SUNDAY TRUNK

7:00 AM - 7:05 AM

RM61 Analysis of Immediate Versus Delayed Sternal Reconstruction with Pectoralis Major Muscle Advancement Flaps Versus Turnover

George Kamel, Bronx
Presenter: **George N Kamel, MD**
George N Kamel, MD(1), Amanda M Rizzo, BA(2), Teresa Benacquista, MD(2), Oren Tepper, MD(1), Lawrence Draper, MD(2), Evan Garfein, MD(3) and Katie E Weichman, MD(2)
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Background

The pectoralis major muscle flap is a versatile reconstructive option for deep sternal wound infections (DSWI) and is often used due to its proximity to the sternal wound. The timing and surgical technique of bilateral pectoralis major muscle advancement flaps versus unilateral pectoralis major muscle turnover and unilateral pectoralis major muscle advancement flap on patient outcomes remains to be elucidated. With this in mind, the purpose of this investigation was to compare the timing, immediate versus delayed and the surgical technique in patients with deep sternal wounds infections on patient outcomes.

Methods

After institutional review board approval was obtained, a retrospective review of all patients who underwent sternal reconstruction with pectoralis major muscle flaps at Montefiore Medical Center from January of 2008 to April of 2017 was conducted. Patients who were diagnosed with DSWI after undergoing cardiac surgery were included for analysis. Patients were divided by flap timing (immediate or delayed) and flap type (unilateral advancement with unilateral turnover or bilateral advancement) for analyses. Bivariate tests were performed to compare patient baseline demographics, clinical characteristics, and medical comorbidities. Outcomes of interest were rates of postoperative complications, same admission mortality, reoperation, readmission, operating room time, and length of stay. A multivariate modeling approach was used to evaluate factors associated with study outcomes.

Results

A total of 88 patients were included for analyses (n=57 bilateral advancement, n=31 unilateral advancement with unilateral turnover; n=62 immediate, n=23 delayed). Baseline characteristics did not differ between groups of flap type or timing. When postoperative complication rates were compared, both groups did not differ with respect to dehiscence, hematoma, seroma, or wound infection; however, the rate of tissue necrosis was significantly greater in patients with unilateral advancement with unilateral turnover flaps (n=6 (19.4%) compared to bilateral advancement

flaps (n=2 (3.5%)) (p=0.021). Mortality during admission did not differ with respect to flap type, but differed significantly with respect to flap timing (immediate n=7 (11.3%); delayed n=9 (34.6%); p=0.015). Length of stay differed significantly by both type and timing (type: bilateral 26.9 ± 22.6 days, unilateral 38.0 ± 26.7 days, p=0.042; timing: immediate= 26.8 ± 22.1 days, delayed= 40.2 ± 27.8, p=0.019).

Conclusion

Patients who underwent pectoralis major muscle advancement flaps had lower incidence of tissue necrosis. Furthermore, the timing of immediate sternal reconstruction was associated with a decreased hospital length of stay. This information suggests that immediate reconstruction with pectoralis major muscle advancement flaps may be a better option when available.

7:05 AM - 7:10 AM

RM62 Value Improvement and Resource Utilization in Complex Abdominal Wall Reconstruction

Keck School of Medicine of the University of Southern California, Los Angeles

Presenter: **Cory K Mayfield, BS**

Cory K Mayfield, BS(1), Daniel J. Gould, M.D., Ph.D.(2), Alex K. Wong, MD(3), Ketan M. Patel, M.D.(3) and Joseph N Carey, MD(3)

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Value Improvement and Resource Utilization in Complex Abdominal Wall Reconstruction

Background

Multiple mesh products exist for abdominal wall reconstruction (AWR). Though recommendations may help guide surgeons choices in the operating room, certainly other financial and institutional pressures may play a bigger role in deciding which product to utilize. Standardization of an abdominal wall reconstruction algorithm may help reduce costs and change surgeons preferences for products in certain surgical scenarios.

Methods

The authors performed a retrospective review of patients who underwent inpatient abdominal wall reconstruction (AWR) within the Division of Plastic Surgery between 2014 and 2016. The patients were identified based on CPT codes for abdominal wall reconstruction (CPT: 49560, 49565, 15734). Patients were separated into low and high-risk groups. High-risk was defined as immunosuppression and/or history of infection/contamination. Patients were stratified by type of mesh including biologic/biosynthetic or synthetic. Four groups were created: high risk biologic (HB), high-risk synthetic (HS), low-risk biologic (LB) and low-risk synthetic (LS) These groups were analyzed for outcome and complications including return to OR, 30-day readmission, recurrence of hernia and infection. The material cost of mesh per group was analyzed as cost per case.

