surgical complications. As other free enteric flaps, ileocolon flap tolerates only a short ischemia time. It also harbors a great amount of bacteria, which would initiate autolysis when the ischemia starts. Therefore, special attention should be given to these patients and rigorous postoperative guidelines are essential in order to minimize complications.

REFERENCES:
1. Mardini S, Salgado CJ, Kim Evans KF, Chen HC. Reconstruction of the esophagus and voice. Plast Reconstr Surg. 2010;126(2):471–85.
2. Rampazzo A, Gharb BB, Spanio di Spilimbergo S, Chung KP, Chen HC. Voice reconstruction with free ileocolon flap transfer: implications for the lower respiratory tract. Plast Reconstr Surg. 2011;127(5):1916–24.
3. Chen HC, Kuo HC, Chung KP, Chen SH, Tang YB, Su S. Quality improvement of microsurgery through telecommunication—the postoperative care after microvascular transfer of intestine. Microsurgery. 2012;32(2):96–102.
4. Chang CC, Kao HK, Huang JJ, Tsao CK, Cheng MH, Wei FC. Postoperative alcohol withdrawal syndrome and neuropsychological disorder in patients after head and neck cancer ablation followed by microsurgical free tissue transfer. J Reconstr Microsurg. 2013;29(2):131–6.
5. Haddock NT, Gobble RM, Levine JP. More consistent postoperative care and monitoring can reduce costs following microvascular free flap reconstruction. J Reconstr Microsurg. 2010;26(7):435–9.

Lymph Node Flap Transfer and Modified Charles Procedure for Advanced Lower Limb Lymphedema

Pedro Ciudad, MD, PhD; Oscar J. Manrique, MD; Ketan M. Patel, MD; Federico Lo Torto, MD; Mouchammed Agko, MD; Hung-Chi Chen, MD, PhD

INTRODUCTION: Lymph node flap transfer (LNFT) is becoming a popular physiologic approach for treating lower limb lymphedema. However, in chronic and severe cases, the Charles’ procedure allows radical reduction of the lymphatic load of the limb and should only be considered when other procedures are not feasible due to its potential complications as infection and poor cosmesis. The aim of this study is to present our experience combining tissue transfer procedures (LNFT) and excisional operations (the modified Charles procedure) for the surgical treatment of advanced lower limb lymphedema.

MATERIALS AND METHODS: From July 2010 to May 2015, 45 patients who were diagnosed and treated for advanced lower limb lymphedema with LNFT and a modified Charles procedure were analyzed. In addition, demographic, circumferential limb measurements, lymphoscintigraphy, skin tonicity and postoperative complications were recorded. The reduction rate was describe by the percentage of improvement on skin tonicity and limb circumference. Postoperative follow-up was performed every 3 months during the first year and subsequently every 6 months.

RESULTS: After a 4-year follow-up, a total of 45 patients were analyzed. Twelve were male and thirty-three were female. During the follow-up period, all patients exhibited dramatic improvement in lower limb skin tonicity 35.0% (range 12.5 to 78.0%) (p<0.05). In addition, the average reduction of limb circumference was 60.0% (range 40.0 to 90.0%) (p<0.05). Moreover, the incidence of cellulitis exhibited a significant reduction in the postoperative period. Only five patients experienced superficial site infection after the operation, which was treated with antibiotics. No major complications were reported postoperatively. However, there were 6 patients with partial skin graft loss requiring re-grafting at the dorsum of the foot. Ten patients required revision and regrafting to improve the cosmesis. Postoperative lymphoscintigraphy displayed improved drainage of the affected limb. In addition, all patients were satisfied with their functional outcomes.

CONCLUSION: In cases of severe lower limb lymphedema, the combination of LNFT with the modified Charles procedure can be a good surgical option. This procedure may prevent some potential complications such as recurrence, infection, and aggravation of the disease due to the physiological properties of the transferred lymph nodes. However, further long-term studies are needed in order to rule out recurrence and long-term complications.

Laparoscopic Harvest of an Extended Right Gastroepiploic Lymph Node Flap With Double Level Inset in Patients With Extremity Lymphedema

Pedro Ciudad, MD, PhD; Oscar J. Manrique, MD; Ketan M. Patel, MD; Federico Lo Torto, MD; Mouchammed Agko, MD; Hung-Chi Chen, MD, PhD

INTRODUCTION: Lymph node flap (LNF) transfer has shown promising results and its becoming one of the
mainstay treatment options for extremity lymphedema. However, there are concerns regarding donor site morbidity following LNF harvest. Also, some observations have been made with regards of the effect of LNF on areas of the extremity away from the transferred flap. Herein, we describe the extended right gastroepiploic lymph node flap (RGE-LNF) via laparoscopic approach with a double level flap inset for patients with upper and lower limb lymphedema.

