

Factors Affecting the Longevity of Femoropopliteal Bypasses

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Patient related Factors

1. Coexisting medical conditions negatively affect bypass procedures.
2. Low estimated GFR can result in poor prognosis in certain patients.
3. Overall benefit from infrainguinal bypass limited to very elderly patients.
4. Continued smoking after lower limb bypass surgery results in increased risk of graft failure.
5. Coagulation disorders are a risk factor for vein graft failure.
6. Patients with preexisting gangrene, ulceration and rest pain have poorer outcomes after procedure.

Bypass related Factors

1. Inadequate distal outflow can lead to bypass failure.
2. Type of conduit used in a bypass procedure is also a major factor.
3. Quality of the vein used for grafting also determines the long term graft patency.
4. Graft patency is also determined by the size of vein graft. Small caliber vein increases the risk of graft failure.
5. Use of antiplatelet agents after surgical infrainguinal reconstructions reduces the risk of graft failure.
6. Heparin coating of ePTFE grafts reduces the risk of graft failure.

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The longevity of femoropopliteal bypass grafts is affected by both patient and bypass related factors. Patients with CLI (critical limb ischemia) often also have other coexisting medical condition such as diabetes, chronic renal insufficiency that can negatively impact the outcome of the bypass procedure regardless of the success of the surgery alone. Advanced distal disease with poor runoff status also affects the success of this procedure. Low estimated GFR is an independent marker of poor prognosis after infrainguinal bypass in patients with critical limb ischemia. The overall benefit from infrainguinal bypass may, however, be limited in the very elderly because advanced age is associated with increased perioperative and postoperative mortality after vascular operations. Continued smoking after lower limb bypass surgery results in a threefold increased risk of graft failure. 1-year patency rate of 63% for smokers as opposed to the 84% rate for nonsmokers has been observed [1]. Smoking has been associated with an increased risk of occlusion of femoropopliteal saphenous vein grafts. Coagulation disorders are a risk factor not only for early but also for late vein graft failure. Patients with hypercoagulable states had poorer primary and secondary patency rates after 5 years of bypass procedure [1]. Degree of ischemia also plays an important role in determining the outcome of the procedure. Patients with preexisting gangrene, ulceration and rest pain have poorer outcomes after the procedure [1].

The distal run-off status is the single most important factor that decisively determines the outcome of bypass procedure. Surgical revascularization is impossible if a suitable outflow vessel is not present and bypass failure is very likely if inadequate distal outflow is present. The type of conduit used in a bypass procedure is also a

major factor for its long term outcome. An autologous vein is superior to prosthetic grafts as bypass material for infrainguinal reconstructions due to long-term patency and resistance to infections [2]. The quality of the vein used for grafting also determines the long term graft patency. Increased wall thickness, postphlebitic changes and varicosities are some of the several reported pre-existing pathological conditions of saphenous veins that predispose them to graft failure. Arm vein grafts are especially prone to stenosis development and aneurysm formation. The graft patency is also determined by the size of vein graft. Damage during vein harvest, dilatation and valve lysis are some of the problems with small-caliber veins. A greater risk factor for graft failure is associated with a small caliber vein [3]. If the greater saphenous vein is less than 3.5 mm in diameter, an arm or composite vein graft should be preferred. Thrombotic graft occlusion after bypass surgery is contributed by platelet activation [4], and this can be reduced by the use of antiplatelet agents such as acetylsalicylic acid and ticlopidine [5]. But low cost and absence of neutropenia as a side-effect make acetylsalicylic acid, the first-choice of antiaggregative agent after surgical infrainguinal arterial reconstruction procedures as compared to ticlopidine. Also Heparin coating of the graft is associated with significant graft failure reduction compared to average ePTFE with no coating, graft failure reduction was reported to be 50% in heparin coated ePTFE grafts as compared to other ePTFE grafts which are not coated with heparin [6].

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