

MONDAY LYMPHEDEMA/GENDER REASSIGNMENT

3:00 PM - 3:05 PM

RM102 Single Surgeon Experience of Using Deep Inferior Epigastric Artery As Donor Vessel for Phalloplasty.

Jens Berli, Portland

Presenter: **Alvin W Annen, B.S.**

Alvin W Annen, B.S.(1), Sara Danker, M.D.(1), Sasha Narayan, B.A.(1), Kylie Blume, B.S., M.A.(2), Aaron Heston, B.S.(1), Nick Esmonde, M.D., M.P.H.(1) and Jens U Berli, M.D.(1) (1)Oregon Health and Science University, Portland, OR, (2)University of Minnesota School of Medicine, Minneapolis, MN

Background

The recipient vessels described most commonly for phalloplasty are the SFA and the DIEA. This study is the first to specifically examine the technique and outcomes of phalloplasty utilizing the DIEA as recipient vessel.

Methods

All patients who underwent phalloplasty between 2016 and 2018 utilizing the DIEA as the recipient vessel were reviewed retrospectively. Recipient vessel choice and flap-related outcomes were analyzed.

The DIEA is harvested through a longitudinal incision in the rectus fascia. The DIEA with its venae comitantes are ligated and delivered through a separate split in the oblique muscles, which is a novel modification that allows the vessels to follow a natural course and for the fascial defect to be closed in its entirety. The recipient vein includes the greater saphenous and/or DIEV, except for one case.

Results

25 of 32 phalloplasties were performed as free flaps. Flaps included 3 ALT (9%), 20 RFFFP (62.5%) and 2 ulnar artery flaps (urethra only) (6.3%). 5 (20%) patients required take back due to venous complications. Of those, 4 (80%) were salvaged. One patient had an unsalvageable venous occlusion on POD 8 (ulnar artery flap). 3 (12%) patients with RFFFP had partial flap loss (<12cm²). In the latest 7 patients (28%) in whom the RFFFP was the donor, the DIEV was connected to the comitans of the radial artery while the cephalic vein was anastomosed to the greater saphenous vein. There were no venous complications in this subset of patients.

Conclusion

Utilizing the DIEA as inflow in these 25 patients proved to be a safe and reliable method. All cases of partial flap loss in the watershed area were resolved with a full-thickness skin graft. Given the frequency of venous complications initially, we modified our technique to include dissection of the saphenous vein to its origin at the sapheno-femoral junction, improved drainage

of the surgical bed, as well as utilization of the DIEV in all cases. Since implementation of those changes (n=7), there have been no further venous complications.

Utilizing the DIEA as inflow for phalloplasty has been successfully applied in this cohort. Venous complications were relatively high until modification of our technique. Further studies are needed to establish which inflow and outflow vessels are ideally suited for free flap phallic reconstruction.

[DIEA Illustration](#)

3:05 PM - 3:10 PM

RM103 Cadaveric Roadmap for a Novel Sensate Vaginal Flap in Male to Female Vaginoplasty

Mayo Clinic , Rochester

Presenter: **Kian Adabi, BA**

Kian Adabi, BA(1), Tony Chieh-Ting Huang, MD, MSc(1), M. Diya Sabbagh, MD(1), Jorys Martinez-Jorge, M.D.(1), Pedro Ciudad, MD, PhD(2), Ricardo Galan, MD(3) and Oscar J Manrique, MD(1)

(1)Mayo Clinic, Rochester, MN, (2)China Medical University Hospital, Taichung, Taiwan, (3)Division of Plastic and Reconstructive Surgery, Universidad Militar Nueva Granada, Hospital Militar Central, Bogota, Colombia

Background: A cadaveric and histological based comparison of the branches of the dorsal nerve of the penis (DNP) utilized in and remnant after the harvest of the clitoral flap is done to assess the feasibility, optimal design, and potential benefits of a sensate neurovascular pedicle flap for erogenous vaginal sensation in this patient population.

Methods: An anatomic dissection of the DNP was performed in 10 male pelvises to identify major trunks and their branches. Their location, diameter, branching pattern along the dorsal aspect of the penis were recorded. Main branches of DNP within the medial dorsal aspect of the penis were preserved for a clitoral flap, while those more lateral were used as innervation for the sensate vaginal flap. The number of main branches in the lateral dorsal aspect of the penis were calculated to ensure sufficient erogenous innervation to vaginal flap. Cross-sections of the penis at proximal and distal points were used for histological analysis with similar medial and lateral compartmentalization. An optimal width and length of the sensate vaginal flap was recommended based on these cadaveric findings.

