American Society for Lymphatic Surgery Scientific Paper Presentations

January 19, 2016 – 1:00 PM to 2:30 PM

1:00 PM - 1:05 PM

The use of Supraclavicular Free Flap with vascularized Lymph Node Transfer for treatment of Lymphedema : A Prospective Study

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Background: lymph node transfer (LNT) is gaining popularity for treatment of lymphedema. The purpose of this study was to evaluate the flap and the donor site morbidity of the supraclavicular (SC) LNT.

Methods: a review of a prospective database was performed for patients who had undergone SC LNT to treat upper or lower extremity lymphedema. Flap and donor site complications were registered for each patient.

Results: fifty patients with lower or upper extremity lymphedema underwent SC LNT (84 percent from the right side) with a mean of 11-months follow-up (range, 3-19 months). Three flaps (6 percent) required reexploration due to venous thromboses. All flaps were saved but one required debridement of the skin paddle. Two patients had local infection with chyle leak (4 percent) and one patient had simple chyle leak (2 percent). No donor site secondary lymphedema was noted.

Conclusions: This is the largest prospective series of SC free flap LNT for treatment of upper and lower extremity lymphedema. Low flap and donor site morbidity make this flap an appealing source of lymph node transfer for lymphedema treatment.

1:05 PM - 1:10 PM

The Superior-Edge-of-the-Knee-Incision Method in Lymphaticovenular Anastomosis for Lower Extremity Lymphedema

The University of Tokyo Hospital, Tokyo, Japan
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Background: Lymphatic vessel diameter and lymph flow are important for accurate anastomosis and effective lymph-to-venous flow in lymphaticovenular anastomosis (LVA). We developed a reliable method, the superior-edge-of-the-knee-incision (SEKI) method, for detecting and making the best use of high-flow lymphatic vessels in the distal medial thigh between the deep and superficial fascia, where movement of the knee, combined with compression between the deep and superficial fascia layers, theoretically results in upward propulsion of lymphatic fluid.

Methods: Thirty patients with lower extremity lymphedema (LEL) who underwent LVA at the thigh were assessed. Fifteen patients underwent LVA under this novel method (SEKI group), and the remaining 15 patients underwent LVA under the conventional method. Intraoperative detection of large lymphatic vessels and of venous reflux and preoperative to 1 year postoperative lymphedematous volume reduction were compared.

Results: LVA at the thigh yielded 30 anastomoses in the SEKI group and 32 anastomoses in the non-SEKI group. Large lymphatic vessels (0.65mm or larger) were more frequently found in the SEKI group than in the non-SEKI group (60.0 percent vs. 18.8 percent; $p = 0.002$). Venous reflux occurred less frequently in the SEKI group than in the non-SEKI group (10.0 percent vs. 65.6 percent; $p < 0.001$). The circumference of the affected limb was reduced in all 15 patients in the SEKI group but in only 8 patients in the non-SEKI group ($p = 0.006$). Reduction of the LEL index was significantly greater in the SEKI group than in the non-SEKI group (24.427 ± 12.400 vs. 0.032 ± 20.535; $p < 0.001$). In both groups, change in the LEL index was significantly greater in patients with large lymphatic vessels than in patients without large lymphatic vessels (24.242 ± 12.565 vs. 0.216 ± 20.667; $p < 0.001$).

Discussion: In patients with severe LEL, degeneration of the smooth muscle in the lymphatic vessel walls leaves the vessels too weak to propel lymph to the site of LVA. This explains why conventional LVA is not effective in some groups of LEL patients. With the SEKI method, the lymphatic vessels are strongly compressed between the superficial fascia and the fascia, and the normal movement of the knee joint during walking is employed as a power source that can effectively propel lymph to the site of LVA. The SEKI method facilitates both detection and utilization of large, high-flow lymphatic vessels, which are important for optimum therapeutic effects in patients with LEL.

1:10 PM - 1:15 PM

Hilar Vessels of the Submandibular and Upper Jugular Neck Lymph Nodes – Anatomical Study for Vascularized Lymph Node Transfer to Extremity Lymphedema

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Objectives: Vascularized lymph node transfer (VLNT) for lymphedema is an emerging method of treatment. Vascularized lymph nodes have been harvested from a number of donor sites i.e. groin, axilla and neck. There is a concern harvesting nodes from the groin and axilla may lead to

donor site lymphedema. This risk is greatly reduced harvesting from the neck due to the abundant supply of lymph nodes here. In this cadaver study, we describe the submandibular and upper jugular groups of lymph nodes, demonstrate their hilar vessels, their source pedicles and drainage veins, quantified and qualified these groups of lymph nodes and their relationship to surrounding structures.

Methods: 5 fresh adult cadaver necks (10 sides) were dissected looking at the submandibular and upper jugular neck nodes under the microscope. We carried out VLNT of upper jugular nodes from the neck to the groin of 1 patient with Stage II lower extremity lymphedema and transferred vascularized submandibular nodes from the neck to the upper arm in 1 patient with Stage II upper extremity lymphedema.