MATERIALS AND METHODS: Between 2012 and 2015, patients with grade II and III upper or lower extremity lymphedema were selected for LNF transfer. Preoperative and postoperative limb circumference and lymphoscintigraphy were obtained. All patients underwent laparoscopic harvest of the extended RGE-LNF. In all cases, a double inset was performed at a distal and mid-limb level of the affected limb by dissecting a single flap in two. In addition, etiology of lymphedema, OR time and complications were analyzed.

RESULTS: A total of 7 patients were analyzed. The etiology was due to mastectomy and axillary lymph node dissection for breast cancer (n=4) and after hysterectomy and radiotherapy for gynecological cancer (n=3). The survival rate of the flaps after microsurgical transfer was 100%. The average operating time for flap harvest was 37 ± 4.7 minutes; The average time for flap preparation was 8.7 ± 0.8 minutes. The average total operating time including harvest and insets was 245 minutes. The average follow-up period was 14 months. The mean circumference reduction rate of the lymphedematous limb during follow-up was 43.4 ± 4.0% (range, 38.3% to 48.9%). Postoperative lymphoscintigraphy showed improvement of the lymph flow on the affected limb in all cases. No donor-site morbidity was encountered during the follow-up period.

CONCLUSION: The laparoscopic harvest of the extended RGE-LNF with a double level flap inset has been showing promising results. Due to the reduction of overall limb volume and symptomatic improvement, this approach may be a new potential treatment option for patients with extremity lymphedema. In addition, minimally invasive approach achieved reduction in donor site morbidity.

REFERENCES:
1. Raju A, Chang DW. Vascularized lymph node transfer for treatment of lymphedema: a comprehensive literature review. Ann Surg. 2014 Jun 19.
2. Ciudad P, Maruccia M, Socas J, Lee MH, Chung KP, Constantinescu T, Kiranantawat K, Nicoli F, Sapountzis S, Yeo MS, Chen HC., The laparoscopic right gastroepiploic lymph node flap transfer for upper and lower limb lymphedema: Technique and outcomes. Microsurgery, 2015.
3. Sapountzis S, Singhal D, Rashid A, Ciudad P, Meo D, Chen HC. Lymph node flap based onthe right transverse cervical artery as a donor site for lymph node transfer. Ann Plast Surg. 2013 Oct;73(4):398–401.
4. Vignes S, Blanchard M, Yannoutsos A, Arrault M. Complications of autologous lymph-node transplantation for limb lymphoedema. Eur J Vasc Endovasc Surg 2013;45:516–520.
5. Massey MF, Gupta DK. The incidence of donor-site morbidity after transverse cervical artery vascularized lymph node transfers: the need for a lymphatic surgery national registry. Plast Reconstr Surg. 2015 May;135(5):939e-940e.

Management of Primary and Secondary Lymphedema: Analysis of 400 Referrals to a Center

Reid A. Maclellan MD, MMSc; Arin K. Greene MD, MMSc

BACKGROUND: Lymphedema is the progressive swelling of tissue due to inadequate lymphatic function. Although lymphedema is a specific condition, patients with a large extremity are often labeled as having “lymphedema”, regardless of the underlying cause. The purpose of this study was to characterize referrals to a center to determine if lymphedema should be managed by specialists.

METHODS: Patients treated in our Lymphedema Program between 2009 and 2016 were reviewed. Diagnosis was determined based on history, physical examination, photographs, and imaging studies. Lymphedema type (primary, secondary), location of swelling, age, gender, previous management, accuracy of referral diagnosis and the geographic origin were documented.

RESULTS: Four hundred patients were referred with a diagnosis of “lymphedema”; 70% were female and 30% were children. Lymphedema was confirmed in 73% of the cohort: primary (56%) and secondary (44%). Twenty-seven percent of patients labeled with “lymphedema” had another condition. Before referral, only 4% of the cohort underwent lymphoscintigraphy (the gold standard diagnostic test for lymphedema), whereas 31% of patients with lymphedema received nondiagnostic tests for lymphedema. Eight percent