

CONCOMITANT RECONSTRUCTION OF COMBINED AORTOILIAC AND FEMOROPOPLITEAL OCCLUSIVE DISEASE AT A SINGLE STAGE

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SUMMARY : *Although there is no complete agreement for the treatment of the aortoiliac and femoropopliteal occlusive disease, the present trend is to make an aortofemoral bypass procedure first and, a femoropopliteal bypass procedure at another additional stage if necessary. In order to evaluate short and long term results of aortofemoral bypass concomitant with femoropopliteal, we followed up 50 patients in whom this procedure was performed within a 6.75 year period till October 1991. Of a total of 84 extremity, profunda femoris artery of 8 extremities was completely occluded and 22 extremities were showing severe atherosclerotic changes. Remaining 54 extremities were intact. In 34 patients aortobifemoral and bilateral femoropopliteal bypasses and in 16 aortobifemoral, unilateral femoropopliteal bypasses were performed. Dacron bifurcation bypass graft in proximal reconstruction and saphenous or PTFE graft in distal reconstruction were used. Operative mortality was 2 %, early postoperative mortality which included first thirty days, was 4 %. Cumulative bifurcation graft limb patency was 91 %, saphenous graft patency was 72 %, and PTFE graft patency was 16 % in five year follow-up. Cumulative limb salvage was 84 % at the same period. Comparison of the cases with one staged combined reconstruction in aortoiliac aortofemoral bypass revealed no significant difference on the basis of operative mortality and risk of complications. Still, combined reconstruction provided a more comfortable and functional life.*

Key Words : *Combined Aortobifemoral And Femoropopliteal Bypass.*

INTRODUCTION

Patients who have both aortoiliac and femoropopliteal segment occlusions, are generally in advanced age and exhibit more serious ischemic symptoms than those with one segment occlusion. These patients have a greater incidence of hypertension, diabetes, cerebral and visceral atherosclerotic vascular diseases (Brewster et al. 1982; Samson et al. 1985).

In the treatment of these patients who exhibit serious capacity decrease, there has so far been no ag-

reement on the surgical procedure to be performed. However, proximal segment reconstruction is often initially carried out (Martinez et al. 1980; Brewster et al. 1982; Samson et al. 1985). Supporters of this method claim that untreated distal occlusion has no effect on the aortofemoral graft patency and that most of these patients have a symptomatic relief with this procedure. Moreover, some authors agree that aortofemoral bypass concomitant with femoropopliteal is a long procedure and has high risk for serious complications (Collins et al. 1978; Crawford et al. 1960).

Conrarily, some authors report that aortofemoral grafts alone are successful in only 60-70 % of the cases for relieving symptoms (Sterpetti et al. 1988). Ten to fiftysix percent of cases with persistent ischemic symptoms due to untreated distal occlusion also need distal bypass revascularization later (Brewster et al. 1982; Samson et al.1985). Reconstructive surgical results of the proximal segment in patients with both deep and superficial artery occlusions, are worse than those with normal deep femoral artery (Charlesworth, 1990).

We followed up 50 patients to investigate the results of aortofemoral bypass concomitant with femoropopliteal in combined aortoiliac and femoropopliteal occlusive disease and the results have been compared to that of the literature.

MATERIALS AND METHODS

Aortofemoral bypass concomitant with femoropopliteal was performed on 50 patients with aortoiliac and femoropopliteal occlusive disease between January 1985 and October 1991 in Ankara Hospital, Social Insurance Organization, Department of Thoracic and Cardiovascular Surgery. All of the cases were suffering from either severe claudication or rest pain. Forty-nine of the patients were male and 1 female. Mean age of the males was 55.9 and the female patients was 50 years old.

All of the cases were heavy smokers and more than half of the patients were still smoking (on an average of one package a day).

Associated diseases were hypertension in 30 %, myocardial ischemia that was confirmed clinically or electrocardiographically in 78 % and insulin-dependent diabetes in 7 %.