Results: There was a mean of 3.2 (range 1 - 5) lymph nodes in the submandibular group and a mean of 4.1 (range 2 - 6) lymph nodes in the upper jugular group. The submandibular nodes were perfused by branches of the facial artery i.e. glandular and/or facial branches and/or submental artery in various permutations. The upper jugular nodes were perfused by the sternocleidomastoid artery, which branches from the superior thyroid artery (70%) or emerges directly from the external carotid artery (30%). Hilar veins were found to drain into surrounding larger draining tributary veins and ultimately into the internal jugular vein. At one-year follow-up, there was considerable decrease in girth circumference in our patients, no episodes of cellulitis after surgery, with subjective improvement in limb heaviness and skin pliability.

Conclusion: This knowledge of hilar blood supply will aid in transferring a lymphatic flap with intact microcirculation. When harvesting the submandibular nodes or upper jugular nodes, it is essential to harvest them based on their source pedicles i.e. facial artery and sternocleidomastoid artery respectively to supply live nodes to the recipient lymphedematous limb.

1:15 PM - 1:18 PM
Discussion

1:18 PM - 1:23 PM
Preoperative Ultrasound Detection Technique of Lymphatic Vessels for LVA
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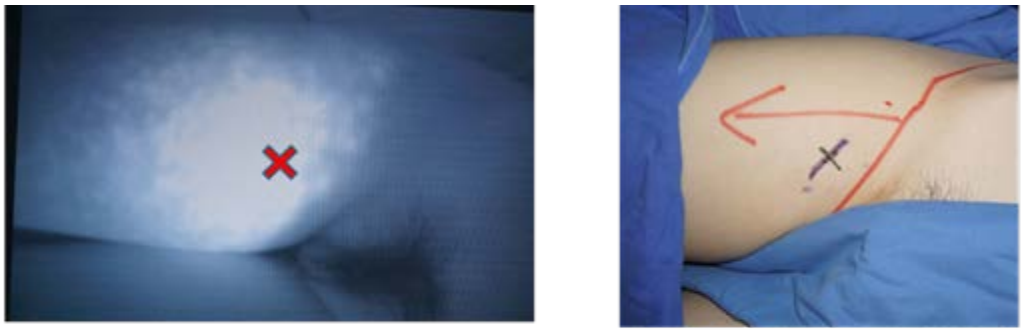
Background: Lymphaticovenular anastomosis (LVA) is an effective surgical treatment for obstructive lymphedema refractory to conservative decongestive therapy. For minimally invasive and effective LVA, preoperative identification of lymphatic vessels and suitable veins is important. Ultrasound is a very common modality, and characteristic ultrasonography findings of lymphatic vessels has been reported as homogeneous, hypoechoic and spicular misshapen images in healthy volunteers. But, no research has yet underlined the feasibility of the device to detect the lymphatic vessels in lymphedema patients and intraoperative observation of lymphatic vessels.

Methods: To assess the feasibility of ultrasound detection technique in lymphedema patients, intraoperative observation of lymphatic vessels was performed during LVA procedure after identification and marking of the lymphatic vessels using ultrasound (n=28). 133 lymphatic vessels were dissected in 113 sites (groin: 34, the medial aspect of thigh: 36, the medial aspect of lower leg: 43). Sensitivity and specificity of the examination were calculated.

Results: The lymphatic vessels were detected by ultrasound in most of sites, where ICG lymphography showed dermal backflow (DB) pattern or ICG was contraindicated (Fig.1,2,3,4 Yellow arrow: Lymphatic vessels, Green arrow: Cutaneous veins). The overall sensitivity and specificity were 93.2% and 85.6%, respectively.

Conclusions: Ultrasonography can identify lymphatic vessels of the lower limbs in lymphedema patients with precision and would complement ICG lymphography technique in lymphedema patients. This technique may aid minimally invasive and efficient lymphatic microsurgery for lymphedema.

