7:17 – 7:25 am

PRESENTER: Cort McCaughey

TITLE: A Concordance Study Comparing Histology Reports from Permanent Sections and Frozen Sections for Staged Surgical Excisions for Lentigo Maligna

AUTHORS: Cort McCaughey[3]; Mark Hyde, MMS, PA-C[1]; Scott Florell, MD[2]; Anneli Bowen, MD[2]; Glen M. Bowen, MD[1, 2]

INSTITUTIONS: 1. Melanoma and Cutaneous Oncology, Huntsman Cancer Institute at the University of Utah, Salt Lake City, UT, United States 2. Department of Dermatology, University of Utah, Salt Lake City, UT, United States 3. School of Medicine, University of Utah, Salt Lake City, UT, United States

Purpose: Staged excisions for lentigo maligna (LM) and lentigo maligna melanoma (LMM) are generally done with either overnight rush permanent sections or with frozen sections frequently augmented with immunostaining such as MART-1/Melan-A. Proponents of permanent sections argue that frozen sections lack the ability to capture cellular detail to the degree that can be rendered with permanent sections. To date there are no published studies comparing the two techniques within the same tumors. We sought to ascertain whether tumor margins determined at the time of surgery using frozen tissue immunostained with a melanoma-specific antibody was equivalent to the accuracy of standard overnight permanent sections in the detection of margins of LM/LMM.

Design: Forty patients with biopsy proven LM/LMM were prospectively enrolled in the study. Each patient underwent a staged excision beginning with two millimeter margins if they had been previously treated with imiquimod 5% cream and five millimeter margins if they had not been pretreated beyond the visible tumor observed with a Wood's lamp. The excised tumor was divided into sixteen radial pie-wedge sections, with odd sections submitted for frozen sections, and opposing even sections submitted for permanent sections. Care was taken to make sure cuts were made from opposing faces of the tissue to optimize the observation of the same tissue area with both techniques. A negative control from sun-damaged skin was taken and stained with Melan-A in all cases to give a picture of background melanocytic hyperplasia in an uninvolved site. Two dermatopathologists interpreted the permanent sections while the Mohs surgeon interpreted the frozen sections of hematoxylin-eosin (H and E) staining as well as Melan-A immunostaining. The results were recorded with each group blinded to the others' interpretation. Once the tumor maps were completed, the final maps were compared and concordance rates were calculated. Concordance rates were based on complete concordance (maps and recommendations identical), incomplete concordance (map disagreement but surgical recommendations identical), and complete discordance (map and surgical recommendation disagreement).

Summary: Of the forty patients enrolled in the study 25/40 (62.5%) were completely concordant meaning that either no residual tumor was seen or residual tumor was identified in the same locales between the two parties with a 95% confidence interval of 45.8%-76.8%. 12/40 (30%) patients were incompletely concordant meaning that there was incomplete agreement between the two maps but without the consequence of leading to a differing surgical/treatment recommendation with a 95% confidence interval of 17.1%-46.7%. 3/40 (7.5%) patients were completely discordant as there was disagreement between the two maps and therefore led to differing clinical decisions with a 95% confidence interval of 2.0%-21.5%. Of the 3 cases of complete disconcordance, 2 (5%) were thought to be over-read by the Mohs surgeon when comparing immunostains with permanent sections and additional unnecessary surgical stages were taken and 1 (2.5%) was under-read by the Mohs surgeon and required the patient to have additional tissue excised. This under-read case had a nidus of invasion that on frozen immunostaining was interpreted as a compound nevus by both the Mohs surgeon and a consulted dermatopathologist but was called invasive melanoma by the two dermatopathologists in this study who viewed the permanent sections of that specimen. This failure to distinguish between invasive melanoma and a benign compound nevus was attributed to the lack of cellular detail in the frozen sections making the theques more banal in appearance than was more obvious with permanent sections.

Conclusion: The inter-observer concordance rates between the Mohs surgeon viewing frozen sections with H and E and immunostaining with Melan-A and two dermatopathologists looking at permanent sections with H and E compares favorably with prior published studies of inter-observer concordance rates between dermatologists viewing permanent sections for LM/LMM. Permanent sections were superior in quality with regards to cellular detail that could not be reproduced with frozen sections. Frozen sections stained with Melan-A provide a good method of evaluating the quantity and pattern of melanocyte distribution in LM/LMM but in specific circumstances, the inability to assess cellular detail with frozen sections can present a serious pitfall. In such cases it seems that the Mohs surgeon is well served to error on the side of caution, especially with regards to potential invasion.