Results

112 patients underwent complex abdominal wall reconstruction (46 HB, 18 HS, 30 LB, and 18 LS). High-risk groups had a longer length of stay, higher rate of complications, and higher acuity per case mix index, as expected. Use of biologic mesh in low risk patients (n=30) had low rates of complications and expected outcomes (6.7% return to OR, 30-day readmission, recurrence of hernia and infection). Recurrence rate at 2 years was not statistically different between high risk and low risk groups (p=0.981). Furthermore, there was no significant difference in the recurrence rate between biologic and synthetic mesh when comparing both high and low risk groups (p=0.535). The average cost of biologic mesh was $9,414.80, while the cost of synthetic mesh was $524.60. Use of biologic mesh in low risk cases, cost $8,890.20 per case, and could be

considered inappropriate (39%). The estimated cost saved when using synthetic mesh for low-risk patients in our cohort was $295,391.20.

Conclusion s

Recurrence rates for complex AWR appear to be unrelated to mesh selection, and there appears to be ab excess use of biologic mesh in low risk patients. Inappropriate use of biologic mesh in low-risk patients adds significant costs. Implementing a critical process to evaluate indications for biologic mesh could decrease costs without impacting the quality of care, thus improving overall value.

7:10 AM - 7:15 AM

RM63 The Vascularized Medial Femoral Condyle Free Flap for Reconstruction of Segmental Recalcitrant Nonunion of the Clavicle

Mayo Clinic, Rochester
Presenter: **Tony Chieh-Ting Huang, MD, MSc**
Tony Chieh-Ting Huang, MD, MSc, M. Diya Sabbagh, MD, Scott P Steinmann, MD and Steven L Moran, MD
Mayo Clinic, Rochester, MN

Background

The clavicle is an important structure that is involved in the stability of shoulder and the upper extremity. Clavicle fractures usually heal without complications, but nonunion may occur. Recalcitrant nonunion is a rare but a potential complication after traditional methods of treatment. Clavicular nonunion is most often treated with clavicular shortening and occasionally free fibular bone grafting. Herein we describe our experience using the vascularized medial femoral condyle free flap for the reconstruction of recalcitrant clavicular nonunion.

Methods

A retrospective chart review of patients who had symptomatic recalcitrant nonunion of the clavicle who underwent reconstruction with the vascularized medial femoral condyle free flap from June 2003 to January 2018. Patient demographics, symptoms, injury details, surgical course and procedure details and follow up data were collected.

Results

A total of 6 patients were identified. There were 1 male and 5 female with an average age of 39.8 years old. All patients had different degrees of pain and discomfort. The average number of previous surgeries is 3.8 before receiving reconstruction with MFC flap. The average time of total nonunion time was 63 months (from the time of fracture to healing). After reconstruction with MFC, the average time to radiological bony union was 16 months. All flaps survived and radiographic bony unions were confirmed with CT and radiographs. Pain was significantly improved in all patients following surgery and all patients returned to work.

Conclusion

The medial femoral condyle free flap is a good option for recalcitrant bony nonunion of the clavicle where larger flaps are not warranted. It is effective and offers minimal donor site morbidity.

7:15 AM - 7:20 AM

RM64 A Comprehensive Analysis of the Deep Inferior Epigastric Arterial Vasculature with Computed Tomographic Angiography

Matthew A. DelMauro, Westbury

Presenter: **Matthew A DelMauro, MD**

Matthew A DelMauro, MD(1), Tom Lin, BS(2), Jolanta B Norelli, BS(2) and Victor A. Moon, MD(1)

(1)Northwell Health, Hofstra Northwell School of Medicine, Lake Success, NY, (2)Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY

Background: Microvascular breast reconstruction with abdominal free flaps achieves satisfactory aesthetic outcomes with low donor-site morbidity. However, comprehensive analyses of the abdominal wall vasculature are lacking.

Methods : A retrospective review was conducted of all female patients undergoing CTA imaging of the anterior abdominal wall over a four-year period at a tertiary-care institution utilizing a standardized protocol.

Results : DIEA caliber (2.29±0.36mm) was unaffected by laterality (p=0.626), number (p=0.270), diameter (p=0.344), or total cross-sectional area (p=0.365) of major (≥1mm) perforators (Table 1). DIEA diameter was positively correlated with increased branching (p=0.036) (Table 2). The type II pattern was the most common (51.94%); Types 0 and IV were the least common (0.32%). 4673 major (≥1mm) perforators were identified per hemiabdomen (5.09±1.98). Type II hemiabdomens demonstrated the greatest number of major perforators (5.44±2.08mm). There was a positive correlation between the number of major perforators and branching of the DIEA (p<0.00001). In Types II-IV, the medial branch/row demonstrated a greater number of major perforators compared to the lateral branch/row (3.74±1.70mm vs. 2.35±1.35mm, p=0.0001). There was no difference in the diameter of major (≥1mm) DIEA perforators based on their location of origin from the medial branch/row versus the lateral branch/row (p=0.940).

Conclusion : The current study evaluated ten-times-more DIEA systems than 70% of all *in vivo* imaging studies; five-times-more DIEA systems than 90% of all *in vivo* imaging studies; and nearly twice the number of DIEA systems as the next largest study. Thus our results may reflect the most accurate estimations of the DIEA system to date. To our knowledge, this is the first study to report a positive correlation between DIEA caliber and branching pattern (p=0.036). This study confirms that more DIEA perforators routinely originate from the medial branch/row than the lateral branch/row. While we noted no difference in perforator caliber based on location of origin (p=0.940), the dominant perforator originated from the medial branch/row 79.87% of the time. We hope that future imaging studies will employ 1.0 mm as the standard minimum diameter for the classification of "major" perforators and will preferentially utilize living subjects/specimens.

