

CONTEMPORARY VASCULAR SURGERY IN LANCASTER

John S Abraham, Senior Surgical Registrar, Justin F Kelly, Consultant Surgeon
Lancaster and Kendal Hospitals

This article outlines the current treatment options for patients with peripheral vascular disease.

Over the past twenty years there has been dramatic progress within the field of vascular surgery. Many surgeons and radiologists are increasingly dedicated to this specialty. With an improvement in surgical results, there has been an increasing demand, particularly for the care of the ischaemic limb, in district general hospitals like Lancaster.

The improved results are due in part to the availability of new surgical and radiological techniques, but also due to advances in medicine, anaesthesia and intensive care. Close liaison between surgeons, anaesthetists, radiologists and physicians (particularly diabetologists and cardiologists) is now essential for the overall care of patients with peripheral vascular disease.

At the Lancaster and Kendal hospitals, we aim to provide a modern service for the treatment of peripheral vascular disease. Table 1 shows the operative workload over two years of one surgeon (JFK) and demonstrates the relative frequency of vascular surgical procedures in Lancaster. Most patients with upper and lower limb ischaemia, carotid, aortic and venous disease can be adequately treated locally.

	1993	1994
Aortic aneurysm repair	26	30
Aorto-femoral bypass	14	5
Ilio-femoral bypass	6	6
Extra-anatomic bypass	7	10
Femoro-popliteal bypass	24	36
Femoro-distal bypass	12	11
Profundaplasty	2	7
Carotid endarterectomy	31	27
Mesenteric artery reconstruction	0	2
Carotid body tumour	1	2
Venous reconstruction (Palma)	1	1
Embolectomy	11	11
Major amputation	4	5
Cervical sympathectomy	5	7
Rib excision	3	7
Arterial angiograms		277
Intravenous arteriograms		19
Percutaneous angioplasty		54

Table 1. Operative workload of one Consultant Vascular Surgeon (JFK) for 1993 and 1994.

ACUTE LIMB ISCHAEMIA

Most patients who suffer a sudden deterioration in limb vascularity have an arterial thrombosis and require urgent admission to hospital and investigation. This includes

patients who have previously undergone arterial bypass surgery. Acute limb ischaemia due to emboli from the heart is gradually becoming less common, probably due to the use of antiplatelet drugs in ischaemic heart disease and anticoagulation of patients with atrial fibrillation. If the viability of the limb is in question, as indicated by severe pain or progressive anaesthesia, then emergency surgery is indicated. However, acute thromboses and at times emboli of native arteries or bypass grafts may now be successfully treated by intra-arterial thrombolysis. This technique can be successful up to four weeks from the acute thrombosis, but the earlier it is commenced the better the chance of a satisfactory outcome. If successful, thrombolysis reveals the underlying arterial pathology such as atheromatous stenosis which can then be treated by percutaneous angioplasty, avoiding the need for surgical reconstruction.

CHRONIC LIMB ISCHAEMIA

Non-Critical Limb Ischaemia

The presenting symptom of non-critical ischaemia is intermittent claudication. Although lower limb ischaemia predominates, much of the following discussion applies to both lower and upper limb ischaemia. The decision to investigate and treat non-critical limb ischaemia depends upon a subjective assessment of the symptoms by both patient and clinician. The risks of treatment are not insignificant in arteriopathies of whom one third have diabetes. These risks must be weighed against the potential benefits of treatment. For a manual labourer a greater exercise capacity is required than for a retired patient. The classical concept of treatment for Life, Limb and Livelihood is important.

The symptoms of intermittent claudication do not always worsen, but frequently abate as the collateral circulation develops after occlusion of a major artery. This phenomenon requires the patient to refrain from smoking and to exercise regularly. It also requires the disease to be largely at one level within the arterial circulation. It is often appropriate to avoid invasive investigation in the first instance for at least six months and monitor the natural history of the symptoms. Non-invasive vascular assessment in the form of segmental limb blood pressure and wave-form measurements before and after standard treadmill exercise will often provide sufficient information to allow both subjective and objective follow-up of this group of patients. If claudication is disabling, it is reasonable to offer most patients angiography with a view to further treatment. Essentially, the more proximal the disease, the more successfully it can be treated in the long term. Aorto-iliac stenoses are nearly all suitable for percutaneous angioplasty. Occlusions may however require aorto-femoral bypass. Patients who are at high risk from major abdominal surgery benefit from extra-anatomic bypass from the axillary or contralateral femoral artery. Figure 1 shows the intra-

arterial digital subtraction angiogram of a patient with disabling calf claudication. In this unfit patient the walking distance was considerably improved by axillo-bifemoral bypass grafting to bypass the severe disease at the aortic bifurcation. Disease in the superficial femoral artery may be suitable for angioplasty, if it is an occlusion less than 4cm, or require femoro-popliteal bypass if more extensive. The decision to treat non-critical limb ischaemia should be made jointly by the patient, the surgeon and radiologist, carefully considering the potential risks and benefits of the necessary treatment.