7:25 – 7:33 am

PRESENTER: Kavitha K. Reddy, MD

TITLE: Cost-effectiveness of Non-melanoma Skin Cancers Treated with Mohs Micrographic Surgery versus Traditional Surgical Excision with Permanent Sections and Excision with Intraoperative Frozen Sections

AUTHORS: Kavitha K. Reddy, MD[1]; Emily P. Tierney, MD[1]; Alexa B. Kimball, MD, MPH[2]; C. William Hanke, MD[3]

INSTITUTIONS: 1. Dermatology, Boston University School of Medicine, Boston, MA, United States 2. Dermatology, Harvard Medical School, Boston, MA, United States 3. Laser and Skin Surgery Center of Indiana, Carmel, IN, United States

Purpose: Analysis of the existing literature on efficacy of Mohs micrographic surgery (MMS) relative to surgical excision confirms the value of MMS in obtaining both the highest initial cure rates and lowest recurrence rates. In the current health care climate, cost-effective treatment of non-melanoma skin cancer is an increasingly important issue. Identification of treatments that provide the greatest reduction in morbidity and mortality and maximize outcomes with reasonable associated incremental cost is of benefit to patients. We set out to compare the incremental cost-effectiveness ratio (ICER) of Mohs micrographic surgery (MMS) with traditional surgical excision (TSE) and excision with intra-operative frozen sections (EIOFS) in the treatment of non-melanoma skin cancers (NMSC).

Design: Cost-effectiveness analysis was performed for treatment of facial non-melanoma skin cancers (primary basal cell carcinoma (BCC) < 2 cm, primary BCC > 4 cm, recurrent BCC, primary squamous cell carcinoma (SCC) < 2 cm, primary SCC > 4 cm, high-risk SCC (ear), and recurrent SCC), with MMS, TSE, or EIOFS. For MMS and EIOFS, repair modalities of complex linear closure (CLC), adjacent tissue transfer (ATT), full thickness skin graft (FTSG), island pedicle (IP), and granulation were analyzed. For TSE, complex linear closure only was analyzed, consistent with standard practice. Costs were calculated utilizing CPT codes and reimbursement data from the American Medical Association 2009 RUC Database. The multiple surgery reduction rule was applied. Effectiveness was defined by 5-year cure rate as derived from meta-analysis by our group of Pubmed literature reviewing over 250 studies reporting recurrence rates of non-melanoma skin cancer after Mohs micrographic surgery and excision. Incremental cost-effectiveness ratios (ICERs) were then calculated from the cost-effectiveness data according to methodology described by the Centers for Disease Control.

Summary: When comparing tumor removal with MMS to TSE with permanent section margins, incremental costs of MMS associated with one percentage point reduction in recurrence rate (ICERs) were: BCC < 2 cm $3.28 per additional 1% recurrence rate reduction, BCC > 4 cm $44.15, recurrent BCC $1.11, SCC < 2 cm $2.62, SCC > 4 cm $15.16, high-risk SCC $0.99, and for recurrent SCC $0.99. When comparing tumor removal with MMS to TSE with permanent section margins, incremental costs of MMS associated with avoidance of one tumor recurrence (ICERs) were: BCC < 2 cm $328 per recurrent tumor avoided, For BCC > 4 cm $4415, recurrent BCC $111, SCC < 2 cm $262, SCC > 4 cm $1516, high-risk SCC $99, and for recurrent SCC $99. When MMS was compared to excision with intra-operative frozen sections (EIOFS), MMS was lower in cost for all tumor types and sizes, given the higher costs for ambulatory surgery center fees and more costly pathology fees associated with EIOFS.

When the cost of repair was added to the cost of tumor removal, the incremental cost of MMS became larger with flap and graft repairs. However, for large and high risk tumors, the increased effectiveness of MMS relative to excision lead to lower incremental cost per recurrent tumor avoided for all repair modalities.

Conclusion: Analysis of the existing literature on efficacy of MMS relative to surgical excision confirms the value of MMS in obtaining both the highest initial cure rates and lowest recurrence rates. We found MMS to be cost effective for tumor removal, where the incremental costs of MMS associated with one percentage point reduction in recurrence rate ranged from $0.99 to $44. Future cost effectiveness analysis demonstrating the outcomes based efficiency of MMS are critical in the current health care climate with heightened sensitivity to financial pressures and declining reimbursement rates which challenge our ability to provide patients with the most optimal treatment for NMSC.

7:33 – 7:41 am

PRESENTER: Natalie M. Curcio, MD, MPH

TITLE: Mortality Due to Skin Cancer after First and Second Renal Transplants

AUTHORS: Natalie M. Curcio, MD, MPH[1]; Li Wang, MS[2]; Thomas Stasko, MD[1]

INSTITUTIONS: 1. Dermatology, Vanderbilt University, Nashville, TN, United States 2. Biostatistics, Vanderbilt University, Nashville, TN, United States

Purpose: In the renal transplant population cutaneous malignancies are more frequent, more aggressive, and carry an increased risk of death. Dermatologists are frequently asked for an opinion as to the advisability of a second renal transplant in a graft recipient with a history of skin cancer and a failing transplant. The purpose of this study was to determine whether the intense immunosuppression required after a second renal transplant increased the risk of death from cutaneous malignancy vs. the risk after only one transplant. We also intended to identify what types of skin cancer most often lead to mortality in the renal transplant population and to determine how long after transplant death occurs.

