

Tuesday, January 14, 2014 - Microsurgical Training Scientific Paper Session - 10:45am - 12:00pm

10:45am - 10:49am

Under the Microscope: Perceptions of US Plastic Surgery Residents on the Acquisition of Microsurgery Fellowship Training

Russell E. Kling, BA; Sanjay Naran, MD; Zoe M. MacIssac, MD; Joseph Losee, MD; Carolyn De La Cruz, MD

Institution where the work was prepared: University of Pittsburgh, Pittsburgh, PA, USA

Background: The advancement of microsurgery is dependent on attracting the premier candidates to the subspecialty upon graduation from plastic surgery residency. This study surveyed attitudes and characteristics among integrated and independent plastic surgery residents, to identify factors that correlate with desire to pursue a microsurgical fellowship.

Methods: A national survey of US plastic surgery residents was conducted. Logistic regression analyses were used to identify correlation of intention to pursue microsurgery fellowship training with the following outcome measures: demographic and socioeconomic factors (gender, age, race/ethnicity, marital status, financial debt, geographical region), career goals and other motivating factors (perception of prestige, financial compensation, work hours, research opportunities, interest level, subjective assessment of technical ability, willingness to undergo further training etc.).

Results: The survey was completed by 168 plastic surgery residents (28% response rate). Both integrated and independent residents reported an interest in pursuing fellowship opportunities after residency (65% vs. 67%, $p>0.05$). There was a trend towards increased desire to pursue a microsurgery fellowship among integrated residents compared to independent residents (25% vs. 15%, $p=0.064$). Outcome measures that correlated with desire to pursue microsurgery fellowship training included perceptions that such training would: improve microsurgery skill level ($p=0.002$), provide additional credentials needed to excel in plastic surgery ($p<0.001$), lead to career enhancement as a result of working under the tutelage of a well-regarded microsurgeon ($p<0.001$), result in more prestige than general plastic surgery ($p=0.016$), render the candidate a better overall plastic surgeon ($p<0.001$) and more competitive in the job market ($p=0.005$), be worth extra training ($p<0.001$). Outcome measures that did

not correlate with desire to pursue microsurgery fellowship training included: microsurgical training during residency was adequate ($p=0.682$) and could practice microsurgery independently without further training ($p=0.644$).

Conclusions: Microsurgery fellowship is a desired career pathway among plastic surgery residents. This is most evident amongst those from integrated programs rather than those from independent programs. Given that intention is related most to perceptions of improvement in career potential and enhancing ones credentials implementing objective means to assess microvascular proficiency is warranted to better determine which residents would benefit most from additional training.

10:49am - 10:53am

Status of Microsurgical Simulation in Plastic Surgery Training: a Survey of United States Program Directors

Saif S. Al-Bustani, MD, DMD; University of North Carolina; Eric Halvorson, MD

Institution where the work was prepared: University of North Carolina, Chapel Hill, NC, USA

Introduction

Various simulation models have been developed and implemented in microsurgical training to overcome some of the limitations of the traditional Halstedian method of teaching trainees by mentorship on real patients. The aim of this study was to assess the status of microsurgery simulation in plastic surgery training in the United States.

Methods

Data was collected and analyzed from responses to a survey sent to all plastic surgery program directors in the United States. Questions asked for the type of simulation set-up when present, quality of the facilities, extent of utilization by trainees, method of trainee evaluation, and program director's perception of the relevance of simulation, amongst other questions.

Results

Half of the program directors responded to the survey. 69% of the programs provide some form of microsurgical simulation to their trainees. The overwhelming majority (75%) has a set-up that includes a laboratory with microscope, and 52% of those provide a live animal model. About half share their facilities with other departments or divisions. None provide virtual training and only one program has an online didactic component. 89% rate the quality of their facilities as good or great. In 82% of the programs, trainee utilization is once every 3-6 months. Only in 11% is the utilization monthly. Formal evaluation of simulation is provided in 41% of the programs, and all evaluations are delivered by faculty with microvascular practice. Evenly, trainees are evaluated by speed of accomplishing anastomosis, patency of anastomosis, intimal alignment, spacing of sutures, instrument handling, and hand motion. While all program directors agree that simulation training is relevant to competence in microvascular surgery, only 60% agree that simulation should be mandatory in training. 43% of

programs require their trainees to complete a formal course in microsurgery before performing similar procedures on patients.

Conclusion

Plastic surgery program directors agree that microsurgical simulation is relevant to competence in the field, and the majority agree that it should be mandatory for training. That said, less than half require a formal course prior to live surgery. Reported resident utilization of available microsurgery facilities is low. We propose standardizing microsurgery simulation early-on in training to maximize trainee's benefit from live operations. Designing and developing a standardized training module and assessment tool to evaluate trainees in microsurgery is a prudent next step. Organizing with other divisions or departments to share facilities may improve their quality and hence utilization by trainees.

