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Lymphovenous Anastomosis in Filarial Lymphedema

S. Jamal

F.R.C.S. (Glasg.) F.R.C.S. (Edin.) A.B.Plastic Surgery, Department of Plastic Surgery, Medical College, Thanjavur, India 613004

Summary

Correction of established filarial edema requires lymphaticovenous by-pass, to overcome the lymphatic obstruction and debulking to reduce the lymphatic load. Lymphnodovenous shunt at inguinal area has given 90% success in the authors hand, proving the by-pass. However, in an enormously swollen leg the dilated distal lymphatics may not be adequately drained and hence a distal lymphaticovenous anastomosis should theoretically offer further reduction; and thereby make debulking effective.

In this article 3 cases are reported in whom lymphovenous anastomosis was done, in 2 at the knee level and in 1 at the ankle, their result and rationale are discussed.

In view of the many publications of lymphovenous anastomosis (LVA) for lymphedema (1, 2, 3, 4) in recent years, with fairly predictable long term good results (5, 6) its place in filarial lymphedema was explored in 3 cases and form the basis of this preliminary report.

Material

For all cases of persistant edema in filariasis, it is our practice to do nodovenous shunt (NVS) and have obtained 90% success in reducing the size of the limb (7). Since our aim was to achieve maximum reduction in the circumference or the edematous limb we tried LVA in three cases in whom we had already performed NVS to see how much additional reduction will result from this procedure. Even though in many patients we tried this procedure because of technical difficulty and local condition of the limb it was possible only in three cases.

Technique

Dorsal pedal lymphatic connulation was performed in 2 cases by *Kinmonth* technique (8) subsequent to primary NVS. Radiologic lymphography revealed hyperplastic lymphatics with dermal back flow (Fig. 1a,b, and Fig. 2a, b) in the swollen part and hypoplastic lymphatics in the proximal part in case 1 (Fig. 1c) and their number was reduced above the knee in case 2 (Fig. 2c). In the third case the lymphatics were visualized only at the time of excisional surgery by injecting patent blue. In case 1 and 2, through a 5cm oblique incision at the postero-medial aspect of the knee the lymphatics were exposed. Injection of dilute patent blue through the pedal lymphatic reached the knee area in 5 to 10 minutes, without any mechanical assistance and made it possible to visualize many lymphatics, the largest one was selected and isolated. By proximal digital compression the veins in the vicinity were distended to select the one with valve. It is important as in our technique of NVS to select the vein for anastomosis without back flow of blood in it. This will prevent thrombosis and occlusion of the anastomosis site; for lymph by itself has very little coagulability (9). The vein and lymphatic were divided at suitable level so that a tension free anastomosis between the proximal vein and distal lymphatic ends could be made. 8/0 monofilament polyamide was used as interrupted stitches for anastomosis. About 3 to 6 stitches were required to produce continent anastomosis. The lymphatic end was slightly slit open to equalize its size to that of the vein before suturing. If there was back flow from the divided vein further proximal dissection and ligation of its tributaries often

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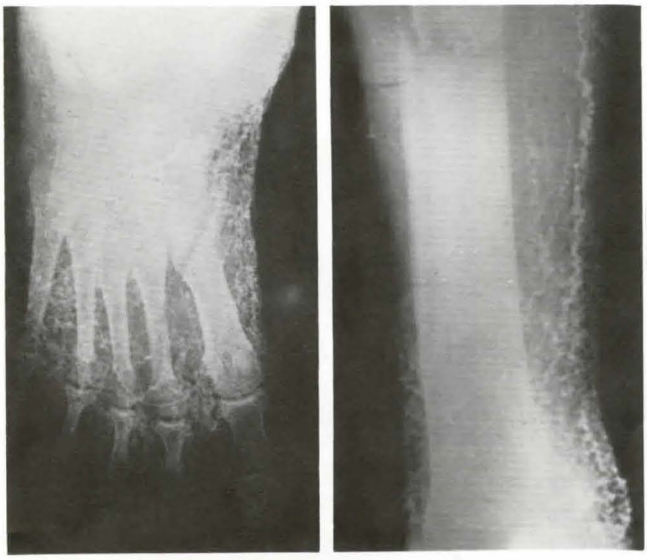


Fig. 1a Lymphangiogram of case 1. 3 years after NVS showing the many hyperplastic vessels and dermal back flow in foot and leg. Part of dermal back flow appearance is due to use of water soluble contrast medium

stopped it, and there was no need in both these cases to look for other non-leaking veins.

Proximal compression of vein after anastomosis and simultaneous injection of saline in the pedal lymphatic confirmed the patency and absence of leaking at the anastomosis (Fig. 3). In the third case, Patent blue was injected in the interdigital area and medial lower leg before proceeding with excision and the lymphatics which were again of the hyperplastic type visualized (2–3 mm in diameter) under the incision in the lower part of leg, and anastomosis of distal two lymph trunks with the proximal vein effected as detailed above.

