Chapter 45
Current Dilemmas and Controversy

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The ideal treatment for the lymphedematous limb should restore both function and a normal cosmetic appearance regardless of its etiology. Unfortunately, it is impossible to achieve these goals with the currently available treatment modalities.[1]

Manual lymphatic drainage (MLD) – based complex decongestive therapy (CDT)[2-4] has long been accepted as the mainstay of treatment in the contemporary management of chronic lymphedema. Its clinical validity and its legitimacy is reviewed in two additional Sections VII and VIII – total 13 chapters altogether – supporting its role as the de facto leader in contemporary lymphedema management.

Because of the ease of availability and accessibility, in addition to having no risk to add "harm" to an already deranged lymphatic system, its value has been overestimated as the sole treatment modality for long-term management. Unfortunately, one crucial aspect of CDT has been neglected: "CDT is neither a panacea nor a curative method." It is only effective in slowing progression at best and never restores the lost function. This remains its Achilles heel. When CDT is discontinued, the lymphedematous condition deteriorates at a faster rate, requiring a lifetime commitment that, again, only slows progression.[5,6]

Such reliance on CDT-based therapy was partly due to the old concept that chronic lymphedema is a simple "static" condition characterized by soft tissue swelling of the affected limb/region after the blockage of the lymph-transporting/collecting system. This is the major flaw: chronic lymphedema is *not* a static condition, but is actually a steadily progressing condition independent of the efficacy of CDT.[7,8]

Chronic lymphedema is now accepted to be a "continuously changing" condition of degenerative and inflammatory processes involving the skin, lymphatics, and lymph nodes. This condition is characterized by recurrent episodes of dermato lymphoadenitis, resulting in diffuse, irreversible tissue fibrosis. What began as a

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simple phenomenon of accumulation of lymph fluid eventually becomes a disabling and distressing limb condition affecting the entire surrounding soft tissue beyond the lymphatic system.[5,7,8]

With a better understanding of the disease process, contemporary treatment of lymphedema has evolved into an approach that is focused on strategies aimed at preserving and improving quality of life for better social, functional, and psychological adaptation.[9]

The role of reconstructive lymphatic surgery has also changed in that its new, different role is to provide improvement of patient quality of life as a whole.[1,9] Various surgical treatments for curative and reconstructive purposes have been introduced throughout the last century as additional methods to control chronic lymphedema.[10-13] Detailed information regarding these surgical treatments is reviewed in other chapters.

Indeed, reconstructive surgery has been known to be the optimal treatment to restore normal lymphatic function with a chance of a "cure" of the chronic lymphedema. This treatment remains controversial mainly because of poor reproducibility and a wide variety of mixed outcomes, and these are most likely due to variation in the selection of patients and variability in the indications for treatment by different surgical teams in different countries.[14]

Among the various criteria required for successful outcome, optimal timing of the surgical procedure is the most critical. Optimal timing of surgery is important because the reconstructive surgery is only successful when performed at the "earlier" stage of chronic lymphedema, before residual lymphatic vessels are damaged by prolonged lymphatic hypertension. Injured lymphatic vessels (not yet destroyed) can be effectively rejuvenated and restored to normal function by continuous MLD-based CDT postoperatively.

Reconstructive surgery is most effective when performed in the earlier stage of lymphedema, when residual lymphatic vessels remain functionally intact with the ability to relieve lymphatic obstruction and lymph stasis after successful lymphatic reconstruction.

In contemporary practice, the majority of ideal lymphatic surgery candidates are never offered reconstructive surgery and are instead, treated with CDT decompression. When reconstructive lymphatic surgery is considered, it is often after the window of opportunity has already passed and the patient is left with an unsalvageable condition with damaged and paralyzed lymphatic vessels.

Furthermore, reconstructive lymphatic surgery requires a continuing commitment by a dedicated and experienced microsurgical team skilled at lymphovenous and lympho-lymphatic anastomosis, in order to achieve successful long-term results. Such a commitment requires significant resources that are often far beyond what is available at the majority of many capable medical centers.

Therefore, reconstructive surgery has many practical limitations and due to its time constraints, has been extremely limited to a few select patients. Although there is no doubt that it is more theoretically sound and ideal than CDT, with a definite chance of a "cure," it is still far from being a practical treatment in the day-to-day management of chronic lymphedema. Reconstructive surgery may serve as the

sole treatment option in the ideal situation or as a supplemental therapy to boost CDT-based physical therapy among its poor responders.[15,16]

In reality, many medical centers only offer reconstructive surgery to patients who are poor to non-responders to conventional CDT-based treatment. CDT-based treatment is often effective in the majority of chronic lymphedema patients. The Institutional Review Board, therefore, encourages delaying surgical therapy until CDT-based therapy has been completely exhausted with no further improvement. Reconstructive surgery is often recommended by a multidisciplinary care team only after properly documenting that the patient has failed extensive CDT, and is then determined to have "treatment failure" and in addition, has experienced steady progression of the disease for preferably 2 years.

