



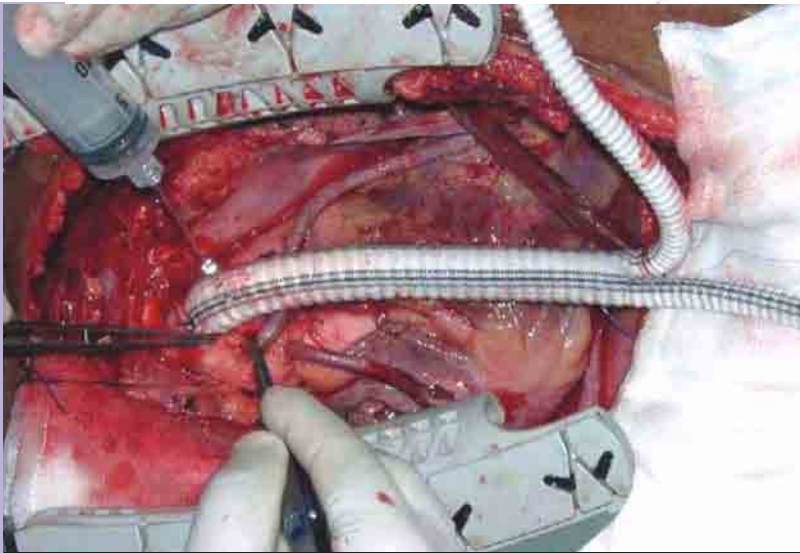
## COMBINED CORONARY & PERIPHERAL ARTERIAL REVASCULARIZATION

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Occlusive disease of major branches of aorta including the coronary arteries is almost always due to atherosclerosis. This disease process is more prone to occur in those sites where the vessel walls are subject to significant turbulence by the blood stream. Thus the coronary arteries, origins of brachiocephalic, left

The symptoms produced by vascular occlusion depend not only on the site and extent of occlusion but also on the speed with which the disease process sets in. A slowly progressing arterial occlusion gives ample time for development of collaterals and hence may never produce significant symptoms. On the other hand, acute occlusions produce sudden onset of severe symptoms and may even produce gangrene of the concerned organ. Extensiveness of collateral circulation varies considerably from patient to patient and so the same degree of occlusion produces ill effects in some but not in others.



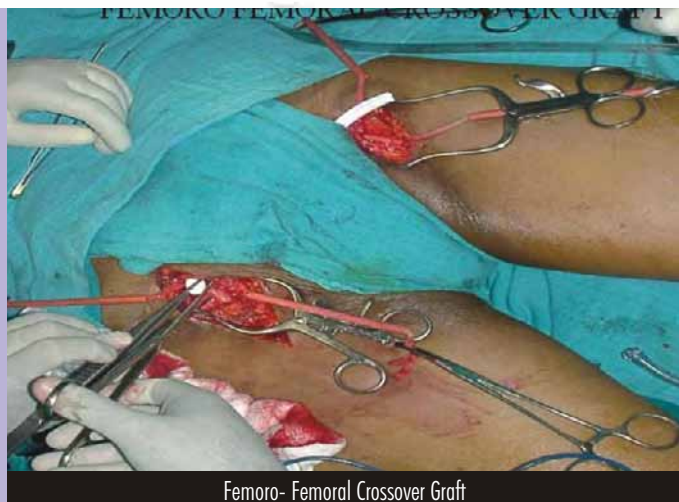
Combined OPCAB and Ventral Aortic Reconstruction

The most common types of peripheral occlusive vascular disease that we come across in our region involve the distal abdominal aorta and the vascular tree distal to it. Aortoiliac disease is not uncommon in our region. Thrombotic occlusion of distal aorta produces the classical Leriche's syndrome, which comprises of easy fatigability and symmetric atrophy of both lower limbs, pallor of legs and feet, inability to maintain a stable erection and absence of pulse distal to terminal aorta, without any trophic changes. Stenotic lesions of individual iliac arteries produce claudication of hip and thigh along with absence of distal pulses. Femoral artery disease produces calf claudication and if severe, rest pain in toes and forefoot.

Arterial occlusion at any level may progress to a stage when the survival of the limb itself is in jeopardy. Such a stage is characterized by rest pain, ulceration or gangrene. Rest pain is an extremely distressing pain, which indicates that the vascular compromise is so severe that the involved limb may soon progress to frank gangrene if not revascularised.

Ischemic ulceration refers to localized skin necrosis due to arterial insufficiency that fails to heal in a period of six weeks. It is usually found in the sole and in the web space between the

subclavian, carotid, mesenteric and renal arteries the distal aorta and its bifurcation and all the vessels distal to it are prone for significant atherosclerosis.



Femoro- Femoral Crossover Graft

toes. The end stage of vascular insufficiency is infarction or gangrene. The necrosed part may secondarily be infected, which may be source of systemic sepsis.

Diabetes and hypertension are definite risk factors. Tobacco smoking increases the risk for peripheral vascular disease and continued smoking produces much inferior results even after revascularization. Hence every effort should be made to stop smoking.