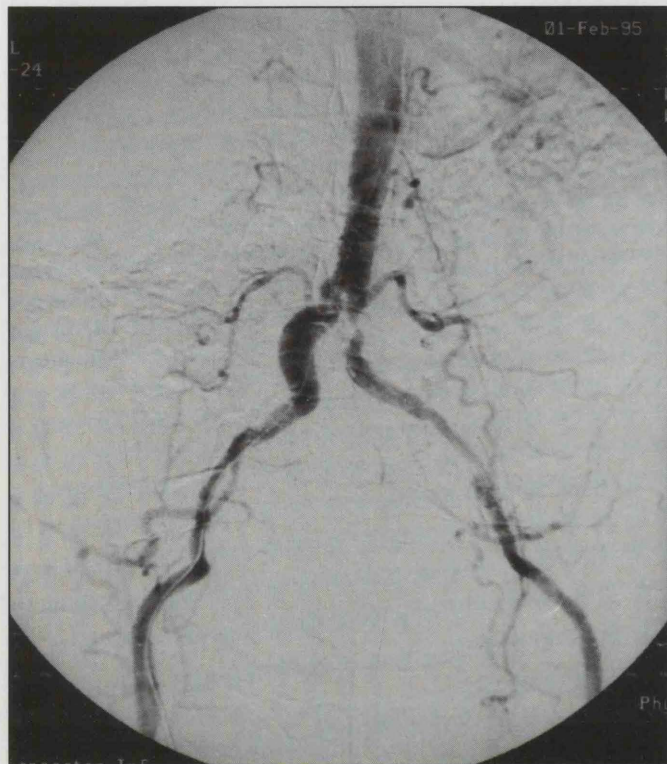


Fig 1 Intra-arterial digital subtraction angiogram of medically unfit patient with incapacitating bilateral calf claudication. Successfully treated by axillo-bifemoral grafting.

Critical Limb Ischaemia

There has been a gradual realisation that aggressive revascularisation, particularly of the lower limbs, reduces the need for major amputation, thus allowing the patient a degree of dignity and self-reliance that few elderly major amputees enjoy. It is no longer acceptable to perform major amputation for critical limb ischaemia without considering revascularisation and limb salvage.

Figures 2 and 3 demonstrate a situation where tissue perfusion pressure has fallen below the critical level for tissue viability and necrosis with infection has occurred. Critical ischaemia results in severe pain at rest, ulceration and gangrene, and can rarely be satisfactorily controlled by analgesia alone. Occasionally diabetic peripheral neuropathy may allow critical ischaemia to occur without severe rest pain. Both situations require urgent intervention. Unless arterial in-flow can be increased, and infection controlled, gangrene will spread and the limb will be lost. Such patients should be referred immediately to the Vascular Surgical Unit where, if possible, revascularisation will be attempted. A combined approach between surgeon and radiologist with percutaneous angioplasty can often be adjuvant to reconstructive surgery. Frequently there is a need to bypass down to the calf arteries, and sometimes into the foot. This requires major time-consuming surgery, but the mortality for such procedures is less than that for a major amputation.

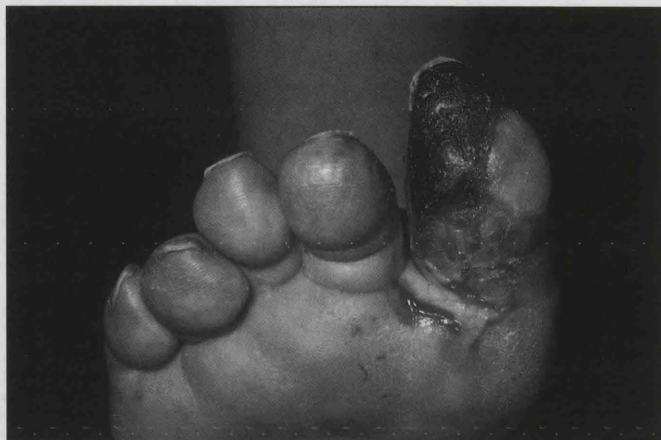


Fig 2 Critical ischaemia leading to tissue necrosis of the great toe.