Patients in whom CDT-based therapy fails and are then considered a candidate for additional reconstructive surgical therapy, typically fall under the later parts of clinical stage II or III, based on our own experience. This stage of lymphedema is generally too advanced and is long after the ideal time period for reconstructive surgery to be curative.

Therefore, reconstructive surgery is now limited to a supplemental role in the management of lymphedema in the non- to poor-responding group of CDT patients. It is now an adjunctive treatment in the management of lymphedema along with CDT-based treatment. Both treatment modalities have mutually complementary effects. Reconstructive surgical therapy requires maintenance CDT. Therefore, the success of reconstructive surgical therapy is dependent on patient compliance with postoperative CDT.[1,16]

Patient compliance with life-long maintenance CDT is the single most important factor that directly influences the long-term results of reconstructive surgical therapy. A comprehensive treatment plan incorporating both treatment modalities as part of a multidisciplinary approach to the treatment of lymphedema, will produce the most effective results.[17]

The various modes of surgical therapy have recently been found to be more effective when combined with CDT, which is in line with the new concept of a multidisciplinary approach to the treatment of lymphedema.[18]

Clinical Experiences (Personal)

Among 1,065 lymphedema patients (131 male and 934 female; 259 primary and 806 secondary; age range 2 months to 82 years), a total of 32 patients were selected for lymphovenous anastomotic surgery (LVAS; $n=19$ patients), and free lymph node transplant surgery (FLTS; $n=13$ patients), during a 10 year period (January 1995 to December 2004).[5,16]

All 32 patients were selected due to failure of CDT alone to relieve intractable symptoms with various indications. Various non-invasive tests including lymphoscintigraphy were performed to determine clinical and laboratory staging in all surgical candidates.

The inclusion criteria and indications for reconstructive surgery were:

- Failure to respond to therapy at clinical stage I or II
- Progression of the disease to an advanced stage (e.g., stage I to stage II or stage II to III) in the setting of CDT-based treatment
- Chylo-reflux combined extremity lymphedema
- High recurrence of local and systemic infection
- Poor tolerance to CDT-based conservative treatment

We NEVER initiated surgery as the primary mode of therapy. We selected the various reconstructive surgical therapies as supplemental treatment.

For lymphovenous anastomotic surgery (LVAS), candidates were offered surgery when CDT-based treatment failed or when it was not sufficient to prevent the rapid progression of the disease: clinical stage I to II, or early stage II to late stage II.

All patients selected met all the inclusion criteria for this additional treatment, particularly among the "secondary" lymphedema patients. Nineteen patients (mean age 49 years; female = 18, male = 1; primary = 4, secondary = 15) underwent a minimum of 3–4 anastomoses between healthy, well-functioning collecting lymph vessels and competent branches of the saphenous vein.

At 6 months, 16 out of 19 LVAS patients with good compliance to maintain postoperative MLD/compression therapy had clinically satisfactory improvement, while the other non-compliant 3 failed. At 24 months, 8 out of 16 were compliant and 8 were not. The non-compliant patients showed progressive deterioration, while the compliant patients maintained their improvement.

At 48 months, 2 out of the 8 compliant patients dropped out. Three of the remaining 6 maintained satisfactory clinical and lymphoscintigraphic improvement.

For free lymph node transplant surgery (FLTS), candidates were selected based on the same indications as for LVAS, but preferably for "primary" lymphedema with progress from clinical stage II to III. Thirteen patients (mean age 34 years, female = 10, male = 3; primary = 6, secondary = 7) at clinical stage II or III underwent FLTS using a microsurgical free grafting technique when LVAS could not be performed.

At 12 months, 10 of the13 FLTS patients with good compliance to MLD showed clinical improvement with a successful graft, but the remaining 2 with poor compliance with the MLD failed.

At 24 months, 8 patients were compliant and 5 were not. Compliant patients maintained clinical improvement while the remaining non-compliant patients showed progressive deterioration.

Conclusion

Reconstructive surgery is a viable option in the management of chronic lymphedema. Postoperative CDT and/or compression therapy is required as supplemental therapy in the group of poor responders to CDT. It is more crucial when instituted at a less ideal/later stage of lymphedema.

Long-term maintenance of satisfactory clinical improvement following the surgical therapy to this less ideal group in particular is totally dependent on the patient's "compliance" in maintaining postoperative CDT/compression therapy.

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