Results: The DNP was composed of on average 4, 5, 6 main branches in 2 (20%), 4 (40%), and 4 (40%), cadavers respectively. Lateral main branches with 1, 2, and 3 main branches in the lateral compartment seen in 2 (20%), 6 (30.7%), 2 (42.8%) cadavers, respectively. These findings were consistent with histological cross-sectional analysis, and further showed increasing branching with more distal cross-sections. A sensate vaginal flap from the lateral aspect of the glans penis with a mean width of 1.14 cm (range, 0.9 - 1.28 cm) ensured at least one main branch of the DNP for erogenous sensitivity. This sensate vaginal flap and its neurovascular pedicle had mean length of 9.8 cm (range, 8.7 to 10.3) allowing its rotation into the anterior vaginal canal.

Conclusion: Lateral branches of the DNP can be preserved after clitoroplasty for reconstruction of a sensate vaginal flap that measures approximately 1 cm in width and has neurovascular pedicle between 8.7 to 10 cm in length. Inset within the anterior vagina wall, this sensate flap can provide patients with an erogenous vaginal “spot” during male to female confirmation surgery. Future clinical studies are required to assess the erogenous function of the flap and impact on patient sexual function and quality of life.

3:10 PM - 3:15 PM

RM104 New Peno-Urethro-Scrotal Reconstruction with Bilateral Superficial Circumflex Iliac Artery Perforator Osteocutaneous (SCIP-OC) Flap

Hiroshima Univ Hp, Hiroshima

Presenter: **Isao Koshima, Prof**

Isao Koshima, Prof(1), Shuhei Yoshida, lecturer(2) and Hirofumi Imai, lecturer(3)

(1)Hiroshima University Hospital, Hiroshima City, Japan, (2)Hiroshima University Hospital, 広島市南区霞, Japan, (3)Hiroshima University Hospital, kasumi, Minamiku, Japan

Background Free radial forearm flap is very common for penile reconstruction. But the major problems are donor site morbidity, large depressive scar after skin grafting, and urethral fistula due to insufficient suture line for urethra, and need for microvascular anastomosis. To overcome those complications, new method using combined island SCIP osteocutaneous flap for urethra and penile shaft was installed for eight cases.

Methods Eight GID patients were treated with bilateral SCIP with or without osteocutaneous flap and gracilis muscle flap. The age of patients were 24-56 (average 35±9) year old. The SCIP flaps ranged from 22 to 38 (average 29.8) cm in length and 5 to 14 (average 9.9)cm in width. Vascularized iliac crest was included in seven cases and bilateral or hemilateral gracilis muscle (or musculocutaneous) flaps were used for three cases.

Results As for postoperative complications in the postoperative follow-up of seven months to 32 months (average 2.7 years), there was a small marginal necrosis of graft, but no serious complications such as wide flap necrosis, urethral fistula and stenosis, or iliac bone infection and resulting absorption. Postoperatively, there was no total flap loss and urethral fistula.

Conclusion The advantages of this method are: minimal morbidity in concealed donor site, No urethral fistula due to large urethral reconstruction, no need for microvascular anastomoses, possible movement with gracilis muscle flap, possible vascularized penile stent and sensory repair, and possible one stage reconstruction for longer urethra of 30 cm in length without insufficiency even for GID female to male patients. The disadvantages are needs several-stage operation, and sometimes bulky penis. SCIP-OC flap has great advantages and less invasive for penile reconstruction.

3:15 PM - 3:20 PM

RM105 Use of a Medial Thigh Perforator-Based Fasciocutaneous Propellar Flap for Soft Tissue Coverage in Buccal Mucosal Graft Urethroplasty: A Novel Technique for the Management of Urethrocutaneous Fistulae

NYU Langone Health, New York

Presenter: **Oriana D. Cohen, M.D.**

Oriana D. Cohen, M.D.(1), Lee C. Zhao, M.D.(1), Rachel Bluebond-Langner, M.D.(2) and Jamie P. Levine, MD(1)

(1)NYU Langone Health, New York, NY, (2)NYU Langone Medical Center, New York, NY

Background

Patients who undergo female-to-male gender affirming surgery demonstrate high rates of neourethral fistula and stricture formation. The transfer of well-vascularized tissue is useful support for urethroplasty. Herein, we evaluate a medial thigh perforator-based fasciocutaneous propeller flap for soft tissue coverage of buccal mucosal graft urethroplasty for stricture or urethrocutaneous fistula.

Methods

Cystoscopy is performed to identify the urethral stricture or fistula tract. The urethra is dissected away from surrounding tissues, and buccal mucosa graft is harvested. In case of stricture, an urethrotomy is made ventrally, and buccal graft is placed as on onlay. For fistula, the graft is placed over the urethral defect.

