



Pedicle omentoplasty in lower limb for ischemic ulcers

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ABSTRACT

Background: Ischemic leg ulcers are due to critical ischemia of the lower extremity. The peripheral vascular diseases like atherosclerosis, thromboangitis obliterans, and diabetes. Restriction of blood flow due to arterial stenosis or occlusion leads to complaint of intermittent claudication, rest pain, ulceration and gangrene. For healing of ischemic ulcers and limb salvage a revascularization procedure is a must. Pedicle omentoplasty is the procedure of choice which can be performed by general surgeon.

Material and Methods: The closed pedicle omentoplasty was done in 20 patients. Among them 15 patients had thromboangitis obliterans, 3 patients had atherosclerotic ischemia and 2 patients had diabetic ischemia. Diabetes was well controlled but the patients were suffering from hypertension. The tailoring of omentum was done after exploratory laparotomy. The omentum reached at least calf muscle by subcutaneous tunnelling.

Result: Improvement in local skin temperature, measurement of oxygen saturation by pulse oximetry in pre and post operative period, ankle brachial pressure index occurred in all the patients. Symptomatic improvement in form of rest pain occurred in all patients. Healing of ulcers and amputation site occurred in all the patients. The patients were assessed on 7th day, 14th day and one month and three months for healing of ischemic ulcers. The healing time for ulcers varied from 3 to 6 weeks.

Conclusion: This revascularization procedure can be done by general surgeon for limb salvage and healing of ischemic ulcers.

KEYWORDS : Omentoplasty, Omentopexy, Critical Ischemia, Ischemic Ulcer

Introduction:

Peripheral vascular disease commonly affects the arteries supplying the lower extremity. It is mostly caused by atherosclerosis, thromboangitis obliterans, diabetes and obstruction. Restriction of blood flow due to arterial stenosis or occlusion leads to complaint of intermittent claudication. Any further reduction in blood flow causes ischemic pain at rest mostly affecting the foot. Ulceration and gangrene may then supervene. Patient with critical limb ischemia describe history of minor trauma resulting in ulceration. Ischemic ulcers can occur anywhere in lower limb especially where the bones are protruding and rub against bed sheets, socks or shoes like shin and lateral malleolus. They also occur commonly in nail bed if the toe nail cuts into the skin or if the patient had recent toe nail trimming or an ingrowing toe nail removal. Leg ulcers may be caused by atherosclerosis, diabetes, buergers disease, renal failure, hypertension, lymphoedema, inflammatory diseases like vasculitis, lupus scleroderma & other rheumatological disease like sickle cell anemia, bowel disorder & infection. The lower limb vessels are having block in their lumen. The atherosclerosis produces blockage in major vessels like iliofemoral or femoropopliteal disease; while Buerger's disease is disease of leg arteries commonly a tibioperoneal disease.^{1,2} Diabetes produces peripheral vascular disease which involves major as well minor vessels. So in diabetes peripheral vascular disease is a combination of macroangiopathy and microangiopathy. The critical limb ischemia is the key factor in these diseases resulting in ulcer formation. For healing of these ischemic ulcers requires a revascularization procedure. Endovascular procedure like Balloon angioplasty and stenting are popular; but have the limitation that all lesions are not amenable to these techniques. Bypass procedures like aortofemoral, femoro-popliteal or femoro-femoral are effective in bringing blood flow in a critical ischemia. Modern technique of revascularization like stem cell therapy is effective in healing arterial ulcers but this technique is not available commonly. Greater omentum provides an alternate pathway of blood flow in a critical ischemic limb.^{3,4} The neoangiogenesis formation takes place between omentum and muscles. This increases the blood flow in lower limb and overcomes ischemia leading to healing of ischemic leg ulcers. This study was carried out with aim to assess efficacy and safety of omentoplasty in healing of ischemic ulcer in patient with critical limb ischemia.

Material and Methods:

The study was conducted at teaching hospital. A total of 20 patients were part of study. The age group was between 30-50 years having ischemic ulcers. Among them 15 patients had thromboangitis obliterans, 3 patients had atherosclerotic ischemia and 2 patients had diabetic ischemia. Diabetes was well controlled but the patients were

suffering from hypertension. These 20 patients suffering from critical leg ischemia with ulceration in Fontaine stage 4 were involved in study. They did not require emergency amputation. Previously they had been treated unsuccessfully with conventional therapy. Five patients of thromboangitis obliterans had failed lumbar sympathectomy.