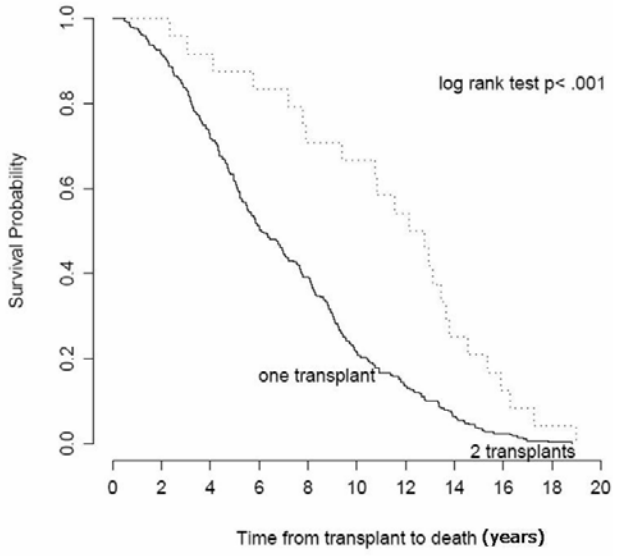


Figure 1: Kaplan-Meier estimate for patients who died from skin cancer (one transplant vs. two transplants).

Types of Skin Cancer	Cases (N)	Percent (%)
Squamous Cell Carcinoma	120	38
Melanoma	90	29
Merkel Cell Carcinoma	42	13
Skin Cancer	24	7.6
Head and Neck Cancer	23	7.3
Sarcoma	5	1.6
Anogenital Cancer	4	1.3
Basal Cell Carcinoma	3	0.95
Kaposi Sarcoma	2	0.63
Spindle Cell Carcinoma	2	0.63
TOTAL	315	100

Table 1: Skin Cancer Causes of Death by Incidence

Design: We conducted a retrospective case-series using the United Network for Organ Sharing (UNOS) database. Patients, both living and deceased, who received only renal transplants from 1987 to 2008, were included in the study. We used primarily descriptive statistics to analyze patient demographics, geographical distribution, causes of death due to malignancy and skin cancer, and time to death. A Kaplan-Meier estimate and Cox proportional hazards model were used to analyze survival.

Summary: Between October 1, 1987 and May 16, 2008, there were 255,115 patients who underwent renal transplants in the United States, with 231,418 patients receiving kidney-only transplants. Of these patients, 214,141 received a single renal transplant and 17,227 received two renal transplants. The median age at first transplant for patient receiving one transplant is 47 years vs. 33 years for patients with two transplants. For both groups, approximately 60% of patients were male and nearly 90% were Caucasian.

During the period analyzed, 19.4% of patients died. Of the 44,849 deaths, 2,909 were due to malignancy and 315 of those were due to skin cancer. The three leading causes of death from cutaneous malignancy were squamous cell carcinoma, melanoma, and Merkel cell carcinoma, respectively. See Table 1 for the full list of skin cancers contributing to death after transplant and their incidences. The median age at first transplant of patients who died from skin cancer was 54 years for patients with one transplant compared to 47.5 years for those with 2 transplants. Males comprised 80% of patients with one transplant who died from skin cancer, but only 67% of those with two transplants. Caucasians comprised 98% and 100% of the patients with one and two transplants, respectively.

When analyzing time to death for patients who died of skin cancer, patients who underwent one renal transplant died an average of 7 years after transplantation. Patients who underwent two renal transplants died an average of 11.3 years after their first transplant and 5.5 years after their second transplant. Figure 1 depicts a Kaplan-Meier estimate of time to death for patients with one vs. two transplants who died of skin cancer (log rank test, $p < 0.001$). According to the Cox proportional hazards model, the estimated risk of death in patients with one transplant is 1.94 times that of patients with two transplants ($p = 0.003$).

Conclusion: In the UNOS database population there is no significant increase in skin cancer mortality after a second renal transplant. However, it is likely that the absolute incidence of skin cancer death among the renal transplant population is underrepresented due to under-reporting and a lack of standard terminology in the database.

7:41 – 7:49 am

PRESENTER: Howard W. Rogers, MD, PhD

TITLE: Incidence Estimate of Non-melanoma Skin Cancer in the United States, 2006

AUTHORS: Howard W. Rogers, MD, PhD[1]; Martin Weinstock, MD, PhD[2]; Ashlynne Harris, MSIV[2]; Michael Hinckley, MD[3]; Steven Feldman, MD, PhD[3]; Alan B. Fleischer, Jr., MD[3]; Brett M. Coldiron, MD, FACP[4]

INSTITUTIONS: 1. Advanced Dermatology, Norwich, CT, United States 2. Brown Medical School, Providence, RI, United States 3. Wake Forest University School of Medicine, Winston-Salem, NC, United States 4. University of Cincinnati Hospital, Cincinnati, OH, United States

Purpose: To estimate the incidence of non-melanoma skin cancer in the United States population in 2006.

Design: This is a cross sectional study employing multiple US government data sets including the Centers for Medicare and Medicaid Services Fee-for-Service Physicians Claims databases to calculate totals of skin cancer procedures performed for Medicare beneficiaries in 1992 and from 1996 to 2006 and related parameters. The National Ambulatory Medical Care Service database was used to estimate non-melanoma skin cancer related office visits. We combined these to estimate totals of new skin cancer diagnoses and affected individuals in the overall US population.