Next, harvest of the medial thigh perforator fasciocutaneous flap is initiated. A handheld doppler is used to identify existing perforators in the medial thigh overlying the adductor muscles. An elliptical flap is designed of adequate size to cover the urethra and buccal graft, leaving a donor site amenable to primary closure. The planned anterior skin incision is incised and elevated in the subcutaneous plane up until the point of the adductor muscle where the perforator is identified. The deep fascia is entered near the perforator to facilitate flap rotation. A signal is confirmed within the flap, and the posterior incision is made such that the entire flap can be elevated. Subsequently, the distance between the flap and the defect space is opened, the flap rotated into position without tension, and sutured.

Results

From October 2014 to February 2018, 6 patients underwent this procedure, of average age 41.3 ± 13.5 years, BMI 25.4 ± 3.1 , and ASA class 2 ± 0.6 . The average length of operation was 454.2 ± 166.6 minutes, with an estimated blood loss of 48.3 ± 14.7 mL. The average medial thigh perforator-based propeller flap was 13.8 by 4 cm. Patients were generally ambulating on post-operative day 1 and discharged home. At mean follow-up time of 454.2 ± 166.6 days, 4 of 6 patients (66.7%) demonstrated no evidence of recurrent urethral stricture or urethrocutaneous fistulae.

Conclusion

Our use of a fasciocutaneous perforator-based propeller flap for soft tissue coverage in conjunction with buccal mucosal graft urethroplasty for the management of urethral stricture and urethrocutaneous fistulae represents a novel approach to providing well-vascularized tissue with minimal donor site morbidity.

3:20 PM - 3:25 PM

RM106 Lymphedema Prevention Surgery: Technical Refinements That Reproducibly Identify and Restore Lymphatic Anatomy

Cleveland Clinic, Cleveland

Presenter: **Cagri Cakmakoglu, MD**

Cagri Cakmakoglu, MD, Stephanie Valente, MD, Risal Djohan, MD, Stephen Grobmyer, MD, Diane Radford, MD, Steven Bernard, MD and Graham S Schwarz, MD, FACS
Cleveland Clinic, Cleveland, OH

Background

Axillary lymph node dissection (ALND) for the surgical treatment for breast cancer consequently results in the development of lymphedema in 15-30% of patients. We hypothesize that lymphatic vessel sparing ALND with axillary reverse mapping (ARM) followed with microsurgical prophylactic lymphatico-venous bypass (LVB) is a reproducible technique for preserving functional lymphatic flow following ALND. The aim of this is to present our institutional experience in technical advancements in restoring the functional lymphatic flow at the time of ALND in the effort to prevent lymphedema.

Methods

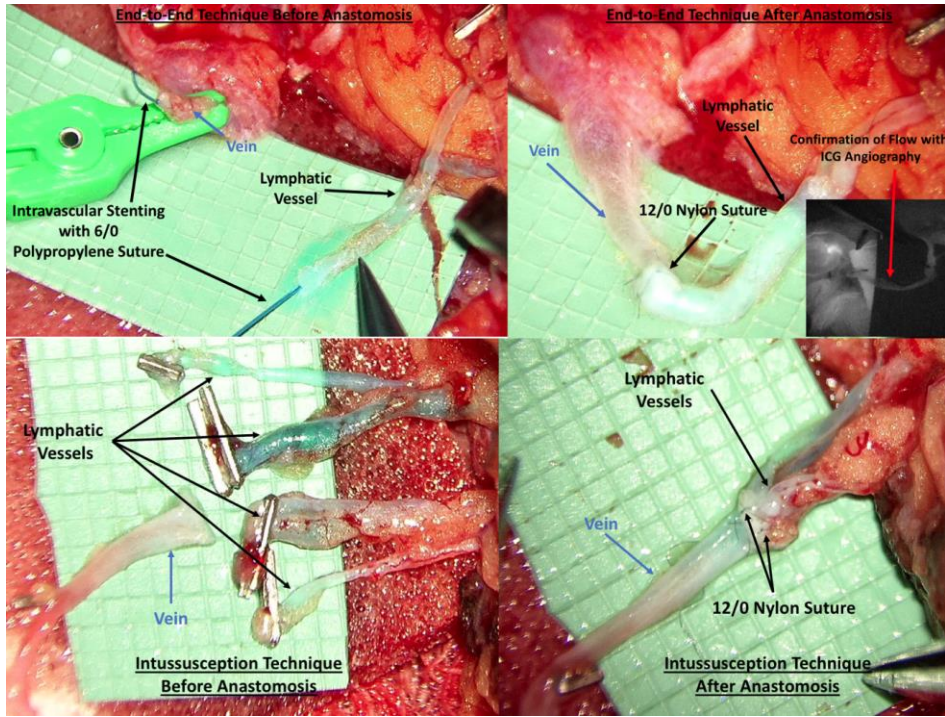
LPS was performed in 35 consecutive patients (34 female and 1 male) with breast cancer and complete ALND at our institution from 10/2016-7/2018. ARM was performed by injecting 4 – 7 cc of isosulfan blue dye at the beginning of the case across the proximal upper inner arm to identify lymphatic channels. Following completion of the lymphatic vessel preserving ALND, LVB was performed. End to End anastomosis with temporary intravascular stenting or an intussusception technique was used based on lymphatic size and availability.