Doppler or Duplex Ultrasonography is the most useful examination in a vascular laboratory. Angiography is necessary only if revascularization is indicated. Even though percutaneous methods of treatment are frequently performed not all lesions are amenable to catheter based treatment. The goals of therapy in peripheral vascular disease are prevention of limb loss, relief of pain, maintenance of a bipedal gait and avoidance of disability.

Non-surgical management consists of cessation of smoking, weight control, graded exercise programmes and drugs. Aspirin and other antiplatelet drugs may slow the progression of lower limb arterial occlusion. Haemorrhologic agents like Pentoxifyllin (Trental) may

provide a modest advantage.

When non-surgical treatment fails to alleviate the distress and when symptoms start interfering with a tolerable life style, surgical treatment should be offered to improve the quality of life. Patients with limited gangrene or ischemic ulcers should be advised surgical revascularization to save the organ.

Successful bypass for limb ischemia requires mature surgical judgement and meticulous techniques. The optimal site for anastomosis is selected based on the angiographic picture. But in many patients, with critical limb ischaemia, with no angiographically visible distal vessels, there will be graftable vessels seen peroperatively and this can be confirmed by direct peroperative angiography.

Various conduits are available in the market but no conduit is superior to autologous long saphenous vein for infra-inguinal bypass. In those cases where long saphenous vein is not available, the short saphenous vein or other veins from upper limb may be used, even if it requires joining smaller bits together, because the long term results of autologous vein is much superior to any synthetic grafts available. If autologous vein grafts are not available, PTFE (Goretex) graft is the next ideal one, provided the graft placed does not cross joints. Thus, PTFE can be used in such situations for femoral to above knee popliteal bypass and femoro-femoral cross over grafts. For supra inguinal bypass like aortobifemoral, aortoiliac or aortofemoral bypass, crimped textile grafts like knitted Dacron grafts which are either collagen impregnated or preclotted ideal. We use reversed saphenous vein grafts for infra inguinal bypass and collagen bonded knitted Dacron grafts for more proximal bypass procedures.

Majority (80%) of our patients are referred to us with either claudication or nonhealing ulcers. 10% of our patients had concomitant coronary artery disease and underwent off pump coronary revascularization and peripheral artery revascularization in the same sitting. Off pump coronary artery surgery is a boon for coronary patients with peripheral arterial disease. It is well known that avoiding the pump spares the patients from platelet dysfunction and full dose systemic heparinization that is needed for going on CPB, which can cause severe bleeding especially with textile or PTFE grafts on the aorta and large arteries. Though preclotting and collagen bonding are said to reduce bleeding considerably, there is definitely a high



Aortogram- Occluded Abdominal Aorta

## Post Operative Angiogram



Ventral Aortic Graft



Ventral Aortic Graft Limbs



Right Femoral Flow



Left Femoral Flow

risk especially when there is an anastomosis on a major vessel like aorta with plenty of space around for the blood under high pressure to seep through. OPCAB causes no more trauma to the body than any other general surgical procedure and so peripheral revascularization surgeries of any magnitude can safely be performed along with it.

One of our patients was a 43-year-old man, a coolie by profession, who was the breadwinner of his family. He was evaluated for complaints of retrosternal chest discomfort and claudication pain of both thighs since one month. He underwent coronary and peripheral angiography. He was found to have significant double vessel CAD with critical stenosis of LAD & PDA. His distal aorta is totally cut off below the origin of renal arteries, with a leash of collaterals supplying the mesenteric vessels. Lower limb vessels were not visualized at all. He was prepared for OPCAB and it was planned to explore both thighs first and to proceed with aortobifemoral grafting only if femoral vessels of adequate quality was seen peroperatively. On the table, it was observed that both femoral arteries were good and surgical pliable, with some back flow from the distal end. He underwent OPCAB with 2 grafts to LAD and PDA first. Abdominal aorta was then approached trans-peritoneally and it was found that the entire abdominal aorta (both supra and infra renal) was heavily calcified like a concrete pipe. Because of the danger of disrupting the chalky aorta, it was decided to connect the proximal stem



Ventral Aortic Graft Limbs Tunneled Through Diaphragm

of a collagen impregnated Dacron trouser (Y) graft to the distal ascending aorta, distal to the two vein grafts. The two limbs of the same was tunneled through the diaphragm and brought to the groin and anastomosed to the femoral arteries. The patient had an uneventful stay and excellent recovery. He resumed his normal labour 3 months after surgery, and is leading an event free good quality life. Check angiogram done 6 months after the procedure confirmed this.

We are routinely performing aortobifemoral, aortofemoral, femoro-femoral and femoro-popliteal bypass surgeries. The excellent run we have had in our series of peripheral occlusive arterial disease patients, even in some with deadly dangerous limbs, is quite affirmative of the fact that a mature approach at the right time and a flawless surgery can provide almost every patient with a bipedal gait on their own limbs.