

FEMORAL ENDARTERECTOMY AGAINST ILIOFEMORAL BYPASS-CASE SERIES

***Suraj Wasudeo Nagre**

Department of CVTS, Grant Medical College, Mumbai

**Author for Correspondence*

ABSTRACT

The purpose of retrospective study is to evaluate the results of open endarterectomy in short atherosclerotic occlusion of the femoral artery against iliofemoral bypass grafting with vein graft. 10 male patients out of which 5 patient underwent endarterectomy of the femoral artery and other 5 underwent iliofemoral bypass grafting with vein graft between May 2013 and May 2015. All patients underwent routine follow up at 1, 3, 6 and 12 months and yearly thereafter. Routine clinical examination, colour Doppler scan and if necessary, arteriogram were done to assess the outcome. The patient has a median age of 40+/-10 years. There was no difference in results between both group. The length of the lesion varied from 2 to 10cm, and the largest endarterectomy done was 10cm. The segments involved were external iliac artery extending to femoral artery. The patency rates were 100 % at 1year follow up. Patency rate was equal in both groups without any complications. Time of harvesting vein graft was saved in endarterectomy patients. So, the endarterectomy was better time and extra incision saving alternative whenever possible with equivocal results.

Keywords: Femoral Artery, Endarterectomy, Iliofemoral Bypass, Arteriogram

INTRODUCTION

The decision for an ideal vascular procedure for occlusive peripheral arterial disease depends on type of lesion involved, patient factors and the options available to deal with it. Even though the endarterectomy was the one of the first described procedures, autogenous long saphenous vein bypass has surpassed it as the preferred procedure for occlusive disease in the infrainguinal region (DeWeese *et al.*, 1966; Edwards, 1968). This is largely the result of several series reporting an inferior long term patency rate with endarterectomy (DeWeese *et al.*, 1966; Imparato *et al.*, 1973). Further studies were conducted to compare the efficacy of available surgical options (vein by-pass, open endarterectomy and semi-closed endarterectomy) to combat the femoro-popliteal occlusion and its howed that the immediate failures and late cumulative patency/ survival were similar for all three procedures (Imparato *et al.*, 1973). Studies supported the use of endarterectomy as available option for infrainguinal arterial diseases with very comparable results to vein grafts (DeWeese *et al.*, 1966; Edwards, 1968; Imparato *et al.*, 1973; Inahara and Toledo, 1978; Abbas *et al.*, 2007). With time, other options were also tried as it soon become apparent.

That the long saphenous vein is a very demanding conduit if acoronary or vein bypass is required in future (Inahara and Toledo, 1978; Abbas *et al.*, 2007). Synthetic grafts and angioplasty were introduced as are placement to vein grafts but several studies have shown inferior results (high early and late restenosis rates) with the use of stents grafts (Ahmadi *et al.*, 2002; Wilson *et al.*, 1989; Veith *et al.*, 1986). The present retrospective study is to evaluate the results of open endarterectomy in short atherosclerotic occlusion of the femoral artery against iliofemoral bypass grafting with long saphenous vein graft.

MATERIALS AND METHODS

Patients and Methods

Endarterectomy of localized lesions of the iliofemoral artery was performed in 5 male patients between May 2013 and May 2015, with a proven diagnosis of chronic occlusion of isolated external iliac artery or iliofemoral artery. The diagnosis was confirmed by angiography. All patients suffered from atherosclerosis, and had thrombosis or stenosis of the external iliac artery associated with/without

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adjoining femoral artery and profunda femoris artery. All endarterectomies were performed as a primary procedure and not as an adjunct to a bypass procedure. The median age of the patients was 40 +/- 10 years. Risk factors for peripheral atherosclerosis were diabetes, electrocardiogram changes of past myocardial ischaemia, smoking and hypertension.

Selection of Patients

The indications for operation in this series were disabling intermittent claudication, rest pain and gangrene. Out of five in two cases, the claudication distance was 100m or less and in two cases had rest pain severe enough to interfere with sleep and one case had established gangrene of the toes.

