Coronary Ostial Stenosis

By Charles L. Pritchard, D.O., J. Gerard Mudd, M.D., and Hendrick B. Barnier, M.D.

SUMMARY
Symptomatic, nonsyphilitic, acquired coronary ostial stenosis is a rare angiographic finding and was found in 0.13% of 3000 coronary angiograms. Three females with this lesion have been treated surgically. Two had left coronary ostial involvement. Coronary angiography may result in catheter tip occlusion of the ostium with chest pain, dyspnea, diaphoresis, systemic hypotension and abrupt fall in pressure at the catheter tip. Recognition of this entity is necessary for safe coronary angiography. Involvement of the left ostium carries the same serious prognosis as does left main coronary disease.

Additional Indexing Words:
Coronary artery disease  Myocardial revascularization  Coronary angiography
Left main coronary artery disease

With the increasing prevalence of and experience with coronary angiography, uncommon lesions are now being recognized. In the minds of many, narrowing of the coronary arterial ostia is a manifestation of syphilitic aortitis. To underscore the occurrence of nonsyphilitic coronary ostial stenosis three cases which have been treated surgically are reported.

Methods
The studies performed on patients were carried out during the routine diagnosis and treatment of their illnesses and signed informed consent was obtained prior to each procedure. Cardiac catheterization was performed on all patients using the Judkins technique. Prior to coronary angiography, all patients were given sublingual nitroglycerin. After encountering the ostial stenosis, the catheter tip was removed and the nitroglycerin repeated to diminish the risk of coronary artery spasm.

Report of Cases
Case 1
A 37-year-old female was admitted to St. Louis University Medical Center in August 1970 for evaluation of a three-year history of recurrent substernal chest pain. The admitting laboratory data, lipid profile and physical examination were within normal limits. The VDRL was nonreactive. The ECG revealed sinus bradycardia and incomplete right bundle branch block. A treadmill maximum exercise test was positive with 2 mm depression of the ST segments. Cardiac catheterization revealed a normal left ventriculogram and an 80% stenosis of the ostium of the left coronary artery. The other coronary arteries were normal.

On September 20, 1970 the patient underwent bypass grafting with a saphenous vein to the left anterior descending coronary (LAD). Six months later the patient was shown to have a normal maximum stress test and a patent vein graft by angiography. One year postoperatively she had a sudden recurrence of her angina and angiograms demonstrated total occlusion of the vein graft. It was later documented that the occlusion was due to an aspergilloma. After a second graft procedure, the patient again had relief of her angina and has remained free of angina to this writing.

Case 2
A 57-year-old white female was hospitalized in August 1973 with an eight-month history of dyspnea on exertion, associated chest pain and an episode of congestive heart failure one month previously. She was also known to have hypertension over the past three to four years. The blood pressure was 160/40 mm Hg and there was a bounding "water hammer" pulse of 70/min. There was a grade III/VI early holosystolic murmur heard along the left sternal border and aortic area. There was a grade II/VI early to mid diastolic murmur heard along the left sternal border. The ECG showed diffuse anterolateral ischemia. The VDRL was nonreactive.

Cardiac catheterization confirmed the presence of aortic insufficiency with no systolic gradient across the aortic valve and a normal ventriculogram. Coronary angiography documented diffuse coronary artery disease with 70% stenosis of the proximal LAD and diffuse disease approximating 30-50% throughout the circumflex and distal LAD. The ostium of the right coronary was 95% stenotic (fig. 1).

The patient underwent aortic valve replacement and a bypass procedure using the left internal mammary artery (IMA) to the LAD and the right IMA to the right coronary. At operation the aorta and annulus were not dilated and the valve appeared incompetent and fibrotic. Microscopic examination confirmed the presence of fibrosis without the presence of calcium. Following operation she has had relief of dyspnea and angina. Postoperative angiography demonstrated patency of both grafts.
Case 3

A 47-year-old white female was hospitalized in September 1973 with a one-month history of chest pain occurring with exertion. The admitting laboratory values, lipid profile and physical examination were normal. The VDRL was nonreactive. Cardiac catheterization revealed a normal coronary angiogram except for a 90% stenosis of the left coronary ostium (fig. 2). The patient underwent a bypass procedure using the left IMA to the LAD. Postoperative angiograms revealed the IMA to be patent and the patient has had relief of her angina.

Discussion

Symptomatic, nonsyphilitic, acquired coronary ostial stenosis is a rare lesion having been recognized in 4/3000 coronary angiograms in our clinic in the years 1969 to 1973. This incidence (0.13%) is consistent with the experience of Cohen (3/1200 angiograms, 0.25%). Lavine, on the other hand, studied 30 patients with 70% or more obstruction of the left anterior descending coronary and found that four had left coronary ostial stenosis.

Although ostial stenosis is not often recognized clinically, Enos and associates have documented the frequent involvement of the aortic sinuses of Valsalva by arteriosclerosis. Mild to moderate arteriosclerosis of the sinuses has been found in the hearts of soldiers dying in action and severe involvement has been found in autopsied patients who averaged 70 years of age. The sinus of the right coronary artery is more frequently and severely involved than is the sinus of the left. Microscopically the changes are similar to those seen elsewhere in the arteriosclerotic aorta.

Coronary angiography in the presence of ostial stenosis carries the risk of catheter occlusion of the ostium. This results in a syndrome of abrupt fall in pressure at the catheter tip (fig. 3), chest pain, dyspnea, diaphoresis and a fall in systemic blood pressure which was recognized in the two patients with left coronary stenosis. Recognition of this situation and prompt withdrawal of the catheter relieves symptoms. These patients can have safe coronary angiography by rapid selective or subselective injection with careful attention given to the position of the catheter tip by monitoring catheter tip pressure.

Two of our patients probably represent "premature" atherosclerosis of the left coronary ostium as they were relatively young and their coronary arteries were relatively normal. The third patient was older, had left coronary disease and right ostium involvement which is most prevalent in the autopsied material. Our experience would suggest that females are more liable to have this lesion.

Figure 1
A high grade stenosis of the right coronary ostium is apparent at the catheter tip (case 2).

Figure 2
The left coronary ostial stenosis can be appreciated at the catheter tip in this right anterior oblique projection (case 3).

Figure 3
Retouched tracing (paper speed, 25 mm/sec) of coronary pressure showing the abrupt decline as the catheter occluded the left ostium. There is systemic hypotension revealed in the initial cardiac cycles after withdrawal of the catheter into the aorta. The upper ECG tracing of the standard lead II demonstrates prominent symmetrical T wave inversion in relation to catheter occlusion of the ostium (case 1).
Obviously, lesions of the left ostium carry the same grave prognosis, which has become well recognized,²,³ as lesions of the left main coronary artery. This has motivated our surgical approach to these patients and the aggressive stance in case 1.

Addendum

Since preparation of this manuscript, all three patients have been restudied one year postoperatively. We have found them to be free of angina with their original ostial stenoses still present and their bypass grafts patent.

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C L Pritchard, J G Mudd and H B Barner

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