

Treatment of Peripheral Lymphedema by Microsurgical Anastomoses of Lymphatics with Valvular Vein

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Abstract Objective Lymphatic microsurgery has been one of the top choices in the treatment of obstructive lymphedema of extremities that are not responsive to conservative method. The major drawback of this method is the possible blood reflux from vein to lymphatics after lymphatics-vein anastomoses. To keep the one way flow at the lymphatics-vein anastomoses site, We explored a new way to anastomose the lymphatics with the adjacent valvular veins with patent valve. **Methods** Fifty-six cases (16 postmastectomy arm lymphedema, and 40 leg lymphedema) with chronic limb lymphedema underwent lymphatics-vein shunts by microsurgical anastomoses of lymphatics with valvular vein either from adjacent veins at the obstructed area or autogenous vein grafts from the distal segment of the V. Saphena magna or/and its collateral branches in the medial surface of the leg. **Results** The patients were followed up for 12 to 56 months. A moderate elastic support was generally applied to the affected limb postoperatively. The study demonstrated very good results in 57% of the patients (32 patients), good in 30% (17 patients) and fairly good in 9% (5 patients), null in 4% (2 patients) in the follow-up period of 12 to 55 months after lymphatic microsurgery. **Conclusion** Anastomoses of lymphatics with valvular veins have been proved clinically to be very effective with very good and good results in 87% of the patients (49/56) in our series of cases with chronic lymphedema of extremities. It is supposed that the existed valves in the vein may play an essential role in maintaining one-way flow of lymph through the lymphatics-vein anastomoses site after operation and attaining the steady results of lymphedema regression.

Key words Chronic lymphedema; lymphatics-Vein anastomoses; microsurgical treatment

Microsurgical treatment of lymphedema of extremities has been one of the top choices in the obstructive lymphedema that are not responsive to conservative method such as "Heating and Bandaging" method, physiotherapy, pneumatic compression. Lymphatic microsurgical techniques can be generally classified into the derivative approach and reconstructive one. Direct derivative shunts through lymphatic-venous Anastomoses are more commonly used in clinical practice. However the major drawback of this method is the possible blood reflux from vein to lymphatics after lymphatics-vein anastomoses. To secure patency at the site of above-mentioned anastomosis, a new way has been undertaken to anastomose the lymphatics with the adjacent valvular veins or autogenous vein grafts with patent valve in our department since 1998. The outcome of

treatment in our series of cases with chronic lymphedema are reported below.

MATERIALS AND METHODS

From March 1998 to April 2001, 56 patients (45 female, 11 male, Mean age 44 yrs) with chronic limb lymphedema underwent lymphatics-vein shunts by microsurgical anastomoses of lymphatics with valvular vein, and were followed up for 12 to 56 months. Sixteen patients had postmastectomy lymphedema, and 40 patients suffered from an unilateral leg lymphedema including 36 cases with secondary lymphedema and 4 primary lymphedema.

All the patients underwent operations under general anaesthesia. To begin with, the preliminary injection of patent blue violet was carried out with a fine hypodermic needle into the dermis of the inner distal part of the upper arm for arm lymphedema or the inner distal thigh for leg lymphedema, to facilitate the visualization of lymphatics at the subsequent operative procedures. A Zeiss dissection microscopy at a magnification of six

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times was routinely used to aid the dissection of the lymphatics. Lymphatics dissection was performed carefully, potential veins for anastomoses were dissected out in the adjacent region if possible. The criteria of the selected veins are : there are valves with good function which can prevent the backflow of blood, also it allows the physiologic solution readily into blood circulation by the injection test. In the leg lymphedema, we often choose the tributaries of the V. Saphena magna for use. If the adjacent veins were not attainable during the operation, autogenous vein grafts would be alternatives.

Autogenous valvular vein grafts can be harvested from the distal segment of the V. Saphena magna or/and its collateral branches in the medial surface of the leg. In the operation, we examine rigorously the presence and its function of the valve through the washing of physiologic solution into the vein in order to secure the one-way flow of the graft after transplantation. At least one valve was included in one vein segmental graft. In the cases of a postmastectomy lymphedema, superficial and deep lymphatics were dissected at the upper arm, at the same time, the external jugular vein at the neck or cephalic vein near to the shoulder were dissected out ready for use. Between the two incisions, the vein grafts passed through the subcutaneous tunnels. End to end anastomoses were carried out distally with the ascending lymphatics at the upper arm, proximally with the external jugular vein or cephalic vein. In the cases of the unilateral lymphedema of the lower extremity, vein grafts were used to bypass the obstructive sites of lymphedema.