Diagnosis was established with translumbar angiography in 18 of the patients and digital subtraction angiography (DSA) in 32. From a total of 84 extremity, profunda femoris artery was completely occluded in 8 extremity, stenotic in 22 and the remaining 54 extremities were intact. Accompanying lesions were juxtarenal aortic occlusion in 4 cases, infrarenal abdominal aort aneurysm in 2 cases, and right renal artery occlusion in one.

The presence of three criteria were accepted as indications of combined reconstruction:1) Rest pain or severe claudication 2)Both aortoiliac and femoropopliteal segment occlusion in angiography 3)Sufficient run-off at the distal side of the popliteal artery. This programm was not applied to the bed-

ridden patients or to those with severe neurologic deficit or serious untreatable disease even though they had these three criteria.

A midline abdominal incision was made in the cases with abdominal aortic aneurysm and renal artery stenosis. Left paramedian incision was made in the remaining. Fifty mg heparin was given to the patients intravenously. Aortobifemoral and bilateral femoropopliteal bypasses were performed on 34 of the cases and aortobifemoral, unilateral femoropopliteal bypasses were performed in 16. Reconstruction of the proximal segment was made with Dacron bifurcation graft. Proximal anastomosis was performed to the infrarenal aorta end to side (except in cases with abdominal aortic aneurysm) and distal anostomosis was performed to the common femoral arteries end to side. The saphenous vein was preferred for the distal segment reconstruction. PTFE graft was used if saphenous vein was not available (saphenous vein in 69 extremities, PTFE graft in 15 extremities). Proximal anastomosis was performed to the limbs of bifurcation graft from which an ellipsoid piece was removed. Side to end distal anastomosis was performed to the popliteal artery at the suprapopliteal or infrapopliteal position (suprapopliteal in 82 extremities, infrapopliteal in 2 extremities). Patients were controlled one month later and at six month intervals from then on.

RESULTS

One patient was lost during the perioperative period due to myocardial infarction. Number of the patients lost during the first 30 postoperative days were 2. One of these patients died of myocardial infarction on the third day and the other on the sixteenth day after an above-the-knee amputation following a graft thrombosis. Eight patients were lost during the follow-up period after the first 30 postoperative days.

In our 49 aortic bifurcation grafts, 5-year-cumulative patency was 91 %. Here, each limb of the bifurcation graft has been considered as a separate graft. No statistical correlation has been established between the patency of the bifurcation graft, age and presence of diabetes mellitus ($\alpha : 0.05$, $t : 2.02$, $53.9 < \mu < 57.89$) ($\chi^2 : 1.84$, $p > 0.05$). Furthermore, there was no correlation between angiographic condition of infrapopliteal runoff and graft patency ($\chi^2 : 0.04$, $p > 0.05$) Fig 1.

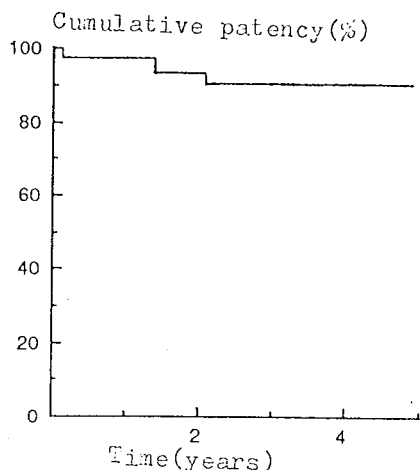


Fig. 1 : Cumulative patency curve for aorto-femoral bypasses.

A cumulative patency of 72 % and 16 % have been noted in a period of 5 years in femoropopliteal bypasses performed with saphenous vein and those performed using PTFE graft respectively (χ^2 : 13.66, $p < 0.001$). This result shows that saphenous vein graft has greater patency rate than PTFE graft as far as the femoropopliteal bypass procedure is concerned. There was also no correlation between preoperative angiographic infrapopliteal run-off and graft patency (χ^2 : 0.052, $p > 0.05$) (Fig 2, 3).