10:53am - 10:57am

End-to-patch Anastomosis for Microvascular Transfer of Free Flaps with Small Vascular Pedicle

Phoebe Tang, MD, PhD; National Taiwan University; Shih-Heng Chen, MD; National Taiwan University Hospital; Hung-chi Chen, MD, PhD, FACS; China Medical University; Samir Mardini

Institution where the work was prepared: China Medical University Hospital, Taichung, Taiwan

BACKGROUND: Although supermicrosurgery is being used in transferring free flaps with small vascular pedicles, it is still difficult in certain situations such as wounds of potential infection. Also it is limited to smaller flaps. Anastomoses of large vessels is still safer for transfer of a large flap for most surgeons, especially young surgeons or those in private practice.

METHODS: When the vascular pedicle of a free flap is smaller than 8 mm, an option is to take a cuff of the major artery for end-to-patch anastomosis. From 1983 to 2013 this method had been applied to free groin flap (92 cases), anteromedial thigh flap (21 cases), and free Becker's flap (5 cases). When a patch had been taken from femoral artery, direct closure was done with 5-0 prolene sutures, followed by coverage with local tissue. When a patch had been taken from ulnar artery, a patch of vein graft was used for repair of ulnar artery.

RESULTS: Among these patients only 1 free groin flap failed. One patient developed bleeding from femoral artery at 2 days after surgery. It was treated by repair of femoral artery and coverage with sartorius muscle. In the ulnar artery the patients had no complaint of cold tolerance, and the postoperative angiogram showed good patency of ulnar artery.

CONCLUSION: For the majority of young plastic surgeons this method provides a reliable and comfortable anastomosis when transferring a flap with small vascular pedicle. The only caution is to repair the donor artery carefully, followed by coverage of the repair site with local tissue.

10:57am - 11:01am

The Stanford Microsurgical and Resident Training (SMaRT) Curriculum:
Training Using an "On-The-Go App"

John Paro; Thomas Satterwhite, MD; Wajhma Massoumi; Terry Spurling;
Gordon Lee

Institution where the work was prepared: Stanford Hospital and Clinics, Palo
Alto, CA, USA

INTRODUCTION

Surgical training is a complex and time-consuming endeavor. Residency programs are faced with hard-limits in the number of hours a trainee may spend in clinical duties. Therefore, it has become increasingly important to maximize learning and provide educational tools that can be utilized inside and outside of the hospital. This is particularly true in microsurgical education, where the stakes are high and there is little room for error.

METHODS

Our group created an online microsurgery curriculum with original content in an effort to improve the technical and cognitive skills of our residents. These materials were recently made available for free on-line at www.smartmicrosurgery.com. We took it one step further and translated our curriculum into a mobile platform: the Stanford Microsurgery and Resident Training (SMaRT) App. This novel application, currently available for iPhone®, provides access to independent learning modules in a portable and user-friendly medium. The "on-the-go app" is divided into the following topics: Preparation, Practice Models, Suturing, Intra-Operative Technique, and Study Questions. The intuitive interface allows seamless navigation throughout the app and offers an immersive multi-media experience. Our curriculum is implemented in a progressive fashion: after reviewing the essentials of microsurgery our residents then practice in the microsurgery lab and are videotaped for further review, scoring, and evaluation. We sought to validate this resource by comparing microsurgical performance in residents with and without access to the curriculum.

RESULTS

Fifteen residents, PGY1-6, performed standardized microsurgical tasks on two separate occasions. Their videotaped performance was graded by expert evaluators using a global rating scale. Residents who had access to the website were more likely to perform "microanastomoses" faster with an

average of 4.5-minute improvement compared with a 1.25-minute change among the control group. Additionally, junior residents who had access to our website showed a significant increase in their graded technical performance when compared to residents without access to the website. Results are similar when analyzing those with access to the SMaRT app, and Likert data suggest that residents favor the portable platform of the app.

CONCLUSION

The SMaRT microsurgical curriculum provides a self-directed, low-cost, and validated educational tool to ensure that residents are safe, competent and technically proficient when they first sit under the operative microscope. Our goal is to provide free access to our curriculum so that trainees from around the world, particularly in locations where microsurgery is not as well developed, can have readily available information and educational resources.

11:10am - 11:14am

A Paradigm Shift in Microsurgical Fellowship Training: Revisiting the Learning Curve

Johnson C. Lee, MD¹; Richard L. Agag, MD²; Oren Z. Lerman, MD³; Suhail Kanchwala, MD⁴; Hani Sbitany, MD⁵; Alexander Au, MD⁶; Melissa Poh, MD⁷; Neal S. Topham, MD⁸; Joseph M. Serletti, MD⁴; (1)Albany Medical Center, (2)Albany Medical College, (3)Lennox Hill Hospital, (4)University of Pennsylvania, (5)University of California, San Francisco, (6)Yale University School of Medicine, (7)University of Texas MD Anderson Cancer Center, (8)Fox Chase Cancer Center

Institution where the work was prepared: Albany Medical College, Albany, NY, USA

Introduction: A microsurgeon's success stems from the experience obtained during and after training. Prior studies have shown that early success rates after training are as low as 72% and rise to 96%-97% after sufficient experience has been gained. Experienced surgeons are at the peak of their learning curve with fine-tuned individual technique and minimal complications. With the increasing popularity of microsurgery and specialized high-volume training programs, we revisit the evolution of this learning curve by evaluating the outcomes of the first microsurgical cases from six microsurgery fellowship graduates.