Results

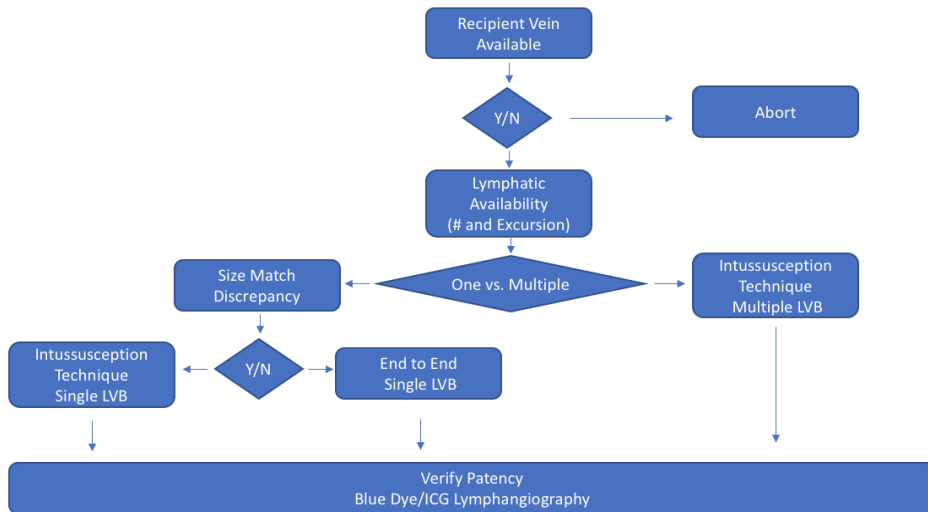
All patients had an average of 2 (range 1-4) blue ARM lymphatics visualized; the size of the lymphatic channels anastomosed to a vein with a patent valve ranged from 0.3mm-1.1mm and all anastomoses were performed using the operative microscope. A total of 28 patients had 1 LVB performed using the end-to-end technique and 7 patients had 2-4 lymphatic channels anastomosed using an intussusception technique into a single vein. After the anastomosis, 3 cc of indocyanine green was injected into the arm to confirm patency and flow. This technique is reproducible as we have successfully completed this procedure in 34 of 35 consecutive cases. We could not perform the operation in one patient due lack of a recipient vein with valvular competence. Thirty-three out of 35 patients had no transient or progressive lymphedema during follow-up.

Conclusion s

Restoration of lymphatic flow using ARM and algorithmic approach to LVB represents an optimized surgical paradigm for prevention of lymphedema after axillary node dissection in breast cancer patients.



LVB Decision Making



3:30 PM - 3:35 PM

RM107 Navigating Insurance Policies for Gender Affirming Surgery

Rutgers New Jersey Medical School, Newark

Presenter: **Wess A. Cohen, M.D.**

Wess A. Cohen, M.D.(1), Alexa M. Sangalang, BA(2), Margaret Dalena, B.A.(2), Paul J Therattil, M.D.(3), Margaret Iwanicki, M.D.(2) and Jonathan D Keith, M.D.(3)

(1)Plastic Surgery, Rutgers New Jersey Medical School, Newark, NJ, (2)Rutgers New Jersey Medical School, Newark, NJ, (3)Rutgers - New Jersey Medical School, Newark, NJ

Background

Patients with gender dysphoria comprise 1.3% of the overall population. While the incidence of gender affirming surgeries continues to increase, patients are often challenged by obtaining medical insurance coverage for these procedures. In 2015, over 50% of patients were denied insurance coverage for gender affirming surgeries. As social and legislative policies continue to evolve, it can be challenging for both the patient and physician to navigate the various insurance policies. To address this, we examined the gender-affirming surgery policies throughout the continental United States.

