The High-Risk Unstable Angina Patient
An Approach to Treatment

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Summary
Unstable angina, an intermediate stage in acute coronary ischaemic syndromes, accounts for about 50% of all admissions to the coronary care units in the United States today. It may progress to myocardial infarction in 15% of cases in the first 2 days, and the in-hospital mortality rate is 5%. The pathological hallmark of this syndrome, confirmed by angioscopy, is fissure of the atherosclerotic plaque within the coronary artery, leading to platelet adhesion and aggregation and fibrin-platelet thrombus formation, which may accelerate progression of the stenotic lesion.

Management of unstable angina is aimed at ameliorating symptoms and reducing ischaemia, improving ventricular function, preventing recurrent ischaemia, myocardial infarction and death, and lastly, containing progression of the underlying coronary artery disease. Acute management includes bedrest, aspirin, heparin, nitroglycerin (glyceryl trinitrate) infusion and β-blockers and calcium channel blockers in selected cases. After the patient is clinically stabilised, provocative tests and angiography may be performed, to be followed by angioplasty or bypass surgery, if necessary. In cases that are refractory to optimal medical therapy, interventions should be performed on a more emergent basis. Long term management includes aspirin and β-blockers, if there is prior infarction, and control of the conventional risk factors.
Unstable angina is an intermediate stage in the broad spectrum of acute myocardial ischaemic syndromes and accounts for approximately 50% of all admissions to coronary care units in the United States today. This spectrum ranges from asymptomatic myocardial ischaemia to sudden cardiac death. During its acute course, unstable angina may tilt towards either of these ends. The incidence of progression of unstable angina to myocardial infarction is estimated at 15% within the first 2 days with an in-hospital mortality rate of about 5% (Mulcahy 1985). Angioscopy, in addition to angiographic and pathological studies, has increased our knowledge about the complex pathophysiological mechanisms involved in this syndrome (Forrester et al. 1987; Shah 1991). Our focus is on pathophysiology of unstable angina and the current therapeutic strategies targeted at the unstable coronary lesion.

1. Definition

Unstable angina is defined as the abrupt onset of ischaemic symptoms in a patient with no prior history of coronary artery disease, dramatic intensification or change in the pattern of ischaemic symptoms in a patient with a history of coronary artery disease, or the recurrence of ischaemic symptoms soon after acute myocardial infarction (Shah 1991). The diagnosis of unstable angina is usually made on clinical grounds. However, supportive evidence of brief myocardial ischaemia as suggested by transient electrocardiographic changes and previously known coronary artery disease increases the accuracy of the clinical diagnosis, and makes it helpful in excluding noncardiac causes of chest pain.

2. Pathophysiology

Angiographic studies have shown that patients with stable and unstable angina do not differ in the severity of coronary artery disease (the number of vessels with a significant stenosis, the percentage diameter stenosis, the minimal diameter stenosis, the length of stenosis and the presence or absence of collaterals) [Alison et al. 1978; Fuster et al. 1975; Wilson et al. 1986]. However, the morphology of the lesion in the culprit coronary artery, examined by antemortem and postmortem angiography, has shown that the stenosis is more often eccentric, with overhanging or irregular margins. Intraluminal haziness or radiolucent filling defects are seen in at least 70% of patients with unstable angina compared with less than 20% of patients with stable coronary artery disease (Ambrose et al. 1985; Levin & Fallon 1982).

In most patients, ischaemic episodes are frequent and generally occur at rest without antecedent increases in myocardial oxygen demand, although secondary changes in heart rate and blood pressure, induced by ischaemia, may further precipitate or accentuate myocardial ischaemia (Chierchia et al. 1980; Figueras et al. 1979; Maseri et al. 1980). Episodic reduction in coronary blood flow, however, appears to be the main trigger for ischaemic episodes. While the exact sequence of events that convert the asymptomatic patient or the patient with stable and effort-induced angina to unstable angina is not completely understood, it is suggested that the instability results from an interplay between the fixed atherosclerotic coronary stenosis and dynamic factors that cause intermittent total or partial coronary artery occlusion (Shah 1991). These factors include abnormal coronary vasmotor tone, intermittent platelet aggregation and intraluminal thrombosis.

The pathological hallmark of acute coronary syndromes is fissure of the atherosclerotic plaque within the coronary artery. Plaque fissure leads to platelet adhesion and aggregation leading to fibrin-platelet thrombus formation. Incorporation and organisation of thrombi into the plaque may lead to accelerated progression of the stenotic lesion that has been angiographically demonstrated in up to 70% of patients with unstable angina, when serially studied during progression from a stable to unstable state (Ambrose et al. 1985; Moise et al. 1983). Furthermore, angioscopic studies have confirmed the presence of complex and fissured plaques in the culprit coronary arteries of patients with un-