and differing imaging technique can affect the results of a scan (Mao et al., J Comput Assist Tomogr 2009; 33(2): 175-178).

(7)

Many recommendations for using CT to assess coronary calcium are derived from either consensus or from studies done in Caucasians (Greenland et al., J Am Coll Cardiol 2007; 49(3): 378-402; Budoff et al., Circulation 2006; 114(16): 1761-1791). The Multi-Ethnic Study of Atherosclerosis (MESA) is a prospective cohort study designed to investigate subclinical cardiovascular disease in a multiethnic cohort of patients (McClelland et al., Circulation 2006; 113(1): 30-37). One question addressed in the MESA study was the value of age-gender based scores as compared to absolute calcium scores. While preliminary findings suggest the measurement of coronary artery calcium adds incremental value to the prediction of CAD, there is insufficient evidence at this time to support a conclusion as to whether age-gender based scores or absolute calcium scores provided greater value for screening for CAD (Budoff et al., J Am Coll Cardiol 2009, 53: 345-52; Detrano et al., N Engl J Med 2008; 358(13): 1336-1345).

(8)

Although observational studies have demonstrated that coronary artery calcium measured by CT provides information in addition to what is obtained through risk scoring algorithms (e.g., Framingham), prospective studies have not identified which subgroups would most benefit from this testing. Additional research is needed to determine the specific role and place of the coronary artery calcium score in the diagnostic process (Piers et al., BMC Cardiovasc Disord 2008; 8: 38).

(9)

In one large observational study, patients with cardiac risk factors who were free of known CAD were evaluated for coronary artery calcium by EBCT. During a 5 year follow-up, patients were monitored for all-cause mortality. In this cohort, calcium scores were a more sensitive predictor of death than the Framingham risk scoring process. The overall death rate for the entire group was 2.4%. There was a positive correlation between a high calcium score and increased mortality rate. Patients with calcium scores between 401 and 1000 or > 1000 had mortality rates of 6.3% and 12.3%, respectively (Shaw et al., *Radiology* 2003; 228(3): 826-833).

(10)

Patients may be classified into several categories of cardiac risk based on their 10-year risk estimates. Patients at low or high risk are not appropriate for coronary calcium determinations. Those deemed low risk require no intervention; high risk patients, such as those with diagnosed CAD or DM, should receive maximal medical therapy and determining coronary calcium burden would not influence a change in treatment (Greenland et al., *J Am Coll Cardiol* 2007; 49(3): 378-402; Budoff et al., *Circulation* 2006; 114(16): 1761-1791).

(11)

In Europe, two risk scoring algorithms, PROCAM and SCORE, have been developed. Similar to Framingham, both provide a formula for calculating cardiac risk over time. Caution must be exercised when applying any of the algorithms to populations which are dissimilar to the original cohort used in the algorithm's development. One systematic review, which looked at the accurate prediction of cardiac risk when using the Framingham risk scoring method in different populations, found that it underestimated cardiovascular risk in populations with high baseline CAD mortality and overestimated the risk in populations with low CAD mortality rates. When attempting to reduce a patient's cardiovascular risk, the patient-medical practitioner relationship remains a major component to a successful outcome and the use of a risk scoring tool can assist in targeting which patients receive the appropriate preventive interventions (Brindle et al., *Heart* 2006; 92(12): 1752-1759).

(12)

Framingham is a commonly used scoring algorithm in the U.S. The tool assigns numerical values based on gender, age, cholesterol levels (total, HDL, and LDL), blood pressure, presence or absence of DM, and cigarette smoking status. Tallying the numbers provides an individual with a score which can be used to estimate their risk of having a coronary event within the next 10 years. Three levels of risk are possible: low < 10%, high > 20%, and intermediate between 10% and 20%.

(13)

The Prospective Cardiovascular Munster (PROCAM) Study developed a risk scoring system to predict global risk of MI occurring within 10 years. A cohort population was followed for 10 years and was limited to middle-aged men living and working in Germany. A PROCAM score > 54 corresponded to > 20% risk of MI or sudden coronary death. These patients were targeted for lipid-lowering therapy (Assmann et al., *Circulation* 2002; 105(3): 310-315). Key factors included in the PROCAM risk assessment which are not used in the Framingham assessment include a family history of heart disease and triglyceride levels (Vrentzos et al., *Int J Clin Pract* 2007; 61(10): 1643-1653).

