

RECENT ADVANCES IN CORONARY HEART DISEASE

PRE-INFARCTION SYNDROME

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INTRODUCTION

Aorto-coronary artery bypass graft surgery is now being employed for the management of various clinical manifestations of coronary artery disease. Favoloro (1972) has reported the results of two thousand, three hundred and seventy-one saphenous vein grafts applied in 1,756 patients for the indication of angina pectoris. His late follow up studies showed that 85% of the grafts remained patent. Drs. Johnson (1971) and Spencer (1972) have reported excellent clinical results in patients with stable severe angina pectoris. With this background, therefore, it was not surprising when Chatterjee et al (1972) reported the results of operative treatment on 21 of their patients with unstable or pre-infarction angina. In that report there was only one operative death. Other surgical groups (Spencer, 1972; Lambert et al, 1971; and Johnson, 1971) have also reported good results after emergency aorto-coronary venous bypass grafting. The reported operative mortalities were in the region of 6%—no greater than the mortality reported when the operation was performed for stable angina pectoris (Favoloro, 1972).

DEFINITION

The term pre-infarction angina, although widely used, is unsatisfactory because its substantiation depends upon the occurrence of subsequent myocardial infarction. Both "unstable" and "crescendo angina pectoris" have been suggested as alternatives. The former term, "unstable angina pectoris" is preferred and refers to a symptom complex which clearly lies between stable angina pectoris and definite acute myocardial infarction. "Unstable angina", itself, may be further subdivided depending on clinical presentation. For instance, a patient presenting with no past history of ischaemic pain, who commences to have typical angina which lasts for under thirty minutes, with the pain relieved by glyceryl trinitrate has "recent onset angina pectoris"—certainly an unstable state.

A patient with stable angina pectoris may notice that the anginal pain comes on with less exertion and lasts for longer—the frequency of the anginal pain may also increase and one must classify this situation as unstable angina. When a patient with previously stable angina pectoris commences to have angina lasting for increasing periods of time—"prolonged angina pectoris", this type will also come into our category of unstable angina.

When a patient with previously stable angina commences to have more frequent pain, each pain of longer duration and of greater severity and commencing on less exertion and even occurring at rest or awakening the patient from sleep, this has been termed "crescendo angina." This is another form of unstable angina.

It should be noted further that even if one groups the patient with unstable angina according to the above headings there will be further prognostic variables depending on the patient's age, history of previous myocardial infarction—sub-endocardial or transmural, past history of hypertension or the presence of diabetes mellitus.

The natural history of patients with this syndrome of unstable angina varies considerably depending on the exact definition. Krauss et al (1971) followed 100 patients admitted to the Coronary Care Unit at the Massachusetts General Hospital with a diagnosis of

pre-infarction angina. Six patients developed infarction and another died in hospital. These patients were all admitted to the Coronary Care Unit because of suspected myocardial infarction and all had twice daily enzyme determinations; daily electrocardiograms and clinical observations which failed to show any evidence of infarction.

A considerable body of data is now becoming available from a number of community studies in patients with so-called unstable angina pectoris. Fulton et al (1972) reported the preliminary results of the first eighteen months of a study of the natural history of unstable angina pectoris in 167 patients. They found that 14% of the patients who complained to a physician of unstable angina developed an acute myocardial infarction. Sudden death was a relatively infrequent sequel in their patients. In an excellent review of the Earliest Symptoms of Coronary Heart Disease and Their Recognition, by Short and Stowers (1972) the histories of 320 patients were cited and effort angina was found to be the first symptom in 51%. In 94% of the patients, the earliest symptom was pain or discomfort in the chest of some type, however, it is interesting to note that crescendo angina or unstable angina was not mentioned specifically.

CLINICAL ASSESSMENT

With a limited knowledge of the natural history of unstable angina we are being forced to make decisions regarding the timing of intervention. Dr. Fowler (1971) clearly stated the predicament in which the physician finds himself in the following:

1. "The physician realizes that the syndrome is usually defined by clinical criteria which are in part subjective.
2. Knowledge of the natural history is still lacking.
3. The risks of diagnostic and surgical interventions in patients in the precarious state are uncertain."

It is theoretically possible and acceptable that if a patient with unstable angina happens to be in a pre-infarction state, has appropriate immediate aorto-coronary bypass grafting, still during the pre-infarction phase, myocardial infarction might be prevented in a significant number. The feasibility of such early emergency surgery has been confirmed by Chatterjee et al (1972) who reported in detail on six patients with what was called a pre-infarction syndrome, who were documented to have impaired myocardial performance which was returned to normal by restoration of the blood supply to the ischaemic myocardium by successful aorto-coronary bypass surgery. In an addendum to their publication they refer to 15 additional patients who had been operated upon, with only one death. Lambert et al (1971) operated on 48 patients who were stated to have impending infarction, and a further 9 of these had an associated arrhythmias; there were only three deaths in this group. It therefore seems reasonable to weigh the potential value of early emergency surgery against the risk of remaining under observation in a Coronary Care Unit.

If surgery is being considered then selective coronary arteriography together with left ventricular angiography is essential before a decision can be made with respect to the patient's suitability, on anatomical and physiological grounds, for a bypass procedure. The reported mortality of selective coronary arteriography ranges from 0.1% to 1.0% and this mortality should be added to the reported surgical mortality of emergency operations.

It should be possible to define a sub group of patients, who are at high risk, in whom the potential benefits of emergency surgery will outweigh the risks of both emergency investigation and emergency surgery.