Figure.1



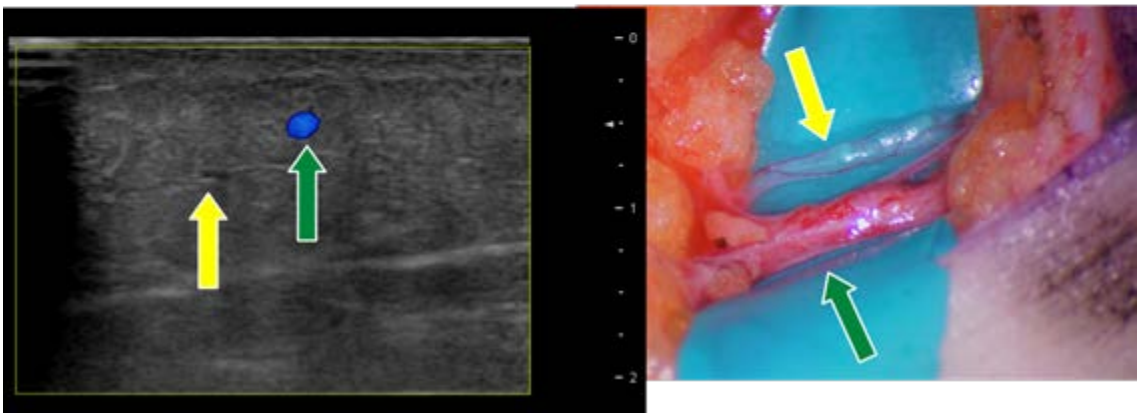
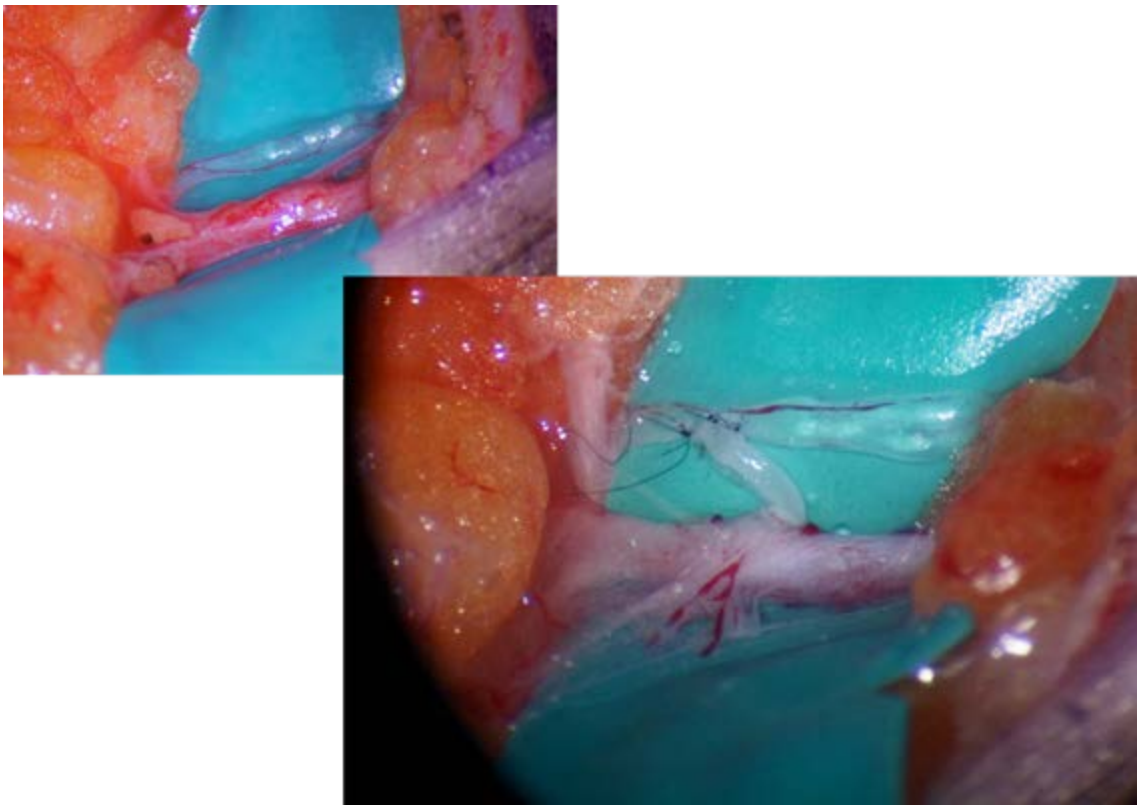