Methods

The top insurance companies in each region (Northeast, South, Midwest, West) of the continental United States were determined by market share as published by the Kaiser Family Foundation, a non-profit, non-partisan organization. Insurance companies must have had at least a 25% market share to be included for analysis. Policies regarding gender-affirming surgery were obtained either by company published online data or via phone call inquiry. Procedures were stratified based on location: “top surgery” (chest and face) vs. “bottom surgery” (genital). Information regarding each insurance company’s qualifying criteria and list of medically necessary procedures were extracted and compared.

Results

Coverage for gender affirming surgery varies by state, insurer, and procedure. 32 of 33 (97%) insurance companies covered mastectomy. However, 7 of 33 companies (21%) excluded nipple areolar complex (NAC) reconstruction. 19 of 33 (57%) insurance companies covered breast augmentation. Regional breakdown included Northeast: 9/13 (69%), South: 3/9 (33%), West: 3/6 (50%), Midwest: 4/5 (50%).

33 out of 33 (100%) covered male to female and female to male genital surgery. In addition to covering phalloplasties and metoidioplasties, 15 out of 33 (45%) of insurance companies covered insertion of penile prosthesis. Regional breakdown included the Northeast: 7/13 (54%), South: 3/9 (33%), West 4/6 (67%), Midwest 1/5 (20%). 27 out of 33 (81%) of insurance companies also covered insertion of testicular prosthesis with regional breakdown of Northeast: 11/13 (85%), South: 8/9 (89%), West: 6/6 (100%), Midwest: 2/5 (40%).

Conclusion

As social and political norms evolve, gender-affirming surgeries will continue to become more popular. Arguably more important, insurance carriers are increasingly covering more procedures than past years, which has reduced a significant barrier to care. However, insurance policies can be difficult to navigate for patients and physicians. Not only does insurance coverage vary by state and insurance provider, but national insurance providers cover variable procedures in different states.

Overall the Northeast and Western regions of the U.S. had greater coverage of gender affirming surgeries. This is consistent with political views based on recent presidential election voter data. Geographic coverage signifies a significant barrier to care for many transgender patients in the United States.

While insurance companies are increasingly covering more procedures, there is still a discrepancy on what is covered. All insurance companies except one, covered female to male mastectomy. However, more than 20% excluded coverage of NAC reconstruction. This divergence likely portends suboptimal patient outcomes as NAC reconstruction has been shown to significantly increase patients satisfaction for female breast reconstruction patients.

While breasts are associated with femininity, only half of insurance's cover breast augmentation for gender affirming surgery. Insurance carriers may justify the physical discomfort that many transmen experience when breast binding as a reason for mastectomy coverage. Likewise, breast augmentation is likely perceived as a cosmetic procedure, much like for a genetically female patient who desires larger breasts.

All insurance companies covered phalloplasty, metoidoplasty, or vaginoplasty. However, a minority of insurance carriers did not think testicular prosthesis were necessary for a patient to affirm his/her gender. Additionally, penile prostheses, which provide transmen the ability to have penetrative intercourse, were covered by approximately half of carriers

Additionally, documentation for pre-authorization is not consistent by insurance company, state, or procedure. At a minimum, most companies require a patient to be at least 18 years old and have a diagnosis of gender dysphoria to undergo gender affirmation surgeries. Number of referrals, time course of hormone therapy, and real life experience as the opposite gender are often cited as requirements for coverage. Further standardization, influenced by the World Professional Association for Transgender Health would help to increase access to care for patients with gender dysphoria. Additionally, a greater understanding of patient satisfaction for gender affirming surgeries could be helpful to guide insurance policies.

3:35 PM - 3:40 PM

RM108 Lymphedema Microsurgery Improved the Outcomes of Congenital Limb Lymphedema

Chang-Gung Memorial Hospital, Taoyuan

Presenter: **Tiffany Ting-Fong Liu, M.D.**

Tiffany Ting-Fong Liu, M.D.(1) and Ming-Huei Cheng, MD, MBA(2)

(1)Chang-Gung Memorial Hospital, Taoyua, Taiwan, (2)Center for Tissue Engineering, Taoyuan, Taiwan

Background

Congenital lymphedema is a rare disease (1 in 100,000 individuals) that causes discomfort, functional impairment, recurrent infections, and psychosocial maladjustment. This study investigates the outcome of physiological microsurgical procedures for congenital lymphedema.