Summary: The total number of procedures for skin cancer in the Medicare fee-for-service population increased by 77% from 1,158,298 in 1992 to 2,048,517 in 2006. The age-adjusted procedure rate per year per 100,000 beneficiaries increased from 3514 in 1992 to 6075 in 2006. From 2002 to 2006 (years in which the databases allow procedure linkage to patient demographics and diagnoses), the number of procedures for non-melanoma skin cancer in the Medicare population increased by 16%. In this period, the number of procedures per affected patient increased by 1.5%, and the number of persons with at least one procedure increased by 14.3%. We estimate the total number of non-melanoma skin cancers in the US population in 2006 at 3,507,069 and the total number of persons in the US treated for NMSC at 2,152,500.

Conclusion: The number of skin cancers in Medicare beneficiaries increased dramatically over the years 1992 to 2006, due mainly to an increase in the number

of affected individuals. Using nationally representative databases, we provide evidence of much higher overall totals of skin cancer diagnoses and patients in the United States population than previous estimates. These data give the most complete evaluation to date of the under recognized epidemic of skin cancer in the United States.

7:49 – 7:57 am

PRESENTER: Joshua Spanogle, MD

TITLE: Risk of Second Primary Malignancies Following Cutaneous Melanoma Diagnosis: A Population-based Study

AUTHORS: Joshua Spanogle, MD[1, 2]; Christina Clarke, PhD, MPH[3]; Sarah Aroner[3]; Susan M. Swetter, MD[1, 4]

INSTITUTIONS: 1. Dermatology, Stanford University Medical Center, Stanford, CA, United States 2. Dermatology, Mayo Clinic, Rochester, MN, United States 3. Northern California Cancer Center, Fremont, CA, United States 4. Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, United States

Purpose: To describe incidence patterns of second primary malignancies (SPMs) occurring after cutaneous melanoma (CM).

Design: Using the Surveillance, Epidemiology and End Results (SEER) program data from 1973-2003, we calculated incidence rates and relative risks for the development of 65 different SPMs occurring in 16,591 CM survivors and over 1.3 million person-years of observation.

Summary: Characteristics for all patients with CM and for those who had at least one SPM are shown in Table 1. Compared with the general population, CM survivors had a 32% higher risk of developing any SPM and demonstrated significantly elevated risks for 13 cancers: melanoma of the skin (SIR 8.99), soft tissue (SIR 2.80), melanoma of the eye and orbit (SIR 2.64), non-epithelial skin (SIR 2.31), salivary gland (SIR 2.18), bone and joint (SIR 1.70), thyroid (SIR 1.90), kidney (SIR 1.29), chronic lymphocytic leukemia (SIR 1.29), brain and nervous system (SIR 1.31), non-Hodgkin lymphoma (SIR 1.25), prostate (SIR 1.13), and female breast (SIR 1.07) (Table 2; only statistically significant data shown). Risks of second primary melanoma of the skin, melanoma of the eye and orbit, and cancers of the prostate, soft tissue, salivary gland, bone and joint were elevated throughout the study period, implying no surveillance bias (Table 2).

Conclusion: The increased risks for developing particular SPMs after CM may be explained by surveillance bias or shared risk factors. However, these probably do not explain the increased risks observed for prostate, soft tissue, salivary gland, and bone and joint cancers years after CM diagnosis. Further investigation into genetic or environmental commonalities between CM and these cancers is warranted.

	First Primary CM		SPM After CM	
Characteristic	No.	%	No.	%
Total Patients	151,996	100	16,591	100
Sex				
Women	69,853	46.0	6,107	36.8
Men	82,143	54.0	10,484	63.2
Age at Diagnosis				
<56 y	79,804	52.5	5,256	31.7
56-65 y	27,658	18.2	4,188	25.2
66-74 y	24,780	16.3	4,622	27.9
≥75 y	19,754	13.0	2,525	15.2

Table 1: Distribution of patients by first cutaneous melanoma (CM) and second primary malignancy (SPM) diagnosis.