With the development of intensive coronary care units we now have the facility to admit to hospital, for close observation, those patients with unstable angina. Clinical examination will often show no abnormality and the electrocardiogram, by definition, would show no evidence of definite infarction, however, there will often be ST and T wave changes. The temperature will be normal and the enzymes will not show evidence of myocardial necrosis. Gilbert (1972) in his analysis of the risk factors in pre-infarction angina gives an excellent guide to future management related to the patient's progress while under observation in a Coronary Care Unit. He was able to identify a high risk group of patients who had pain on the day following admission or thereafter and the presence of ST or T wave changes on the electrocardiogram. He considers that patients in this sub group should have angiographic and haemodynamic investigations, usually on the second day after admission. Patients who demonstrate proximal coronary artery lesions, suitable for surgery with normal or only mild impairment of left ventricular function may be offered immediate surgery. Those patients who have vessels unsuitable for grafting should be continued on a medical regime which should include relief of pain, the administration of sublingual glyceryl trinitrate for recurrent pain, the use of isosorbide dinitrate (or similar drug) given two hourly in an attempt to relieve pain and perhaps prevent infarction. Anticoagulant therapy should also be used. This is best maintained using a continuous intravenous infusion of sodium heparin or as an alternative calcium heparin may be administered subcutaneously every eight hours. The therapeutic effect of heparin should be monitored by maintaining the whole blood clotting time between 2 and 3 times the patient's initial control value. Beta adrenergic blocking drugs such as propranolol or practolol should be used as they reduce the myocardial oxygen consumption and probably lower the ischaemia threshold for infarction. Beta adrenergic receptor blockade will also directly reduce the sympathetically mediated heart rate and blood pressure elevation associated with exertion or ischaemic pain. The patient should be kept comfortable and composed with the use of a sedative or drug such as diazepam. If left ventricular failure is diagnosed clinically or on review of the chest x-ray then diuretic therapy should be introduced. Digitalis is also indicated for any recurrent supraventricular arrhythmia or persistent heart failure.

If myocardial infarction occurs in a patient with coronary arteries suitable for grafting, immediate surgery is of very doubtful benefit. The actual operation becomes quite hazardous and direct procedures on the infarcted myocardium are not well established. If shock accompanies infarction then the feasibility of emergency surgery should be reviewed. Keon et al (1971) has reported, encouraging experience with this very difficult group of patients.

Although good results have been reported with emergency bypass grafting the final place for this type of surgical approach remains unclear and any attempt to clarify the situation by randomizing the patients between a surgically treated and a medically treated group appears justified. Both groups of patients should continue to have most meticulous medical or surgical care following randomization and both the short term and long term progress must be carefully documented.

To enable "unstable angina" to be treated as a medical emergency the present coronary care facilities require expansion and family practitioners need to receive clear guidelines on the indications for referring their patients for assessment. The hospital, cardiologic and cardiac surgical facilities will require expansion if those patients with unstable angina pectoris are to be admitted as emergencies and subjected to full investigation when pain persists for more than 24 hours and their electrocardiograms show ST and T wave changes. With increased experience we should have confirmation of the sub group of patients with unstable angina who are at maximum risk with respect to the development of infarction and could potentially benefit most from emergency surgery. While prevention of coronary artery disease must remain our prime aim, a valid secondary aim could be the reduction in the incidence of acute myocardial infarction in those patients with established coronary disease. If our preliminary data relating to the good early results after emergency bypass grafting stands up to continued scrutiny then a whole new area of endeavour becomes available.

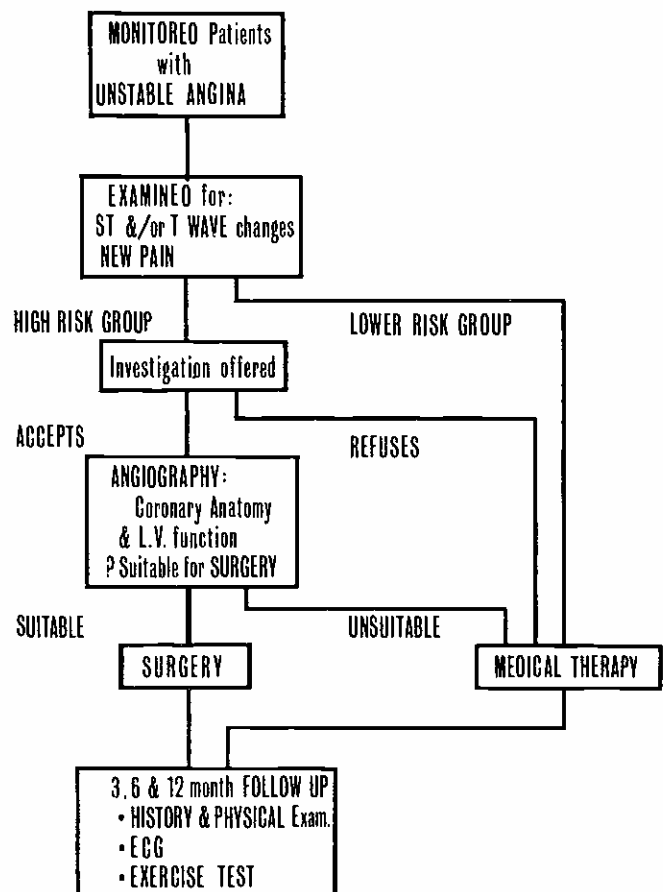


Fig. 1. The suggested outline management for patients with unstable angina.

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