Combined Physiologic and Excisional Therapies Improve Cancer-Related Lymphedema Outcomes

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—Justin M. Sacks, MD, MBA, FACS

According to a new prospective study, combining a physiologic procedure, dual gastroepiploic vascularized lymph node transfer (VLNT), followed by suction-assisted lipectomy (SAL) allows patients with late stage II lymphedema to reestablish lymphatic flow and achieve near-normal limb size while virtually eliminating infections (J Surg Oncol [published online ahead of print January 22, 2018]. doi: 10.1002/jso.24969).

Nonsurgical options, including compression garments, have been the mainstay of lymphedema treatment. However, lifelong management with complete decongestive therapy and the use of compression garments is bothersome and costly. Therefore, effective surgical treatments are desirable as an option for treating and possible reversing lymphedema.

Typically, the surgical treatment of lymphedema is performed only after failure of conservative therapy, says the lead author of the study, Mouchammed Agko, MD, of the department of plastic surgery at China Medical University Hospital in Taichung, Taiwan, and, as in his institution, when there is no improvement after 6 months. “While different procedures work best at different stages of the disease, with recent advances in imaging technology, surgical techniques, and instruments, surgery can now be used at all stages of lymphedema,” he says.

Dr. Agko says that although there are many studies describing VLNT and SAL in the literature, they have been used mostly in isolation or in the reverse order: SAL first followed by VLNT.

Study Details
Twelve patients were included in the study between May 2014 and April 2015. Their diagnosis of stage II lymphedema was confirmed using lymphoscintigraphy as per the International Society of Lymphology criteria, when “elevation does not reduce swelling [of the limb] and there may or may not be pitting as tissue fibrosis is more evident.”

“In this stage, there’s a substantial amount of fibroadipose tissue in the lymphedematous limb,” says Dr. Agko. “Hence, removal of this fat is necessary (by SAL) in addition to improving the lymphatic flow (by VLNT).”

In the first stage of their treatment, patients had an extended gastroepiploic vascularized lymph node flap, based on the gastroepiploic vessels, harvested laparoscopically. The flap then was divided extracorporeally into 2 units, allowing insertion into 2 separate levels. At the 1-month follow-up, patients were custom fitted with compression garments until they underwent the SAL procedure, which was performed 6 to 8 months after VLNT.

Limb measurements, episodes of infection, and use of compression garments were recorded on postoperative visits after each surgery at 2 weeks, 1 month, 3 months, 6 months, and every 3 months thereafter. Circumference measurements were recorded at 4 levels for each affected and contralateral healthy limb: 10 cm above the elbow or knee, 10 cm below the elbow or knee, 10 cm above the wrist or ankle, and at the mid-palm or mid-foot.

Follow-up after the completion of both procedures was, on average,
23.5 months. The average volume of lipoaspirate was 1730 mL for the upper extremity and 2840 mL for the lower extremity.

“Even though this study is small, reporting on only 13 patients, their findings of significant volume reduction for patients is consistent with our findings,” says Justin M. Sacks, MD, MBA, FACS, associate professor of plastic and reconstructive surgery in the department of plastic and reconstructive surgery at Johns Hopkins Hospital in Baltimore, Maryland. Dr. Sacks coauthored a literature review of 69 journal articles reporting on lymphedema in early 2017 (J Reconstr Microsurg. 2017;33:412-425). The researchers divided the studies into 5 groups: patients receiving VLNT, excision, liposuction, lymphovenous anastomosis, and combined or multiple therapies. Each study was given a score for methodological quality using an algorithm developed by the research team. “Our conclusions are the same as this latest study,” says Dr. Sacks. “VLNT and liposuction are the best options.”

Study Results
The overall circumference reduction rate after VLNT was, on average, 37.8% and 38%, respectively, for the upper and lower extremities. After SAL, the overall circumference reduction rate increased to 97.8% (range, 92.3%-99.8%), respectively.

Prior to treatment, patients reported an average of 1.8 infectious episodes, but only 1 patient had a single episode after VLNT and prior to SAL. No infections were registered after SAL.

On average, all patients were able to transition initially to daytime-only compression approximately 6.9 months after SAL and completely discontinue compression garments approximately 3 months later. The transition was slower in the lower extremity than in the upper extremity.