Site	All study period		2-11 mo		12-59 mo		12-59 mo		□120 mo	
	Observed Cases	O/E ratio	Observed Cases	O/E ratio	Observed Cases	O/E ratio	Observed Cases	O/E ratio	Observed Cases	O/E ratio
All sites	16,591	**1.32**	2135	**1.69**	6382	**1.40**	4205	**1.23**	3869	**1.15**
Salivary gland	67	**2.18**	5	1.59	29	**2.58**	17	**2.03**	16	**1.99**
Pharynx	27	**0.61**	4	0.81	7	**0.40**	11	0.89	5	0.45
Hypopharynx	14	**0.54**	2	0.72	3	**0.31**	6	0.86	3	0.49
Other oral cavity	2	**0.21**	0	0.00	2	0.54	0	0.00	0	0.00
Esophagus	102	**0.78**	12	0.91	40	0.85	30	0.86	20	**0.59**
Liver	72	**0.77**	9	0.90	28	0.77	19	0.69	16	**0.58**
Larynx	72	**0.58**	10	0.72	34	**0.70**	17	**0.49**	11	**0.36**
Lung and other respiratory	1572	**0.83**	167	0.86	565	**0.81**	430	**0.82**	410	**0.79**
Bones and joints	21	**1.70**	1	0.73	7	1.45	5	1.45	8	**2.56**
Soft tissue (including heart)	158	**2.80**	16	**2.70**	59	**2.76**	42	**2.64**	41	**2.66**
Skin-melanoma	3923	**8.99**	672	**16.02**	1561	**10.16**	897	**7.73**	793	**7.06**
Other non-epithelial skin	95	**2.31**	15	**3.67**	32	**2.14**	31	**2.69**	17	1.44
Female breast	1565	**1.07**	146	1.13	560	**1.15**	428	1.08	431	1.01
Cervix uteri	40	**0.57**	4	0.48	18	**0.58**	9	**0.39**	9	**0.44**
Prostate	2870	**1.13**	322	**1.27**	1140	**1.25**	721	**1.08**	687	**1.09**
Kidney	359	**1.29**	61	**2.21**	129	**1.28**	84	1.11	85	1.14
Eye and orbit-melanoma	45	**2.64**	7	**4.07**	17	**2.74**	8	1.74	13	**2.93**
Brain and other nervous system	186	**1.31**	21	1.45	76	**1.46**	46	1.20	43	1.21
Thyroid	217	**1.90**	45	**4.06**	90	**2.20**	42	1.37	40	1.40
Non-Hodgkin lymphoma	601	**1.25**	111	**2.40**	206	**1.23**	149	1.17	135	1.06
Chronic lymphocytic lymphoma	168	**1.29**	28	**2.28**	56	1.28	40	1.23	44	1.38
Nonlymphocytic leukemia	133	**0.78**	10	0.59	42	**0.70**	35	0.78	46	1.05
Myeloid and monocytic leukemia	118	**0.82**	9	0.63	35	**0.69**	33	0.87	41	1.10
Other leukemia	15	**0.58**	1	0.37	7	0.74	2	0.29	5	0.75

Table 2: Standardized incidence ratios (SIRs) of second primary malignancies (SPMs) after cutaneous melanoma (CM) according to time to diagnosis of SPM, 1973-2003.

Bold denotes that 95% confidence intervals (CIs) excluded 1.0. Excess risk is per 10,000 person-years.

7:57 – 8:05 am

PRESENTER: Julie Gladsjo, MD, PhD

TITLE: Treatment of Surgical Scars with the 595nm Pulsed Dye Laser Using Purpuric and Nonpurpuric Parameters: A Comparative Study

AUTHORS: Julie Gladsjo, MD, PhD; Shang I.B. Jiang, MD

INSTITUTION: Medicine (Dermatology), UC San Diego, San Diego, CA, United States

Purpose: Since the 1980's, the pulsed dye laser has been used to improve the cosmetic appearance of scars. However, the optimal laser parameters for treating scars are not known. The purpose of this study was to determine whether treatment of fresh surgical scars with a pulsed dye laser using purpura-inducing settings will improve

clinical appearance better than one using non-purpura-inducing settings or no treatment. A secondary goal is to determine whether multiple treatment sessions are superior to a single treatment.

Design: Patients with a linear surgical wound measuring at least 4.5 cm located anywhere on the body except for hands, feet or genitals, were enrolled at the excision visit. At the post-operative suture removal visit, patients received the first of 3 pulsed dye laser treatments, spaced 4 weeks apart (at 2, 6, and 10 weeks after surgery). The surgical wounds were divided in 3 equal contiguous parts, each measuring at least 1.5 cm. One segment was treated using purpuric settings (pulse duration of 1.5msec), a second segment was treated at the same fluence but nonpurpuric settings (10msec pulse duration), while a third control segment received no treatment. Fluence delivered was determined by Fitzpatrick skin type. In order to minimize the effects of wound tension, position of each treatment condition was randomly assigned. Outcome of each scar segment was assessed by the investigator using the Vancouver Scar Scale which evaluates overall scar appearance, visibility of scar, erythema, hyperpigmentation, and hypopigmentation; and by a blinded evaluator who rated the overall cosmetic appearance. Outcomes assessments were performed at 6, 10, and 14 weeks.

Summary: Preliminary results of 6 patients showed that there were no significant differences in the appearance of the three scar segments between the three study conditions overall, or at the 14 week assessment visit, as rated on the Vancouver Scar scale. Neither was there any difference in the subjective rating of pain between the purpuric and nonpurpuric treatment settings. No subject reported any adverse event.

At the meeting, we will present our study results, projected to include data from 20 patients, comparing the ratings of scar appearance for the three treatment parameters. We will also report whether multiple laser treatments result in significantly better appearance than a single treatment.

Conclusion: The differences between purpuric versus nonpurpuric settings with the pulsed dye laser and single versus multiple treatments for improving the cosmetic appearance of scars will be discussed.

8:05 – 8:13 am

PRESENTER: Allison M. Hanlon, MD, PhD

TITLE: Mohs Micrographic Surgery for the Treatment of Cutaneous Lymphadenoma

AUTHORS: Allison M. Hanlon, MD, PhD[1]; Anna S. Clayton, MD[1]; Brent R. Moody, MD[2]; Thomas Stasko, MD[1]

INSTITUTIONS: 1. Dermatology, Vanderbilt University, Nashville, TN, United States 2. Skin Cancer and Surgery Center, Nashville, TN, United States

Purpose: The purpose of the study was to investigate the clinical characteristics and outcome of cutaneous lymphadenoma patients treated with Mohs micrographic surgery.