Methods: A review was performed of the microsurgical caseload completed by six surgeons at the University of Pennsylvania/Fox Chase Cancer Center Microsurgery Fellowship and MD Anderson Clinical Fellowship in Microvascular Reconstructive Surgery from 2008-2011. A prospectively collected, retrospective review was performed of 300 cases comprised of the first 50 microsurgical cases from each surgeon's first year after training.

Results: During fellowship, an average of 131 cases in 18 major groups were performed by each fellow: muscle-sparing transverse rectus abdominus musculocutaneous (MSTRAM) (38.1%), anterolateral thigh (ALT)(18.7%), deep inferior epigastric perforator (DIEP)(16.1%), radial forearm (RF)(6.8%), fibula (6.5%), latissimus (3.4%), transverse upper gracilis (1.5%), gracilis (1.4%), gluteal artery perforator (GAP)(1.4%), vertical rectus abdominus musculocutaneous (1.3%), scapula (1.1%), superficial inferior epigastric artery perforator (SIEA) (1%), jejunum (0.5%), lateral arm (0.4%), serratus (0.4%), vastus lateralis (0.1%), deep circumflex iliac artery (0.1%), and other types (0.9%). The first 300 microsurgical procedures after training included MSTRAM (44%), DIEP (24.7%), ALT (14%), RF (5.7%), fibula (5.3%), SIEA (1.7%), latissimus (1.3%), rectus

(1%), GAP (1%), extremity replant (0.7%), and gracilis (0.3%). Overall complications occurred in 16.7% of patients: wound dehiscence (7.3%), infection (2.7%), fistula (2%), hematoma (1%), fat necrosis (1%), seroma (0.7%), pneumothorax (0.3%), bulge (0.3%), pneumonia (0.3%), pulmonary embolism (0.3%), deep vein thrombus (0.3%), and carotid blowout (0.3%). A second operation was required in 6.3%. Partial flap loss occurred in 1.7%. Total flap loss occurred in 3% for a success rate of 97%. There is no significant difference ($p>0.05$) when compared to the 96% combined success rate of 23 expert microsurgeons reported by Khouri et al.

Conclusion: With recent advancement in complexity, volume, and education in microsurgical training programs, we have shown that it is possible for current microsurgical fellowships to provide robust training with a sufficient amount of microsurgical exposure to produce outcomes comparable to those of experienced microsurgeons.

11:14am - 11:18am

A Novel Supermicrosurgery Training Model: The Chicken Thigh

Wei F. Chen, MD¹; Anas Eid¹; Takumi Yamamoto, MD²; Jerrod Keith¹; Grace Nimmons¹; Walter Thomas Lawrence¹; (1)University of Iowa Hospitals and Clinics, (2)University of Tokyo

Institution where the work was prepared: University of Iowa Hospitals and Clinics, Iowa City, IA, USA

Background

Supermicrosurgery, the technique of anastomosing vessels smaller than 0.8 mm, has been increasingly utilized in reconstructive surgery. It requires a more technically refined skill set than standard microsurgery. All currently available biologic training models involve the use of live rat. While providing high-fidelity training, the use of animals is expensive, inconvenient, and may be impractical for many seeking to develop this specialized skill. We have developed a non-living, biologic training model using chicken thighs to facilitate routine, cost-effective supermicrosurgery practice.

Methods: The ischiatic neurovascular bundle was identified in twenty chicken thighs, and dissected distally to the end of the specimen (Fig. 1). The vessel diameters were measured at several points along the artery and vein, and their respective branches. Vessels with diameters in the 0.3 mm to 0.8 mm range were selected for training for supermicrosurgical anastomosis.

Results: The branching pattern of the ischiatic artery and vein were anatomically consistent with intermediate and terminal secondary and tertiary branches consistently in the range of 0.3 to 0.8 mm. In all specimens, at least one 0.3 mm vessel could be identified through additional intramuscular dissection (Fig. 2). Supermicrosurgical anastomoses were successfully performed in all twenty specimens (Fig. 3).

Conclusions: This study introduces a novel, convenient, and economical model for supermicrosurgery utilizing easily obtained chicken thighs. The chicken thighs have an anatomically consistent vascular branching pattern (Fig. 4), and vessels of appropriate sizes for training can be easily identified and isolated. Surgeons looking to develop or refine supermicrosurgical skills may find this non-living, biologic model valuable.

