



## **ASRM Concurrent Scientific Paper Presentations: Torso and Trunk Reconstruction**

**January 19, 2016 – 10:15 AM to 11:00 AM**

10:15 AM - 10:20 AM

### **Prophylactic use of the gracilis flap to diminish urinary complications at the time of free flap phalloplasty**

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**Introduction:** Urethral fistulas are not uncommon (50-80% incidence) following radial forearm flap transfers for phalloplasty in both cis-males and transsexual men. In an effort to decrease fistula rates, prelamination of radial forearm flaps was performed with a combination of buccal and vaginal mucosa in addition to full thickness skin grafts if needed. We also performed immediate prophylactic pedicled gracilis flaps in these patients in an effort to circumvent urinary complications.

**Methods:** 7 consecutive patients underwent radial forearm flap prelamination with buccal and vaginal mucosa in addition to skin graft if needed, surrounding an 18Fr foley catheter in the suprafascial plane during this first stage. At the time of flap transfer, 6-8 weeks later, a pedicled gracilis flap was used to not only buttress the urethral anastomosis with well vascularized muscle but also to fill the neo-scrotum and help avoid later, costly and problematic testicular implants.

**Results:** In the postoperative period, no patient had developed urethral-cutaneous fistulas. One patient developed distal urethral stenosis which required dilation in the office only. At an average of six months follow-up our incidence of fistula was 0. All free tissue transfers survived and all were able to use their phallus for both intercourse and urination in the standing position.

**Conclusions:** Microsurgical phalloplasty has traditionally suffered from a high incidence of urinary complications. We have shown that when using a gracilis flap, which is commonly used in fistula repair, prophylactically two distinct goals are accomplished. We are able to avoid urinary complications and fill the neo-scrotum with autologous tissue obviating the need for testicular implants.

10:20 AM - 10:25 AM

## **Complex Intrathoracic Esophageal Reconstruction with Microvascular Jejunum Transfer**

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### *Background*

Primary esophageal reconstruction options after esophagectomy include the gastric pull-up and colon interposition. In cases where these options have failed or are not feasible the jejunum is the next choice, either as a free jejunal graft (FJ) or a supercharged pedicled jejunal graft (SPJ). Outcomes and operative decision making for free tissue reconstruction of the esophagus are difficult, particularly regarding vascular access and utilization of bowel segments. Our report describes our experience with complex esophageal reconstruction at a high volume academic center.

### *Methods*

A retrospective review was performed to identify all cases of delayed esophageal reconstruction using jejunal grafts performed over a 10 year period from 2005-2015. The indications for jejunal reconstruction, patient demographics and comorbidities, anatomical characteristics of the reconstruction, perioperative complications, and outcomes were examined. Perioperative complications were graded using the Clavien-Dindo classification.

### *Results*

Thirteen patients were identified with a median age of 63 years (range 48 to 79 years). Eleven (85%) were men and two (15%) were female. Reconstructions included FJ in 11 patients and a SJP graft in 1 patient. In 1 patient a SPJ graft was attempted but was aborted intra-operatively secondary to inability to provide venous outflow. All flaps were placed in a substernal position. In all patients the arterial inflow was the internal mammary artery using an end-to-end anastomosis. Venous drainage was via the innominate vein with an end-to-side anastomosis. The gastrointestinal reconstruction was individualized according to anatomic considerations. Most commonly (in 8 patients) an end-to-end jejunogastric anastomosis was performed in an end-to-end fashion. Surveillance upper endoscopy was routinely performed on postoperative day five. There were no flap failures. The median time of surgery was 10 hr and 19 min (range 8:54 to 13:46).

The median length of stay (LOS) was 26 days (range 9 to 50 days). There were no perioperative mortalities (grade V complications). All patients survived to discharge from hospital and none expired within the 90 days following surgery. There were thirteen early complications (occurring within 30 days of surgery) including four grade II complications, two grade IIIa complications, four grade IIIb complications, two IVa complications, and one IVb

complication. There was one anastomotic leak, treated with endoscopic stent placement. All patients ultimately resumed a regular oral diet.

### *Conclusions*

Substernal esophageal reconstruction using the jejunum either as a free graft or pedicled supercharged graft provides a reliable option for patients requiring complex esophageal reconstruction when traditional conduits are unavailable.

10:25 AM - 10:28 AM

### **Discussion**

10:28 AM - 10:33 AM

### **Reconstruction of Complex Chest Wall Defects Requiring Skeletal Stabilization Using Autologous Myo-osseous Flaps**

The University of Chicago Hospitals, Chicago, IL, USA

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**Background:** Complex chest wall defects requiring skeletal stabilization present a difficult reconstructive challenge. In the setting of infection, radiation or otherwise marginalized tissue, the use of alloplastic material increases complication rates. Given the proven benefits of vascularized autologous tissue for these unfavorable circumstances, we examined our experience with myo-osseocutaneous flaps for chest wall reconstruction.

