Surgical management of complications

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From September 1977 until July 1979 percutaneous transluminal dilatation of coronary stenosis was performed in 82 patients. The obvious potential for complications inherent to this method has prompted a mandatory surgical standby during all dilatation procedures. The cardiac surgical team is alerted during percutaneous transluminal dilatation, but the elective procedures are continued; the actual dilatation takes place during the period when the first case in the operating room is just being finished and the next has not yet been started. The primary purpose of emergency aortocoronary bypass grafting for complications of percutaneous transluminal dilatation is the reestablishment of blood flow to a suddenly obstructed coronary artery. As a corollary to this demand, the loss of the myocardial muscle mass must be kept at minimum and this is best accomplished by the rapid institution of cardiopulmonary bypass. The unloading of the heart by the pump oxygenator reduces the myocardial oxygen consumption by 50%, eliminates the dangerous arrhythmias, and restores the normal hemodynamics in cases of sudden left ventricular pump failure.

Patients

Emergency aortocoronary bypass grafting was

necessary in 7 of 82 patients subjected to percutaneous transluminal dilatation. In addition, symptoms of beginning myocardial infarction developed in one patient several hours after percutaneous transluminal dilatation but, due to a communication breakdown, was not seen by the surgeon until a well-established myocardial infarction with an enzyme release had developed; this patient was treated by medical management alone. The indication for emergency coronary grafting was either a sudden complete occlusion of a previously stenosed vessel, usually accompanied by severe angina, arrhythmia or pump failure or the sudden appearance of protracted, refractory angina without angiographic evidence of vascular obstruction, but with persistent electrocardiographic changes suggestive of beginning infarction or injury (ST-segment elevation). In five patients, the complication became evident during the procedure; all five were immediately transferred to the operating room. In the other two patients, the chest pain appeared several hours after the procedure; they were taken to the operating room after the electrocardiogram showed evidence of myocardial injury or necrosis or both. The lesion that required emergency revascularization was situated in the left anterior descending artery in five, and in the right coronary artery in two patients.

Results

All patients survived the operation and were able to leave the hospital 8 to 24 days after the procedure. In only one patient who underwent revascularization after a sudden onset of severe angina several hours after an otherwise uneventful percutaneous transluminal dilatation did the postoperative electrocardiogram show the evidence of persistent transmural infarction. This patient is also the only one in whom a substantial loss of myocardial muscle mass was demonstrated by postoperative creatine phosphokinase (CPK) measurements. A moderate increase of CPK and CPK-MB values was noted in two or more patients, but their electrocardiograms normalized prior to discharge. No serious complications occurred and all the patients are still alive.

Discussion

Percutaneous dilatation is not an innocuous procedure and it has a definite potential for major, life-threatening complications; therefore, it should be performed under a cardiosurgical standby. The immediate aortocoronary bypass grafting with rapid institution of cardiopulmonary bypass can prevent the development of myocardial infarction. If a coronary vessel becomes obstructed during percutaneous transluminal dilatation, the size of the myocardial infarction and its hemodynamic effects are unpredictable, depending on the preformed coronary collaterals; furthermore the pain seems to be an unreliable symptom for diagnosing the onset of infarction. The infarction can occur not only during but also several hours after the percutaneous transluminal dilatation, and the patients should probably remain in the intensive care unit for 12 to 24 hours after an otherwise successful dilatation procedure. They should have the electrocardiogram leads attached over the area where the ischemia or necrosis can be expected. In a fully established, nonprogressing transmural myocardial infarction with an enzyme release, the revascularization is not useful and indeed it might be harmful. When the complication has occurred, the time element becomes critical and no time should be lost with

extended trials of medical management or additional diagnostic procedures. The patients should be fully informed that a coronary procedure might become necessary in the course of transluminal dilatation. Only close cooperation between the cardiologists and cardiovascular surgeons can prevent the major complications of percutaneous transluminal dilatation.