Myocardial Revascularization

Pages with reference to book, From 137 To 139

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The credit for recognition of coronary arterydisease and description of Angina Pectoris goes to Herberden.[1] However coronary artery disease existed long before that. A recent archeological find in China indicates that coronary artery disease existed as early as 2100 years ago.[2] Coronary artery disease may have existed as long as the human race but the upsurge in the prevalance of coronary artery disease is a modern pheno. menon, largely in the last few decades. The clinical manifestations of coronary artery disease are due to myocardial ischemia. These range from symptomless ischemia, angina pector of all grades and types to the catastrophic event of myocardial infarction and sudden death. The pathophysiology of myocardial ischemia is decreased myocardial perfusion secondary to coronary obstruction. A fifty percent reduction in diameter equivalent to 75% decrease in cross sectional area leads to myocardial ischemia on excercise or the classical angina pectoris. Though fixed coronary obstruction is the primary cause for myocardial ischemia. Coronary vasospasm[3] forgotten entity has emerged as one of the factors in the pathogenesis of myocardial ischemia. Management of myocardial ischemia consists of medical and surgical measures. The medical measures like nitrates[4], Beta Blockers[5] and slow channel calcium blocking agents[6] act by decreasing the work of heart and some of these agents also dilate the coronary vessels. As the physicians tried to ameliorate the myocardial ischemia by medical means surgeons attempted to increase myocardial blood flow by direct methods. Thomas Jornesto[7] in 1916 did sympathelectomy in an attempt to improve myocardial blood flow. Claud Beck[8] in 1930 tried to improve myocardial perfusion by attaching vascular pedicles to the surface of heart.

In 1950 Vineberg[9] did internal mammary artery ligation and implantation with a view to improve myocardial blood flow. However all these attempts were failures as they did not improve symptoms and alleviate the ischemic process. In 1958 Mason Sones developed the technique of coronary angiography and that lead to new thoughts in the surgical management of myocardial ischemia. Sabiston[10] was the first to perform end to end coronary bypass operation and Debakey[11] used end to side anastomosis since then the technique has been further developed by Johnson, Cooley. Favalaro, Efflers and others,[12] and has become an accepted procedure. Before indication for coronary artery surgery are considered it would be appropriate to discuss factors influencing the decision for surgery. Surgery is not a cure for the coronary artery disease as the disease process is continuous the progressive nature of the disease requires long term reduction of known risk factors i.e. hypertension, hypercholesterolaemia, hypertriglyceridemia, hyperglycemia, smoking, stress, obesity and sedentary life style.

The mortality from angina pectoris is variable. It was 4% per annum in Frumenghan study[13] ,13% for left main coronary artery disease[14] and 20% for unstable angina[15]. The prognosis of medically treated patient depends on the extent of the disease and overall left ventricular function. The mortality is 2% 7% and 11% for single double and triple vessel disease respectively[16] Aggressive medical management has made significant reduction in mortality.

The surgical mortality is related to the degree of impairment of left ventricular function. However the over all accepted mortality abroad is less than 2% and in good centres it is less than 0.8%. Perioperative infarction still accounts for 5%, however it causes limited damage and has little effect on hospital or late mortality.[17] The graft potency rate is 86% after one year and subsequently grafts close at the rate of 0.7% per annum[18]. In the background of these factors and known data on bypass surgery

following are accepted indications for coronary bypass surgery. Left main coronary artery disease with morethan 50% reduction in diameter carries a grave prognosis. It carries more than 40% mortality at 2 years and 70% at 4 years. The Multicentre National cooperative study of unstable angina in USA studied 288 patients[19,20] and they observed at a very early stage of the study that patients with left main coronary artery disease with more than 50% reduction in luminal diameter benefit from surgery. Similar results are reported by others.[21] Main left coronary artery disease once identified surgery should be not deferred for a trial of medical management.

Unstable Angina: The multicentre cooperative study mentioned eatlier provides scientific data on the management of unstable angina, and showed no statistically significant difference in mortality and the incidence of late inyocardial infarction in the medically and surgically treated patients. The surgically treated group had higher rate of early myocardial infarction. The quality of life was improved in surgically treated group, but there was not increased longevity of life in surgically treated patients either in this study or other series. In unstable angina first the patient should be stablized by aggressive medical management and intraaortic baloon counter pulsion if necessary. When stable patient should have a study of coronary anatomy and a decision for surgery should be based on that.

Stable Angina Pectoris: There are two issues to be answered, improvement in symptoms and prolongation of life. As far as surgical management of stable angina pectoris is concerned there is little doubt that angina is improved and exercise tolerance increased in 75 95% patients who undergo bypass surgery.[21]

Regarding the long term survival the data on prolongation of life after bypass surgery is still not convincing. According to the results of European collaborative study,[22] Surgically treated patients with 3 vessel disease and impaire4 left ventricular function have better survival. It also suggests improved survival in surgically treated patients with two vessel disease when proximal third of the left interior descending artery is affected. As far as single vessel isease is concerned there is no difference in survival rates in those treated medically or surgically.

The results of coronary artery surgical study[23] do not support the claims of the European study. According to coronary artery surgical study in patients with Angina pectoris bypass surgery does not prolong life or prevent myocardial infarction. Patients with three vessel disease with impaired left ventricular function treated surgically did better as compared to those treated medically but this was not statistically significant.

Until further data is available it would appear that all patients with stable angina should be treated medically. If they fail to improve on aggressive medical management surgery may be considered. Bypass surgery will result in symptomatic improvement and enhance exercise tolerance. It may increase survival in patients with three vessel disease with impassed left ventricular function. There is little data to support increased survival after surgery in two vessel disease and no evidence for improved prognosis in patients with single vessel disease treated surgically.

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