Table 1. DIEA System Characteristics Based on Laterality of Hemiabdomen	**All Hemiabdomens**	**Right Hemiabdomens**	**Left Hemiabdomens**	**p-Value (Right vs. Left)**

DIEA (*n*)	928	464	464	
Mean Diameter ± SD (mm)	2.29±0.36	2.28±0.37	2.30±0.35	0.626
Major (≥1mm) Perforators (*n*)	4673	2388	2285	
Mean No. per Hemiabdomen	5.09±1.98	5.21±2.02	4.96±1.94	0.270
Mean Diameter (mm)	1.44±0.24	1.43±0.26	1.44±0.23	0.344
Mean Diameter of Largest Perforator (mm)	1.78±0.41	1.78±0.42	1.77±0.41	0.956
Location of Largest Perforator (%)	Medial (79.87)	Medial (79.61)	Medial (80.19)	
Major (≥1mm) Medial Branch/Row Perforators (*n*)	3461	1754	1707	
Mean No. per Hemiabdomen	3.79±1.66	3.84±1.66	3.75±1.65	0.275
Mean Diameter (mm)	1.45±0.27	1.44±0.27	1.45±0.27	0.636
Mean Diameter of Largest Perforator (mm)	1.78±0.41	1.78±0.41	1.78±0.41	0.624
Major (≥1mm) Lateral Branch/Row Perforators (*n*)	1214	634	580	
Mean No. per Hemiabdomen	1.38±1.45	1.42±1.45	1.34±1.41	0.022
Mean Diameter (mm)	0.83±0.75	0.85±0.75	0.83±0.74	0.215
Mean Diameter of Largest Perforator (mm)	1.78±0.37	1.79±0.40	1.76±0.33	0.602

Table 2. DIEA System Characteristics Based on DIEA Branching Pattern

	Total	**Type 0**	**Type 1**	**Type 2**	**Type 3**	**Type 4**
No. of Hemiabdomens, *n* (%)	928 (100)	3 (0.32)	375 (40.41)	482 (51.94)	65 (7.00)	3 (0.32)
DIEA (Excluding type 0)						
Mean Diameter (mm)	2.29±0.36	-	2.26±0.36	2.30±0.36	2.38±0.32	2.53±0.35
Major (≥1mm)Perforators (*n*)	4673	-	1690	2621	349	13
Mean No. per Hemiabdomen	4.94±1.96	-	4.61±1.67	5.44±2.08	5.37±2.07	4.33±1.53
Mean Diameter (*n*)	1.44±0.34	-	1.41±0.33	1.46±0.35	1.47±0.38	1.42±0.23
Mean Diameter of Largest Perforator (mm)	1.79±0.40	-	1.73±0.39	1.81±0.41	1.88±0.41	1.73±0.11
Location of Largest Perforator (%)	Medial (79.87)	-	-	Medial (66.80)	Medial (73.85)	Medial (66.67)

7:25 AM - 7:30 AM

RM65 Comparison of Effective Cost and Complications after Abdominoperineal Resection: Primary Closure Versus Flap Reconstruction

University of Michigan, Michigan Medicine, Ann Arbor

Presenter: **Jessica J Hsu, MD, PhD**

Jessica J Hsu, MD, PhD(1), Jessica I Billig, MD(1), Lin Zhong, MD, MPH(2), Lu Wang, PhD(1), Kevin C Chung, MD, MS(3) and Theodore A Kung, MD(4)

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Background:

Flap reconstruction is recommended for select patients undergoing abdominoperineal resection (APR) in order to mitigate infection and wound healing complications. Defining the complication rates and costs associated with APR with and without flap reconstruction will determine if flap reconstruction is effective from both clinical and resource utilization standpoints. This study uses insurance claims data to evaluate the effective costs and complication profiles of patients who undergo APR with and without flap reconstruction.

Methods:

A retrospective population-based analysis using the Truven MarketScan Databases from 2009-2016 was conducted on patients who were diagnosed with colorectal carcinoma and underwent APR with and without flap reconstruction. Complications within six months of the index operation were identified using ICD-9/ICD-10 codes. The cumulative cost associated with healthcare utilization within six months of the index operation and the effective cost ratio (cumulative cost divided by number of healthy days) were calculated. Univariate and multivariable logistic regressions were used to study the association between flap reconstruction and effective cost.