Preoperative assessment:

The clinical assessment was using ankle-brachial systolic pressure index. The preoperative assessment included routine investigations LFTs, HIV, HCV, HBsAg were done in all patients. X-ray leg and foot was done to see the underlying osteomyelitis. In all the patients the diagnosis of critical ischemia was made by Doppler scan. The Doppler study was done to demonstrate the block and flow in distal vessels. CT angiography can delineate the arterial anatomy of the lower limb vessels.

Technique:

Standard technique was used in all the patients. Midline supraumbilical incision was used for laparotomy. The omentum was examined for its length and breadth. Notice was taken whether omentum was single layered or double layered. Presence of omental vessels, right omental artery and middle omental artery and left omental artery is noticed. Tailoring of omentum is planned accordingly. The omentum can be lengthened based on left or right vessels. Double layered omentum can be tailored for both limb based on left and right vessels. Through left and right iliac fossa the lengthened omentum is brought out in subcutaneous plane. Multiple incisions are used for subcutaneous tunnelling into thigh and leg. Level of omentum whether it reaches the thigh and leg does not differs in revascularisation of ischemic limb.

Postoperative period:

Nothing orally was given for 48 hours. Patients were switched to oral feed once peristalsis returned. Routine antibiotics and analgesics were given. They were advised to keep limbs straight for 2 to 3 days. The patients were made to walk on 4th or 5th day. Sutures were removed on 10th postoperative day.

Duration of hospital stay:

The hospital stay varied from 10 to 20 days. Extended stay was necessary in patients with wound infection.

Complications of omentoplasty:

This procedure requires laparotomy carries the complications related to laparotomy like intestinal obstruction, intra-abdominal abscess and

ischemia. limb infections and postoperative edema were two major concerns.

Results:

Symptomatic improvement visual and analgesic requirement were assessed. Improvement in local skin temperature, measurement of oxygen saturation by pulse oximetry in pre and post operative period, ankle brachial pressure index occurred in all the patients. Symptomatic improvement in form of rest pain occurred in all patients. Oxygen saturation measured by pulse oximetry were observed in all patients. Improvement in local skin temperature was present in all the patients. Healing of ulcers and amputation site occurred in all the patients. The patients were assessed on 7th day, 14th day and one month and three months for healing of ischemic ulcers. The healing time for ulcers varied from 3 to 6 weeks. Local dressings of ulcers were used in all patients. The ulcer healing time was long about 3 months in one diabetic ischemic limb.

Discussion:

In ischemic ulcers thromboangitis obliterans remains the major cause in India. Multiple modalities are used as treatment. Drug therapy is of benefit only in early stages. Surgical options are lumbar sympathectomy, direct arterial surgery, omentoplasty and amputation as last resort.⁵ In patients with critical limb ischemia surgery is required to salvage the limb. With sympathectomy relapses are common due to normalisation of vasomotor tone.^{5,6} Arterial reconstruction is impossible due to distal major disease. Endovascular surgical procedure requires interventional surgery by experts. Omentoplasty is a revascularization procedure which can easily done by a general surgeon. Omentoplasty is a good alternative of salvage limb and improve ischaemic ulcers.⁷ Greater omentum is a primitive part of GIT containing a vast network of blood vessels and lymphatics. If deprived of its own blood supply it may survive by attaching to arteries in its vicinity. Lipid fractions from omentum induces neoangiogenesis and thereby improving circulation in surrounding tissue.^{8,9} In series by Babu, Menon, Vaidanathan et al and Ranvir and Sharma, healing of ulcers occurred in 100% and 89% patients respectively.^{10,11,12,13} Our patients achieved 100% healing of ulcers. Plastic surgeons have entered in this arena by using free omentum graft which has been harvested from abdomen by laparoscope. This procedure can be combined with a bypass vein graft to which free omentum flap is anatomised using microscopic technique.¹⁴

Conclusion:

This is a simple surgery which can be performed by general surgeon; need no special equipment, for limb salvage and healing of ischemic ulcers.



Fig 1. Showing Omentum Lengthening

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