Editor's Note

When Should Patients with Chest Pain Be Referred for Coronary Angiography?

Key words: chest pain, coronary angiography

The general indication for coronary angiography is the need to know the anatomic pathology of the coronary arteries. In 1975, Gofreddo Gensini stated, “The primary goal of coronary arteriography is the identification, localization, and assessment of obstructive lesions present within the arteries of the heart.”¹

A proper angiogram can yield the following information:

1. Anatomic pathology, which includes the stenosis percent narrowing, its location and morphology, and the condition of the distal vessel.
2. Physiology related to anatomy, which includes regional and global left ventricular (LV) function, TIMI flow, microcirculatory flow, and collateral blood flow.

In this editorial, I will address the following conditions:

1. Chronic stable angina
2. Suspicion of coronary artery spasm
3. Acute coronary syndromes
4. Chest pain of uncertain etiology
5. Positive stress test without symptoms
6. Computed tomography positive for calcium in the coronary arteries.

Chronic Stable Angina

The Class 1 indications for coronary angiography in chronic stable angina patients are Canadian Cardiovascular Class 3 or 4 despite medical therapy, LV dysfunction, strongly positive stress test, sudden cardiac death or ventricular tachycardia (VT) survival, and angina plus heart failure symptoms.²

Class 2A indications are uncertain diagnosis after stress testing when it is important to know diagnosis; disability, illness, or obesity that precludes stress testing; the requirement of a definite diagnosis for the patient's occupation; and stress testing that is inadequate for prognosis.

Class 3 indications (nonindications) for stable angina patients are risk greater than benefit and absence of ischemia in patients responding to medical management.

Suspicion of Coronary Artery Spasm

To make the diagnosis of coronary artery spasm, one needs to document transient coronary artery constriction either spontaneously or following ergometrine or acetylcholine infusion, with associated symptoms and preferably transient ST-segment elevation.³

Acute Coronary Syndromes

Unstable Angina Non-ST-Segment Elevation Myocardial Infarction (NSTEMI)

Class 1 indications for this group of patients are related to risk.⁴ Those at high risk include patients with new ST-segment depression; elevated biomarkers, for example, CRP, TnT, CK; refractory angina (ischemia) despite intensive anti-ischemic therapy; and refractory angina plus heart failure symptoms (may be due to mitral regurgitation); high-risk findings on stress testing; ejection fraction <40%; angina plus hypotension; sustained VT; percutaneous coronary interventions (PCI) within six months; and prior coronary artery bypass graft surgery.

In the same group of patients without high-risk indicators as outlined above, coronary angiography is indicated if revascularization is planned early or at a later time.

Class 2A indications for coronary angiography are early invasive strategy in a patient with repeated acute coronary syndromes who is undergoing good medical therapy without ongoing ischemia—that is, the stabilized patient with other high-risk indicators.

Class 3 (nonindications) includes patients with extensive co-morbidities that render the risk of revascularization greater than its benefit, and those with acute chest pain not likely due to myocardial ischemia.

ST-Segment Elevation Myocardial Infarction (STEMI)

Class 1 indications for acute PCI are the following:⁵

1. As an alternative to fibrinolytic therapy in patients with ST-elevation MI or a new left bundle-branch block oc-

curing within 12 h of symptoms or persistent pain, performed in a timely fashion (<90 min), by experienced operators in an appropriate laboratory environment;

2. In cardiogenic shock patients <75 years of age.

Class 2 indications for acute PCI in patients with STEMI are an indication for reperfusion therapy but a contraindication to thrombolytic therapy.

Class 2B indications for acute PCI in patients with STEMI are obvious acute MI within 12 h of symptoms, but patent infarct-related artery with <TIMI 3 (normal) flow.

Class 3 indications (nonindications) for acute PCI in patients STEMI are presentation >12 h after symptoms and no ischemia; following thrombolysis and no ischemia; or when a skilled operator with surgical backup is not available.

Chest Pain of Uncertain Etiology

The differential diagnosis in this category is broad and does require an experienced clinician to evaluate the patient whose diagnosis remains uncertain. Differential diagnoses include aortic dissection, pericarditis, especially with ST-segment elevation; GI problems, for example, esophageal spasm; pneumothorax; pulmonary infarction; pleurisy; and musculoskeletal problems.

The Asymptomatic Patient with a Positive Stress Test

The indications for angiography in asymptomatic patients with positive stress tests are positive stress test at a low cardiac workload, ventricular arrhythmias during or after exercise, hypotension during exercise, and a large at-risk area as determined by electrocardiography (ECG), perfusion, or wall motion abnormalities.

Calcium Detected in the Coronary Arteries by Computed Tomography

In itself, calcium detected in the coronary arteries is not an indication for angiography. However, it is a strong indication for aggressive risk-factor modification, since the presence of calcium equals the presence of atherosclerosis. In my opinion, angiography is indicated if there is evidence for a flow-limit-

ing stenosis in the coronary circulation; this can be assessed by stress, ECG, nuclear, or echocardiographic studies.⁶

Summary

When evaluating patients with possible coronary artery disease, it is necessary to combine physiologic assessment (measurements of ischemia) with anatomic pathologic assessment (coronary angiography).

Coronary angiography currently is the only way to assess the anatomic pathology of the coronary circulation with precision. When it is combined with ventriculography and tests for myocardial ischemia, one can make clinical decisions related to the significance of the coronary artery disease observed. Common sense really demands that coronary angiography is only indicated when the information derived from this diagnostic procedure will facilitate therapeutic decisions in the individual patient.

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