Figure 1

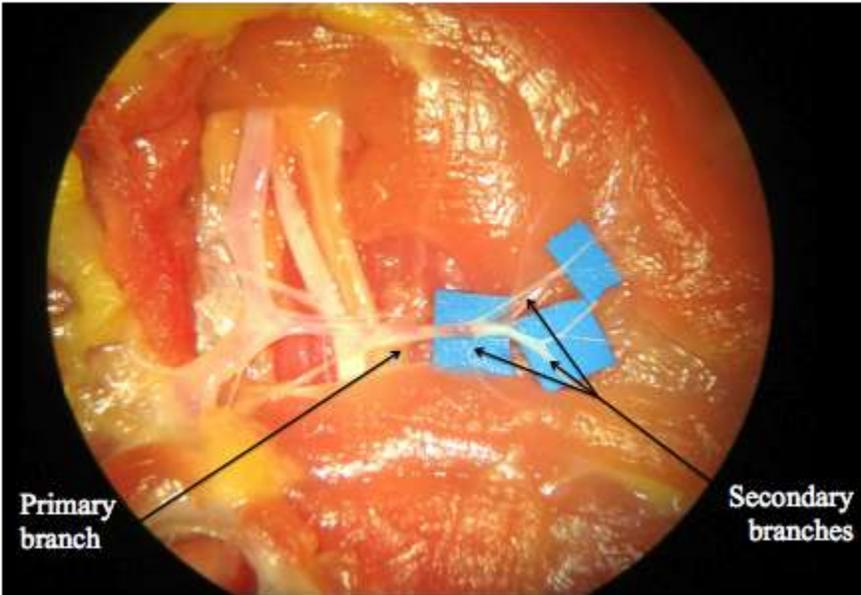


Figure 2

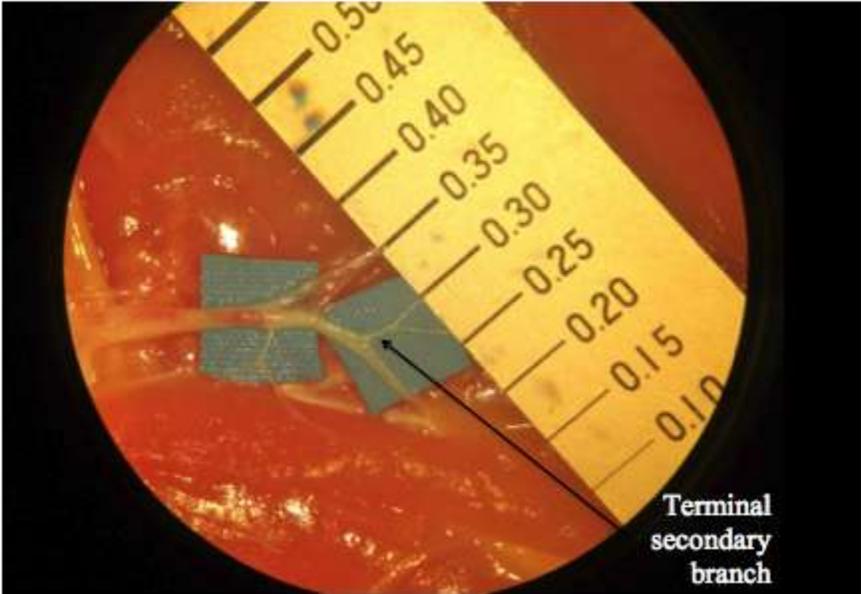


Figure 3

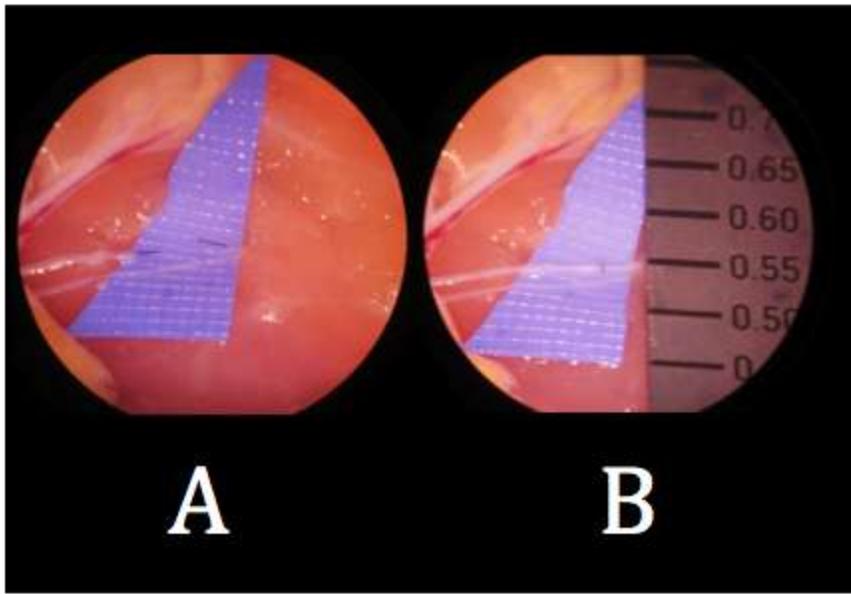
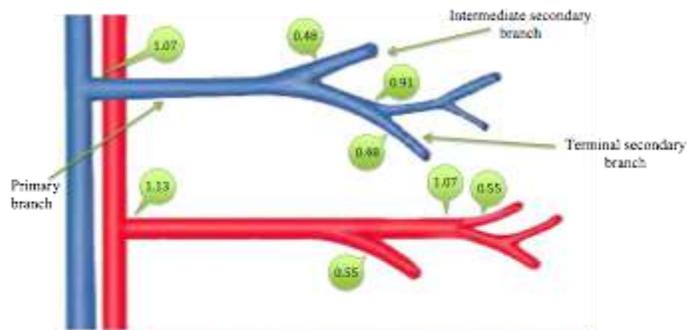