Results:

In this cohort of 2,557 patients, 2,363 underwent APR and 194 underwent APR with flap reconstruction. At six months postoperatively, there were no differences in complication rates between the two groups (47% for APR, 53% for APR with flap reconstruction, P=0.116). Flap reconstruction was protective against intra-abdominal infections (OR, 0.4; 95% CI, 0.2-0.9; P=0.033) but conferred an increased risk of wound healing complications (OR, 1.5; 95% CI, 1.0-2.3; P=0.039). There was no difference in total cost of care at six months postoperatively ($69,620 for APR alone vs. $69,625 for APR with flap reconstruction , P=0.456). Flap reconstruction was not associated with increased effective cost. Effective cost was greater for the APR alone ($259/healthy day) than the APR with flap reconstruction ($186/healthy day), but this was not statistically significant (P=0.17).

Conclusion:

Our nationwide study supports the use of flap reconstruction after APR in select patients with risk factors. We found no differences in overall complication rates and cumulative costs between patients undergoing APR alone and APR with flap reconstruction. Despite more extensive surgery with additional donor site(s), flap reconstruction was not associated with a higher effective cost compared to APR alone. This suggests that flap reconstruction likely mitigates morbid complications and decreases healthcare spending in patients with specific risk factors, thus warranting consideration of plastic surgery consultation when planning to perform APR in higher-risk patients.

7:30 AM - 7:35 AM

RM66 Robotic Harvesting of Rectus Abdominis Muscle for Oncoplastic Pelvic Reconstruction: Can a Cadaveric Training Model Improve Surgical Performance?

Mayo Clinic, Rochester

Presenter: **Joseph Banuelos, MD**

Joseph Banuelos, MD(1), Tony Chieh-Ting Huang, MD, MSc(1), Jorys Martinez-Jorge, M.D.(1), Pedro Ciudad, MD, PhD(2), Minh-Doan Nguyen, MD, PhD(1) and Oscar J Manrique, MD(1)

(1)Mayo Clinic, Rochester, MN, (2)China Medical University Hospital, Taichung, Taiwan

Background Vertical Rectus Abdominis Muscle flap (VRAM) is one of the most commonly used flaps during oncoplastic pelvic reconstruction1. The use of robotics in surgery has achieved fewer complications, lower conversion to open procedures and shorter length of stay, bringing a direct benefit to patients2-4. During plastic surgery training minimally invasive (MIS) exposure for intrabdominal flap harvest has been limited5. Our goal is to describe the application of a cadaveric training model for intraabdominal flap harvest analyzing surgical performance. **Methods** A cadaveric training model to harvest the rectus abdominis muscle using robotic surgery (da Vinci® Xi™ surgical system) was design. Two board certified plastic surgeons with 5 years in practice performed all flaps. A total of 3 (5-8mm ports) were placed on the contralateral abdomen to triangulate each VRAM. Time to complete harvest for each flap, instrument collisions, excessive instrument force and master workspace range were recorded by the da Vinci system to measure surgical performance. We analyzed these variables by comparing values between the first and the last half of the dissections of both surgeons. **Results** A total of 10 female fresh cadavers (20 VRAMS) were dissected, each surgeon performed half of the procedures. There were no changes in technique during training. Total time to harvest each flap was 95 min (range 72 – 124 min). Comparing time to harvest between the first and the last half of flaps was 124 vs. 85 min (p=0.005). Average Collision of Instruments was 5, with 9 times for the first harvest vs. 4 for the last harvest (p=0.005). Average instrument out of view was 4cm, with 6 cm for the first vs. 2 cm for the last harvest (p=0.05). Finally, the average Master Workspace Range was 10.4 cm, with 12.6 cm for the first half and 8.8 cm for the las half (p=0.05). No complications were seen during any of the flap harvest. **Conclusion** The trend towards minimally invasive techniques has show to be very beneficial for patients. Within our specialty, appropriate exposure to technology and new techniques are necessary. This cadaveric minimally invasive model has demonstrated that with frequent training and repetition a significant improve surgeon's performance. However, caution and safety are fundamental when applied in the clinical setting.

7:35 AM - 7:40 AM

RM67 Freestyle Perforator Preserving Technique for the Pedicled ALT in Distant Functional Reconstructions: A Cadaveric Study and Clinical Outcomes

State University of Campinas - Brazil, Campinas

Presenter: **Guilherme Cardinali Barreiro, MD, PhD**

Guilherme Cardinali Barreiro, MD, PhD(1,2), Chelsea C. Snider, MD(3) and Luiz Henrique Silva Borges, MD(4)

(1)Medical Assistance Institute for the Public Server, Sao Paulo, Brazil, (2)Plastic Surgery, State University of Campinas, Campinas, Brazil, (3)Institute for Plastic Surgery, Southern Illinois University School of Medicine, Springfield, IL, (4)State University of Campinas, Campinas, Brazil