Design: We performed a retrospective chart review of four cutaneous lymphadenoma patients treated with Mohs micrographic surgery from 1998-2008. We included the anatomical location, tumor size, patient age, number of Mohs layers, and recurrence rate.

Summary: Cutaneous lymphadenoma is a rare, benign, slow growing tumor that presents on the head and neck in young and middle aged adults. The usual clinical presentation is a slow growing papule resembling a basal cell carcinoma. Metastasis has not been documented. Cutaneous lymphadenomas are treated with surgical excision. The tumor usually presents in an anatomically sensitive area where margin control and conservative excision are indicated; therefore, Mohs micrographic surgery may be preferred over wide local excision. We present four cases of cutaneous lymphadenoma treated with Mohs micrographic surgery from 1998 to 2008. The average age of the patient at diagnosis was 49.5 years old. All of the patients had tumors presenting on the face. The average pre-operative tumor size was 0.9 cm. The average number of MMS layers was 2. Follow up was available for three patients with an average follow up period of 29 months. None of the three patients had a recurrence.

Conclusion: To our knowledge, this is the largest series describing the use of Mohs micrographic surgery for the treatment of cutaneous lymphadenoma. Our data indicate that cutaneous lymphadenoma patients treated with Mohs micrographic surgery had a favorable recurrence rate making it a treatment option for this rare tumor.

8:13 – 8:21 am

PRESENTER: Jason Litak, MD

TITLE: The Routine Use of Adjuvant Cytokeratin Immunostaining in Mohs Micrographic Surgery for Non-melanoma Skin Cancer

AUTHORS: Jason Litak, MD; Jeffrey Altman, MD; Heydar Karimi, PhD; Lady C. Dy, MD

INSTITUTION: Dermatology, Rush University Medical Center, Chicago, IL, United States

Purpose: The respective recurrence rates for basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) treated with conventional Mohs micrographic surgery (MMS) are 1-2% and 3.1% for primary tumors, and 5-6% and 7% for recurrent tumors. These recurrences may be due to residual tumor not identified with standard hematoxylin and eosin (H&E) staining.

To determine whether the addition of immunohistochemical staining with a mixture of AE1/AE3 cytokeratin monoclonal antibodies will identify residual tumor cells in sections in which the H&E-stained frozen sections were negative.

Design: One hundred consecutive cases of non-melanoma skin cancer were treated with the Mohs procedure under standard conditions using H&E-stained slides. Once the "final layer" was determined to be tumor free by the Mohs surgeon, an extra slide from the "tumor free" tissue block was stained with a mixture of AE1/AE3 cytokeratin monoclonal antibodies. Any cases identified with residual tumor cells were further evaluated with an additional frozen section slide processed with H&E staining.

Summary: Of the 100 cases of non-melanoma skin cancer determined to be tumor free on H&E-stained frozen sections, the adjuvant use of immunostaining with AE1/AE3 cytokeratin monoclonal antibodies identified:
1. # cases showing no positivity
2. # cases with positivity corresponding to occult tumor cells (#BCC, #SCC) (#obscured with inflammatory cells)

Preliminary Results: Of 4 cases and 5 slides, 1 slide was positive for residual tumor identified by immunohistochemistry (Figure 1). Correlation to the original H&E slide (Figure 2) revealed occult residual tumor not originally indentified.

Conclusion: The routine use of adjuvant cytokeratin immunostaining in MMS for the treatment of non-melanoma skin cancer is useful in identifying residual tumor cells not identified on standard H&E-stained frozen sections. This technique is limited by the experience of the Mohs surgeon in the interpretation of immunohistochemical frozen section slides. The technique is also limited by the technical skill of the histotechnologist in the preparation of the immunohistochemical slides.

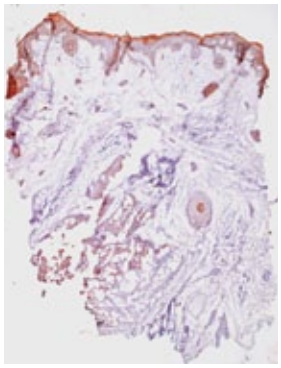


Figure 1: Positive AE1/AE3 cytokeratin immunostaining revealing tumor cells in the dermis.

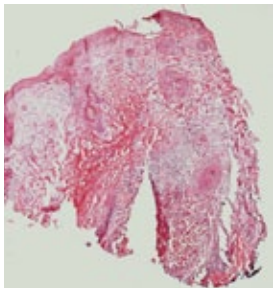


Figure 2: Original H&E slide from Mohs procedure initially called "tumor-free". Occult tumor identified by correlation with IHC slide.

