

## EDITORIAL

### LYMPHATIC MICROSURGERY: A POTENT WEAPON IN THE WAR ON LYMPHEDEMA

The role of microsurgery in disorders of lymph flow has been debated for more than 20 years (1). Nonetheless, the pivotal issues of proper indications and clinical outcome are still highly relevant (2). From our experience of more than 745 operations (3), lymphatic microsurgery (LM) should properly be divided into two major groups. The first defined as "derivative" LM refers to direct lymphatic-venous (LV) shunts (4-7). These consist of end-to-side (6) and end-to-end (7) LV anastomoses, which are most commonly used in adult patients, and lymph nodal capsular-venous anastomoses (2,5), most advantageously used in pediatric patients. The second group termed "reconstructive" LM includes interposition or autologous lymphatic-venous-lymphatic (LVL) shunts (8), autologous lymphatic transplantation (9) and free lymphatic (10) or lymph vessel nodal flaps (11).

Derivative operations are used when: 1) appropriate lymph nodes and lymphatic collectors are available, 2) the venous system is intact in the lymphedematous limb, and 3) a normal or increased lymphatic-venous pressure gradient exists in the lymphedematous extremity (12). Based on these criteria, derivative microsurgical operations can be used in approximately 30% of patients with peripheral lymphedema. Clinical outcomes of the derivative operations are favorable in greater than 80% of patients as signified by a regression in limb swelling greater than 50% for at least 3 years. To attain these results, it is essential that a proper lymphatic-venous pressure gradient be maintained postopera-

tively. As suggested by Yamada (12), this goal can be accomplished using combined physiotherapy (13). Thermotherapy (14,15) may also be useful to minimize episodes of lymphangitis whereas benzopyrones may facilitate mobilization of plasma proteins from the interstitium (16).

In contrast to derivative lymphatic microsurgical operations, lymphatic "reconstructive" microsurgical procedures are used in patients in whom coexistent venous disease nullifies or reverses the lymphatic-venous pressure gradient in the lymphedematous limb (17). Since 1980, we have used intralymphatic interposition autologous venous grafts (LVL) with favorable outcome in more than 80% of patients (18). In contrast to lymphatic autotransplantation and free lymphatic (1) and/or lymph nodal flaps (11), an interpositional LVL shunt transports a greater volume of lymph because of the greater number of lymph collectors which can be anastomosed to the venous graft. The technique (LVL), moreover, is easier to perform, esthetically satisfactory and without risk to the uninvolved contralateral limb (19). Bilateral lymphedematous arms or legs are best reconstructed using a venous interposition valve graft.

Also worth noting is that microsurgical techniques can be applied equally well in primary lymphedema where there is lymph nodal fibrosclerosis (e.g., at the groin) with otherwise normal appearing but dilated afferent lymphatic collectors. Usually, these patients are subject to microsurgical

lymphatic reconstruction only after non-operative treatment including physiotherapy has failed to bring about at least a greater than 50% regression of limb edema.

The major methods we use to verify clinical improvement include water volumetry and isotope lymphography (lymphangioscintigraphy) (20). Water volumetry utilizes the Archimedes principle of displacement of water in a cylindrical tub with a graduated column to assess volume (edema) changes before and after treatment. With lymphangioscintigraphy, efficacy of microsurgical lymphatic reconstruction operations has been verified by 1) reduced dermal backflow, 2) "disappearance" of the tracer at the site of microanastomosis with the bloodstream, 3) earlier tracer "pick-up" by the liver indicative of more rapid entry into the blood circulation.

Parenthetically, it should be noted that we now use isotope lymphangiography as the chief diagnostic tool (20) reserving conventional oil contrast lymphography for patients with chylous reflux syndrome where more precise delineation of retroperitoneal lymphatic collectors may be required (21).

Overall, the major treatment methods of peripheral lymphedema encompass physiotherapy, thermotherapy and microsurgical lymphatic reconstruction. On the one hand, lymphatic microsurgery typically results in more rapid edema regression than nonoperative techniques. On the other hand, physiotherapy, drugs, and thermotherapy help maintain and even improve the outcome after operation. A great advantage of the nonoperative approaches is that mechanical manipulation, diuretics, anticoagulants, benzopyrones, and elastic support garments can all be used without highly specialized surgeons or even admission to the hospital. Nonetheless, as technical advances and microsurgical skills continue to progress, lymphatic reconstruction has an extremely bright outlook albeit for the foreseeable future most likely in conjunction with the nonoperative remedies previously enumerated.

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**Comment:**

*In keeping with the ongoing debate regarding the best available treatment of peripheral lymphedema, the Editors over the last several years have offered space for both surgical and non-surgical methods to be explored within the pages of this journal. Although the last word is not yet written on this subject, we submit to the readers the previous opinions from the group at the University of Genoa who have had considerable experience in lymphatic microsurgery as it applies to the treatment of lymphedema. Whereas the Editorial Board is still uncertain as to the proper role of lymphatic microsurgery in the treatment of lymphedema, there is no question that technical innovations continue to advance and as greater skill is acquired, these techniques may some day become the preferred methods to relieve secondary and in some instances even primary lymphedema. We suspect there is still a long way to go in this particular area, but the concept of restoring lymphatic continuity to make someone "whole" or "intact" is certainly appealing particularly if the surgeon can restore them to a physical state without need for daily drug or mechanical therapy. Whereas it is still doubtful that that day has as yet arrived for most patients, the concepts and the studies are certainly worthy of reflection as work in this field progresses. (CLW)*

See also next article.