Figure 4



	Mean (mm)	Maximum (mm)	Minimum (mm)
Diameter at origin of PAB	1.13 [±0.23]	1.8	0.75
Diameter at origin of PVB	1.07 [±0.24]	1.6	0.6
Diameter at TBP of PAB	1.07 [±0.26]	1.3	0.45
Diameter at TBP of PVB	0.91 [±0.29]	1.6	0.45
Diameter at origin of SAB	0.55 [±0.18]	0.95	0.25
Diameter at origin of SVB	0.46 [±0.18]	1.1	0.25

PAB = primary arterial branch, PVB = primary venous branch, TBP = terminal branching point, SAB = secondary arterial branch, SVB = secondary venous branch.

11:18am - 11:22am

Assessing The Learning Curve of Robotic Assisted Microsurgical Skills
Taiba Alrasheed, MD; Jesse C. Selber, MD, MPH; Jun Liu, MA; Matthew M. Hanasono, MD, PhD; Charles E. Butler, MD; MD Anderson Cancer Center, University of Texas

Institution where the work was prepared: University of Texas, MD Anderson Cancer Center, Houston, TX, USA

Background:

Robotic surgery as a field has expanded rapidly over the past two decades and is being used widely among the surgical sub-specialties. Its applications in plastic surgery have emerged gradually over the last few years. One of those promising applications is robotic assisted microvascular anastomosis. The purpose of this study was to develop a validated assessment instrument, and then assess the learning curve for robotic-assisted microvascular anastomoses. The authors hypothesized that the subjects would demonstrate measurable improvement across multiple domains of performance as a result of robotic practice.

Methods:

In part 1, an assessment instrument called SARMS (structured assessment of robotic microsurgical skills) which combines the previously validated SAMS (Structured Assessment of Microsurgical Skills) with validated skill domains in robotic surgery was tested. Four blinded expert evaluators graded 6 recorded videos and inter-rater reliability was determined. In part 2, a cohort of five microsurgery fellows and five faculty members each participant performed five robotic-assisted microanastomotic sessions. All 50 sessions were subjected to blind evaluation using SARMS. Primary outcomes were changes in time required to complete an anastomosis for each participant over the 5 sessions, and trends in SARMS scores for each skill area for each participant over the 5 sessions.

Result:

Inter-rater reliability for the SARMS instrument was excellent for all skill areas rated among the four expert, blinded evaluators, demonstrated by Cronback alpha scores greater than 0.9 in each category. All skill areas and overall performance improved significantly for each participant over the five robotic-assisted microanastomosis sessions, and operative time decreased over the study for all participants. The results showed an initial steep

technical skill acquisition followed by more gradual improvement, and a steady decrease in operative times that ranged between 1.2 hours and 9 minutes.

Conclusion:

The Structured Assessment of Robotic Microsurgery Skills is a valid instrument for assessing microsurgical skill, with good inter-rater reliability. Subjects at all levels of training from very little microvascular experience to microsurgery experts gained proficiency over the course of 5 sessions.

11:22am - 11:26am

An algorithm for free flap reexploration – tactics to improve flap salvage
Guilherme Cardinali Barreiro, MD¹; Rachel Baptista, MD¹; Daniel Marchi dos Anjos²; Kiril Endo Kasai¹; Marcus Castro Ferreira¹; (1)Clinics Hospital Of the University of São Paulo, (2)University of Sao Paulo
Institution where the work was prepared: University of Sao Paulo, Sao Paulo, , Brazil

Introduction

Microsurgical flaps reexploration is challenging and stressful to the microsurgeon. Flap salvage is possible in 28 to 90% if the vascular compromise is detected early.(1-2). There is no consensus on the procedures once flap suffering has been diagnosed, and scattered data of few centers worldwide have been published. We evaluated 34 reexplorations and suggest a safety algorithm in microsurgery and flap reexploration.

Method

Retrospective analysis of prospectively collected data from 34 consecutive microsurgical flap reexplorations from June 2010 to July 2011, for oncologic reconstructions, including breast, head and neck, trunk and limbs. Flaps were clinically assessed for viability every 3 hours. Patients received 300 mg of aspirin and profilatic dose subcutaneous heparin. Reexplorations were performed by a single surgical team. Tactics and techniques were based on published successful procedures. Fisherxs Exact test was used.

Results

Venous impairment was the main cause of reexploration. Fifteen out of the 24 congested flaps were saved (62,5%) and only 3 out of 10 ischaemic flaps (30%). For venous thrombosis, reexplorations before 12 hours after the flap transfer; single venous anastomosis in the primary surgery; and changing the receptor vein in the reoperation were independently statistically significant in flap salvage ($p < 0,01$). The use of thrombolytics (streptokinase 3000 u/mL) prevented venous and arterial flap losses ($p < 0,05$), as well as the use of vein grafts ($p = 0,01$). We built an algorithm for safe techniques in flap salvage. Mean follow up was 12 months.