Fig.1 16 year-old girl with primary lymphedema in her left leg before lymphatic microsurgery

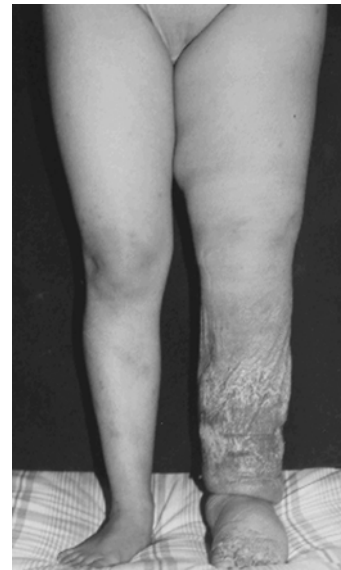


Fig.2 16 year-old girl with primary lymphedema in her left leg, one year after lymphatic microsurgery

RESULTS

Clinical criteria to evaluate the patients includes: the comparison of limb circumference and volumetry before and after the operation, regression of edema and subjective improvement of symptoms. This clinical modalities were repeated after 2 week, 3, 6months following the operation and the every year. The typical pictures are seen below(Fig.1,2) A moderate elastic support was generally applied to the affected limb postoperatively for at least for two years. The results were classified as very good, good, fairly good and null according to Professor Campisi's evaluation standard (1). We observed very good results in 57% of the patients (32 patients), good in 30%(17 patients) and fairly good in 9% (5 patients), null in 4%(2 patients) in the follow-up period of 12 to 55 months after lymphatic microsurgery.

DISCUSSION

All patients in the series of cases were always treated firstly by conservative protocols, "Heating and Bandaging" method^[2] is our first choice for the management of the peripheral lymphedema, which also includes "non-specific" drug usages depending on the signs and symptoms of every particular patient, for example, antibiotics, anti-inflammatories, and more "specific" agents such as benzo-pyrones and physical decongestive therapy such as complex physiotherapy. Those patients

with the chronic and recalcitrant lymphedema are addressed to microsurgical techniques, in which the above-mentioned therapeutical approaches have failed to improve the clinical conditions.

Accurate assessment of the status in vascular and lymphatic pathways is critical especially with non-invasive ways, we prefer to use lymphoscintigraphy on each patient as a routine, which is a reliable modality for safely delineating the lymphatic status and determining if the microsurgical procedures is indicated. The lymphatic and /or lymph nodal severe hypoplasia or extensive obliteration of superficial and deep lymphatic collectors represents an absolute contradiction to lymphatic shunting operations. Doppler flow metrics play an essential role in assessing the conditions of the venous system. CT scan and MRI are occasionally used to detect the tissue changes in the diseased limb, which is helpful for preoperative planning.

Our group began to explore the possible way for the treatment of lymphedema by microlymphatic techniques at the late of 1970s^[3]. Anastomoses of lymphatics with valvular veins or autogenous valvular vein grafts are intended to prevent the blood reflux after lymphatic-venous anastomoses and overcome the drawbacks of traditional method of microsurgical anastomosis^[4,5], which prove to be very effective with very good and good results in 87% of the patients (49/56) in our series of cases with chronic lymphedema of extremities. It is supposed that the existed valves in the adjacent vein to the lymphatics or the transplanted vein grafts may play a essential role in maintaining one-way of lymphatic fluid after operation and attaining the steady results of lymphedema regression, particularly in the lower extremities because of the gravitational phenomenon. From our experiences, at least one valve was required to prevent the

the venous blood regurgitation in a single vein graft in our series, but what is the appropriate number of the valves remained to be studied.

The postoperative treatment essentially consists of the administration of dextran at low molecular weight (500-1000cc/24h) and wide spectrum antibiotics and the passive mobilization of the patient in bed.. A modest elastic compression is applied immediately after the operation in the operating theater. The patient is usually discharged from hospital at the end of second week. In addition, we believe that supportive procedures such as appliance of elastic compression are still a necessary step to get a long-lasting reduction of lymphedema after microlymphatic surgery.

REFERENCES

1. Campisi, C. The autologous vein grafts in reconstructive microsurgery for lymph stasis, in Olszewski, W.L.: 'lymph stasis: pathophysiology, diagnosis and treatment'. Boston, USA, CRC Press(1991) 553-573.
2. Ji-liang Gan, Sheng-li Li, Ren-xiang Cai, et al. Microwave Heating in the management of postmastectomy upper limb lymphedema. *Annal of Plastic Surgery*, 1996; 36(6): 576-580.
3. Chang, TS: Minute vein versus lymphatic duct auto-transplantation in the treatment of experimental lymphedema, in Casley-Smith, J.R., Piller N.: 'Progressin Lymphology-X', Adelaide, University of Adelaide Press(1985), 230-231.
4. Li Sheng-li, Chen Shou-zheng, Wang Shan-liang, et al. Treatment of post-mastectomy upper limb lymphedema by transplantation of potent valvular vein. *Shanghai Medical J.* 2000, 23(7): 393-395.
5. Sheng-Li Li, Wei-Gang Cao, Ti-Sheng Chang, et al. Reconstructive microsurgical treatment of lymphedema by autogenous valvular vein grafts. *European Journal of Lymphology* 2001, 34(9): 91.