

Microsurgical Lymphonodovenous Implantation for Chronic Lymphedema

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This is a prospective study of 10 cases, 14 lower extremities lymphedema were treated by microsurgical lymphonodovenous implantation from October 2001 to July 2003. All of the presented patients suffered from filariasis⁽¹⁾ with obstructive lymphedema of the lower limbs. The surgical technique is described. The results have been satisfactory. The average reduction in the circumference of the affected limb was 7.37 cm at 16 cm below the knee joint level, with an average follow up of 4.5 months. Subjective and objective signs were improved.

Keywords : Lymphedema, Lymphonodovenous implantation-microsurgery

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There are many classic surgical approaches⁽²⁾ in the treatment of obstructive lymphedema of the extremities. The application of microsurgical techniques⁽³⁻⁹⁾ to the drainage of lymph into the venous system offers new possibilities in this field.

From October 2001 to July 2003 the authors treated 10 patients with lymphedema in lower limbs by microsurgical lymphonodovenous implantation. This paper reports the authors' experience in microsurgical lymphonodovenous implantation for treating obstructive lymphedema of the lower limb.

Patients and Method

From October 2001 to July 2003, 10 patients, 6 males and 4 females had 14 affected lower limbs. The age of the patients ranged from 22 to 60 years, the average age was 41.8 years (range 22-60). The affected lower limb were 5 single right limbs, one single left limb and 4 bilateral limbs in 10 patients. The average duration of edema before treatment was 20.4 years (range 8-40).

The circumferences of the affected lower limb were measured at three levels; knee joint level (mid-patella in horizontal), 16 cm below the knee joint level and metatarsal head level. The measurements were done at the first visit, three weeks after the operation and at each follow-up visit every 2 to 6

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months. The patients were also questioned regarding subjective postoperative changes of the affected extremities (Table 1).

Operative technique (Fig. 7)

The operations were carried out under regional anesthesia. Zig-zag incision lines were marked on the anteromedial aspect of the thigh. The skin incision was made and exploration of an adequately sized vein and saphenous vein was carried out first. After identification of the veins, the groin lymph nodes were detected later. The lower pole of the node was decapsulation. The vein was occluded with a soft microclip, and the proximal part of the vein was trans-

Table 1. General aspects affecting the lower limb and duration of edema before surgery of 10 patients

| Patent | Age | Sex | Affected area (lower extremity) | Duration of edema before surgery (years) |
|--------|-----|-----|---------------------------------|--|
| 1 | 39 | F | Right | 26 |
| 2 | 60 | M | Right | 20 |
| 3 | 40 | M | Bilateral | 13 |
| 4 | 28 | M | Left | 14 |
| 5 | 22 | M | Bilateral | 8 |
| 6 | 42 | M | Bilateral | 18 |
| 7 | 59 | M | Right | 40 |
| 8 | 59 | F | Bilateral | 30 |
| 9 | 41 | F | Right | 26 |
| 10 | 28 | F | Right | 9 |

posed and covered the nuded lower pole of the lymph node with nylon 8-0 under a microscope, 6 to 8 stitches. The zig-zag wound was closed layer by layer by absorbable suture 4-0 and skin layer by nylon 4-0. When two lymph nodes were identified, two microsurgical lymphonodovenous implantations were achieved. The average time to perform the procedure was 1 to 2 hours. Postoperatively, the limb was bandaged and elevated at night. The pressure garment was applied for at least 3 months.

Results

The number of implantations on each extremity varied from one to two. Ten cases of chronic lymphedema of the lower limbs treated by microsurgical lymphonodovenous implantation were followed from 1.5 months to 17 months, with an average follow-up of 4.5 months. On subjective results, all patients felt more comfortable, with a decrease in size and weight, softer skin, and better fitting of clothes after surgery. None of them suffered from induration or lymphangitis of the operated extremity during the follow-up period.