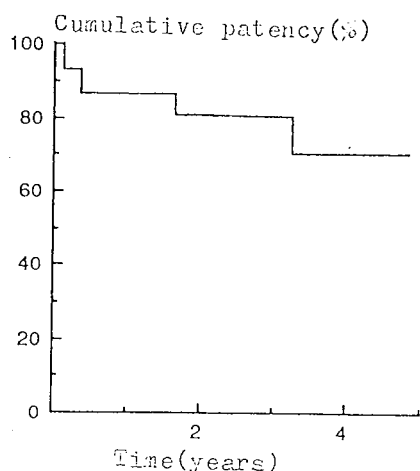


Fig. 2 : Cumulative patency curve for femoropopliteal bypasses (reversed saphenous vein).

In the patients with patent femoropopliteal bypasses, who had had no complaint of either angina or dyspnea, exercise tolerance was normal. None of these patients showed any indication of intermittent claudication. In patients whose bifurcation grafts were patent and femoropopliteal grafts were occluded, 60 % had claudication, 30 % had rest pain and remaining 10 % had no complaint.

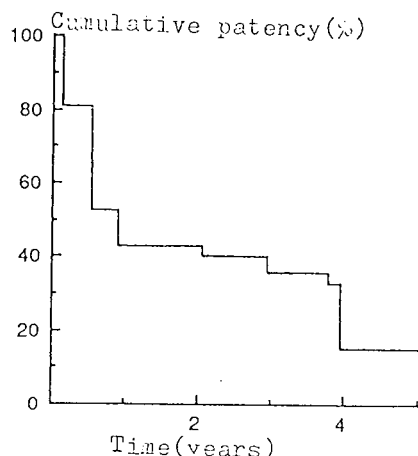


Fig. 3 : Cumulative patency curve for femoropopliteal bypasses (PTFE).

During first 30 postoperative days 3 of femoropopliteal grafts were occluded. One of these patients did not develop gangrene in the extremity and was discharged with claudication. Graft thrombectomy was performed in 2 other cases who had developed advanced ischemia. However, amputation became an absolute necessity at the end in both cases. Cumulative limb salvage in a 5-year, long-term follow-up period was 84 %.

DISCUSSION

In 1960's, performance of femoropopliteal bypass concomitantly with aortofemoral bypass used to be considered as an unacceptable procedure due to a high rate of mortality and morbidity (Collins et al. 1978; Crawford et al. 1960). At the present, high mortality rate in such cases has been eliminated, thanks to the advances made both in surgical and anaesthetic techniques. Poulias gives 3.2 % perioperative mortality rate in bifurcation graft replacements performed for aortoiliac occlusions (Poulias et al. 1985). Harris installed only bifurcation graft in one group of patients with aortoiliac and femoropopliteal occlusion and applied femoropopliteal bypass concomitantly with aortobifemoral in another group and observed no difference of perioperative mortality in two groups (Harris et al. 1985). In such cases, operative mortality of Eidt is 0 %, whereas it is 2 % in our cases (Eidt and Charlesworth, 1986). As can be seen, there is no difference in operative mortality between the cases with bifurcation graft replacement only and those with complete reconstruction. Neither advanced age nor existence of an ischemic heart disease is an absolute contraindication for the surgical intervention. Mor-

tality and morbidity rates in complete reconstruction type of patients show similarity to bifurcation graft mortality and morbidity rates (Charlesworth, 1990).

