

# Operations for arterial stenosis or occlusion

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Site of disease and type of operation Surgical operations are usually reserved for patients with severe symptoms (CLTI or lifestyle-limiting claudication) where angioplasty has failed or is not possible. Aortoiliac occlusion Justin H Miller, 1924–1994, vascular surgeon, Royal Adelaide Hospital, Adelaide, Australia. responds well to aortobifemoral bypass ( Figure 61.20a ) using a Dacron graft ( Figure 61.21a ), although the operation carries a perioperative mortality and systemic morbidity (stroke, cardio - respiratory failure, renal injury) rate of about 5% and 15%, respectively. In unfit patients, an axillobifemoral bypass is an alternative, although patency rates are less. If only one iliac system is occluded, an iliofemoral or femorofemoral crossover graft may be performed. Superficial femoral artery disease can be treated by femoro - popliteal bypass ( Figure 61.20b ); long-term graft patency is determined by the quality of inflow and outflow, graft length with the knee) and (whether the distal anastomosis is above or below the conduit used for the bypass. Autologous great saphenous vein (GSV) gives the best results and can be used reversed or in situ after valve disruption. If the GSV is not available from either leg, the lesser saphenous or arm veins may be used. If no vein is available, a prosthetic polytetrafluoroethylene (PTFE) graft may be employed ( Figure 61.21b ), although patency rates are less; many surgeons construct the lower anastomosis using a small collar of vein (Miller cuff or St Mary's boot) between the PTFE and the recipient artery, which may improve patency. Isolated CFA or profunda disease can be treated with endarterectomy and patch (vein or prosthetic) or a short bypass in the groin. Frequently, in patients with CLTI, particularly those with diabetes, the occlusion extends beyond the popliteal artery into the tibial (crural) vessels. Limb salvage can be attempted with a

Figure 61.19 (a) Occlusion of the popliteal artery extending into the tibioperoneal trunk. intraluminal positioning beyond the occlusion. (c) Balloon angioplasty. the lumen and balloon moulded. (f) Completion angiogram. (a) Figure 61.20 (a) Atherosclerotic narrowing of the aortic bifurcation. Aortobifemoral graft to bypass the stenosis. artery stenosis providing poor collateral circulation. A femoropopliteal graft is used to bypass the occluded area into good 'run-off' below. (b) A lesion crossed with a catheter angiogram confirming (d) Angiogram demonstrating vessel recoil. (e) Stents inserted to maintain (b) (b) Long superficial femoral

femorodistal bypass, with success even more dependent on the state of the run-off vessel and the quality of the vein conduit (minimum diameter 3 mm). The risk of early graft failure with limb loss is high (approximately 30% at 30 days) and these long bypasses are only appropriate for limb salvage. Technical details For aortobifemoral bypass, the aorta should be approached through a midline abdominal incision; a transverse abdominal incision divides the inferior epigastric vessels

(important collateral vessels in patients with an occluded aorta) and should be avoided. The common femoral arteries and their branches are exposed through vertical groin incisions; an oblique or transverse groin incision may be preferred for patients with obesity. The small bowel is retracted to the right and the posterior peritoneum opened. Retroperitoneal tunnels are made from the aorta to the groins. Heparin (5000 U) is given intravenously and the vessels clamped. A vertical incision is made in the anterior aspect of the aorta, to which an obliquely cut, bifurcated Dacron graft is sutured end-to-side with a non-absorbable suture (polypropylene). The graft limbs are then fed down to the groins, where they are anastomosed end-to-side to the common femoral arteries or, if there is evidence of profunda stenosis, to an arteriotomy running from the common femoral vessel down into the profunda. The posterior peritoneum is closed over the Dacron graft to prevent adhesion of the graft to the bowel, and the abdomen and groin wounds are closed. For femoropopliteal bypass the popliteal artery above or below the knee is exposed through a medial incision. The CFA is exposed at groin level. The GSV may be used in two different ways. First, it may be excised, its tributaries tied and the vein used in a reversed fashion so the valves do not obstruct the flow of blood. Alternatively, it may be left in place (in situ) and the valves disrupted with a valvulotome. The graft is sutured to the femoral artery proximally and to the popliteal artery distally. Femorodistal bypass involves fashioning the distal anastomosis to a tibial vessel. If no suitable vein is available, prosthetic material (usually PTFE) may be used, with or without a small vein collar (Miller cuff or St Mary's boot) at its distal end (Figure 61.22). A femorofemoral crossover graft involves tunnelling a prosthetic graft subcutaneously above the pubis between the groins. An axillofemoral graft is tunnelled subcutaneously between the axillary artery proximally to reach one or both of the femoral arteries; the patency rates of an axillobifemoral bypass are better than those for an axillofemoral bypass. Results of operation The long-term results of aortoiliac reconstructive surgery are good and are usually marred only by progressive infrainguinal disease; 90% remain patent at 5 years post surgery. Femoro - popliteal surgery is less successful. Immediate postoperative success for vein bypass exceeds 90% but the 5-year patency is around 60%. PTFE bypass yields poorer results than vein bypass, with 5-year success rates of less than 50%. Although the results of femorodistal bypass are even less satisfactory, such surgery can ensure limb salvage in patients who are generally debilitated and whose expected lifespan is limited; long-term patency is less important.

## (b) ® Figure 61.21 (a) A Dacron bifurcation graft; (b) a polytetra /f\_1 uoroeth ylene graft.

Figure 61.22 (a) Completion angiogram of a femoropopliteal bypass graft (with a Miller cuff). (b) Completion angiogram of a femorodistal bypass graft in situ.

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