Clinical Findings and Investigations

In those with occlusive disease localized to the iliofemoral artery, the patient's usually had with no pulses in the limb distally on the affected side. Occasionally, weak pedal pulses were present. All patients were investigated by Colour Doppler scan and femoral angiography (Figure 1). Where unequal femoral pulses were present, or bruits were audible over the iliac or common femoral vessels, suggesting more proximal lesions, lumbar aortography was performed and if present these patients were excluded from the study.



Figure 1: CT Angiogram Showing Occluded Bilateral External Iliac Artery with Reformation of Distal Vessels

Surgical Technique

This report is limited to patients undergoing endarterectomy of the femoral artery and if needed extended proximally to external iliac artery and distally to the profunda femoris artery. A single open technique was preferred to do the endarterectomy. After adequate systemic heparinization, proximal and distal control of the involved artery was attained. A single longitudinal arteriotomy (Figure 2) was done extending both proximally and distally to the uninvolved segment to facilitate endarterectomy and also avoid the injury to the intima of the patent segment. After sharp division of the proximal and the distal ends of the plaque, the cut edge was secured with 7-0/8-0 polypropylene suture to avoid dissection of the artery. The base of the plaque was cleared of any debris and residual medial circular fibres with fine forceps and the vessel was irrigated with heparinised saline after removal of endarterectomy specimen (Figure 4). Fogarty embolectomy was done as a routine procedure for additional safety to evacuate any clot, ensure patency of the reconstructed artery and identify any significant residual stenosis requiring revision of the procedure. Arteriotomies were closed with a vein patch in all cases (Figure 3).

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The short saphenous vein from the operative site was generally used for the vein patch. A drain was always inserted during the closure without any negative pressure applied to the closed wound. Only those patients with absent distal pulse or reduced flow considered for postoperative angiogram. Post-operative anticoagulation was routine. Most patients were given 5,000 units of unfractionated heparin every 6h for the first 24 hr after surgery. They were also administered 75 mg each of tablet clopidogril and aspirin in immediate postoperative period and there after once a day. Prior to discharge, usually on the fourteenth day, patients were shifted to a once daily dose of clopidogril and aspirin. There were no hospital deaths, and no late deaths.

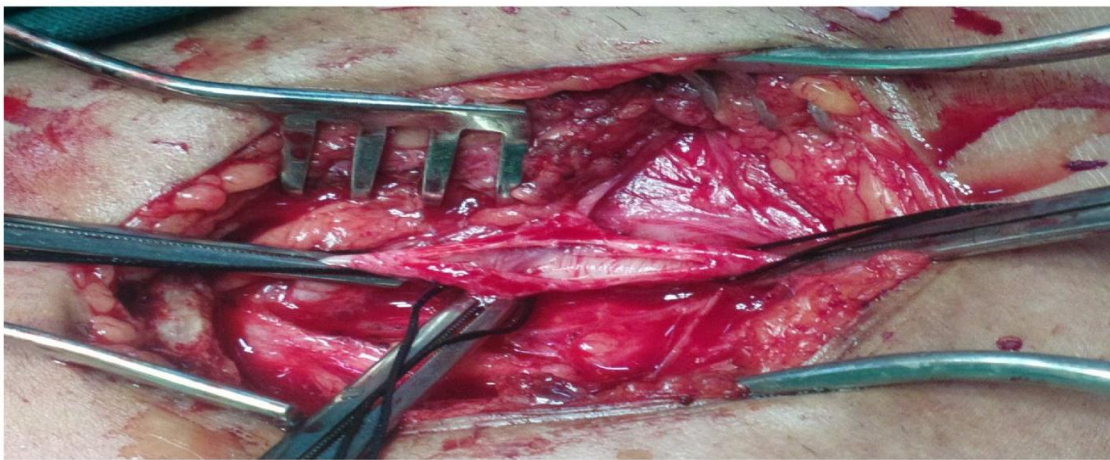


Figure 2: Two Centimeter Femoral Arthrotomy across the Profunda Femoris Artery



Figure 3: Femoral Arthrotomy Closed with Vein Patch



Figure 4: Femoral Artery Endarterectomy Specimen

RESULTS AND DISCUSSION

Results

There was clear evidence by restoration of pulses that the endarterectomy remained patent in all 5 patients (100 %). All these patients were discharged with patent reconstructions. There was no difference in results between the limb side affected (left, n=25, right, n=22). The length of the lesion varied from 2 to 12 cm, and the largest endarterectomy done was 10 cm. The segments involved were iliofemoral with profunda in all cases.