Figure. 2



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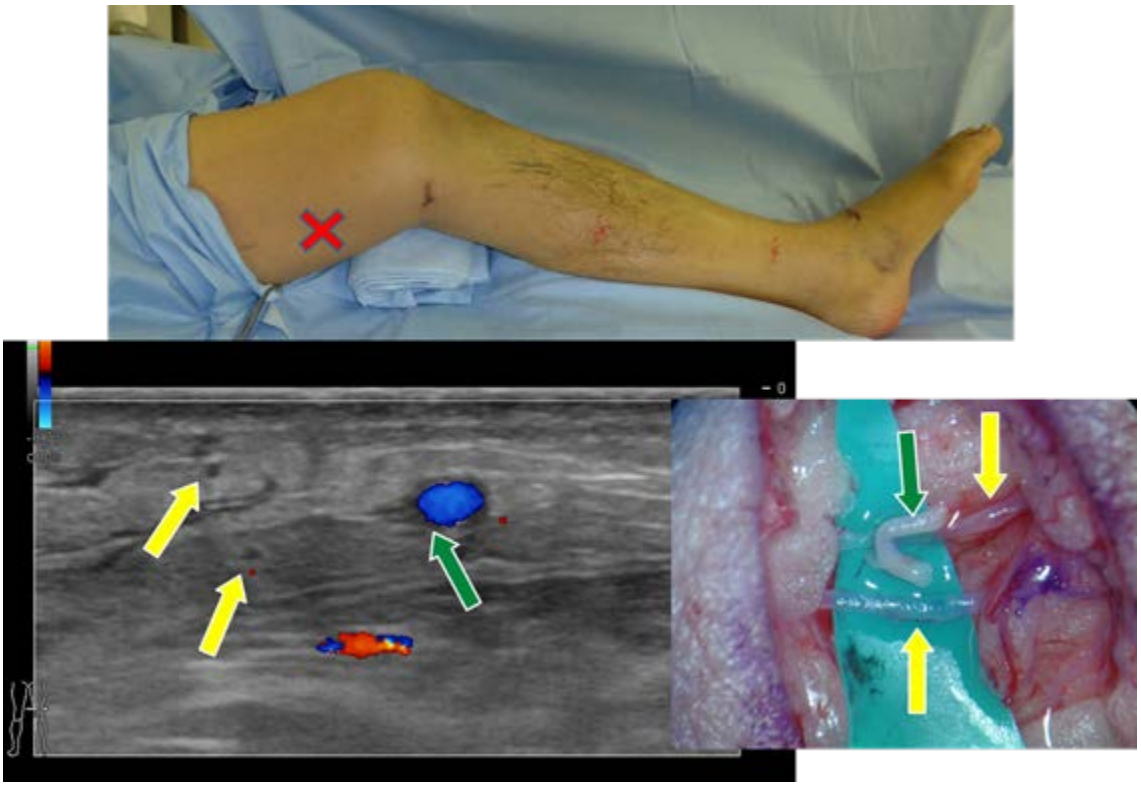
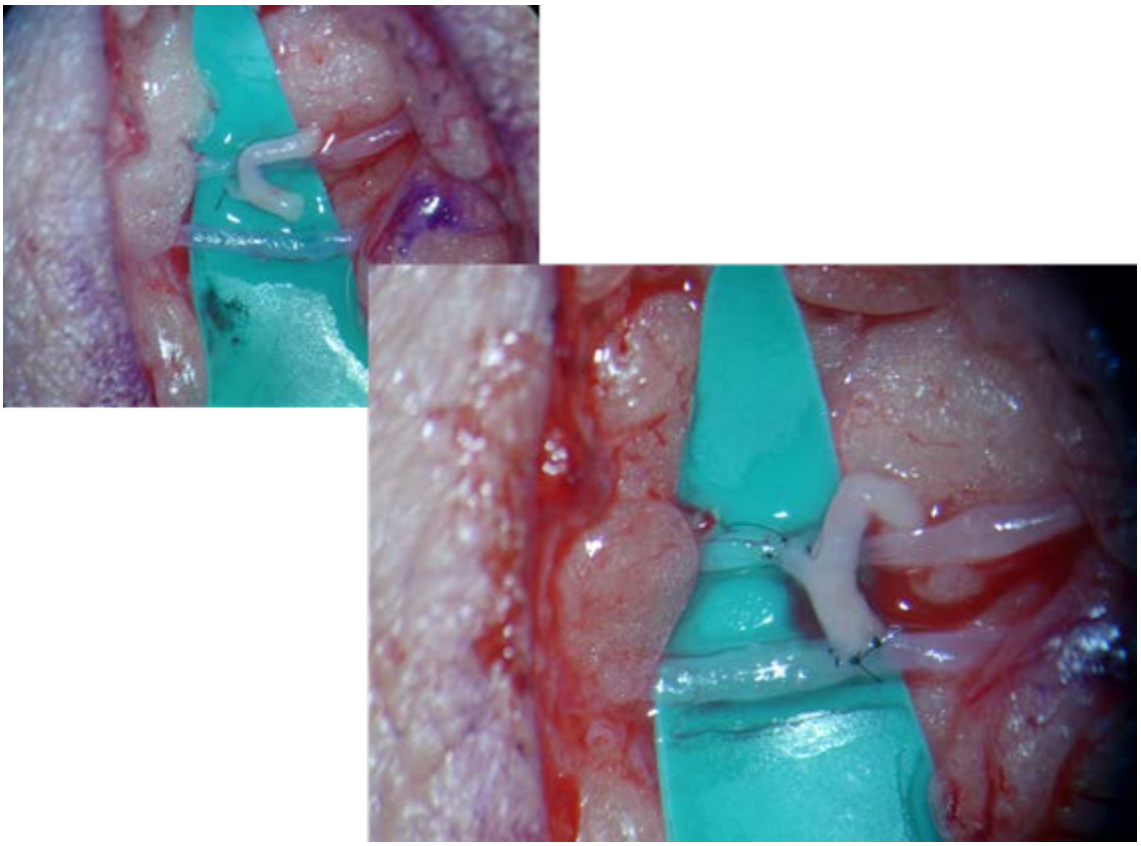


Figure. 4



1:23 PM - 1:28 PM

Vascularized Lymph Node Transfer for the Treatment of Upper Extremity Lymphedema after Breast Cancer Therapy

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BACKGROUND: Secondary lymphedema is a common problem in patients following breast cancer surgery. In addition to swelling, these patients experience pain, heaviness, and recurring infections. Currently the standard treatment for lymphedema is complete decongestive therapy (CDT), which is rigorous and time consuming. Vascularized lymph node transfer (VLNT) is a surgical treatment for lymphedema that re-establishes local lymphatic flow. VLNT offers the possibility of reducing symptoms, improving quality of life, and decreasing the need for CDT. This prospective study investigated the outcomes of VLNT for the treatment of upper extremity lymphedema.