For assessing the results circumference of the limb were measured as in our NVS cases and the percentage reduction in the excess circumference compared with the non-operated limb and expressed as:

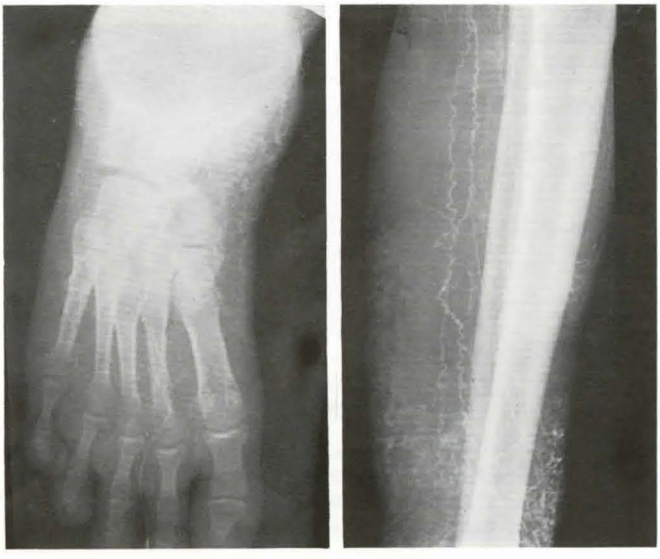


Fig. 1b Lymphangiogram of same case 1. After excision of skin and subcutaneous tissue, note the marked reduction in dermal black flow and the numbers of hyperplastic vessels

Fig. 1c Lymphangiogram of case 1 showing the few lymphatics in thigh. The site of NVS seen as denser area along with a faint trace of the anastomosed vein-line drawing of the same
V = Vein; N = node

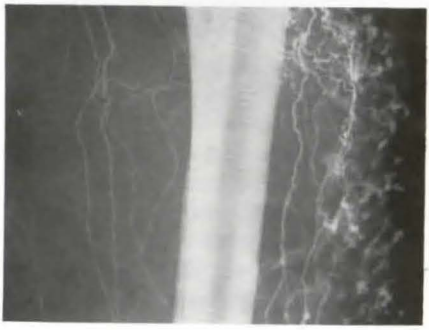
$$\frac{\text{Initial circumference of edematous limb} - \text{Circumference of edematous limb after surgery} - \text{Initial circumference of normal limb} - \text{Subsequent circumference of normal limb}}{\text{Initial circumference of operated limb} - \text{Initial circumference of normal limb}} \times 100$$

Excess circumference is the difference between the circumference of operated and non-operated limbs.

Results

Following LVA there was further reduction in the excess circumference of limb which ranged from 7–25 per cent. In addition the skin became more supple and pliable because of less dermal thickening. The redundant skin and subcutaneous tissues were ex-

2a)



2b)

2c)

Fig. 2 Lymphangiogram of case 2 after NVS dermal back flow and hyper-plastic vessel in lower leg (a); mid leg (b) and knee (c). The last one shows the convergence of lymphatics in the medial and lateral aspects of the knee and a lymphnode in the medial aspect

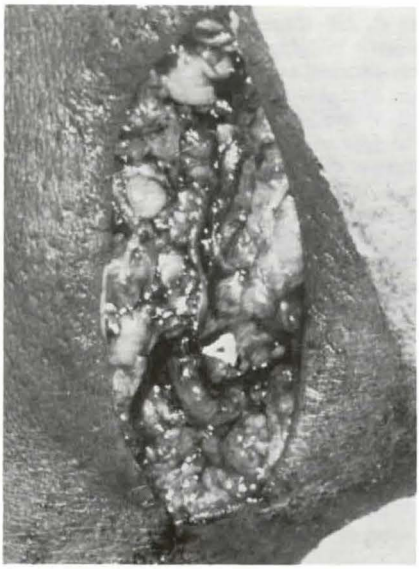


Fig. 3 Shows the vein and lymphatic at the site of anastomosis in case 2.
Lymphatic L 2.5 mm and vein V 4 mm diameter

cised 7–10 days after LVA. The excision was done in such a way, the LVA was preserved and maximum tissues removed in a single sitting. Additional excision if required, as in case 3 was performed 10–12 days after.

Discussion

It is said (10) the lymphatic transport capacity is the product of the total cross-section of the lymphatic vessel system and the lympho kinetic forces. In established filarial elephantiasis the lymphatic transport is severely affected by alterations in the lymphatic vessel system and the lymphokinetic forces to varying degrees. So the treatment should aim at correcting both these defects to the extent, they are deranged simultaneously or concurrently in a given case. Bridging operations (11, 12, 13) nodovenous shunt (14) and lymphaticovenous anastomosis (15) are designed to overcome the obstruction to lymph flow by providing alternate pathways, while excisional surgery (16, 17) implantation of nylon net (13) and external elastic support attempt to correct the defective lymphokinetic forces. To improve the drainage the author modified the lymphaticovenous shunt of *Nielubowicz* and *Olszewski* (15) as nodovenous shunt (NVS) and obtained 90% success in reducing the size of the limb. However in many cases while doing excisional surgery it was observed, considerable amount of fluid to ooze out from the field of operation. This may be, probably due to the inadequacy of the few proximal lymphatics to drain all the lymph from the many persistent hyperplastic lymphatics in the swollen area. Hence additional shunts between the lymphatics and veins in the distal area will afford better drainage. For this purpose the medial aspect of the knee was selected in the two cases reported here: because the lymphatics converged and the swelling is less at this site. In addition during excisional surgery the anastomosis can be preserved. The popliteal mode could not be used in case 1, because of the mechanical hinderance by the swelling in the leg. In the third case LVA was possible in the lower leg at the time of excisional surgery and its real contribution in reducing the size was not assessable. In the other two cases the reduction in size following LVA ranged from 6 to 25 per cent and greatly helped to minimize the number of excisional surgery, to obtain acceptable size of limb.

Eventhough, only in 3 cases, LVA has been performed, the observation and result definitely call for further trial in cases of filarial elephantiasis.

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Addendum:
Since submission of this paper in few more cases LVA was done in the leg with encouraging results.

Prof. S. Jamal, Department of Plastic Surgery, Medical college, 30B Rajappa Nagar, Thanjavur, India 613 007