SHORT REPORT

Experience with Femoral Vein Grafts for Infra-inguinal Bypass

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KEYWORDS
Infra-inguinal bypass;
Femoro-popliteal vein;
Arterial reconstruction

Abstract
Introduction: Prosthetic grafts are used for infra-inguinal bypass when autogenous veins are inadequate but have poorer patency and greater risk of graft infection. We report the use of femoro-popliteal vein (FPV) for such cases.

Report: FPV was used in 20 infra-inguinal bypasses (14 combined with other veins). 11 were primary and 9 secondary reconstructions, involving 13 femoro-tibial and 7 femoro-popliteal bypasses. Mean follow up was 78 months. At one year, limb salvage was 83%, primary patency 61%, primary assisted patency 73% and secondary patency 78%.

Conclusion: FPV is an acceptable conduit for infra-inguinal bypass when other vein sources are inadequate.

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Introduction

Great saphenous vein (GSV) is the conduit of choice for infra-inguinal bypass, but when this is not available, alternative sources of vein, such as contralateral GSV, short saphenous or arm veins, or prosthetic grafts can be used.1 The successful use of femoro-popliteal vein (FPV) was described by Schulman in the 1980s for femoro-popliteal bypass but has not been reported since.2,3 We present a twenty-year experience of using FPV grafts for infra-inguinal reconstruction when other sources of vein were inadequate and prosthetic grafts were deemed inappropriate.

Report

Of 483 infra-inguinal bypasses performed by the senior author between 1989 and 2010, FPV grafts were used in 20 cases. In 6 of these, FPV was used alone but was combined with arm or great saphenous veins (GSV) in 14 cases (Table 1).

The proximal anastomoses were to the common femoral artery (13), superficial femoral artery (4), above-knee popliteal artery (1), below-knee popliteal artery (1) or a previous GSV graft (1). The distal anastomoses were to 13 tibial arteries, 6 popliteal arteries and in 1 to
a previous GSV graft. Eleven were primary reconstructions and 9 were graft revisions. The indications for surgery were rest pain (8), tissue loss (6), prosthetic graft infection (2), vein graft aneurysm (1), vein graft stenosis (2) and claudication (1).

The median age was 71 years (range 56–83). Five (25%) were women. All patients underwent preoperative Duplex vein mapping. The FPV was harvested as previously described preserving the profunda femoris and below-knee popliteal vein. Postoperative duplex Doppler surveillance was performed at 6 weeks, 3 monthly for one year, 6 monthly for a further 2 years and yearly thereafter. Follow up was 1–181 months (mean 78 months). Cardiovascular risk factors included: smoking (80%), diabetes (20%) and cardiac disease (40%).

Patient survival was 100% at 12 months (15/15) and 86% (11/13) at 5 years.

Five patients developed 10 stenoses. Five were inflow vessel stenoses (2 patients) treated by angioplasty and 5 were graft stenoses treated by angioplasty (1), surgery (2) or surgery + angioplasty (2). Six patients suffered 9 graft occlusions treated by surgery (4), thrombolysis (1), thrombolysis + surgery (1). Three underwent major amputation. At 12 months, limb salvage was 89%, primary patency 61%, primary assisted patency 73% and secondary patency 78%. Mean limb salvage was 102 months. At five years limb salvage was 83%, primary patency 36%, primary assisted patency was 66%, and secondary patency 78% (Fig. 1).

Early complications included wound infections (3), DVT (1), foot drop following prolonged preoperative acute ischemia (1) and graft thrombosis leading to above-knee amputation (2). Two patients developed severe leg swelling with bullae, which resolved with limb elevation.

One graft rupture occurred in a short basilic vein segment of a composite FPV/basilic graft.

Table 1  Other vein sources used in combination with FPV in 14 composite vein grafts.

<table>
<thead>
<tr>
<th>Combination of veins used with FPV</th>
<th>Number of cases</th>
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</thead>
<tbody>
<tr>
<td>GSV</td>
<td>4</td>
</tr>
<tr>
<td>GSV, cephalic</td>
<td>1</td>
</tr>
<tr>
<td>GSV, basilic</td>
<td>3</td>
</tr>
<tr>
<td>Basilic</td>
<td>2</td>
</tr>
<tr>
<td>Basilic, cephalic</td>
<td>1</td>
</tr>
<tr>
<td>GSV, brachial, cephalic</td>
<td>1</td>
</tr>
<tr>
<td>GSV, brachial</td>
<td>1</td>
</tr>
<tr>
<td>Brachial</td>
<td>1</td>
</tr>
</tbody>
</table>

(GSV: Greater saphenous Vein).

Figure 1  Kaplan Meyer’s survival plots of primary patency, primary assisted patency, secondary patency and limb salvage (calculated using Systat 10, SPSS Inc.).
Two patients required repair of aneurysms within an FPV graft at 9 and 10 years, two developed late lipodermatosclerosis, and one developed venous ulceration.

Discussion

Whilst prosthetic bypass is the usual option when GSV or arm veins are unavailable, the patency is poor, especially for bypasses to tibial or pedal vessels and there is a high risk of graft infection with tissue loss or a recent surgical incision.

Although FPV has been used effectively for arterial reconstruction in infected fields there are potential difficulties for infra-inguinal bypass: The length of FPV available for harvesting from the profunda femoris to the knee joint is only 30–33 cm. Whilst this is often sufficient for graft revision, a primary bypass may require FPV from both legs or splicing with a segment of GSV or arm vein. Venous outflow restriction in the donor limb is not a major problem in practice even when the ipsilateral GSV has previously been excised. Here, temporary leg edema was common after FPV harvest but was severe in only two cases and the late venous morbidity was mild or moderate, as previously reported. The larger diameter of FPV caused no technical problems even for tibial bypass.

Patencies for bypass using alternative autogenous veins are generally superior to those of PTFE and excellent long-term patency has been reported for femoro-popliteal bypass with FPV. Despite small numbers, our results also show that FPV can give satisfactory results for infra-inguinal bypass. Whilst primary patency was disappointing, especially at 5 years, primary assisted and secondary patencies were good following revision of surveillance-detected stenoses by angioplasty or vein patch.

Conclusion

FPV should be considered in preference to a prosthetic graft for infra-inguinal bypass when other vein sources are insufficient, especially when there is a potential risk of graft infection.

Conflict of Interest

None.

References