**Methods:** Patients with complex chest wall defects who underwent autologous latissimus myo-osseous flap reconstruction at a single center between 1986 and 2015 were retrospectively reviewed. Outcomes evaluated included: demographics, defect etiology and location, and major complications. A cadaver study was also performed to elucidate the perfusion to the vascularized rib component.

**Results:** Ten patients underwent chest wall reconstruction with ages ranging 23-71 years (Table 1). One patient had complete sternal resection for osteomyelitis and chronic draining wounds secondary to pyoderma gangrenosum. A second underwent resection of the manubrium and clavicles for osteoradionecrosis. Eight others had full-thickness chest wall defects secondary to tumor extirpation and/or osteoradionecrosis and osteomyelitis. Seven were reconstructed with ipsilateral myo-osseous or myo-osseocutaneous pedicled flaps and the remaining three with free latissimus myo-osseocutaneous flaps. Four patients had complications requiring reoperation including: wound dehiscence treated with negative pressure therapy, hardware failures (n=2), and partial skin loss necessitating skin grafting. Three patients had neoadjuvant radiation, which did not correlate with complication rate. A latissimus dorsi flap was also raised in a fresh cadaver with methylene blue injected antegrade into the proximal thoracodorsal artery. The stain

propagated into the posterior intercostal vessels at multiple rib levels, indicating that they can fill and drain in a retrograde manner via flow from the thoracodorsal system.

**Conclusions:** Initially described for head and neck reconstruction, the latissimus myo-osseous flap provides up to 14 cm of autologous vascularized bone that is an excellent option for chest wall reconstruction where skeletal reconstruction is mandated and the use of alloplastic materials are not ideal. Through a cadaver study, we found that the vascularized rib component of this flap does not require a musculotendinous-periosteal connection as seen in the serratus anterior or pectoralis major myo-osseous flaps. This unique vascular anatomy permits separation of bony and soft tissue components, allowing a great degree of freedom for inseting, fixation and contouring to complex defects.

#	Age	G	Disease	X R T	Skeletal Defect	Flap(s)	Rib Used	Complications
1	71	M	Metastatic SCC, osteoradionecrosis osteomyelitis	Y	Right anterior ribs 2-4	Ipsilateral pedicled LMOC	8 10	None
2	57	M	Adenocarcinoma	Y	Right postero-lateral ribs 4-9	Contralateral free LMOC/SAR	6 10	None
3	67	M	Laryngeal carcinoma osteoradionecrosis osteomyelitis	Y	Manubrium, left clavicle	Ipsilateral free LMOC	8	None
4	23	M	Desmoid tumor	N	Left anterior ribs 1,2 and middle third of clavicle	Ipsilateral pedicled LMOC	10	None
5	46	M	Pyoderma gangrenosum	N	Total sternectomy	Left free LMOC	7 9	1. Takeback for hematoma 2. Wound dehiscence requiring debridement and removal of ribs 3. VAC and delayed closure
6	53	M	Chondrosarcoma	N	Left anterior ribs 3-5	Ipsilateral pedicled LMO	10	1. Hardware failure 2. Draining cutaneous sinus requiring debridement/rib removal
7	60	M	Neurofibroma	N	Left anterior ribs 2,3	Ipsilateral SAR	5	None
8	25	M	Rhabdomyosarcoma	N	Right anterior ribs 3-6	Ipsilateral pedicled LMOC	7* 10	None
9	79	M	Hemangioma	N	Right postero-lateral ribs 3-7, scapular portion	Ipsilateral pedicled LMOC, serratus fascial flap	9	1. Partial flap skin loss requiring skin grafting 2. Extrapleural empyema
10	71	F	SCC	N	Left clavicle and anterior ribs 1,2	Ipsilateral pedicled LMOC	8	Hardware failure

10:33 AM - 10:38 AM

### **Propeller Obturator Artery Perforator Flap for Vulvar, Vaginal or Scrotal Reconstruction**

Chang-Gung Memorial Hospital, Taoyuan, Taiwan

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#### **Purpose:**

The perforator(s) of the anterior branch of the obturator artery is located at the uppermost gracilis territory. The perforator flap based on it is thin and pliable, offering a good solution for loco-regional defects<sup>1</sup>. In this study, we investigated the perforator topography of the anterior branch of obturator artery and proposed a new flap, the propeller obturator artery perforator flap, for vulvar, vaginal or scrotal reconstruction.

#### **Materials and Methods:**

Identification and evaluation of the perforator(s) at the uppermost gracilis territory was conducted during elevation of the gracilis flap, the obturator artery perforator flap or the profunda femoris artery perforator flap. Between January of 2011 and May of 2014, thirty-two

thighs in 26 patients were evaluated. The distance of the obturator artery perforator from the pubic tubercle and the perforator types (musculocutaneous or septocutaneous) were recorded. Among these, eleven patients underwent perineal reconstruction with the propeller obturator artery perforator flap(s), including a scrotal reconstruction and 10 vulvar/vaginal reconstructions. Patient age ranged from 22 to 85 years (mean, 66.1 years).