(14)

The Systematic Coronary Risk Evaluation (SCORE) system was developed as a tool to manage cardiovascular risk in European clinical practice. Factors used in creating this system include total cholesterol, total and HDL cholesterol ratio, systolic BP, age, gender, and smoking status. Within the European community, an individual country's cardiovascular mortality rate classifies them as either low or high. Cardiovascular risk-reduction therapy (e.g., statin administration) is initiated when the 10-year risk of a fatal cardiovascular event (e.g., MI, CVA, AAA) is $\geq 5\%$ (Graham et al., *Eur Heart J* 2007; 28(19): 2375-2414; Conroy et al., *Eur Heart J* 2003; 24(11): 987-1003). The European guidelines for cardiovascular prevention do not identify a SCORE value for which patients should be screened for increased coronary artery calcium. Until prospective studies are completed which will delineate this information, clinical judgment serves as the basis for decision making (Graham et al., *Eur J Cardiovasc Prev Rehabil* 2007; 14 Suppl 2: S1-113).

(15)-RIN:

Patients with more than two risk factors for coronary heart disease are considered high-risk and are, therefore, not candidates for coronary artery calcium evaluation.

(16)

A variety of new or emerging risk factors that have the potential to improve global risk assessment for coronary artery disease are being studied. Among these, C-reactive protein, obesity, metabolic syndrome, and coronary artery calcium in particular are the subjects of intense research and scrutiny for their impact. While research continues, these novel approaches to risk assessment are not universally accepted (Helfand et al., *Ann Intern Med* 2009; 151(7): 496-507).

(17)

Patients are considered to have increased risk for CAD when a first-degree blood relative (e.g., sibling, parent, child) was diagnosed with a cardiac condition (e.g., MI, sudden cardiac death, positive stress test) or underwent a cardiac procedure (e.g., revascularization) before the age of 60.

(18)-DEF:

Hypertension is defined for these criteria as systolic BP > 140 mmHg or diastolic BP > 90 mmHg. In patients with chronic kidney disease or with DM, hypertension may be defined as systolic BP ≥ 130 mmHg or diastolic BP ≥ 80 mmHg.

(19)

At present, hormone therapy is not recommended for the sole or primary indication of coronary protection for women of any age (North American Menopause Society, Menopause 2010; 17(2): 242-255). The question of whether HRT provides cardioprotective benefit in postmenopausal women has been the subject of intense scrutiny, especially in light of the potential risks of such therapy. A systematic review looked at major studies, such as the Heart and Estrogen/Progestin Replacement study (HERS) and the Women's Health Initiative (WHI) study, which evaluated the use of HRT in prevention of chronic diseases including cardiovascular disease. The authors concluded that data did not show significant benefit of HRT over use of placebo in prevention, and in fact some of the data on healthy women who were on continuous HRT for one or more years actually showed significantly higher rates of coronary events (Farquhar et al., Cochrane Database Syst Rev 2009; (2): CD004143). Secondary analysis of the data from the WHI study supports short-term use of HRT for postmenopausal symptoms. Also, women who initiated hormone therapy for symptoms closer to menopause tended to have reduced coronary heart disease risk compared with the increase in coronary heart disease risk among women more distant from menopause (Rossouw et al., JAMA 2007; 297(13): 1465-1477).

(20)

Cocaine has multiple cardiovascular and hematologic effects. Use of this illicit drug leads to the potential for increased myocardial oxygen demand by increasing heart rate, blood pressure and contractility; decreasing oxygen supply through vasoconstriction; and contributing to thrombosis formation by stimulating platelet activation. It also is believed to accelerate atherosclerosis (McCord et al., Circulation 2008; 117(14): 1897-1907).

(21)-MDR:

The use of CT, either by multidetector or electron beam, to noninvasively assess the risk of cardiac disease in asymptomatic patients is a rapidly emerging and controversial technology. Current data on this imaging modality are derived predominantly from observational studies and do not provide information on long-term outcomes. While some current studies suggest that coronary artery calcium measurement may provide incremental value in reclassifying patients to a higher risk status (based on a high coronary artery calcium score), it remains unclear whether coronary artery calcium scanning has a favorable effect on clinical outcomes (Bonow, N Engl J Med 2009; 361(10): 990-997; Helfand et al., Ann Intern Med 2009; 151(7): 496-507; Greenland et al., J Am Coll Cardiol 2007; 49(3): 378-402). Therefore, until data suggest a positive impact on clinical outcome, requests for coronary CT require secondary medical review.