Fig 3 Critical ischaemia leading to tissue necrosis at the ankle, and secondary larval infestation.

At Lancaster we perform more infrainguinal bypass surgery than the average for surgeons with a vascular interest (figures from the Vascular Surgical Society Audit of Registry 01/12/1992). At a recent audit of 16 femoro-distal bypass grafts over two years at Lancaster the patency rate of grafts (and limb salvage) was 75% with follow-up of 0-2 years. This is in part responsible for our low major amputation rate of about 10 each year, in comparison with 30 – 40 major amputations each year for the local population of 200,000 prior to the introduction of a vascular service. All patients with limb-threatening ischaemia deserve consideration for reconstructive surgery. The earlier intervention occurs, the better the chance of limb salvage.

Ischaemic and Diabetic Ulceration

Ulceration of the foot or lower leg may occur as a result of critical ischaemia alone, or in combination with venous insufficiency or diabetes mellitus. The presence of infection compounds the problems, particularly in the diabetic patient where neuropathy is such a critical feature, and greatly increases the risk of limb loss. Such patients need urgent assessment, control of infection and revascularisation. In this way ischaemic and neuro-ischaemic ulcers in diabetic patients may be given the maximum opportunity to heal.

CAROTID DISEASE

Approximately four out of every five strokes occur because of cerebral infarction due to arterial occlusion or emboli. The commonest site from which emboli arise is the carotid bifurcation. This area seems to be particularly vulnerable to the formation of atheromatous plaque (Figure 4). Stenosis

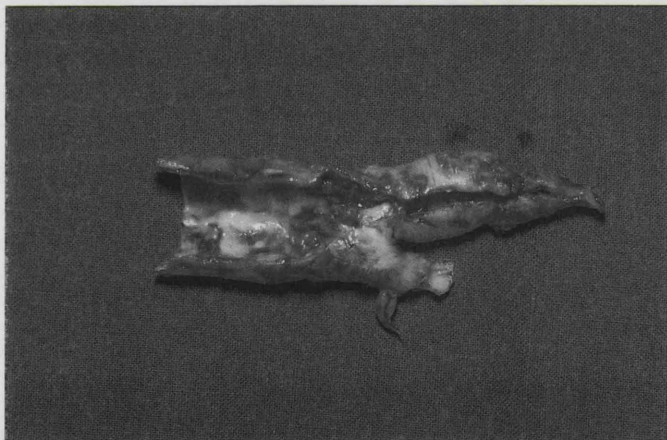


Fig 4 Carotid endarterectomy specimen showing ulcerated atheromatous plaque at the carotid bifurcation.

and plaque ulceration lead to haemodynamic upset, platelet deposition and subsequent embolisation to the cerebral hemisphere or retina of the eye via the ophthalmic artery.

The North American Carotid Endarterectomy Trial⁽¹⁾ and European Carotid Surgery Trial⁽²⁾ have clarified the role of surgery in carotid disease. Both trials showed that in symptomatic patients (ie those with transient ischaemic attacks or stroke due to cerebral ischaemia) a stenosis at the carotid bifurcation of 70% or greater is preferentially treated by carotid endarterectomy. The local results and care of these patients was published in this journal in 1993 (Vol 1:11). Stenoses of less than 70% may be better treated with antiplatelet agents. Treatment of carotid stenosis is of course aimed at the prevention of stroke. In order for such preventative surgery to be acceptable, there must be a low morbidity, particularly the intra-operative stroke rate which should be less than 5%. Intraoperative stroke may be partly due to inadequacies of surgical technique and meticulous care must be taken to minimise the risk to the patient. Approximately 25-30 carotid endarterectomies are performed annually at Lancaster (Table 1). Current national trials continue to define further the role of carotid endarterectomy, particularly for asymptomatic disease. It seems likely that the demand for carotid surgery will increase over the next decade. Patients suspected of suffering ischaemia in the territory of the internal carotid artery, either by exhibiting motor or sensory long tract signs, dysphasia, or amaurosis fugax, are assessed non-invasively using colour Doppler ultrasound. In many patients arteriography is unnecessary and treatment can be planned using the results of the ultrasound assessment alone.

