

Clinical Appropriateness Guidelines: Diagnostic Coronary Angiography

Appropriate Use Criteria

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Proprietary

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Description and Application of the Guidelines



AIM's Clinical Appropriateness Guidelines (hereinafter "AIM's Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based, where possible, criteria for medical necessity determinations. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of healthcare
- To promote the most efficient and cost-effective use of services

AIM's guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up to date clinical principles and best practices. Relevant citations are included in the "References" section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of AIM's Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of AIM's Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

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CPT Codes

- 93454..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation
- 93455..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) including intraprocedural injection(s) for bypass graft angiography
- 93456..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right heart catheterization
- 93457..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) including intraprocedural injection(s) for bypass graft angiography and right heart catheterization
- 93458..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed
- 93459..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed, catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) with bypass graft angiography
- 93460..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right and left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed
- 93461..... Catheter placement in coronary artery(s) for coronary angiography, including intraprocedural injection(s) for coronary angiography, imaging supervision and interpretation; with right and left heart catheterization including intraprocedural injection(s) for left ventriculography, when performed, catheter placement(s) in bypass graft(s) (internal mammary, free arterial, venous grafts) with bypass graft angiography

Standard Anatomic Coverage

- Coronary arteries

Imaging Considerations

- This guideline does not supersede the enrollee's health plan medical policy specific to diagnostic coronary angiography.
- In addition to coronary angiography, diagnostic cardiac catheterization may include any or all of the following: left heart catheterization, right heart catheterization, left ventriculography, right ventriculography, aortography and intracardiac shunt studies. Only procedures which provide clinically relevant information should be performed at the time of coronary angiography.
- Selection of the optimal diagnostic imaging for cardiac evaluation should be made within the context of other available modalities (which include treadmill stress test, myocardial perfusion imaging, stress echocardiography, cardiac CT, cardiac MRI and Cardiac PET), so that the resulting information facilitates patient management decisions and does not merely add a new layer of testing.
- Duplicative testing or repeat imaging of the same anatomic area with same or similar technology may be subject to high-level review and may not be medically necessary unless there is a persistent diagnostic problem or there has been a change in clinical status (e.g., deterioration) or there is a medical intervention which warrants interval reassessment.

- Although the risk benefit ratio for any procedure should dictate clinical appropriateness on a case by case basis, advanced age, advanced renal disease advanced malignancy or coagulopathy should be considered relative contraindications to coronary angiography.
- Providers who refer patients for coronary angiography and those who perform such procedures are responsible for considering safety issues. One of the most significant considerations is the requirement for intravascular iodinated contrast material, which may have an adverse effect on patients with a history of documented allergic contrast reactions or atopy, as well as on individuals with renal impairment, who are at greater risk for contrast-induced nephropathy.
- Since coronary angiography requires the use of fluoroscopy, it is critically important that every effort be made to minimize both patient and laboratory staff exposure to ionizing radiation.

Requirements for Diagnostic Coronary Angiography

- Elective coronary angiography is generally to be considered only when a patient has undergone noninvasive evaluation.
- Coronary angiography requires conscious sedation; it should only be performed at locations where cardiac monitoring and appropriate equipment for cardiopulmonary resuscitation are readily available.
- Coronary arteriography is never clinically appropriate when used as a screening test in asymptomatic individuals.

Table 1: Classification of EKG treadmill test results (performed without imaging)*

Low risk EKG treadmill test result	Duke treadmill score $\geq +5$
Intermediate risk EKG treadmill test result	Duke treadmill score -10 to +4
High risk EKG treadmill test result	Duke treadmill score ≤ -11 ; OR ST segment elevation; OR Hypotension with exercise; OR Ventricular tachycardia; OR Prolonged ST segment depression