Discussion

Venous congestion is the main cause of flap suffering but arterial thrombosis has the least chance of salvation. In spite of the inter and intragroup variations and the retrospective analysis of the data, this study suggests that precise planning and specific reexploration tactics may be useful to improve free flap salvage. This could be achieved with reexploration before 12 hours of post op; changing the receptor pedicle and the use of single venous anastomosis, thrombolytics and vein grafts. Clinical and hematologic compensation are also key in flap salvage. An algorithm was developed to guide reexploration maneuvers.

Conclusion

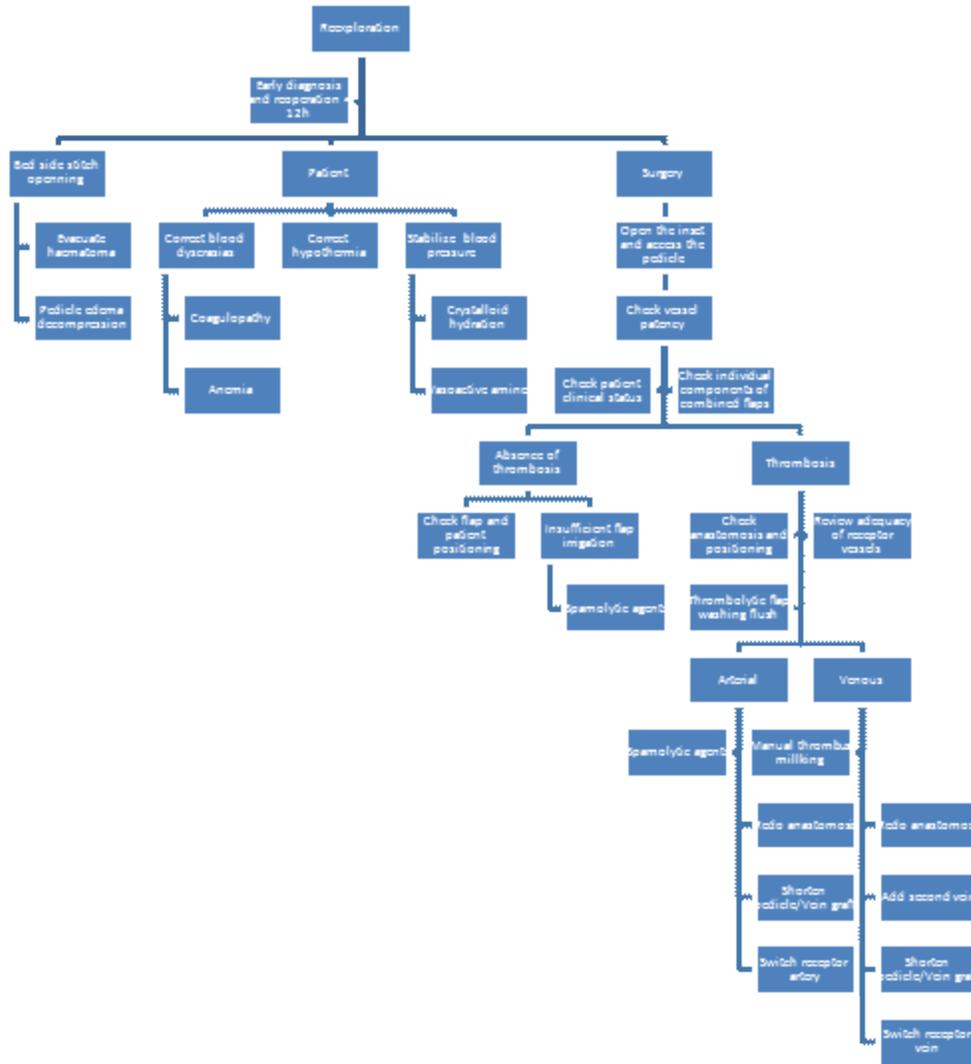
Free flap reexploration requires quick and oriented response. This algorithm provides some successful techniques in flap salvage surgery and patient care.

Figures



Figure 1: Retrograde thrombolytic flush with streptokinase 3000 u/mL in a congested flap.

Figure 2: Algorithm for free flap vascular compromise reexploration



11:35am - 11:39am

Intraoperative Transfusions And Postoperative Outcomes In Free Flap Reconstructive Surgery: A Critical Analysis Of 673 Patients From The ACS-NSQIP Database

Mark M. Melendez, MD, MBA¹; Pablo Baltodano, MD¹; Jose Flores, MPH²; Karim Sarhane, MD, MSc¹; Francis Abreu, BSc²; Carisa M. Cooney, MPH¹; Gedge D. Rosson, MD¹; (1)The Johns Hopkins Hospital, (2)Johns Hopkins Bloomberg School of Public Health

Institution where the work was prepared: The Johns Hopkins Hospital, Baltimore, MD, USA

PURPOSE:

Our group previously established that specific blood related comorbidities such as preoperative anemia are independently associated with adverse outcomes in immediate breast reconstructive surgery. However, there remains a paucity of information on the frequency and impact of blood transfusions during free flap reconstruction. We aimed to assess the effect of intraoperative transfusions on 30-day postoperative morbidity in patients undergoing microvascular free flap reconstructive surgery.