METHODS: There were 47 patients who met the inclusion criteria, which included developing lymphedema after breast cancer therapy and having an indication for VLNT surgery. Patients

were evaluated preoperatively and postoperatively at 1,3,6,9 and 12 months by circumferential measurements, pain/heaviness scales, and the LymQOL for quality of life. Preoperatively all of the patients had a bilateral MR lymphangiogram. During the procedure, a free flap of soft tissue containing lymph nodes was harvested from a donor site (the neck, chest wall, or lower abdomen). After the flap was raised and inset into the axilla, arterial and venous anastomosis was performed followed by an intraoperative ICG angiogram.
RESULTS: Current results show a decrease in arm volumes by 23.47% at 1 month, 45.62% at 6 months, and 46.7% at 12 months. Pain and heaviness consistently decreased to 0/10 and 0.2/10 respectively at 12 months. The amount of CDT used postoperatively was significantly less compared to the preoperative use. Infection rate significantly decreased postoperatively. Overall quality of life scores improved from 5.4/10 preoperatively to 9.3/10 at 12 months. Average Procedure length was 2-3 hours with a inpatient stay of 1 day.
CONCLUSIONS: VLNT has led to decreased use of CDT and significant improvement in lymphedema symptoms resulting in a better quality of life with significant reduction in arm volume. VLNT has the ability to transform treatment options for patients with lymphedema.

1:28 PM - 1:33 PM
DEEP Inferior Epigastric Lymph Node FLAP: Potential New DONOR Site for the Treatment of Extremity Lymphedema
Indiana University School of Medicine, Indianapolis, IN, USA
Juan Socas, MD; Sunil S. Tholpady; Indiana University School of Medicine
DEEP INFERIOR EPIGASTRIC LYMPH NODE FLAP: POTENTIAL NEW DONOR SITE FOR THE TREATMENT OF EXTREMITY LYMPHEDEMA.

Introduction:

Treatment of extremity lymphedema has been a historically challenging problem. With the introduction of vascularized lymph node transfers, promising results have been seen in multiple reports. Donor site morbidity from lymph node harvest has been of concern for patients and surgeons. In this study we describe the deep inferior epigastric lymph node flap (DIELNF) as a preferred donor site for vascularized lymph node transfer.

Methods:

Five consecutive patients that underwent bilateral Deep Inferior Epigastric Perforator flap breast reconstruction were selected with total of 10 specimens obtained. Dissection of the Deep Inferior Epigastric vessels was performed in the routine fashion. Three centimeters proximal to the junction with the External Iliac Vessels dissection included all surrounding lymphatic tissue and vessels were then transected at the junction with the External Iliac vessels. The distal 3 cm were then clipped and divided off the DIEP pedicle. Methylene blue was injected through the distal arterial opening to help identify lymph nodes and ensure continuity of its blood supply with the pedicle. Specimen was sent to pathology for examination and count of number of lymph nodes per specimen.

Results:

Ten specimens were obtained. Mean specimen volume was 3.5 cm x 3 cm (range = 2.5 x 2.5 to 4.5 x 4 cm). Mean pedicle length was 6 mm (range = 4 mm to 8 mm). Mean number of lymph nodes per specimen was 3(range = 2 to 5). The number of palpable lymph nodes clinically identified at the time of harvest was 2.

Conclusion:

The DIELNF is a very promising approach for prophylactic treatment of extremity lymphedema in patients undergoing breast reconstruction. It circumvents morbidity and concerns for iatrogenic lymphedema with other lymph node harvest sites. On patients undergoing unilateral breast reconstruction the full contralateral deep inferior epigastric lymphatic system could be used as a cable flap to increase the number of lymph nodes within the flap. The small size of the flap allows placement distally in the extremities with minimal aesthetic compromise and need for secondary debulking. This study demonstrates the lymphatic system can be reliably harvested on the DIEA/V; future studies should focus on mapping the entire system and the optimal number of nodes to prevent lymphedema.

1:33 PM - 1:36 PM
Discussion

1:36 PM - 1:41 PM
Mid- and Long-Term Results Of Patency In Side-to-end Lymphatic Venous Anastomosis For Treatment Of Upper Limb Lymphedema
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BACKGROUND: There are few reports on lymphatic-microsurgery in upper limb lymphedema. We report mid- and long term results in patency of lymphaticovenous side-to-end anastomosis (LVSEA) by real-time lymphangiography and effects to reduce contents of postoperative compression in breast cancer -related lymphedema. The aim of this study is to evaluate volume changes of the affected limbs and contents of CDP and patency of the anastomoses. METHODS: Between 2009 and 2012 29 limbs of 29 patients with pre-and postoperative CDP by one institute and LVSEA by one surgeon were evaluated. All of them had breast cancer-related lymphedema. Volumes were calculated based on circumferential measurements at several points of the upper limb pre- and postoperatively. Moving average method was used for comparison of the volume at each period (100days). Patency of 119 anastomoses in the 29 patients was evaluated by real-time ICG fluorescence lymphangiography after surgery with follow-up ranging from 5 to 51 months. We also asked the patients how they put or not compressive garments on the affected limb after surgery. RESULTS: The mean volume of the affected limb was 1232ml at the initial visit, 1173ml during 1 to 100 days before surgery, and 1146ml during 1 to 100 days after surgery. There were statistical difference between the volumes at initial visit and the mean of a 100-days period before surgery (effect of CDP) and between the mean volumes of a 100-days