Methods

Nine pediatric patients (7 females, 77.8%), with a mean age of 9.2 ± 5.9 years (ranged, 2-18 years), underwent surgical intervention for congenital lymphedema between 2013 and 2017. Lymphovenous anastomosis (LVA) was indicated for patients with short symptom duration and partial lymphatic obstruction and vascularized lymph node transfer (VLNT) for patients with prolonged symptoms and total lymphatic obstruction. Preoperative assessments included measurements of limb circumference, Tc99 lymphoscintigraphy, sonography, Magnetic resonance (MR) lymphography, MR angiography, and any other physical conditions (e.g., cellulitis). After surgical treatment, they received regular followup assessments including episodes of cellulitis, limb circumference measurement and ultrasound Doppler for the patency of pedicle and number of transferred lymph nodes. We used the Wilcoxon signed rank and Spearman's rank correlation tests for statistical analyses.

Results

A total of 13 lymphedematous limbs (11 lower limbs and 2 upper limbs) underwent surgical treatment (10 submental VLNT, 2 LVA, 1 omental VLNT). Cheng's Lymphedema Grading ranged from 0 to 4 (2.6 ± 1.6). The VLNT flap success rate was 100%, and the two LVA were patent. At a followup of 32.2 ± 15.2 months, mean body weight was increased 6.9 ± 3.7 kg, from 38.7 ± 21.7 kg (range 12 to 71 kg) preoperatively to 42.8 ± 17.3 kg (range 18 to 71 kg). The limb circumference was reduced by 0.9 ± 4.0 cm for AK/AE (range: 3.5 to 8.5 cm, $p=0.5$), 1.2 ± 4.8 cm for BK/BE (range: 3.5 to 9.5 cm, $p=0.7$) and 4.9 ± 6.5 cm for AA (ranged 1.5 to 16.5, $p<0.05$) without wearing compression garments. Among 9 limbs with cellulitis preoperatively, the frequency of cellulitis decreased from 2.3 ± 2.1 times/year preoperatively to 0.5 ± 0.5 times/year postoperatively ($p<0.05$), and showed moderate positive correlation to preoperative Cheng's Lymphedema Grading ($\rho=0.503$, $p=0.2$).

Conclusion s

Pediatric patients with congenital limb lymphedema may have reduced limb circumference and decreased episodes of cellulitis without wearing compression garments from LVA and VLNT approaches.

3:40 PM - 3:45 PM

RM109 Lymphedema Risk Reduction Surgery: A Reliable Approach to Avoid Breast Cancer Related Lymphedema

Sant Pau University Hospital, Barcelona

Presenter: **Jaume Masia, MD, PhD, MBA**

Jaume Masia, MD, PhD, MBA

Plastic Surgery Department, Sant Pau Hospital - Universitat Autònoma de Barcelona, Barcelona, Spain

Background: Breast cancer related lymphedema (BCRL) is a very disabling side effect of the axillary lymph node surgery (ALNS). Although more conservative surgery has been introduced, it continues to be a prevalent iatrogenic problem that affects quality of life in breast cancer patients. Best way to solve a problem is avoid it, the aim of this work is to describe our surgical approach to keep the lymphatic system of the upper limb with a minimal impairment after the ALNS.

Methods: *From June 2012 to February 2017 we performed a prospective study using different techniques for an immediate upper limb lymphatic system reconstruction after ALNS.* The procedures were axillar microsurgical lymphaticovenular anastomosis (LVA) in 27 patients and functional vascularised lymph node transfer (FVLNT) with lymph-lymphatic anastomosis in 10 cases. For 19 mastectomy patients with abdominal tissue excess, microvascular breast reconstruction using the DIEP flap was performed in combination with FVLNT plus lymph-lymphatic anastomosis (TBAR – Total Breast Anatomy Restoration).

Results: All flaps survived and 1:4 LVA were performed in each patient. No major complications were seen after surgery. The follow up of the patients were between 5 years and 14 months. The rate of preoperative versus post-operative excess circumference was less than 2 cm all cases, no one had clinical signs of lymphedema and depending on the technique used we performed lymphoscintigraphy or ICG lymphographic assessment one year post operation. We missed 2 of the 56 patients, all patient follow-up showed stable results free of lymphedema.

Conclusion: Our experience shows that lymphedema risk reduction surgery can be considered as a safe and effective procedure to avoid BCRL.

