

Editorial Comment

The Place of Transluminal Coronary Angioplasty in the Management of Variant Angina: A Warning*

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It is now generally accepted that both fixed and dynamic coronary artery narrowing contribute to the origin of myocardial ischemia in the majority of patients. However, it is my belief that use of the term "variant angina" should be restricted to patients reporting ischemic chest pain occurring at rest or during ordinary activity, not related to the intensity of exertion *and* without limitation of exercise tolerance because of pain. Within this definition it is important to distinguish between two groups of patients: those with a long history of nonexertional angina without angina of effort or previous infarction and those with recent onset severe chest pain at rest, most commonly preceded by effort angina or infarction, or both (1). The former group will almost invariably be found to have normal or near normal coronary arteriograms, whereas the latter will have hemodynamically important proximal stenoses of one or more coronary arteries. In almost all cases the ambulatory or rest electrocardiogram will reveal ST segment elevation or depression during episodes of pain (2). I believe that the term "coronary spasm" should be restricted to transient, profound coronary narrowing which may be focal or diffuse. Spasm should be diagnosed at angiography, during spontaneous attacks or after provocation with ergonovine maleate. It is obvious from the above definitions that coronary artery vasomotion plays a variable role in the genesis of myocardial ischemia among these patients (2).

Prevention and treatment of myocardial ischemia. The goal of therapy for patients with *proven* coronary artery spasm should be the prevention of myocardial ischemia rather than the prevention of recurrent attacks of angina, because myocardial ischemia can occur in the absence of

chest pain (3). This requires careful monitoring over time for ST segment shifts. In these patients, the identification of multiple episodes of myocardial ischemia, some of which are asymptomatic, suggests a variable degree of reversible narrowing. Management of the unstable patient should be started with intravenous nitroglycerin. Long-acting sublingual, oral or topical nitrates are also of demonstrated efficacy, but should be reserved for the less acutely ill patient and for those who have been stabilized by intravenous therapy. Selective beta-blocking drugs may be used cautiously in patients already taking a vasodilating agent. The slow (calcium) channel blockers are extremely potent coronary vasodilating agents and are very effective in the treatment of variant angina. However, patients with associated hemodynamically important and fixed proximal obstructions may also benefit from coronary angioplasty. How should these patients be selected?

Role of coronary angioplasty. Percutaneous transluminal coronary angioplasty was introduced as a treatment for coronary artery disease in 1977 (4). Angioplasty is currently considered to be the treatment of choice for patients with significant disability, despite adequate medical therapy, who have proximal, severe single vessel disease. Experience has proven the procedure to be effective and relatively safe in properly selected patients when performed by experienced operators. Bredlau et al. (5) prospectively recorded all in-hospital complications of the first 3,500 consecutive patients to undergo elective angioplasty at Emory University Hospital. Multiple lesion angioplasty was performed in only 11%. Isolated, minor complications occurred in 6.9%, and major complications (emergency surgery, myocardial infarction or death) were observed in 4.1%. There were two surgical and two nonsurgical deaths, giving a total mortality of 0.1%. About twice this number of major complications and several times the number of deaths can be expected in less experienced hands (6,7).

Angioplasty in fixed versus dynamic coronary stenosis. The *qualitative* interpretation of coronary stenosis assessed by percent reduction of luminal diameter correlates poorly with the physiologic effect of stenosis, as assessed by the reactive hyperemic response of coronary flow velocity (Doppler technique) at operation after 20 seconds of coronary artery occlusion (8). Both overestimation and underestimation of lesions with less than 60% stenosis are common. Underestimation of lesion severity occurs in 95% of vessels with greater than 60% stenosis. This has particular pertinence to the study by Bertrand et al. (9) in this issue of the Journal. They compared the results of percutaneous transluminal coronary angioplasty in a group of 132 patients with fixed atherosclerotic narrowing and in a group of 97 patients with dynamic coronary stenosis (ergonovine-in-

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duced spasm superimposed on fixed stenosis). Sixty percent or greater stenosis was used as the single *anatomic* criterion for selection. All patients underwent follow-up angiography. The rate of restenosis (defined as a loss of 50% of the initial gain) was significantly higher in patients with combined fixed and dynamic coronary stenosis (35 versus 22%, $p < 0.05$). In addition, patients with fixed stenosis alone were more apt to remain asymptomatic after restenosis than those with combined fixed and dynamic narrowing (38 versus 15%).

Because visual interpretation of the coronary arteriogram may not accurately predict the physiologic importance of a *fixed* coronary stenosis, the decision to perform angioplasty must be made with great care and can be made more accurate if minimal cross-sectional area can be measured as well as percentage narrowing (10). The additional problem in patients with variant angina and combined fixed and dynamic narrowing is to determine what part of the visualized obstruction is *reversible* by intravenous or intracoronary nitroglycerin and which part is not. The study of Bertrand et al. has contributed to our understanding of the potential benefits of percutaneous transluminal coronary angioplasty in patients with fixed and dynamic stenosis. However, the selection of patients and the results of the study might have been different if absolute diameter at the site of narrowing and pressure gradients had been measured before and after the intracoronary administration of nitroglycerin in patients with a dynamic component to stenosis.

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