Effect of Reconstruction on Symptoms

All primary successes in this group had complete relief from claudication after surgery. In patients having severe rest pain in addition to claudication, both symptoms were relieved. Patients presenting with toe gangrene had relief from their symptoms after operation.

Late Patency after Reconstruction

All cases in both group have patency rate 100 % after one year of follow up.

Discussion

Bypass surgery has been the preferred initial treatment in patients with chronic critical ischemia and a femoropopliteal occlusion (DeWeese *et al.*, 1966; Hunink *et al.*, 1995). But the improvements in technique appear to allow endarterectomy to be performed below the adductor canal with equal success rate (Inahara and Toledo, 1978; Abbas *et al.*, 2007; Irvine *et al.*, 1965). In our experience it is 100 % at 1 year. There are a few reports dealing with the treatment of segmental occlusive disease of the femoral artery; but, in general, these reports have combined treatment of the external iliac artery with the femoral artery as a single entity (DeWeese *et al.*, 1966; Imparato *et al.*, 1973).

Though the majority of surgeons prefer the saphenous vein bypass graft (DeWeese *et al.*, 1966; Edwards, 1968), a few advocate endarterectomy and reconstruction of the iliofemoral segment (Inahara and Toledo, 1978; Abbas *et al.*, 2007; Cambria *et al.*, 1991). Several authors have reported comparable results of vein bypass grafts and endarterectomy (DeWeese *et al.*, 1966; Edwards, 1968; Imparato *et al.*, 1973; Inahara and Toledo, 1978; Abbas *et al.*, 2007), while others indicate superior results with the saphenous vein bypass grafts (DeWeese *et al.*, 1966).

Endarterectomy has the advantage that it preserves the long saphenous vein. The vein patch graft was mainly taken from the easily accessible short saphenous vein. Preservation of the long saphenous vein has an advantage that it can be of use later for coronary, femoropopliteal and femorotibial grafts (Inahara and Toledo, 1978; Abbas *et al.*, 2007). Angiography is often used to obtain an assessment of the length of artery requiring endarterectomy. However, this is frequently much longer than is apparent radiologically. The main information sought from the angiography is, however, the patency of the distal arterial bed (Edwards, 1968).

When the superficial femoral artery alone is the site of operation, the common femoral and popliteal arteries must be carefully scrutinized on the angiograms. If any doubt exists about their adequacy they

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must be explored at operation, because disease above or below the superficial femoral endarterectomy may cause primary failure. In short occluded segments we prefer to use direct endarterectomy without stripping. In long occluded segments, if the atheromatous material separates easily, we can use a stripper. It should be done under direct vision to ensure that no damage is done to the outer wall of the vessel. In all cases, whether stripping is done or not, the lowest limit of the endarterectomy is directly visualized through an arteriotomy, and the distal intima anchored where required.

We believe that any arteriotomy distal to the common femoral artery should be closed with a vein or Dacron patch, and some common femoral arteriotomies also require this (Irvine *et al.*, 1965; Cambria *et al.*, 1991). Some surgeons recommend angiography on the operating table after stripping, to ensure that no atheromatous fragments are left in the arterial lumen. It would certainly appear to be wise to do this especially when the stripping was difficult. However, we prefer open endarterectomy under direct vision in these conditions.

The primary results have been encouraging, and all of those cases presenting with claudication were relieved of their symptoms. In the group of patients presenting with gangrene or rest pain the alternative to arterial reconstruction was a major amputation, and all but one were saved this. One more patient also kept his limb, because his rest pain was relieved after a successful endarterectomy.

Conclusion

The present study illustrates that endarterectomy of the femoral artery should be considered available option to bypass techniques in selected patients with localized disease. Endarterectomy provides for revascularization without use of the long saphenous vein graft and sparing it for a future bypass, either coronary or femoropopliteal or tibial, if required. It relieves symptoms of claudication effectively and amputation can be avoided in a vast majority of patients with threatened limbs. Femoro-popliteal/distal bypass with PTFE graft or long saphenous vein may be performed if an endarterectomised segment gets occluded.

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