period before and after surgery (effect of LVSEA). Out of 119 anastomoses 61(51%; 61/119) were detectable. Out of 61 detectable sites 26(43%; 26/61) were patent. Cumulative patency rate decreased gradually over the period of about 4 years. Regarding the compressive garments, 14 patients became freed from putting the garments and contents of CDP were reduced in 11 after surgery. CONCLUSIONS: LVSEA is effective to reduce both volume of the affected limb and contents of CDP in the breast cancer related patients.

1:41 PM - 1:46 PM

Surgical Anatomy of the Vascularized Submental Lymphnode Flap: A Fresh Cadaveric Study and Clinical Implications

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Background

Harvesting the submental flap for vascularized lymph node transfer (VLNT) presents a challenging procedure due to the close relation of the marginal mandibular branch of the facial nerve (MMN), the topographic- and caliber-variation of the submental artery (SA) and the limited pedicle length for a free tissue transfer. The aim of this study was to evaluate surgical anatomical landmarks and variations of the submental-lymphnode flap.

Methods and Materials

The authors examined the characteristics and landmarks of 18 submental-lymph node flaps in 9 fresh cadavers. The diameter, length, caliber of the SA and its relation to bony anatomic landmarks were measured. In addition, the number of lymph nodes was evaluated through dissection and ultrasound.

Results

Within the designed submental flap (10cmx5cm) the number of the lymphnodes were on average 3(SD0.6) with an average size of 4.5 mm(SD1.78) x 2.9 mm(SD1.22). Projection of the lymph node on the mandible, measured from median-sagittal plane(MSP) towards the mandible angle, was at 63.4mm(SD5.82) e.g. 55% of mandible for the first lymph node and for the following lymph nodes was 50.4mm(SD7.67) e.g. 53%, 44.0mm(SD8.63) e.g. 55%, 40.50mm(SD2.12) e.g. 42%. The MMN consistently crossed the mandible body and the facial artery (FA) from dorso-caudal to ventro-cranial at 72 mm(SD 5.2) measured from MSP, e.g. 75% (=3/4) of the mandible's length. Here, the nerve always lied superficial to the facial artery and was on average 0.96 mm in diameter (SD 0.14). SA was located on average at 64mm,e.g. 66% of the mandible with an average diameter of 1.34mm(SD0.20).

Conclusion

The submental-lymph node flap has a constant anatomy of vascular supply and lymph nodes. Care shall be taken of the MMN which is always superficial to the mandible body and the facial artery (FA), to avoid any postoperative impairment to facial function.

1:46 PM - 1:51 PM

The Surgical Anatomy of the Supraclavicular Lymph Node Flap: a Basis for the Free Vascularized Lymph Node Transfer

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Background Vascularized lymph node transfer (VLNT) proves to be an effective surgical method in reducing lymphedema. Apart from the submental region and the groin, the supraclavicular region enjoys great popularity. This study describes the surgical anatomy of the supraclavicular lymph node flap in regard to pedicle length, pedicle diameter as well as number of lymph nodes and their exact location inside the flap for the first time. Methods Bilateral supraclavicular dissections of 9 fresh cadavers (5 female) were carried out. The lymph node flap was marked above the clavicle in between the sternocleidomastoid muscle and the trapezius muscle with a size of 10 x 5 cm. Before dissection, the exact number of lymph nodes was determined sonographically by a consultant in radiology. The lymph nodes' distance from the jugular notch was measured and the vascular pedicle's diameter and length were documented. Additionally, the location at which the transverse cervical artery passes under the brachial plexus was documented in a coordinate system, in which the clavicle served as x-axis and a normal drawn at the appropriate location as y-axis. Results On average there were 1.5 ± 1.85 to the right / 3 ± 2.26 to the left lymph nodes found. Their mean distance from the jugular notch was 8.29 ± 2.15 cm to the right/ 6.10 ± 1.21 cm to the left. The pedicle's length was 4.72 ± 1.03 cm to the right/ 4.86 ± 0.99 cm to the left and diameter 2.03 ± 0.83 to the right / 1.80 ± 0.77 to the left. The artery's crossing beneath the brachial plexus was found at 7.9 ± 1.35 cm x 2.6 ± 0.5 cm to the right/ 7.44 ± 1.66 cm x 2.72 ± 0.51 cm to the left. Conclusion The supraclavicular lymph node flap's pedicle length as well as the pedicle's diameter are suitable for a microvascular tissue transfer. However, the number of lymph nodes may vary in a wide range. We therefore recommend a preoperative sonographic quantification of the lymph nodes.