Table 2: Classification of results of stress tests performed with imaging*

	SPECT MPI or Stress PET	Stress Echocardiography
Low risk	$< 5\%$ ischemic myocardium	No stress induced WMA
Intermediate risk	$5\% - 10\%$ ischemic myocardium	Stress induced WMA in a single segment
High risk	$> 10\%$ ischemic myocardium Stress induced WMA in ≥ 2 segments; OR TID; OR Significant stress induced LV dysfunction	Stress induced WMA in ≥ 2 segments; OR TID; OR Significant stress induced LV dysfunction

MPI = myocardial perfusion imaging; TID = transient ischemic LV dilation; WMA = wall motion abnormality

Table 3: Pre-test probability of coronary artery disease by age, gender and symptoms*

Age (yr)	Gender	Typical/Definite Angina Pectoris	Atypical/Probable Angina Pectoris	Non-Anginal Chest Pain	Asymptomatic
30-39	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
60-69	Men	High	Intermediate	Intermediate	Low
	Women	High	Intermediate	Intermediate	Low

*Table 1, Table 2, and Table 3 are excerpted from the ACCF/SCAI/AATS/AHA/ASE/ASNC/HFSA/HRS/SCCM/SCCT/SCMR/STS 2012 Appropriate Use Criteria for Diagnostic Catheterization (Patel, 2012).

Common Diagnostic Indications for Coronary Angiography

Patients with Established Coronary Artery Disease (CAD)

- Asymptomatic patients with high-risk findings on noninvasive stress testing (see Tables 1 and 2); **OR**
- Symptomatic patients with **any of the following**
 - Intermediate or high-risk findings on noninvasive stress testing (see Tables 1 and 2); **OR**
 - Persistent symptoms despite use of (or contraindication to) guideline directed antianginal medical therapy; **OR**
 - Angina, heart failure, or arrhythmia within 90 days of myocardial infarction when coronary angiography was not performed at the time of the infarction

Patients with Suspected CAD

- Asymptomatic patient with **any of the following**
 - High-risk findings on noninvasive stress testing (see Tables 1 and 2); **OR**
 - Resting LV systolic dysfunction (ejection fraction 40% or less) with evidence of viability in the dysfunctional segment; **OR**
 - Lesions of unclear severity (left main) on CCTA
- Symptomatic patient with **any of the following**
 - High pretest probability (see Table 3) of CAD based on (age, gender and symptom description) in a patient who has high-risk of cardiac death (SCORE risk > 5%); **OR**
 - Intermediate or high-risk findings on noninvasive stress testing (see Tables 1 and 2); **OR**
 - Low-risk findings on noninvasive stress testing (see Tables 1 and 2) in patient with ongoing ischemic equivalent symptoms; **OR**
 - Equivocal or uninterpretable noninvasive stress testing; **OR**
 - Resting LV systolic dysfunction (ejection fraction 40% or less) with evidence of viability in the dysfunctional segment; **OR**
 - Newly recognized LV systolic dysfunction (ejection fraction < or = 49%) of unknown etiology; **OR**
 - Newly recognized regional wall motion abnormality of unknown etiology (regardless of ejection fraction); **OR**
 - CCTA finding of > 50% stenosis; **OR**
 - Lesions of unclear severity (left main or non left main) on CCTA

Patients with either Suspected or Established CAD

- Patients resuscitated from sudden cardiac death or with documented ventricular fibrillation or sustained ventricular tachycardia; **OR**
- Following cardiac transplant in a patient who has not undergone coronary angiography in the preceding six months; **OR**
- Patients scheduled to undergo valve replacement/repair who fall into **any of the following** categories:
 - Male > 40 years; **OR**
 - Women who are postmenopausal; **OR**
 - Persons with known CAD; **OR**
 - Persons with moderate or high risk of CAD (based on established risk calculations such as SCORE or Framingham); **OR**
- Congenital heart disease with suspected coexistent CAD and **either of the following**
 - To exclude coexistent atheromatous CAD in patients undergoing surgical repair of congenital heart disease who have moderate or high risk of CAD (SCORE); **OR**
 - To evaluate patients with suspected congenital anomalous coronary artery abnormalities

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