ANEURYSMAL DISEASE

The abdominal aorta is by far the commonest and most important site of aneurysmal disease. A screening programme in Oxford⁽³⁾ revealed a 5.4% incidence of aortic aneurysm in men aged 65 to 74 years, and the incidence appears to be increasing rapidly. If an aortic aneurysm ruptures the chances of survival are approximately 50% if the patient reaches hospital alive, and 25-60% of aneurysms over 4cm in diameter will rupture⁽⁴⁾. To reduce the mortality from rupture, a policy of elective aneurysmal repair is pursued. The exact size at which aneurysmal repair should be performed remains controversial. There is currently a national trial designed to evaluate the natural history of aortic aneurysms of 4 to 5.5cm diameter. At Lancaster there is a special clinic to monitor patients with very small aneurysms using ultrasound at three or six monthly intervals. If an aneurysm becomes symptomatic (ie abdominal, back or loin pain) or tender, or

the patient suffers any form of collapse, immediate repair of the aneurysm is mandatory.

Screening the 'at risk' population for the presence of aortic aneurysm is under consideration. Aortic aneurysms are in part hereditary, possibly explained by the paucity of elastin in the aortic wall when compared to the normal aorta. Ultrasonic screening at the age of 50 is offered at Lancaster to close relatives of patients known to have aortic aneurysm, and has on several occasions detected an unsuspected aneurysm which required repair. The majority of aneurysms are still discovered accidentally during abdominal examination or radiological studies of the abdomen. Specific examination of the aorta should be part of routine abdominal examination for patients with hypertension, hernias and urological problems.

At present aortic repair is performed by open surgery. Several researchers, notably the Nottingham group⁽⁵⁾, are exploring the concept of endoluminal repair by placing a dacron stent into the aorta through the femoral artery. This exciting advance avoids aortic clamping, and may ultimately replace open repair in about 60% of patients. The stent design, however, is in its early stages, and the technique is still experimental.

OTHER CONDITIONS

Thoracic Outlet Syndrome

Thoracic outlet syndrome (TOS) can be difficult to diagnose, but is rewarding to treat in the correct group of patients. Symptoms suggestive of TOS include parasthesiae and weakness in the distribution of the brachial plexus, arm heaviness and pain particularly following exercise, and occasionally cyanosis when the subclavian vein is compressed. Enlargement of the thoracic outlet by cervical rib resection (if present) or first rib resection can be beneficial for these patients. Rib resection is performed by open surgery.

Cervical Sympathectomy

Cervical sympathectomy can now be performed by thoracoscopic techniques similar to those used in laparoscopy. Palmar and axillary hyperhidrosis, and occasionally severe Raynaud's disease often improve dramatically following this procedure.

FUTURE DEVELOPMENTS

Within the field of arterial bypass, it is now established that vein grafts are superior to prosthetic material such as Gortex[®] or Dacron for most infrainguinal bypasses. It may be possible in the future to seed endothelial cells onto prosthetic grafts to prolong graft patency, or endarterectomised arterial segments instead of performing bypass procedures. Adjuvant therapy with vasodilators such as prostacyclin may be shown to be beneficial.

Carotid surgery may be beneficial for patients outside the current criteria, particularly for asymptomatic patients with severe stenosis, and those who have symptomatic ulcerated plaque without severe stenosis.

Perhaps one of the most exciting developments is in the field of endovascular surgery. If aortoiliac aneurysmal and occlusive disease can be treated by graft placement through the femoral artery, this minimally invasive approach may

significantly reduce morbidity and mortality in this group of patients.

SERVICES IN LANCASTER AND KENDAL

There are presently two consultant surgeons with an interest in vascular surgery working in the Lancaster and Kendal hospitals. Patients are seen in outpatient clinics at both Lancaster (including a dedicated specialist vascular clinic run by JFK once a week) and Kendal. Patients may be referred for an urgent opinion and one of the surgeons with a vascular interest is available at all times to advise and admit patients with acute vascular problems. All major vascular surgery including interventional radiology is performed at Lancaster, with facilities for recovery at Kendal if appropriate.

Surgical and radiological follow-up of vascular procedures and Duplex surveillance of vein grafts leads to a heavy outpatient workload. Rolling audit of all vascular procedures, however, is essential if one is to be certain of the effectiveness of major surgery and able to compare local results with national standards.

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