Case Report

Laparoscopic Harvested Omental Flap Transfer for Lower Extremity Lymphedema Patient: Case Report in Thailand

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Vascularized lymph node transfer [VLNT] is one of the important treatment modalities of lymphedema patients. It displays promising results, especially against advanced stage lymphedema. Omentum is one among various donor lymph node for transfer. It provides several advantages but has been unpopular due to its celiotomy complication. In the present report, the authors use laparoscopic-assisted method to minimize the unfavorably results from celiotomy.

Keywords: Lymphedema, Lymphatic surgery, Vascularized lymph node transfer, VLNT, Omental flap transfer

J Med Assoc Thai 2018; 101 (5): 685-8
Website: http://www.jmatonline.com

Lymphedema treatment can be categorized into two main parts[1], non-surgical and surgical treatments. Non-surgical treatment is comprised of 1) complete decongestive therapy [CDT], which includes manual lymphatic drainage [MLD], skin care, compression wraps with short-stretch bandages, and light exercises, 2) optical laser therapy, and 3) pneumatic compression pumps. The surgical treatment is usually required for more advanced stages or refractory lymphedema, which can be further classified into reductive and physiologic techniques.

Lymphatic bypass and vascularized lymph node transfer [VLNT] are the two hallmarks of the physiologic techniques. In Thailand, both are used selectively to treat lymphedema patients. Lymphatic bypass is most often performed in early stage lymphedema, while VLNT is required for the more advanced lymphedema.

Generally, for the VLNT, there are multiple donors and recipient sites to be selected[2] (submental, supraclavicular, thoracic, groin, omentum for donor site and groin, knee, ankle for recipient site). Each has its own advantages and disadvantages, and varied results[3]. Free vascularized omental lymphatic flap is one of the preferred treatment methods for advanced staged lymphedema[4-6]. The omentum will absorb and pump lymphatic fluid into systemic circulation[6]. The transferred flap also contains healthy lymph nodes, which produce vascular endothelial growth factor C [VEGF-C] that promotes lymphangiogenesis[7,8].

In the present report, the authors harvested free omental flap laparoscopically and transferred to the ankle level for treatment of stage III lower extremity lymphedema patient.

Case Report

The patient was a 70-year-old Thai female with lymphedema of left lower extremity because of the cervical cancer treatment that she received for five years. She encountered difficulty in daily life activities due to the enlarged limb and had a history of recurring cellulitis, once or twice per year. Physical examination showed stage III lymphedema according to the International Society of Lymphology Staging System[9]. The pre-operative circumference difference between the lower extremities are described (Figure 1). The measurements were taken at the 10 cm above patella, upper patella's border, 10 cm below patella, supra-malleolar, and midfoot. Lymphoscintigraphy showed a large number of collateral vessels and dermal backflow along left lower extremity. Six months prior to the operation, the patient had an unsuccessful lymphaticovenular anastomosis because the proper lymphatic vessels could not be located.

A two-team approach was utilized. The abdomen was accessed with four ports. The gastrocolic part of

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How to cite this article: Iamkijkarn C, Tansawet A, Rattanamahattana O, Sirimahachaiyakul P. Laparoscopic harvested omental flap transfer for lower extremity lymphedema patient: case report in Thailand. J Med Assoc Thai 2018;101:685-8.

Figure1. Pre-operative circumference difference between the lower extremities are 6, 5.5, 9, 6, and 2.5 cm at the 10 cm above patella, upper patella's border, 10 cm below patella, supra-malleolar, and midfoot respectively.

omentum was divided with ultrasonic shearing device avoiding injury to the gastroepiploeic arcade. The dissection was continued to the infra-pyloric region to identify the right gastroepiploeic vessels, which would be a flap's pedicle. The right gastroepiploeic vessels were divided at its origin. Closed to the gastric greater curvature, the dissection was performed to gain the lymphatic-bearing tissue with its feeding vessels. The vascular arcade was divided again when dissection reached the branch of left gastroepiploeic vessels. Finally omental flap was retrieved (Figure 2). For the ankle, posterior tibial vessels were identified and prepared for anastomosis.

The omentum was then transferred to the patient's ankle. The anastomosis between right gastroepiploeic artery and posterior tibial artery, right gastroepiploeic vein and posterior tibial vein was performed. The skin was dissected for flap inset, and split thickness skin graft was used to cover the rest of the omentum.