## **Results:**

Single perforator from the anterior branch of obturator artery was found at the uppermost gracilis territory in all 32 thighs. The perforator was located at a mean of 1.1 cm (range, 0.8 to 1.4 cm) lateral to the pubic tubercle; it was septocutaneous in 3 thighs (9.4%) and musculocutaneous in 29 thighs (90.6%). In the 11 patients of perineal reconstruction, seventeen propeller obturator artery perforator flaps were elevated. The flap area ranged from 4x7 cm<sup>2</sup> to 7x21 cm<sup>2</sup>. The donor sites were primarily closed in all cases. All flaps survived completely. At a mean follow-up time of 5.1 months (range, 3 to 10 months), all patients returned to normal daily activity with good functional outcomes.

## **Conclusion:**

The perforator of the anterior branch of the obturator artery is constantly present at the uppermost gracilis territory. The propeller obturator artery perforator flap is a versatile and reliable option for vulvar, vaginal or scrotal reconstruction.

10:38 AM - 10:43 AM

## **Decreased venous thrombosis and operative time with anastomotic coupling device versus hand-sewn anastomoses: a cohort study**

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## **Background**

The objective was to analyze operative time and venous complications in free flaps with venous anastomoses performed with an anastomotic coupling device (ACD) versus hand-sewn. ACDs have gained broad acceptance. However, no cohort study has reported operative times, included consecutive patients, or used a matched comparison group. Previous studies were potentially biased; they were completed by specialized centres, with careful selection of vessels to perform ACD anastomoses.

## **Materials & Methods**

This is a retrospective cohort study. Consecutive free flaps were reviewed; outcomes for hand-sewn veins (2007-2010) were compared to ACD (2010-2013). Cases were matched for

reconstruction type: breast, head and neck, lower extremity trauma, and extremity tumor. Re-explorations and complications were abstracted for all flaps in duplicate using a standardized form, and criteria defined a priori. Reason for re-exploration and intra-operative diagnosis were critically analyzed with intra-operative findings classified as: arterial thrombosis, venous thrombosis, or mechanical obstruction (pedicle kinks not leading to failure). Operative times for ACD versus hand sewn were compared for, 1) venous re-explorations secondary to venous congestion, and 2) matched unilateral DIEP breast reconstruction.

## Results

Overall, 291 free flaps were included; 147 ACD and 144 hand-sewn venous anastomoses. Venous thrombosis was significantly lower in ACD versus hand-sewn (1/147, 1% vs 9/144, 6%,  $p < 0.01$ ). There was no difference in re-exploration for venous congestion (5/147, 3.5% vs 11/144, 7.5%,  $p = 0.13$ ), or overall re-exploration (12/147, 8% vs 16/144, 11%,  $p = 0.43$ ). All flaps re-explored for mechanical obstruction were salvaged. Operative times were significantly shorter for ACD versus hand-sewn for flap re-exploration secondary to venous congestion, and unilateral DIEP flaps.

## Conclusions

Compared to hand-sewn veins, using an ACD significantly decreases venous thrombosis, and shortens operative time for flap re-exploration in venous congestion, and unilateral DIEP in matched cases. No difference in overall flap complications was found. This study addresses a gap in the ACD literature. It is the first comparative study to critically analyze venous complications, use a consecutive sample, and a matched comparison group. Further, it is the first to estimate the cost utility of the ACD in decreasing venous thromboses and shortening re-exploration operative time. These improved outcomes may be used to support adoption of ACD technology for institutions from a financial perspective. Lastly, this study provides the first comparison of operative times for matched elective cases.

10:43 AM - 10:48 AM

### **Micro Coronary Bypass in Infants and Neonates - Technical Tips**

The Hospital for Sick Children, Toronto, ON, Canada

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Pediatric coronary bypass grafting (PCABG) is associated with serious complications and presents unique challenges, including origin, position and distribution of the coronary vasculature. Pediatric patients require special technical consideration and microsurgical techniques including appropriate fine instruments, 10-0 or 11-0 microsutures, and repair under the operating microscope may significantly improve results. With collaboration between the divisions of Cardiothoracic Surgery and Plastic and Reconstructive Surgery, we have utilized the expertise of both specialties to reduce technical complications and improve outcomes following PCABG. We surgically anastomose the left internal mammary artery (LIMA) to the left anterior

descending (LAD) with the use of an operating microscope and 10-0 nylon sutures. With the heart on bypass, movement is not a concern although speed is of the essence. Issues of coronary artery branches preclude usual suturing techniques and downstream hearty flow is essential. Our end to side technique optimizes downstream flow, emphasizes heel and toe suture strength and aims for a leak reduced and preferably leak free anastomosis. Flows are high, leaks are troublesome and require stoppage often through additional sutures which may be difficult to position and may require the baby to be placed on bypass once again. The technical details of this repair emphasixing the above points will be described and illustrated in detail. We have learned many of these lessons the hard way and hope to pass on our experience in this difficult and complex but very rewarding microsurgical endeavour.

10:48 AM - 10:52 AM

**Discussion**