Postoperative circumferential measurements showed a decrease in all sites of the affected extremities. The average decrease was 3.5 cm at knee joint level, 7.37 cm at the 16 cm below the knee joint level and 2.75 cm at the metatarsal head level. All patients had a greater decrease rate in circumference of the dorsum of foot and leg than thigh. The post-operative improvement in circumference was continued through-

out the follow-up period. In the present series, the postoperative results presented no clear relationship with the preoperative duration of edema, maximum preoperative enlargement in circumference, or number of microsurgical implantations (Table 2).

Case Report

Case 1

A 41-year-old woman suffered from chronic lymphedema of the right lower extremity. The duration of edema before treatment was 26 years. The circumferences of the affected lower limb were 43 cm at knee joint level, 41 cm at 16 cm below the knee joint level and 23.5 cm at metatarsal head level. At 2 months postoperatively, the size of the right lower limb was reduced remarkably. The circumference of the affected lower limb in the postoperative period was 40 cm at knee joint level, 38 cm at 16 cm below the knee joint levels and 23.5 cm at the metatarsal head level (Fig. 1,2).

Case 2

A 22-year-old man had lymphedema of the bilateral lower limb for 8 years. The circumferences of the right lower limb were 40 cm at the knee joint level, 44 cm at 16 cm below the knee joint level and 29 cm at the metatarsal head level. The 4 months postoperative results were 3.5 cm at knee joint level, 35.5 cm at 16 cm below the knee joint level, and 25 cm at metatarsal head level.

The circumferences of the left lower limb were 38.5 cm at the knee joint level, 40 cm at 16 cm below the

Table 2. The number of microsurgical lymphonodovenous implantations, follow-up period and the circumference of the lower limb at the three levels, knee joint level, 16 cm below the knee joint level and metatarsal head level

| Patient | Number of MLV | Follow up period | Maximal decrease (Pre-op to Post-op) in circumference (cm) | | |
|---------|---------------|------------------|--|------------------------------|--------------------------------|
| | | | Knee joint level | 16 cm below knee Joint level | Metatarsal head level |
| 1 | 1 | 7m | 1.5 (43.5-42) | 5 (48.5-43.5) | 1 (28-27) |
| 2 | 1 | 5m | 4.5 (42-37.5) | 14 (52-38) | 6 (33-27) |
| 3 | 1 | 17m | Rt 6 (40-34) Lt 5.5 (39-33.5) | 9.5 (42.5-32) 4 (38-34) | 1 (24-23) 1.5 (24-22.5) |
| 4 | 1 | 2m | 1.5 (37-35.5) | 7 (42.5-35.5) | 4 (31-27) |
| 5 | 1 | 4m | Rt 5 (40-35) Lt 1.5 (38.5-36) | 8.5 (44-35.5) 6 (40-34) | 4 (29-25) 2 (27-25) |
| 6 | 1 | 2m | Rt 5 (49-44) Lt 7 (49-42) | 16 (60-44) 12.5 (56.5-44) | 3 (30-27) 5 (33-28) |
| 7 | 2 | 2m | 2.5 (41.5-37) | 5.5 (42.5-37) | 2.5 (29.5-27) |
| 8 | Rt 2 Lt 1 | 3m | Rt 4.5 (41.5-37) Lt 3.5 (38.5-35) | 8 (40.5-32.5) 5 (38-33) | 5.5 (29-24.5) 4.5 (28-24.5) |
| 9 | 1 | 2m | 3 (43-40) | 3 (41-38) | 0.5 (23.5-23) |
| 10 | 1 | 1.5m | 5.5 (44-38.5) | 14.5 (48.5-34) | 3.5 (24.5-21) |



Fig. 1 Pre-operative of case 1

knee joint level and 27 cm at the metatarsal head level. The 4 months postoperative results were 36 cm at the knee joint level, 34 cm at 16 cm below the knee joint level, and 25 cm at the metatarsal head level (Fig. 3,4).