Freestyle Perforator Preserving Technique for the Pedicled ALT in Distant Functional Reconstructions: A Cadaveric Study and Clinical Outcomes **Background** The pedicled anterolateral thigh flap (ALT) can reach defects from the mid-abdomen to the perineum and the reverse pedicled ALT can extend to the knee. The lateral femoral cutaneous nerve (LFCN) provides sensation to this well-known flap. Based off of the descending branch of the lateral femoral circumflex artery, multiple skin islands and the vastus lateralis muscle can be harvested with the flap. We present the safety, reliability and reproducibility of a freestyle perforator preserving technique of the pedicled ALT flap for defects outside the borders of the thigh. **Methods** Anatomic studies of 40 anterolateral thigh flaps were harvested in 20 cadavers. Freestyle technique with perforator preserving incision was performed to identify the perforators and isolate the flap components. The LFCN was identified all flaps. From May 2010 to May 2016, 42 patients were reconstructed using a pedicled ALT for defects outside of the thigh region. Patient age ranged from 28 to 60 years. The vascular branch to the rectus femoris muscle was ligated for elongation of the main pedicle as necessary. A tunnel was created under the proximal sartorius and rectus femoris muscles for perineal and contralateral defects. The flap was tunneled subcutaneously for lateral defects. Superdraining was performed when the reverse ALT was utilized. **Results** Twenty-two fasciocutaneous and 20 myocutaneous flaps were harvested with 60% including the LFCN. Six functional vaginal reconstructions, 3 functional penile reconstructions, and various hip, perineal and abdominal defects were successfully treated. The reverse ALT required superdraining to the greater saphenous vein in all cases. Sensate flaps regained two-point discrimination that was comparable to the contralateral thigh within an average of 6 months. The donor area was grafted in 8 (19%) patients and no major complications or flap losses were observed. Five minor wound dehiscences were treated conservatively. Mean follow up was 8 months. **Conclusion** The freestyle perforator preserving technique for pedicled ALT flap harvest with the LFCN provides reliable functional and sensate reconstruction of hip, lower abdomen, groin and perineum. Superdraining the reverse ALT is suggested to prevent flap congestion.

7:40 AM - 7:45 AM

RM68 Incidence of Incisional Hernia at VRAM Donor Site with and without Mesh Reconstruction

Mayo Clinic, Rochester

Presenter: **Andrew Michael Mills, MD**

Andrew Michael Mills, MD(1), Karim Bakri, MBBS(2), Nho V. Tran, MD(1) and Jeremie Douglas Oliver, BS, BA(1)

(1)Mayo Clinic, Rochester, MN, (2)Plastic Surgery, Mayo Clinic, Rochester, MN

Background

The pedicled vertical rectus abdominis myocutaneous (VRAM) flap is useful in the reconstruction of defects located in the abdomen, pelvis, groin and thigh. However, this flap can lead to incisional hernias in the abdominal donor site. We investigated whether the use of mesh in the closure of the abdominal donor site affected the incidence of incisional hernias and other complications and other associated morbidities following VRAM procurement.

Methods

This is a retrospective review of patients undergoing VRAM flaps for soft tissue reconstruction. We compared patients undergoing abdominal donor site closure with primary repair to those with prosthetic or biologic mesh. The incidence of incisional hernias was objectively detected by Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) and correlated with physical examination. All patients included in the study had postoperative cross-sectional imaging follow-up of at least 12 months.

Results

A total of 162 patients with oncologic and traumatic diagnoses who underwent VRAM flap reconstruction for sacrectomy, vaginectomy, abdominoperineal resection, pelvic exenteration, thigh excision and pelvic/thigh trauma, with the mean age at surgery of 53.8 years, were included in this study. Median radiographic follow-up was 40.4 months [IQR 21.7, 69]. Mesh repair of the donor site was performed in 26 patients, and the remaining 136 underwent primary closure only. Mean BMI in the primary closure group was 27.0 compared to 29.2 in the mesh repair group ($p = 0.1$). In total, 33 patients (24.3%) developed radiographic evidence of abdominal wall hernias in the primary closure group with 11 (33%) of these undergoing subsequent hernia repair with mesh. Three patients (11.5%) who underwent mesh repair developed an incisional hernia compared with 24.3 % (n=33) of the 136 patients who underwent primary donor site repair ($p = 0.136$). Of these three patients, one required subsequent hernia repair with mesh (33%). Only one patient (3.8%) in the mesh repair group developed an abdominal donor site infection compared to 0 in the primary closure group.

Conclusion

This retrospective study showed a trend towards a decrease in the incidence of incisional hernias at the VRAM donor site when a mesh repair was performed compared to a primary repair, without mesh (11.5% vs 24.3%). However, the results failed to reach statistical significance ($p = 0.136$). The authors conclude that routine prophylactic use of mesh to reconstruct VRAM donor sites cannot be warranted or justified before more analysis with a larger sample size is performed.