Post-operative flaps were closely monitored for five days. The patient started her oral intake on the following day, began to ambulate on day 7, and was finally discharged home on day 20 (Figure 3). She was allowed to start CDT one month after. Total follow-up time lasted six months. The patient was evaluated for symptoms improvement and measurement of the limb circumference. Patient's permission were obtained for the pictures and data in the present article.

Results

After six months, without lifestyle modifications, the affected limb became much lighter and softer compared to the pre-operative period. The patient experienced no further episodes of cellulitis. The skin quality was healthier. The reduction rate[6] of the limb circumference was 21%, 13%, 38%, 33%, and 50% at 10 cm above patella, upper patella's border, 10 cm below patella, supra-malleolar and midfoot, respectively (Figure 4). There were no post-operative complaints of dyspepsia, gastrointestinal dysmotility, or hernia formation. Post-operative lymphoscintigraphy revealed improved results.

Figure 2. Omental flap.

Figure 3. The flap and skin graft on post-operative day 20.

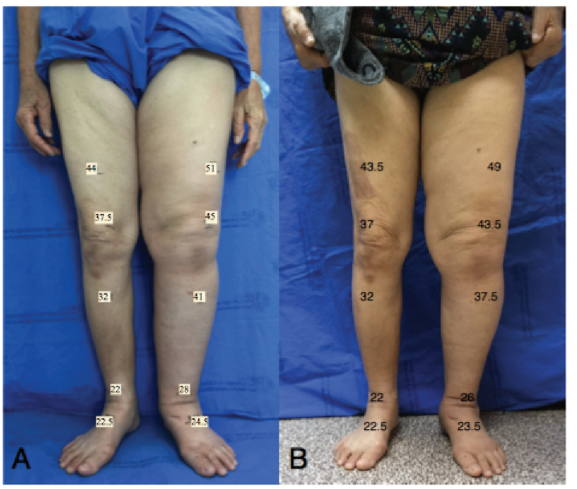

Figure 4. (A) Pre-operative photograph. (B) Post-operative photograph taken at the 6-month follow-up after omental transfer to the ankle. The reduction rate of the limb circumference was 21%, 13%, 38%, 33%, and 50% at 10 cm above patella, upper patella's border, 10 cm below patella, supra-malleolar, and midfoot respectively.

Discussion

VLNT is increasingly popular as the preferred treatment of lymphedema patients, particularly those in the advanced stages[1]. From the literature, there are multiple donor sites and recipient sites available. The surgical planning and flap selection are beyond the scope of the present paper. Omentum was chosen as the donor lymph node because it offered a large number of lymph nodes, low donor site morbidity, and could be approached by two teams simultaneously. However, there are some disadvantages of this flap. The flap needs skin graft to heal and there are limited supporting evidence regarding digestion and intra-peritoneal immune long-term maintenance. With the laparoscopic-assisted harvest technique[5], the rate of incisional hernia, celiotomy scar, and post-operative pain are diminished. For the recipient vessels selection, the authors used ankle as an inset position due to the lymphedema location, since the calf region was more severe.

From the present report, our team found that Laparoscopic-harvested omental transfer produced an impressive outcome with low donor site morbidity as the previous studies performed[4-6]. It provides desirable option for advanced stage lymphedema patients who need VLNT.

Despite these promising results, we believe that lymphedema patients should be treated individually, depending on the degree of severity, patients' concerns, surgeons' preference, and resource or team availability. Long-term follow-up and more successful cases are required to identify the safety and efficacy of this flap option for lymphedema.

What is already known on this topic?

Although not as widely used as other donor sites, Omentum is one of the donor sites used in VLNT. Recently, laparoscopy has been used in harvesting the omental flap to decrease the complication from celiotomy. This technique provides impressive results in USA and Taiwan. However, the technique has never been practiced in Thailand.

What this study adds?

The authors' intention is to share our experience in laparoscopic harvested omental flap transfer for lower extremity lymphedema patient. With our successful results, our team is very optimistic that this technique will be highly effective in treating lymphedema patients in Thailand.

Potential conflicts of interest

The authors declare no conflict of interest.

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