Some reports in recent years state that untreated femoropopliteal occlusions do not adversely effect the patency of bifurcation graft (Crawford et al. 1981; Martinez et al. 1980; Hill et al. 1980). However, reports contradictory to this view are continuously increasing. Malone et al. report graft thrombosis as 5 % in the patients with normal distal artery versus 27 % in the cases of affected distal artery (Malone et al. 1977). In the cases with widely affected profunda femoris artery or with advanced distal ischemia, cumulative bifurcation graft patency is 81 % in the 1st year and 36 % in the 5th year (Heyden et al. 1980). Disturbed distal circulation and increase in the resistance one the results of aortoiliac reconstruction. Many authors agree that overall incidence of thrombosis in bifurcation grafts varies between 6 and 20 % and that this figure is nearly twice as high in the patients with occluded superficial femoral artery (Charlesworth, 1988). Harris reports that he has installed only bifurcation graft in 106 patients and performed distal bypass simultaneously with bifurcation graft in 63. The same report states that 5-year cumulative bifurcation graft patency has been 65 % in the patients with bifurcation graft only as opposed to 98 % in the patients with bifurcation grafts with concomitant distal bypass (Harris et al. 1985).

Functional results in the cases with bifurcation graft only in aortoiliac and femoropopliteal occlusions have not been as satisfactory as expected. Royster reports that he has installed only bifurcation graft in 53 such cases and that the symptoms disappeared in 33 of the cases and persisted in 20 in various degrees (Royster et al. 1976). Sumner and Strandness also achieved functional improvement in the ischemia threatening the extremity in similar manner and reported that proximal reconstruction was inadequate in itself, that the rest pain subsided only in the patients with bifurcation graft, and that claudication persisted in 50 % of the patients (Sumner and Strandness, 1978). Hill et al. have evaluated a group of patients during tread-mill exercise testing and have found out that bifurcation graft had been insufficient in 74 % of the limbs (Hill et al. 1980). Dardik et al. also report that bifurcation graft replacement alone has not been successful in the patients with rest pain or gangrene (Dardik et al.

1979). Due to similar functional results, Harris reports that he had to perform femoropopliteal bypass in 21 of 106 patients to whom he had installed bifurcation graft only (Harris et al. 1985). Benson is of the opinion that bifurcation graft should be installed first in such cases and femoropopliteal bypass should be resorted to 3-6 months later if the symptoms persist (Benson et al. 1966). However, ischemic condition of the extremity may not permit waiting such a long time in every patients.

In bifurcation graft replacement, profundaplasty is presented as an alternative method in recent years in such cases, and Pearce gives 5-year patency as 86 % and limb salvage as 72 % (Pearce and Kempozinski, 1984). According to another source, actuarial 5-year patency and overall 5-year actuarial limb salvage has been 62.2 % and 60.2 % respectively in bifurcation graft replacement and profundaplasty (Sterpetti et al. 1988). It is true that profundaplasty increases patency: however, this does not necessarily mean alleviation of symptoms. Functional improvement resulting from combined reconstruction lasts longer than that obtained with profundaplasty.

In femoropopliteal bypasses concomitant with aortofemoral, Charlesworth reports 5-year cumulative patency in bifurcation graft as 94 % and states that diabetes, age, or sex does not effect the patency (Charlesworth et al. 1990). Five year cumulative patency of Harris in such cases is 98 % (Harris et al. 1985). We have also established in our own cases that neither diabetes nor age affected the patency. Our 5-year bifurcation graft patency is 91 %.

Charlesworth reports cumulative patency of femoropopliteal bypass components in combined reconstructions as 80 % in 4 years in saphenous vein and 50 % in 2 years with PTFE grafts (Charlesworth, 1990). This rate is 71 % in 3 years in Harris distal bypasses (Harris et al. 1985). Our 5-year cumulative patency is 62 % in saphenous vein and 16 % in PTFE grafts.

In connection with limb salvage after femoropopliteal bypasses concomitant with aortofemoral, Eidt reports that only 21 of the limbs out of 304 necessitated amputation during 5-year follow-up period (Eidt and Charlesworth, 1986). Our own 5-year cumulative limb salvage rate is 84 %.

In the light of these comparative results presented, we believe that combined reconstruction in a single stage is an ideal treatment of aortoiliac and

femoropopliteal occlusive disease. Complete reconstruction provides a more comfortable and more functional life for the patient.

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