Case 3

The 40-year-old male, had had underlying thalassemia and lymphedema of the bilateral lower limbs for 13 years. The circumferences of the right lower limb were 40 cm at the knee joint level, 42.5 cm at 16 cm below the knee joint level, and 24 cm at the metatarsal head level. The 17 months post-operative results were 34 cm at the knee joint level, 32 cm at 16 cm below the knee joint level and 23 cm at the metatarsal head level. The circumferences of the left lower limb were 39 cm at the knee joint level, 38 cm at 16 cm below the knee joint level and 24 cm at the metatarsal head level. The 17 months postoperative results were 33.5 cm at the knee joint level, 34 cm at 16 cm below the knee joint level, and 22.5 cm at the metatarsal head level (Fig. 5,6).

Discussion

Lymphedema^(1,2) is a disease characterized by an abnormal accumulation of lymph fluid in the



Fig. 2 The 2 months postoperation of case 1

tissues of the body which causes uncomfortable and disability swelling. It can affect the arms, legs and other parts of the body. In the early phase, the swelling consists mainly of fluid. In the chronic phase, however, the swelling consists not only of lymphatic fluid, but also significant deposits of fat and tough scar tissue. A chronic and progressive condition of lymphedema can cause discomfort, cosmetic deformity, repeated episodes of infection, particularly cellulitis and/or lymphangitis, malignant degeneration, thickening of the skin and/or hardening of the limb, elephantiasis and papillomatous growth.

Lymphedema can be classified into primary and secondary. Primary lymphedema has unknown cause and can appear during any stage of life. Secondary lymphedema may result from surgery, chemotherapy, radiation, trauma and infection such as filariasis.

Lymphedema may be treated by medical and surgical means⁽²⁾. The medical approaches for the management of lymphedema include

- skin care and hygiene
- manual lymph drainage
- pneumatic pumps
- heat therapy

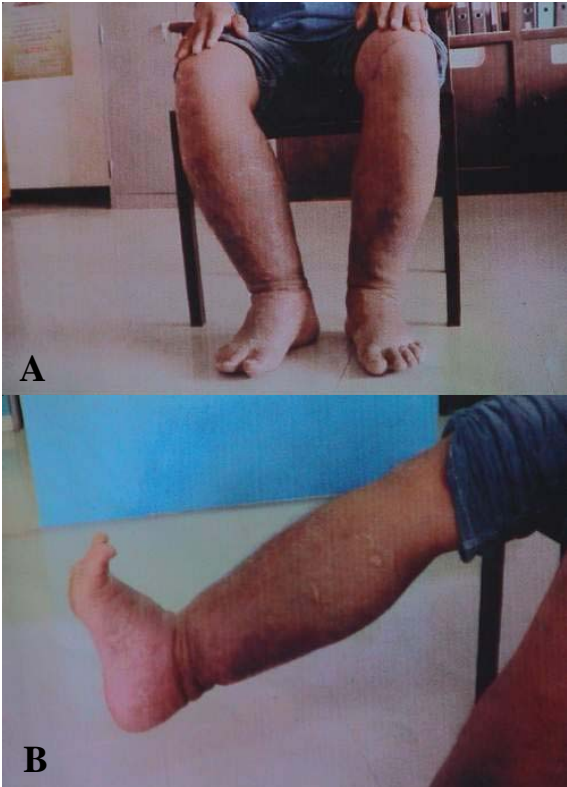


Fig. 3 Pre-operation of case 2



Fig. 4 At 4 months of post- operation of case 2



Fig. 5 Pre-operation of case 3



Fig. 6 The 17 months post-operation of case 3

The lower extremities with compression garment

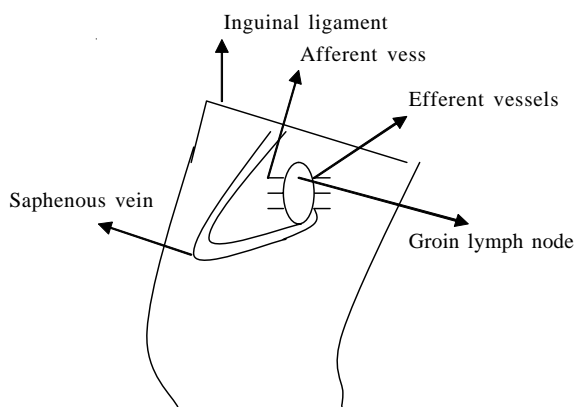


Fig. 7 Microsurgical lymphonodovenous implantation

- complex decongestive physiotherapy
- therapeutic exercises
- compression garments.