7:50 AM - 7:55 AM

RM69 Long-Term Follow up of Perineal Reconstruction with Inferior Gluteal Artery Flaps

St Thomas' Hospital, London

Presenter: **Asmat H Din, FRCS**

Asmat H Din, FRCS(1), Marlene See, FRCS(1), Pari-Naz Mohanna, FRCS(2) and Paul Roblin, FRCS(3)

(1)St Thomas' Hospital, London, United Kingdom, (2)Department of Plastic Surgery, St Thomas' Hospital, London, United Kingdom, (3)Department of Plastic Surgery, St.Thomas Hospital, London, United Kingdom

Long-term follow up of perineal reconstruction with inferior gluteal artery flaps **Background:** Abdominoperineal excisions along with pelvic extentorations for malignancy lead to large perineal defects. These patients have often had neo-adjuvant chemoradiotherapy and multiple studies have shown the benefits of flap closure of these perineal defects in decreasing surgical site morbidity. Multiple options exist for flap closure of these defects. We present our long-term outcomes of inferior gluteal artery perforator (IGAP) flap perineal reconstructions, patient reported outcome measures, as well as our refinements on the technique. **Methods:** Prospectively collected data for all IGAP perineal reconstructions performed at our institution over a 5-year period was reviewed, and all patients were invited to a specially arranged follow up clinic to be examined. As well as demographic information and details regarding their surgery and outcomes they completed pre- and post-op patient reported outcome surveys to assess their quality of life post-surgery. **Results:** In total 36 patients were included with a mean follow up time of 23 months (6 – 57 months). Mean length of inpatient stay was 16 days, and time to complete wound healing 2 months. Mean time to normal sitting as well as return to normal daily routine was 4 months. 47% of patients had minor wound complications and 6% had wound complications requiring return to theatre. There were no total or partial flap losses. 15% of patients had a perineal hernia but only 3% were symptomatic requiring operative management. Spearman correlations showed that lower BMI correlated with increasing length of post-operative pain ($p=0.027$). Length of stay correlated with colorectal surgical complications ($p=0.004$) but not with wound or flap complications. Linear regression showed that no single variable accounted for delayed wound healing when the others were taken in to account ($p=0.329$). It also showed that neoadjuvant radiotherapy ($p=0.011$), immunosuppression ($p=0.008$), and smoking ($p=0.006$) were all independently linked to hernia formation. Those with higher BMIs were also more likely to have post-operative infections ($p=0.037$). **Conclusion:** Our series has shown no partial or total flap losses, acceptably low donor site morbidity, and good patient tolerance of IGAP perineal reconstruction.

7:55 AM - 8:00 AM

RM70 Abdominal Wall Reconstruction in the Transplant Population

Chris Devulapalli, Washington

Presenter: **Chris Devulapalli, MD**

Chris Devulapalli, MD(1), Jessica Wang, MD(2), Arjun Kanuri, MD, MBA(3), Elliot Walters, MD(4), Elizabeth G. Zolper, BS(5), Cara K Black, BA(5), Sarah R. Sher, MD(6), Christopher E. Attinger, MD(6) and Karen K. Evans, MD(7)

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Background:

Incisional Hernias following visceral transplantation can be a common complication burdened by primary and secondary recurrences due to the state of chronic immunosuppression, multiple prior laparotomies, and medical comorbidities in this population. Previous literature, however, is limited in reporting outcomes of abdominal wall reconstruction specifically in this high risk cohort. We retrospectively reviewed our experience with abdominal wall reconstruction in visceral transplant patients to critically appraise our technique and associated outcomes.

Methods:

Following IRB approval, we retrospectively reviewed all transplant patients referred by Transplant Service for incisional hernia and underwent repair by the senior author from January 2009 to January 2018. Patient demographics, comorbidities, operative details, postoperative complications, and time to complete wound healing were recorded. Descriptive statistics were used to evaluate outcomes within the cohort.

Results:

Within the study period, 33 transplant patients underwent incisional hernia repair with mean age of 58 years (range, 27- 75) and mean BMI of 29.7 kg/m2 (range, 20- 48). Majority of patients had prior liver transplantation (14 patients, 42.4%), followed by kidney (13, 39.4%), kidney/liver (1, 3.0%), and kidney/pancreas (1, 3.0%). Patients were on 1 to 3 immunosuppressive agents including any combination of tacrolimus, mycophenolate, or prednisone. Average time of presentation with incisional hernia was 21 months (range, 1-83) from time of transplantation. Fourteen patients (42.4%) initially presented with an infected wound and underwent an average of 3 surgical debridements (range, 1-5), prior to definitive repair. Mean defect size was 17.5 cm length (range, 6-45) by 15.1 cm width (range, 3-30), and total area of 98.4 cm2 (range, 20-560). Midline fascial opposition was achieved in all but 1 patient who was bridged with mesh. Unilateral component separation was used in 3 patients (9.1%) and bilateral in 9 patients (27.3%). Repairs were reinforced with biologic mesh using underlay technique in 22 patients (66.7%). During mean follow-up period of 3.5 years (range, 1-9), recurrences occurred in 5

patients (15.2%), of which 4 were in liver transplant patients. Wound healing complications occurred in 7 patients, 21.2% (2 seromas treated with aspiration, 2 hematomas requiring operative drainage, 1 abscess requiring percutaneous drainage, and 2 wound dehiscence treated with local wound care). Average time to complete wound healing was 77 days (range, 12-818; median, 29 days).

Conclusion:

Abdominal wall reconstruction can be performed in visceral transplant patients safely and efficaciously with recurrence rates comparable to that found in the general population.