1:51 PM - 1:54 PM

Discussion

1:54 PM - 1:59 PM

A Lymphedema Surveillance Protocol: Impact on a Lymphatic Surgery Program

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Background: The interventions for lymphedema, either therapy or surgery, are most effective early in the course of disease. A lymphedema surveillance program monitors high risk patients thereby allowing physical therapists and lymphatic surgeons to identify and intervene on patients with early lymphedema. To our knowledge, no prior report of the impact of a formal lymphedema surveillance protocol on a lymphatic surgery program has been described.

Patient and Methods: A lymphedema surveillance protocol was initiated at the University of Florida in 2014. All patients scheduled to undergo axillary surgery for breast cancer were provided an opportunity to undergo a pre-operative clinical assessment by a lymphedema certified physical therapist and baseline bioimpedance spectroscopy (LDEX). Post-operative lymphedema evaluation including repeat LDEX was recommended at 1, 3, 6, 9, and 12 months. Our prospectively collected database was reviewed from February 2014 to June 2015. All patients with newly diagnosed unilateral breast cancers who completed a pre-operative lymphedema evaluation and subsequent operation at our institution were included in the analysis.

Results: 76 patients were identified with a mean age of 60 years and average BMI of 28.8. The majority of women underwent partial mastectomies (59.2%), 7.9% received neoadjuvant chemotherapy, 14.5% completed adjuvant chemotherapy, and 61.8% underwent radiation therapy. 85% of patients received sentinel lymph node biopsy (SLNB) alone and 15% of patients underwent axillary lymph node dissection (ALND). 62% of patients (n=47) presented for at least one post-operative lymphedema surveillance visit with an average follow-up of 5.3 months. No patients demonstrated early lymphedema after SLNB. After ALND, 4 of 11 patients (36%) were diagnosed with early lymphedema by LDEX and/or clinical assessment. 3 patients were diagnosed with early lymphedema while awaiting DIEP flap reconstructions. All three have either undergone (n=2) or are scheduled (n=1) to undergo DIEP flap reconstruction with simultaneous lymph node transplantation. The fourth patient has opted against reconstruction altogether.

Conclusion: A lymphedema surveillance protocol aids in defining institutional rates of lymphedema and identifying high risk patients. Microsurgeons often delay autologous reconstruction in breast cancer patients with nodal metastases until after completion of adjuvant radiation therapy. Our surveillance program was effective at diagnosing early lymphedema in these high risk patients prior to their scheduled reconstruction thereby allowing them the option to choose a simultaneous lymph node transplantation.

1:59 PM - 2:04 PM

Effectiveness of Lymphatic Microsurgical Procedures in the Treatment of Primary Lymphedema

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Ming-Huei Cheng, MD, MBA, FACS; Chang Gung Memorial Hospital; Ketan M. Patel; University of Southern California

Introduction

Vascularized lymph node transfer (VLNT) and lymphovenous bypass (LVB) procedures represent physiologic treatment options for symptomatic lymphedema. Secondary causes related to oncologic surgery and/or radiation have been successfully treated using these surgical procedures. Primary lymphedema represents a poorly understood lymphedematous condition with equally poor understanding of the benefits of microsurgical intervention. The purpose of this study was to review our experience with this patient population to better understand the effectiveness of microsurgical procedures.

Methods

A retrospective review of a prospectively maintained database of patients who received microsurgical treatment for primary lymphedema was reviewed. Both LVB and VLNT procedures were used in this patient cohort. Outcomes related to demographics, circumference differences, and symptoms, and quality of life (QoL) changes were evaluated. A validated questionnaire, the LYMQOL, was used to assess QoL outcomes.

Results

Thirteen patients were identified and met inclusion criteria. All patients had primary lower extremity lymphedema. Average age and symptom duration was 37.8 years and 162 months, respectively. The average lymphedema stage was classified as Stage II in 66.7% of patients. Average follow-up was 12.2 months. VLNT was used in most cases (69.2%) while LVB was used in the remainder of patients. The average overall circumference reduction was 3.6 cm with more improvement seen in patients who received VLNT as compared to LVB (*4.2cm v. 1.9cm*). Improvements in body weight and cellulitis occurrence was significantly improved in the VLNT cohort ($p<0.05$). In addition, patient-reported QoL domains related to function, appearance, symptoms, and mood were significantly improved following VLNT ($p<0.05$ *in all domains*) as compared to LVB ($p>0.05$ *in all domains*).

Conclusion

Lymphatic microsurgical procedures are valuable treatment options for patients with primary lymphedema. Vascularized lymph node transfer appears to result in improved overall outcomes

as compared to lymphovenous bypass procedures in this specific patient population. Improvements in objective clinical measures (limb circumference, body weight, and cellulitis occurrence) correlate well with improved patient-reported quality of life parameters.