Angela Cheng, MD, FACS, assistant professor in the division of plastic surgery at Emory University Hospital in Atlanta, Georgia, says that although she offers a range of options for treating lymphedema, including physiologic and excisional procedures (depending on patient symptoms and examination), she has not considered this particular combination or order of procedures. “It is encouraging that the authors were able to achieve great circumference reduction and sustained without [life-long dependency on] compression garments, which is considered the Holy Grail.”

Dr. Agko says this study is unique for a number of reasons. First, it is a prospective study. “Unfortunately, there are only a handful of prospective studies in the field of lymphedema surgery,” he notes.

Instead of the usual method of single VLNT, Dr. Agko says his team performed dual VLNT. “This is due to the unique properties of the gastroepiploic vascularized lymph node flap, which were described by senior author Professor Hung-Chi Chen’s team 4 years ago,” he says. “Due to abundance of lymph nodes in the gastroepiploic area, 2 flaps can be fashioned from a single donor site. In addition, the harvest of the flap is done laparoscopically, therefore minimizing morbidity.”

In addition to the near-complete reduction in the excess limb size and the absence of infections after the second stage of the treatment, Dr. Agko notes that the patients were able to maintain these favorable outcomes at an average follow-up of 23.5 months.

Possible Complications
Dr. Agko says the most dreaded complication with VLNT is secondary lymphedema at the donor site. “This risk of iatrogenic lymphedema from this site is minimal,” he adds.

As with any laparoscopic procedure, there is the potential risk of injury to the intra-abdominal organs, adhesion formation, and hernia. Dr. Agko says no such complication was noted in this study. In relation to SAL, he says, possible complications include transient numbness, skin injury, and blood loss. “In this study, 5 patients reported transient numbness and 1 patient required blood transfusion,” he says.

Dr. Cheng says intra-abdominal complications include bleeding or hematoma, injury to the bowel or organs, or any other typical complication of a laparoscopic procedure. “Infection is always a concern in a limb with lymphedema. Aggressive liposuction also can have large blood loss and require transfusion. Recovery from the first surgery (laparoscopic omental harvest and transfer) is likely 3 to 5 days followed by 2 to 3 weeks of wound care for the skin graft and the second surgery with liposuction requires a few days in the hospital for management.” She adds that liposuction also likely requires 1 to 2 days in the hospital for fluid management. Dr. Agko says recovery time in the study required 1 week in the hospital and another week at home.

The lack of complications does not mean the therapy is simple to perform, says Dr. Cheng. “This technique requires both laparoscopic skills to harvest the flap—which is
not common for most plastic surgeons—and microsurgical skills to perform 4 anastomoses,” says Dr. Cheng. “The liposuction is not difficult.”

So who are the best candidates for the surgical treatment of lymphedema? “This is a complex question,” says Dr. Cheng. “Patients should be evaluated and treated by a certified lymphedema therapist then referred to surgeons who perform lymphedema surgery for further evaluation and discussion of which procedures can help them the most.” The authors indicated the best candidates are patients who experience infectious episodes, are not able to wear compression garments, failed to respond to conservative nonsurgical standard therapy, or desire surgical intervention and who have stage II lymphedema. The authors excluded patients with primary lymphedema, and therefore Dr. Cheng points out she cannot extrapolate about it from this study, although others have reported some success.

Dr. Sacks says surgery should be considered after conservative management has failed. “Anyone with stage II and stage III lymphedema should be considered as candidates.” However, Dr. Sacks says one big question remains: “Should the 2 procedures be performed at the same time or sequentially as this study recommends? We still don’t know.” He also says that at present, surgical procedures for lymphedema are underperformed for 2 main reasons. “First, there are too few multi-institutional, double-blind studies using these procedures that you can show patients. They just don’t exist.” However, he says the biggest hurdle is insurance carriers. “Often, they view liposuction as cosmetic and VLNT as experimental, even though the literature is growing,” Dr. Sacks says. “That’s why papers like this coming out can only help. I mean, if you can show a procedure or 2 procedures that reduce lymphedema volume by 97%, what would you do?”

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