8:00 AM - 8:05 AM

RM71 Comparison of Tumor Recurrence in Oncoplastic Pelvic Reconstruction with VRAM Versus Omental Flaps

Mayo Clinic, Rochester

Presenter: **Jeremie Douglas Oliver, BS, BA**

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Background - The purpose of this study is to describe our experience and outcomes in oncoplastic pelvic reconstruction for patients who underwent either vertical rectus abdominis musculocutaneous (VRAM) or omental flap following abdominoperineal resection (APR) at a single tertiary care institution.

Methods - All patients who underwent pelvic reconstruction following APR with either VRAM or omental flaps from January 1992 – January 2017 were retrospectively reviewed. Patient demographics and relevant comorbidities including chemotherapy and radiation therapy data were collected and analyzed. In addition, margin status at the time of oncologic resection was analyzed. Flap-specific data were collected for each approach. Oncologic data collected includes cancer type, stage at time of APR, and rate of tumor recurrence within the flap.

Results – A total of 562 patients were identified who underwent pelvic reconstruction with either VRAM or omental pedicle flaps. Of these, 274 (48.8%) underwent VRAM reconstruction and 288 (51.2%) underwent omental flap reconstruction. All margins were negative at time of cancer ablation surgery. Complications data included: seroma [VRAM=2(0.36%); Omentum=32(5.69%), p<*0.0001*], wound dehiscence [VRAM=31(5.52%); Omentum=17(3.02%), p=*0.022*], abscess [VRAM=4(0.71%); Omentum=27(4.8%), p<*0.0001*], cellulitis [VRAM=2(0.36%); Omentum=10(1.78%), p=0.025]. Statistical comparison of tumor recurrence between these two reconstructive approaches showed a significantly higher recurrence rate in omental flaps compared to VRAM flaps (*p= 0.000127*).

Conclusion – The results of this study suggest a significantly higher tumor recurrence rate in omental flap pelvic reconstruction compared to VRAM flaps. This knowledge has the potential to influence surgical planning and flap selection in pelvic reconstruction.

8:10 AM - 8:15 AM

RM72 Characteristics of the Superficial Circumflex Iliac Artery Perforator (SCIP) Flap in a Western Population and a Practice Approach for Free Flap Reconstruction

University of Pennsylvania, Philadelphia

Presenter: **Martin J Carney, MD**

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Background

There has been increasing interest in the SCIP flap as a source of thin, pliable soft tissue combined with a favorable donor-site. Despite several clinical series from Asia, barriers to adoption include reluctance to perform sub-millimeter "super-microsurgery" and the effect of body habitus on flap feasibility. The purpose of this study is to distinguish vascular anatomic characteristics of the SCIP flap in a North American population.

Methods

Computed tomography angiography was performed to study a total of 84 vessels in healthy prospective renal donor patients from a radiographic database. Descriptive statistics as well as linear regression comparing variables to BMI were performed.

Results

Mean BMI and age were 27.1 and 47.8, respectively. The SCIA originated from the common femoral artery in 77 cases (remainder profunda). The mean vessel diameter was 1.85mm at source vessel origin. Distance from skin to source vessel averaged 30.7mm. Supra-scarpal subcutaneous thickness averaged 16.5mm. The mean distance from Scarpa's fascia to vessel origin was 14.1mm. Direct three-dimensional distance from vessel origin to pubic tubercle was 50.2mm. A medial and lateral perforator split off of the SCIA was observed in 38 cases. Significant differences were shown when comparing BMI to skin to source vessel distance ($p<0.001$), supra-Scarpal subcutaneous fat thickness ($p<0.001$), and fascial distance to vessel origin ($p<0.001$). BMI did not significantly affect vessel diameter.

Conclusion

Despite a significantly higher BMI than previously published cohorts, the SCIP flap remains an excellent source of thin and pliable tissue. When dissected closer to the source vessel, a vessel caliber of nearly 2mm can be achieved thus obviating the need for "super-microsurgery" in this population.

8:15 AM - 8:20 AM

RM73 A Novel Approach in Abdominal Wall Reconstruction to Restore Function for Both Motor and Sensory Recovery

Cleveland Clinic, Beachwood

Presenter: **Aparna Vijayasekaran, MD**

Aparna Vijayasekaran, MD(1), Isis Scomacao, MD(1), Risal Djohan, MD(2), Vahe Fahradyan, MD(1), Richard Drake, PhD(1) and Jennifer Mcbride, PhD(3)