METHODS: Patients who underwent any type of microvascular free flap reconstructive surgery from 2005 to 2009 were identified from the American College of Surgeons National Surgical Quality Improvement Program (a prospective, risk adjusted, outcomes-based registry). De-identified data were obtained for 30-day postoperative morbidity, as well as demographics, preoperative and perioperative risk factors. Specific morbidity variables included cardiac, respiratory, neurological, urinary tract, flap, wound and venous thromboembolism outcomes. Logistic regression was used to assess the crude and adjusted effect of intraoperative transfusions (defined as a receiving > 1 unit of packed red blood cells during surgery) on 2 primary outcomes: 1) combined postoperative morbidity and 2) return to the operating room.

RESULTS: The study population included 673 patients, of whom 90 (13.37%) received intraoperative transfusions. Of these, 44.4% (n=40) had morbidity. In comparison, only 22.30% (130 of 583) non-transfused patients experienced morbid events. Crude odds ratios predicting 30-day postoperative morbidity were significantly higher in transfused patients than in those not receiving transfusions, OR_unadjusted = 1.49 (p<0.0001). This

trend prevailed after extensive adjustment for clinically and statistically relevant confounders, yielding a significant OR_{adjusted} = 1.32 (p<0.05) for 30-day morbidity. Furthermore, transfusion was significantly associated with higher return to the operating room: transfused patients were 1.45 times more likely to return to the operating room, compared to non-transfused patients (OR_{adjusted}=1.45; p<0.001) even after extensive adjustment for other perioperative risk factors.

CONCLUSION: These results represent strong evidence of an adverse effect of intraoperative transfusions on the postoperative outcomes of patients undergoing free flap reconstructive surgery. Preventing transfusions may lower the risk of morbidity after free flap surgery, but when transfusion during surgery is indicated and unavoidable, enhanced post-operative surveillance is highly recommended.

Table 1. Logistic regression models predicting 30-day postoperative morbidity and return to operating room rates after microvascular free tissue transfer.

Transfusion Status	Odds Ratios predicting composite morbidity			
	Univariable Regression (Unadjusted Odds Ratios)		Multivariable Regression [§] (Adjusted Odds Ratios)	
	OR	95% C.I.	OR	95% C.I.
Not Transfused	<i>Referent</i>		<i>Referent</i>	
Transfused	1.50***	1.27 to 1.77	1.32*	1.06 to 1.64
	Odds Ratios predicting return to the operating room			
	Univariable Regression (Unadjusted Odds Ratios)		Multivariable Regression [§] (Adjusted Odds Ratios)	
	OR	95% C.I.	OR	95% C.I.
	Not Transfused	<i>Referent</i>		<i>Referent</i>
Transfused	1.37**	1.17 to 1.61	1.45**	1.16 to 1.81

*p<0.05, **p<0.001, ***p<0.0001

Multivariable analysis after adjusting extensively for the following variables: 1) Age (continuous), 2) Preoperative Hematocrit (continuous), 3) Smoking status (dichotomous), 4) Perioperative Transfusions (dichotomous), 5) Work relative value unit (continuous), 6) Operation Year (categorical), 7) Inpatient Status (dichotomous), 8) Type of Anesthetic method (categorical), 9) American Society of Anesthesiologist classification (categorical), 10) Previous wound infection (dichotomous), 11) Previous cardiovascular morbidity (categorical), 12) Previous respiratory morbidity (categorical), 13) Previous renal morbidity (categorical), 14) Previous hematology-oncology morbidity (categorical), 15) Diabetic status (dichotomous), 16) Alcohol consumption > 2 drinks/day in 2 weeks before admission (dichotomous), 17) Steroid use for chronic condition (dichotomous), 18) History of previous operation within 30 days of the surgery (dichotomous).

11:39am - 11:43am

Indications and Outcomes of Prophylactic and Therapeutic Extracranial-to-Intracranial Arterial Bypass for Cerebral Revascularization

Ming-Huei Cheng; Emre Gazyakan; Chung-Kun Tsao, MD

Institution where the work was prepared: Chang Gung Memorial Hospital, Taoyuan, Taiwan

Introduction: The purpose of extracranial to intracranial (EC/IC) bypass surgery is to treat cerebral ischemia or to divert the flow in complex lesions by augmenting cerebral blood flow. EC/IC bypass is a demanding procedure. By means of advanced microsurgical technique the procedure can be performed with high success rate. This study was to investigate outcome of the cerebral revascularization with EC/IC bypass.

Materials and Methods: Between January 2004 and December 2011, 28 patients underwent EC/IC bypass. Indications were intracranial aneurysms (six cases), vessel occlusion (nine cases), cranial base tumor (two cases), and Moyamoya disease (two cases). The outcome was reviewed in the rate of bypass patency, postoperative stroke, neurological deterioration, and surgical related death. A comprehensive follow up was available for a mean of 26.8 months.