3:45 PM - 3:50 PM

RM110 Correlation of Quality of Life in Patients with Lymphedema to Limb Volume, Bioimpedance, and Indocyanine Green Lymphangiography Stage

Memorial Sloan Kettering Cancer Center, New York

Presenter: **Itay Wisner, MD, PhD**

Itay Wisner, MD, PhD(1), Elizabeth O Kenworthy, MD(1), Babak J Mehrara, MD(2) and Joseph H Dayan, MD(2)

(1)Memorial Sloan Kettering Cancer Center, Plastic and Reconstructive Surgery, New York, NY, (2)Plastic and Reconstructive Surgery, Memorial Sloan Kettering Cancer Center, New York, NY

Background: Assessing outcomes in lymphedema is challenging because there is no single objective metric that measures lymphatic function. Consequently, patient reported outcomes (PROs) have become an important tool in lymphedema assessment. It is currently unknown if commonly used measures of lymphedema correlate with quality of life. Improving our understanding of how these metrics impact quality of life will allow us to better understand their relative importance and may help guide treatment. The purpose of this study was to test if there was a correlation between PRO and limb volume, bioimpedance spectroscopy (BIS), and ICG stage.

Methods: Baseline measurement data from a prospective study of quality of life in lymphedema patients was used for this study. Metrics included limb volume based on perometry, bioimpedance spectroscopy (BIS), and ICG stage using the MD Anderson staging system, and presence or absence of cellulitis. The Lymphedema Life Impact Scale (LLIS) version 2, a validated quality of life questionnaire for lymphedema was compared to these measures using a Spearman correlation test.

Results: A total of 27 patients were studied: 20 with upper and 7 with lower limb lymphedema. 20 had breast cancer, 4 had gynecologic tumors, and 3 had sarcoma. Overall impairment based on the LLIS was most strongly correlated to ICG stage. There was a lesser but also moderate correlation with limb volume and bioimpedance with the overall LLIS score. Presence or absence of cellulitis did not have a strong correlation to LLIS in this study.

Conclusion: The data in this study suggests the strongest correlation to quality of life in patients with lymphedema is ICG stage. As ICG findings may reflect underlying physiologic function of the lymphatic system, treatments aimed at improving physiologic function may have a relatively greater impact on improving quality of life. Further prospective study is required to evaluate this secondary hypothesis.

Table 1: Baseline Characteristics of Study Group

		Mean	SD	N	%
Age		55	11		
Gender	Female			26	92.9%
	Male			2	7.1%
BMI		25.59	3.16		

Lymphedema Duration (Months)		55	70		
Limb	Upper			21	75%
	Lower			7	25%
Underwent Chemotherapy				23	82.1%
Underwent Radiation				25	89.3%
Initial Diagnosis	Breast			20	71.4%
	Cervical			1	3.6%
	Endometrial			3	10.7%
	prostate			0	0.0%
	sarcoma			4	14.3%

Table 2: Correlation Coefficient of Different Imaging and Objective Lymphedema Measurements*

	Age								
LE Duration	-.027	LE Duration							
ISL	.103	.426	ISL						
BMI	-.011	.210	.267	BMI					
L-Dex	.292	.329	.621	.318	L-Dex				
Pero%Diff	.198	.375	.654	.314	.794	Pero%Diff			
Man%Diff	.181	.129	.572	.209	.711	.888	Man%Diff		
MRA Fluid	-.266	.308	.462	.260	.312	.672	.649	MRA Fluid	
MRA Fat	.207	-.056	.555	-.126	-.045	.434	.402	.590	MRA Fat
ICG	-.081	.339	.630	.553	.689	.410	.250	.295	.040

* yellow marked cells stands for statistically significant correlation between row and column variables ($p < 0.05$).

Table 3: Correlation Coefficient Comparison of Lymphedema Measurements and Lymphedema Quality Of Life Questionnaire Scores*

	L-Dex (N=27)	Pero%Diff (N=28)	ICG (N=18)
LLIS Physical	.411	.498	.601
LLIS Psychological	.099	.188	.436
LLIS Functional	.281	.454	.350

LLIS % Impairment	.310	.451	.595
-------------------	------	------	------

* Significant correlations ($p < 0.05$) are marked in yellow. ISL= international society of lymphology, BMI= body mass index, L-Dex= lymphedema index, Pero%Diff= permoeter percent difference from normal limb, Man%Diff= manual examination percent difference from normal limb, ICG= indocyanine green lymphangiography staging, LLIS= lymphedema life impact scale version 2 questionnaire (domains included: physical, psychological, functional, and percent impairment). ULL27= upper limb lymphedema questionnaire.

