INTERNAL MAMMARY ARTERY USAGE IN CORONARY ARTERY BYPASS GRAFTING IN THE ELDERLY PATIENTS

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SUMMARY : Although the left internal mammary artery (LIMA) is now considered by many authors to be "the graft of choice" for coronary artery bypass grafting (CABG) because of its reported excellent long - term patency; its usage in the elderly is still questionable. This study was done to compare the perioperative course and early results of LIMA and saphenous vein grafting (SVG) in the elderly. From January 1987 through September 1993, 72 patients aged 65 years and older underwent CABG. 41 patients received LIMA grafting, while the others received SVG only. The perioperative mortality rate was 9.5 % (4/41) in the LIMA group and 9.7 % (3/31) in the SVG group. 2 patients in the LIMA group (4.9 %) and 2 patients in the SVG group (6.5 %) had perioperative myocardial infarction. Postoperative duration of hospital stay was significantly shorter in the LIMA group when compared with that of SVG group. 63 of the patients were followed up for a mean period of 20 months. The rate of survival was 97.6 % in the LIMA group and 93.5 % in the SVG group. These results indicate that, despite the slightly increased mortality rate, CABG can be safely performed in the elderly and, as in the younger patients perfect results can be obtained with LIMA grafting.

Key Words : *Left Internal Mammary Artery (LIMA), Saphenous Vein Graft (SVG), Coronary Artery Bypass Grafting (CABG), Elderly.*

INTRODUCTION

Coronary bypass surgery has been shown to relieve angina and myocardial ischemia more effectively than medical therapy in patients with stable and unstable angina and to improve survival in different patient groups. The number of elderly patients suffering from coronary artery disease increases every year in Turkey. Because coronary artery disease accounts for two-thirds of deaths in the older age group - those aged 65 years and older - and excellent short-term results have been reported; more elderly patients are being considered as candidates for CABG. With current techniques, CABG procedures can be safely performed in the elderly with mortality and morbidity rates only slightly higher than those in younger patients (9, 11, 13).

Despite its excellent late patency rates compared with the saphenous vein grafts, the usage of the LIMA in the geriatric group has still been discussed by many authors. Some of the cardiac surgeons still avoid using LIMA in the elderly, because of assuming that LIMA grafting would provide no acceptable benefit for the patient with a limited longterm outlook. In addition, it is believed that LIMA grafts

will increase the perioperative complications in the geriatric group. In this group of patients the origin of LIMA is frequently found to be stenotic because of atherom plaques.

Since 1990 LIMA grafts have been used routinely for CABG in our hospital regardless of the age, unless there is a contraindication as the urgency of the operation, radiation to the chest wall, severe pulmonary disease, etc. In this study we tried to compare the results of LIMA and SVG in the elderly patients.

MATERIALS AND METHODS

From January 1987 through September 1993, 72 patients, aged 65 years and older, underwent CABG in the Department of Thoracic and Cardiovascular Surgery, Gazi University Medical School, Ankara. The mean age of the patients was 67.2. Three of the patients were operated under emergency conditions. Of these 72 patients 41 (56.9 %) received LIMA, while 31 (43.1 %) received SVG only. 55 of the patients were operated after January 1990 and LIMA was used in 41 of them. The patients who underwent another surgical procedure, except for the 10 patients with aneurysm resection in combination with CABG, were excluded from this study.

The operations were performed via median sternotomy and with standard extracorporeal perfusion techniques. After sternotomy, the LIMA and accompanying veins were dissected with a wide pedicle. The dissection was done particularly with diathermy and the branches of the LIMA were occluded with clips (4). After the institution of cardiopulmonary bypass, moderate systemic hypothermia was employed in all cases. Cold crystalloid potassium cardioplegia or blood cardioplegia was used for myocardial protection. The distal anastomoses of the saphenous vein grafts were performed during the period of cross-clamping of the aorta. As the last anastomosis, LIMA was inserted. The proximal vein anastomoses were done after the release of the cross-clamp and defibrillation of the heart.

Postoperatively all the patients were followed up with routine hemodynamic monitorization and mechanical ventilation in the first 6 to 24 hours.

The mean follow-up period was 20 months (1 to 60 months). 53 of the patients were seen at the outpatient department regularly at 15 days, 1 months, 3 months, 6 months and annually afterwards.

RESULTS

Preoperative Data. 32 of the LIMA group patients and 26 of the SVG group were male. The incidence of hypertension was 25 % totally. 11 of the 72 patients were diabetic (15.3 %). 8 patients had chronic pulmonary disease (11.1 %). 40 of the patients had had at least one preoperative myocardial infarction (55.5 %). The mean of the ejection fraction was 60.8 % in the LIMA group and 63.7 % in the SVG group. The NYHA classes of all the patients were between IIB and IV. The sex distribution, frequency of risk factors and concomittant diseases of the LIMA and SVG groups are shown in Table 1. Extent of coronary arter disease, state of left ventricular function, NYHA groups and the number of grafts inserted are shown in Table2.