2:04 PM - 2:09 PM

The Groin vs. Submental Vascularized Lymph Node Flaps: A Head to Head Comparison of Surgical Outcomes following Treatment for Upper Limb Lymphedema

Chang Gung Memorial Hospital, Taoyuan, Taiwan
Ming-Huei Cheng, MD, MBA, FACS; Chang Gung Memorial Hospital; Ketan M. Patel; University of Southern California

Introduction

Growing experience in lymphatic microsurgery, particularly vascularized lymph node (VLN) transfer has allowed for the discovery and utilization of new lymph node sources. The groin (VGLN) and submental (VSLN) lymph node flaps have been described as valuable options in the treatment of upper limb lymphedema. Although published reports have shown success with each of these options, no comparative evaluation has been performed of these two valuable lymph node flaps. Therefore, we performed a comparative analysis following submental and groin VLN transfers in the setting of upper limb lymphedema.

Methods

A retrospective review of a prospectively maintained database of patients who received microsurgical treatment for lymphedema was reviewed. Patients who had either submental or groin VLN transfer for upper limb lymphedema were isolated. Patient measurements were obtained at the same follow-up evaluation in both cohorts. Patient characteristics and demographics were compared. Outcomes of interest included flap characteristics, post-operative and intraoperative complications, and limb circumference changes at the designated follow-up following reconstruction.

Results

Nineteen patients were identified and met inclusion criteria. More identified patients underwent VGLN (68%) as compared to VSLN (32%) flaps for upper limb lymphedema. Patient age, BMI, and symptom duration were similar between cohorts (*p=0.8; p=0.7; p=0.6, respectively*). On evaluating flap characteristics, similar vein diameter (*2.6 v. 3.0mm; p=0.3*) and artery diameter (*2.1 v. 2.4mm; p=0.3*) were found between VGLN and VSLN cohorts, respectively. Similar lymph node numbers were found between flaps, respectively (*3 v. 4; p=0.4*). Circumference reduction was higher in the VSLN cohort (35.3%) as compared to the VGLN cohort (23.4%) during the 6-month follow-up evaluation, but did not reach statistical

significance (*p=0.3*). Total number of complications was higher in the VGLN cohort as compared to the VSLN cohort (*38.5 v. 16.7%; p=0.04*).

Conclusion

Vascularized groin and submental lymph node flaps are both valuable surgical options in treating upper limb lymphedema. Flap characteristics are similar between VLN flap options. Similar improvements in limb circumference may be expected with both VLN flaps, albeit with an increased complication rate with the VGLN flap.

2:09 PM - 2:12 PM
Discussion

2:12 PM - 2:17 PM
Barcelona Lymphedema Algorithm for Surgical Treatment (BLAST): a Critical Review of 200 Cases
Sant Pau University Hospital, Barcelona, Spain
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Breast cancer related lymphedema (BCRL) is a chronic condition that affects quality of life, a prevalence of 21% has been reported to occur on breast cancer patients. We will review in this paper the indications included in the Barcelona Lymphedema Algorithm for Surgical Treatment (BLAST) that we have established after a critical assessment of 200 cases during the last 10 years.

Following an accurate clinical evaluation, the main information required to individualize the surgical treatment is to evaluate the remaining functionality and the morphology of the lymphatic system of each patient. For that purpose we perform a preoperative assessment using imaging techniques.

Indocyanine green (ICG) fluorescence lymphography is of paramount importance since it allows us to evaluate the function of the lymphatic system. This information is crucial during the preoperative assessment because only a patient with functioning lymphatic channels can be considered a potential candidate for reconstructive lymphedema surgery. ICG lymphography is also used to evaluate the anatomical distribution of the lymph channels and the existence of superficial collateral pathways, that information is highly variable between patients and the presence of collateral lymphatic circulation would be a protective factor against lymphedema. ICG lymphography is performed in the outpatient clinic during the first consultation and depending on the results lymphoscintigraphy (LS), magnetic resonance lymphography (MRL) and computed tomography (CT) angiography might be required.

When the lymphatic channels are still functioning, we perform LVA (lymph-venous anastomosis) alone or in conjunction with VLNT (lymph-node transfer). When the patient requires breast reconstruction and a surgical treatment for lymphedema the chosen option is a combined DIEP/SIEA flap with groin VLNT with double vascularization. We have encountered that patients with medial predominant drainage without collateral dorsal vessels or with less than 6 lymphatic channels are more likely to develop lymphedema and consequently, in these patients we propose the concept of Total Breast Anatomy Restoration (TBAR) after mastectomy and axillar dissection as a preventive procedure, which would involve immediate breast reconstruction accompanied by lymph-lymphatic anastomosis between the stumps of the upper limb lymphatic vessels remaining after lymph node dissection and the afferent vessels from transplanted lymph nodes. In later stages of lymphedema, when no remaining lymph channel function is observed, we opt for vibroliposuction (Brorson´s technique) which reduces hypertrophic adipose and fibrous tissue.

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Discussion