TUESDAY PRACTICE/OUTCOME STUDIES

3:50 PM - 3:55 PM

RM111 The Dynamic-Lymphaticovenular Anastomosis Method for Breast Cancer Treatment-Related Lymphedema: Creation of Functional Lymphaticovenular Anastomoses with Use of Preoperative Dynamic Ultrasonography

St. Marianna University School of Medicine, Kanagawa

Presenter: **Yukio Seki, MD**

Yukio Seki, MD(1), Akiyoshi Kajikawa, MD, PhD(2), Takumi Yamamoto, MD, PhD(3), Takayuki Takeuchi, MD(4), Takahiro Terashima, MD(5) and Norimitsu Kurogi, MD(5)
(1)Department of Plastic and Reconstructive Surgery, St. Marianna University School of Medicine, Kanagawa, Japan, (2)Department of Plastic and Reconstructive Surgery, St. Marianna University School of Medicine, Kanagawa, Japan, (3)Department of Plastic and Reconstructive Surgery, National Center for Global Health and Medicine, Tokyo, Japan, (4)St. Marianna School of Medicine, Kanagawa, Japan, (5)Surgery, Shonan Atsugi Hospital, Kanagawa, Japan

Background: Lymphaticovenular anastomosis (LVA) is generally effective for breast cancer treatment-related upper extremity lymphedema (UEL). Clinical improvement is, however, limited by the degree of sclerosis of the lymphatic vessels. Lymphatic vessels with degenerated smooth muscle are inadequate in propelling lymph into the anastomosed vein. The author developed a reliable method, the dynamic-lymphaticovenular anastomosis (dynamic-LVA) method for detecting the incision points by preoperative dynamic ultrasonography to utilize even sclerotic lymphatic vessels, in which patient's natural hand movements theoretically propel lymphatic fluid to the site of anastomosed vein.

Methods: Thirty patients with breast cancer treatment-related lymphedema treated by 3 incisions at the forearm for creating lymphaticovenular anastomoses were assessed: 15 in whom the dynamic-LVA method were used and 15 in whom the conventional method was used. Intraoperative status of lymphatic vessels and postoperative lymphedematous volume reduction were compared.

Results: Placement of incisions at a total of 90 forearm sites (3 per patient) yielded creation of 90 LVAs (32 in linear ICG lymphography pattern incisions and 58 in standard pattern incisions). Sclerotic lymphatic vessels were encountered at greater frequency in linear pattern incisions in the dynamic-LVA group than in the conventional LVA group (7.1% vs. 38.9%, $P = 0.030$). Diameters of the lymphatic vessels did not differ significantly between the conventional LVA group and dynamic LVA group (0.43 ± 0.25 mm vs. 0.47 ± 0.14 mm, respectively; $P = 0.332$) or in the prevalence of dynamic flow of lymph to veins without venous reflux (64.4% vs. 73.3%, respectively; $P = 0.362$). Postoperative volume reduction was significantly greater in the dynamic-LVA group than in the conventional LVA group; the UEL index at 1 month was 8.12 ± 3.06 vs. 3.74 ± 5.82, respectively ($P = 0.018$) and at 6 months was 8.74 ± 3.58 vs. 2.62 ± 10.39, respectively ($P = 0.046$).

Conclusion: Dynamic-LVA is clinically beneficial because the imaging guides decisions over where the incisions should be placed so that a patient's natural hand motions can be utilized to

propel lymph into the anastomosis despite the presence of sclerotic lymphatic vessels. It is also beneficial because even early improvements are obtained.

Figure.1

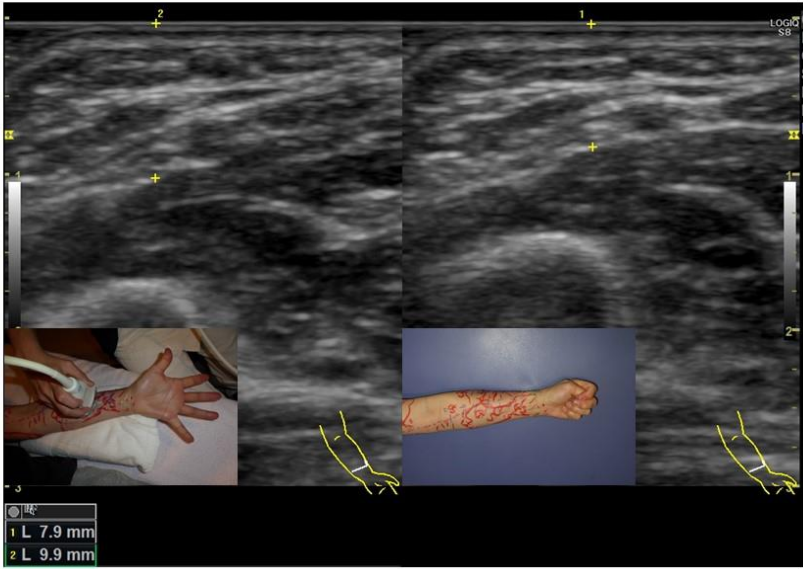


Figure.2