Results: The bypass was performed in twenty-two cases between the superficial temporal artery (STA) and the middle cerebral artery (MCA), in five cases between the external carotid and the MCA and in one case between the occipital artery and the posterior inferior cerebral artery. In 42.9 percent of these cases the bypass was performed by interposing a reverse great saphenous vein graft (SVG). Postoperative cerebral angiography demonstrated complete patency rate of 96.4 percent. There was no incident of postoperative stroke, neurological deterioration and surgical related death respectively.

Discussion: The EC/IC bypass is able to augment cerebral blood flow. The STA is the preferred donor vessel alone or in conjunction with SVG providing excellent results in bypass patency and postoperative morbidity. By using microsurgical techniques a low complication rate can be achieved thus improving the outcomes in complex neurosurgical cases.

11:43am - 11:47am

Endoscopically Assisted Medial Sural Artery Perforator Flap Harvest
Cheng-Hung Lin; Nidal Deek; Chung-Chen Hsu; Yu-Te Lin; Chih-Hung Lin
Institution where the work was prepared: Chang Gung Memorial Hospital,
Taipei, Taiwan

Background: The medial sural artery perforator flap is a versatile flap in reconstructive microsurgery. It can provide thin soft-tissue coverage, and allow single-stage composite tissue reconstruction. However, the variable location and tricky course of its perforators result in increased risk of perforator injury, especially when a small or split flap is designed. Conventional methods that rely on wide exposure usually lead to increased donor site morbidity and decreased patients' satisfaction. In an attempt to resolve this problem, the authors used the endoscope to assist medial sural artery perforator flap harvest.

Patients and Methods: From June to December of 2012, 11 patients underwent medial sural artery perforator flap reconstruction at various recipient sites, using an endoscopically assisted harvest technique. Through a 1-cm incision at the anterior border of the medial gastrocnemius muscle, the endoscope was used to identify all suitable perforators in the subfascial plane. Flaps were designed based on endoscopic findings and transferred to reconstruct defects in head (n=1), hand/wrist (n=7), foot (n=2) and leg (n=1). Defect dimensions and skin paddle dimensions, number of perforators, donor site closure methods, and endoscopically-assisted surgery time were all recorded.

Results: No perforator injury occurred during identification process. At least, one sizeable perforator ($\geq 1\text{mm}$) was found (range, 1 to 3). Only 53.8% (7/13) of the perforators are at the location identified by the hand-held Doppler ultrasound. One flap was pedicled and the rest were free. Of the free flaps, one was a split flap, and all flaps survived. None of the cases needed conversion to the conventional method. In all cases, flap surface area matched the reconstructed defect, and no further tailoring was required. Primary or delayed primary wound closures were achieved in 10 patients while skin graft was needed in the case receiving a pedicled flap. The mean time to detect perforators was 9 minutes (9 ± 4 min).

Conclusion: Endoscopically assisted medial sural artery perforator flap harvest is a reliable and useful technique. By the use of endoscope, perforators are identified safely in higher magnification and enhanced vision. With current refinement, the medial sural artery perforator flaps can be harvested with precision and flexibility to increase surgeon's confidence, minimize donor site morbidity, and maximize patient's satisfaction.

11:47am - 11:51am

A New Vascularized Cervical Lymph Node Transplantation Model: an Anatomic Study in Rat

Safak Uygur, MD; Can Ozturk, MD; Mehmet Bozkurt, MD; Grzegorz Kwiecien, MD; Maria Madajka, PhD; Maria Siemionow, MD, PhD; Cleveland Clinic

Institution where the work was prepared: Cleveland Clinic, Cleveland, OH, USA

Introduction: Vascularized lymph node transfer is of a high interest for the treatment of lymphedema. Currently, there are few experimental small animal models of vascularized lymph node transplantation. In this study, our aim was to describe a new vascularized cervical lymph node transplantation model in rat.

Material and methods: Ten male Sprague-Dawley rats weighing 200 to 250 g were used in this study. The anatomical features of the neck lymph nodes in rats were explored. Anatomic neck dissections were performed and lymph node flaps were harvested. The common carotid artery and external jugular vein were used as the vascular pedicles of the lymph node flap. The methylene blue dye was injected into the arterial pedicle. Lymph nodes were identified and their structure was confirmed by histological evaluation. Laser-assisted indocyanine green angiography was used to confirm perfusion of the lymph node flap.

Results: An adequate perfusion was observed in the lymph node flap. The dye disseminated evenly within lymph nodes, which indicating that the flap had a well- established vascular network and an adequate blood supply. Macroscopically, perfusion of five to six lymph nodes was observed. Histological examination of tissue samples confirmed well defined lymph nodes. Following indocyanine green administration, fluorescence was observed throughout the lymph node flap as well as within venous pedicle of the flap.

Conclusion: To the best of our knowledge, this is the first report describing vascularized lymph node flap in head and neck region of the rat. Our lymph node flap preparation technique confirmed 5-6 lymph nodes within the flap. The presented lymph node flap can be applied to transplantation studies, lymphedema studies as well as to studies on immunological mechanism of tolerance and rejection.