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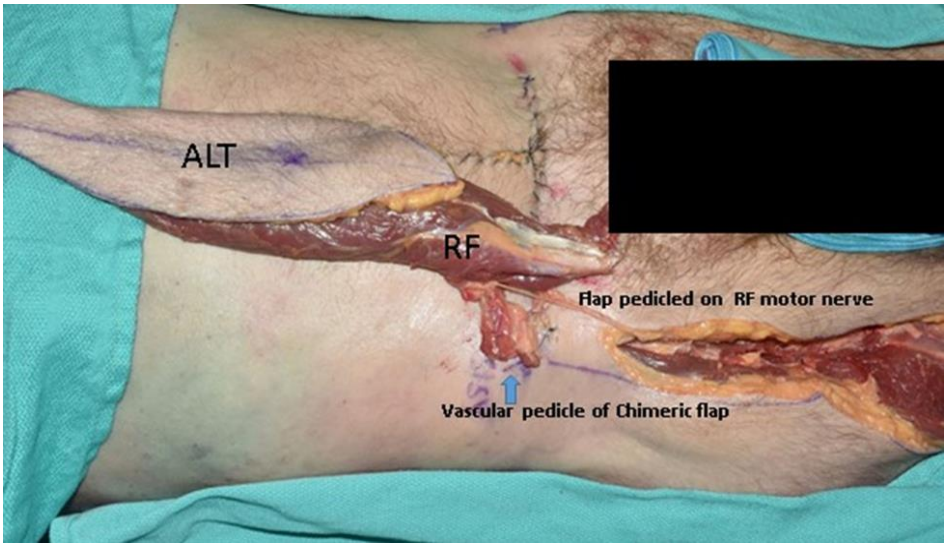
Background: Dynamic and Functional abdominal wall reconstruction (FAWR) remains an unsolved challenge. The ideal flap would have a reliable vascular pedicle, harvested with minimal donor site morbidity, capable of large area surfacing with potential for motor and sensory innervation. A cadaveric study was designed to investigate the feasibility of using a free composite thigh flap with anterolateral thigh (ALT) and rectus Femoris (RF) components pedicled only on the motor nerve branch for FAWR.

Methods: Eight fresh cadavers were systemically dissected. A chimeric thigh flap including an ALT flap and RF was designed. ALT with large skin paddle was designed and raised. The lateral femoral cutaneous nerve was dissected and integrated to the flap. ALT pedicle dissection was continued until the main rectus arterial branch (descending branch of lateral circumflex femoral artery) which was preserved. RF was elevated and the common pedicle was dissected up to the femoral origin. The motor nerves to the RF muscle were carefully dissected to their femoral origin. All the vessels and nerves to the flaps were measured.

Results: Mean cadaveric age was 66.37±6.04, BMI 22.15±3.75 and height 175.89±11.71cm. 7/8 cadavers were male. 16RF flaps were dissected and 7 were harvested as a true chimeric flap with ALT. Mean RF flap area was 213.5±42.73cm^2 and the ALT was 341.28±154cm^2. Mean number of neurovascular bundles associated with RF flap was 2.07±0.47mm and average cross-sectional diameter of the dominant nerve was 2.26±0.58mm. Primary motor nerve length was 9.40±2.35cm. The common vascular bundle in all 7 chimeric flaps were ligated and the flap was rotated towards the abdomen pedicled only by primary motor nerve of the RF muscle. Nerve length was adequate for reach up to xiphoid area in all 7 flaps(Fig1).

Conclusion: This study demonstrates the practicability for the use of composite free flap with ALT and RF muscle free flap pedicled only in its motor nerve branch. Satisfactory length of femoral nerve branch was achieved to allow proper flap rotation. Leaving the nerve pedicled negates muscle atrophy during re-innervation in any functional free flap. Even with the limitations in a live patient (primary muscle contraction causing some loss of length and the variability in vascular anatomy inherent to any thigh flap) we think this flap would be an excellent option for FAWR in the right patient.

Figure 1


ALT
RF
Flap pedicled on RF motor nerve
Vascular pedicle of Chimeric flap

8:20 AM - 8:25 AM

RM74 Surgical Reconstruction in the Female Genital Mutilation Patient

Hospital of the University of Pennsylvania, Philadelphia
Presenter: **Takintope Akinbiyi, MD**
Takintope Akinbiyi, MD, Emily Langston, BS and Ivona Percec, MD, PhD
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Background: The clitoris is essential to female sexual function and the female genitalia appearance is heavily tied to female sexuality. Female genital mutilation (FGM) disfigures the vulvar region to reduce female sexual pleasure and protect women's purity for marriage. However, FGM, has no known health benefits and is considered a human rights violation. Our work aims to educate the plastic surgery community about FGM and options for surgical reconstruction. **Methods:** Six women subject to FGM underwent genital reconstruction by our group. Under conscious sedation, we widely released scar tissue and exposed the clitoral remnant for remucosalization in combination with fat grafting. We present the results of our evolving technique and long term results. **Results:** Five women with symptomatic WHO type II and one with type III (infibulation) FGM were treated between 2016-2017. Fat grafting after reconstruction was utilized in three women during minor revisions secondary to recurrent adhesions, one of which was treated with a buccal mucosal graft. All experienced resolution of dyspareunia and all regained sensation to the clitoris and sexual pleasure. **Conclusion:** Immigration is bringing increasing numbers of FGM patients into our practices. It is important for the plastic surgery community to be educated about these patients and to work together with our interdisciplinary colleagues to offer reconstructive options to these women. Vulvar and clitoral reconstruction with fat grafting represents a powerful and safe therapy. Plastic surgeons have the unique opportunity to offer life-altering reconstruction to women subject to FGM, as we do for our breast cancer patients.