8:21 – 8:29 am

PRESENTER: Heather D. Rogers, MD

TITLE: Prospective Study of Wound Infections in Mohs Micrographic Surgery Using Clean Surgical Technique in the Absence of Prophylactic Antibiotics

AUTHORS: Heather D. Rogers, MD[1]; Edward B. Desciak, MD[2]; Rebecca Marcus, MD[2]; Shuang Wang, PhD[3]; Julian MacKay-Wiggan, MD, MS[2]; Yehuda D. Eliezri, MD[2]

INSTITUTIONS: 1. Medicine, University of Washington School of Medicine, Seattle, WA, United States 2. Dermatology, Columbia University Medical Center, New York, NY, United States 3. Biostatistics, Columbia University Medical Center, New York, NY, United States

Purpose: Mohs micrographic surgery (MMS) has a low rate of surgical site infection (SSI) without the use of prophylactic antibiotics. In the studies to date, there has been variation in the steps taken by each surgeon to prevent SSIs but in all cases sterile technique was used during wound reconstruction. We sought to evaluate the rate of SSIs among patients undergoing MMS with the use of clean surgical technique for all steps of MMS including wound reconstruction in the absence of prophylactic antibiotics.

Design: We prospectively evaluated 1000 patients undergoing MMS using clean surgical technique for SSIs. Clean surgical technique includes the use of clean surgical gloves and towels and a single pack of sterile instruments for all steps including wound reconstruction.

Summary: There were 11 infections among 1000 patients with 1204 tumors; the SSI rate was 0.91% (CI 0.38% to 1.45%). Three of the 11 infections were complications of hematomas. Four of the 11 infections occurred in flap closures, with the highest rate of SSI of 2.67% (4/146).

Conclusion: This is the first study to examine the rate of SSIs with the use of clean surgical technique for all steps of MMS including wound reconstruction in the absence of antibiotic prophylaxis. Our rate of SSIs of 0.91% is exceedingly low, underscoring the overall safety of MMS and its performance in the outpatient setting without the use of antibiotic prophylaxis or sterile technique.

8:29 – 8:37 am

PRESENTER: Jason D. Givan, MD

TITLE: Post-operative Lower Leg Wound Infections Following Mohs Micrographic Surgery: A Comparison of Incidence Rates Pre- and Post-implementation of a Clinical Care Protocol

AUTHORS: Jason D. Givan, MD; Dori Goldberg, MD; David E. Geist, MD; Mary E. Maloney, MD

INSTITUTION: Dermatology, University of Massachusetts, Worcester, MA, United States

Purpose: The purpose of this study is to evaluate the effectiveness of a simple clinical care protocol with regard to the incidence of post-operative lower leg (i.e. below the knee) wound infections following Mohs micrographic surgery. Pre- and post-protocol wound infection rates will be compared.

Design: We designed and implemented a simple clinical care protocol for patients undergoing Mohs micrographic surgery on the lower leg. The protocol was invoked for all patients requiring Mohs surgery on a site below the knee and involved pre-operative, operative, and post-operative aspects. Pre-operatively patients were instructed to wash the entire involved leg with anti-bacterial soap the night prior to and the morning of surgery. Prior to the initiation of surgery, all patients were instructed to remove both shoes and both socks, as well as long pants. An initial surgical prep of the entire involved lower leg from the knee to the toes, including the toe web spaces, was performed with Hibiclens scrub. This was followed by a standard Hibiclens surgical prep locally at the surgical site. Post-operatively, patients were given specific wound care instructions including instructions to re-wash the surgical site separately after showering to

remove bacteria that may have been carried over and into the wound. Mupirocin ointment was prescribed in all cases. Local compression wraps and leg elevation were utilized. Strenuous exercise and prolonged standing/ walking were prohibited. Post-operative wound infection rates will calculated and compared to pre-protocol infection rates to determine protocol effectiveness.

Summary: Our research efforts are on going. However, early statistical trends suggest that there has been a clear decrease in post-operative wound infection (and wound dehiscence) rates following the implementation of this clinical care protocol.

Conclusion: Lower extremity post-operative wound infections following Mohs micrographic surgery are not uncommon. Multiple factors are likely to contribute to this clinical scenario including bacterial contamination during the operative procedure and wound contamination post-operatively as microorganisms are carried over and directly into the surgical wound through the act of bathing. Additionally, increased venous and lymphatic pressures, inherent to the lower leg, contribute to micro and macroscopic wound dehiscence and prolonged healing time. We have addressed each of these issues via the implementation of a simple clinical care protocol with clear preliminary benefit.

7:17 – 7:25 am

PRESENTER: Erica H. Lee, MD

TITLE: Resident Training in Mohs Micrographic Surgery and Procedural Dermatology: A Survey Assessing the Residents' Role and Perceptions

AUTHORS: Erica H. Lee, MD[1]; Kishwer S. Nehal, MD[1]; Stephen W. Dusza, MPH[1]; Elizabeth K. Hale, MD[3]; Vicki J. Levine, MD[2]

INSTITUTIONS: 1. Dermatology Service, Memorial Sloan-Kettering Cancer Center, New York, NY, United States 2. Dermatology, New York University Langone Medical Center, New York, NY, United States 3. Laser & Skin Surgery Center of New York, New York, NY, United States

Purpose: In the past decade the scope of surgical training in dermatology residency has increased. Understanding the residents' role in Mohs surgery and procedural dermatology provides insight to current training practices, trends and overall compliance. To assess the residents' surgical experience and training perceptions, a survey was sent to third year dermatology residents.