The surgical management may be divided into two procedures. The first one is anatomical excision of the excess tissue. The excised limb can be covered by skin graft or primary closure. The second one is the physiological lymph drainage bypass procedure. This procedure can be performed by anastomosing the lymphatic vessel or lymph node to the venous system using microsurgical techniques⁽²⁻⁹⁾. The problem of anatomical excision⁽²⁾ is the relapse of the swelling and disfigurement in the case of skin graft, ulceration of the grafted skin and hyperkeratosis. With the advance of microsurgery, the microlymphaticovenous shunt has been used for the creation of a new lymphatic bypass. The microlymphaticovenous anastomosis^(4,7) has offered a worthwhile clinical application. Yuhei Yamamoto and Tsuneki Sugihara⁽⁹⁾ have applied the external connective adventitial and adipose tissue with lymphatic capillaries implantation into the small vein. The author's technique modified the lymphoid tissue of the lower pole of lymph node implantation into the saphenous vein. This technique will shunt the lymph from the lymph node to the venous system. This technique is so easy when compared to the microlymphaticovenous anastomosis and microsurgical lymphaticovenous implantation. But in the absence of lymphnode, this technique can not be used. In the present series, slight weekly changes in the reduction of lymphedema were shown and the tissue consistency of the calves showed soft consistency on the day after the operation.

Although the number of 10 patients was not large and follow-up periods were not long, all lower

extremities showed both subjective and objective improvements during the follow-up period. This simple and easy technique to create a lymphaticovenous bypass can be expected to provide improvement and is recommended in the treatment of chronic lymphedema.

Conclusion

The present article presents the authors experience with microsurgical lymphonodovenous implantation in the treatment of chronic filariasis lymphedema. The authors attempt is to create a lymphaticovenous shunt with an implantation of the decapsulation lower pole of lymph node into the saphenous vein. The transpose saphenous vein will cover the lower pole of the denuded lymph node by nylon 8-0, 6 to 8 stitches. Our clinical results with 10 patient, 14 lower limbs with chronic lymphedema demonstrated the effectiveness of this technique. This easy and simple method could be used widely and could provide stable improvement of chronic lymphedema.

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การผ่าตัดรักษาภาวะโรคเท้าช้างโดยการฝังต่อมน้ำเหลืองเข้ากับเส้นเลือดดำด้วยวิธีจุลศัลยกรรม

รัชต์ วงศ์ตรังคพันธ์

การศึกษานี้ได้รายงานผลการผ่าตัดฝังต่อมน้ำเหลืองเข้ากับเส้นเลือดดำด้วยวิธีจุลศัลยกรรมเพื่อการฟื้นฟูภาวะคั่งของน้ำเหลืองในบริเวณขาในผู้ป่วยโรคเท้าช้าง 10 ราย จำนวนขา 14 ข้าง ตั้งแต่เดือนตุลาคม พ.ศ. 2544 จนถึงเดือนกรกฎาคม พ.ศ. 2546 โดยผู้ป่วยทั้งหมด ได้รับความร่วมมือจากงานโรคเท้าช้าง กรมควบคุมโรค ว่าเป็น Filariasis ผลจากการศึกษาครั้งนี้เป็นที่น่าพอใจทั้งในแง่นามธรรมและรูปธรรม โดยมีขนาดของเส้นรอบวงของขา ที่มีภาวะโรคเท้าช้างลดลงเฉลี่ยประมาณ 7.37 เซนติเมตร ณ. ระดับ 16 เซนติเมตร ต่ำจากระดับข้อเข่า โดยมีระยะเวลา การตรวจติดตามหลังผ่าตัดเฉลี่ยประมาณ 4.5 เดือน