	LIMA Group	SVG Group
Total patients	41 (56.9 %)	31 (43.1 %)
Male	32 (78.0 %)	26 (83.8 %)
Hypertension	11 (26.8 %)	7 (22.5 %)
Smoking history	29 (70.7 %)	22 (71.0 %)
Diabetes	7 (17.0 %)	4 (12.9 %)
Chronic pulmonary disease	4 (9.8 %)	4 (12.9 %)
Prior MI	24 (58.5 %)	16 (51.6 %)

Table 1 : Sex distribution, risk factors and concomittant diseases of the LIMA and SVG groups.

	LIMA Group	SVG Group
Diseased vessels		
One	6 (14.6 %)	5 (16.1 %)
Two	14 (34.1 %)	13 (41.9 %)
Three	14 (34.1 %)	10 (32.3 %)
Four or more	7 (17.0 %)	3 (9.7 %)
NYHA Groups (mean)	2.3	2.5
Ejection fraction (mean)	60.8 %	63.7 %
Fractional shortening (mean)	34.7 %	35.5 %
No.of grafts inserted (mean)	2.54	2.35

Table 2 : Extent of coronary artery disease and number of grafts inserted in the LIMA and SVG groups.

Operative and Postoperative Data. The difference between the operative courses of the LIMA and SVG groups of elderly patients as reflected by total perfusion time and aortic cross-clamping time was not statistically significant. The perioperative mortality was 9.5 % in the LIMA group, while it

was 9.7 % in the SVG group. The causes of the operative death were shown in Table 3. The rate of perioperative myocardial infarction was not significantly different between the two groups (4.9 % in the LIMA and 6.5 % in the SVG groups). Likewise, the incidence of sternal wound infection was slightly different (2.4 % in the LIMA group and 3.2 % in the SVG group). Significantly more patients in the LIMA group, however, received (+) inotropic drugs after the operation compared with the patients without LIMA grafts. Chest tube drainage was 950±521 ml in the LIMA group while 877±401 ml in the SVG group. The need for intraaortic balloon pump was 17.0 % in the patients with LIMA grafts and 9.9 % in ones with SVG. The rate of reoperation for bleeding was slightly higher in the LIMA group (7.3 % vs 6.4 %). Finally the mean postoperative hospitalization was significantly shorter for the patients with LIMA grafts compared to the patients with vein grafts (9.9 vs 14.0 days) (Table 4).

Long-term survival. 63 of the patients were followed up for a mean period of 20 months (1 to 60 months). 1 patient in the LIMA group and 2 patients in the SVG group died between the 2nd and 60th months after being discharged. The rate of survival was 97.6 % in the LIMA group while 93.5 % in the SVG group. None of our patients had recurrent angina after CABG.

	LIMA Group	SVG Group
LV failure	1	2
Myocardial infarction	-	1
Cardiac tamponade	1	-
Multiple organ failure	1	-
Mediastinitis	1	-
TOTAL	4 (9.5 %)	3 (9.7 %)

Table 3 : Causes of operative death.

DISCUSSION

As the standard of the health care generally improves, the number of the elderly people is increasing in our country as it is in the other developing countries. While the population is aging, the incedence of coronary artery disease and the diagnosis facilities and the centers dealing with cardiac surgery have increased relevantly. Though elderly patients are assumed to have significantly increased morbidity and mortality in any major operation because of compromised functional reserves of their vital organs; many studies have shown that CABG procedures can be safely performed in these patients with acceptable mortality and morbidity rates-only slightly higher than those in younger patients (2, 3, 4, 12, 13).

In many series it has been noted that routine use of LIMA did not cause any increase in the incidence of major surgical complications in patients older than 65 years, and superior patency rates were obtained with LIMA grafts when compared with saphenous vein grafts.

The operative mortality rate has ranged from 0 % to 14 % in the elderly patients undergoing coronary artery bypass in the larger series, and those including patients less than 80 years old generally reported lower mortality rates (5, 6, 7, 8). The ten-year patency rates of the LIMA grafts differ from 69 % to 95 %. Severe hyperlipidemia and diabetes mellitus are regarded as relative contraindications for LIMA grafting because of the risk of developing earlier atherosclerotic changes in the brachiocephalic artery and LIMA after the operation. Similar apprehension exists concerning excessive stretching of the grafts by emphysematous lungs. In many series it has been reported that patients with diabetes mellitus have not had a higher incidence of sternal wound infection after LIMA harvesting and patency rates of LIMA are not significantly shorter compared with that of nondiabetic patients (1).

	LIMA Group	SVG Group
Postoperative inotropic support	26.8 %	29.0 %
Need for IABP	14.6 %	9.6 %
Chest tube drainage (mean)	950 ± 521 ml	877 ± 401 ml
Reoperation for bleeding	7.3 %	6.4 %
Sternal wound infection	2.4 %	3.2 %
Postoperative hospital stay (mean)	9.9 days	14.0 days

Table 4 : Postoperative data of the LIMA and SVG groups.

As a result, though patient selection factors play an important role in the different results between LIMA and SVG patients; as in younger ones, LIMA grafting can be safely applied to the elderly patients and has the potential to improve both the quality and quantity of life.

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