Design: A 34-question survey was sent to 107 dermatology residency programs accredited by the Accreditation Council for Graduate Medical Education (ACGME). The survey was mailed to third year dermatology residents in March 2009. The survey was designed to assess: 1) resident experience in Mohs surgery and procedural dermatology, 2) resident self-evaluation of competency and preparation level, 3) resident perspective of procedural dermatology training and 4) overall satisfaction. A follow-up survey was mailed to non-responders in April 2009.

Summary: Two hundred forty one surveys were returned, for a response rate of 66%. A total of 95 programs responded (89%).

Sixty three percent of respondents spend more than one month in a Mohs surgery rotation, 24% spend two to four weeks and 9% spend less than two weeks during an academic year. In the majority of Mohs cases, 18% of responding residents are the primary surgeon, 66% assist and 10% observe. In flap reconstructive surgery, forty-nine percent of residents are the primary surgeon (designing, cutting and suturing) and 45% assist only (supplement anesthesia, undermine, suture and cauterize). A similar response pattern was observed for skin graft reconstruction. The primary surgeon and assistant role were clearly defined in the survey.

Residents are generally the primary surgeon in botulinum toxin, injectable fillers, sclerotherapy, superficial chemical peels and nail surgery, however experience is limited in dermabrasion, liposuction and medium depth peels. Over 50% are not exposed to hair transplantation, ambulatory phlebectomy, blepharoplasty and rhytidectomy during training.

Competency level was self-assessed by residents. Residents felt competent in suturing techniques and excisional surgery (>90%), advancement flaps (60%) and full thickness skin grafts (48%). Residents generally felt better prepared to integrate botulinum toxin and laser surgery into practice after graduation compared to injectable fillers and sclerotherapy.

The surgical procedures residents feel competence should be achieved at the end of training include excisional surgery, chemical peels, botulinum toxin, injectable fillers and the laser treatment of vascular lesions.

Conclusion: Resident training in Mohs micrographic surgery is primarily limited to the assistant role. Competency in Mohs micrographic surgery is not achieved during residency and post-residency training is warranted for proficiency. Residents feel confident in reconstructive surgery likely due to increased exposure in training, but may not reflect true competency. Residents are performing laser and cosmetic procedures; however, experience varies widely among various types of procedures. Overall, residents are satisfied with their training in procedural dermatology.

7:25 – 7:33 am

PRESENTER: Keoni Nguyen, DO

TITLE: A Novel Interactive High-fidelity Cutaneous Surgical Training Model of the Head, Neck, and Shoulders

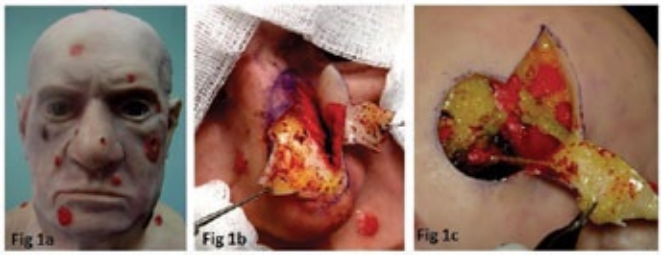
AUTHORS: Keoni Nguyen, DO; Joseph McGowan, MD; Tom G. Olsen, MD; Brett M. Coldiron, MD, FACP; Heidi B. Donnelly, MD

INSTITUTION: Dermatology, Wright State University, Dayton, OH, United States

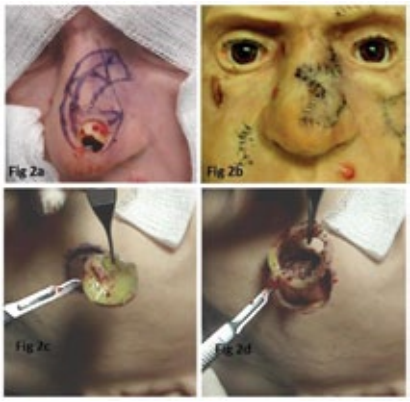
Purpose: Dermatologic surgery continues to take on an important role in the surgical arena due to the increase in skin cancers in an aging population. Although the dermatology surgical curriculum is changing to accommodate the demands of our healthcare system, there is great variation in the surgical training received among dermatology residencies and procedural dermatology fellowships. In 2008, Reid et al. reviewed 211 training anonymous surveys of recent graduates and confirmed that residents were dissatisfied with their surgical and cosmetic training. One factor that may restrict residents from acquiring more hands-on surgical experience is the ethical concerns of "practicing" on live patients. Adequate cutaneous surgical models for residents and fellows are lacking to repetitively practice their surgical skills. Currently, eighty-four percent of dermatology training programs are utilizing pig's feet models to instruct and evaluate dermatology residents. Pig's feet are low-fidelity models, meaning they do not accurately simulate skin elasticity and turgor. Low-fidelity models are suboptimal for teaching advanced concepts of flap vectors, dissecting planes, danger zones, and tumor free margins. Our objective is to introduce a novel three-dimensional "high-fidelity" cutaneous surgical training model.

Design: A high-fidelity cutaneous surgical model of the head, neck, and shoulders was developed. Over thirty tumors are strategically placed on the head, neck, and shoulders (Figure 1a). Beneath the cutaneous layer, there are simulated subcutaneous fat, nerves, blood vessels, muscles, fascia, cartilage, and bony structures of the head, neck, and shoulders (Figures 1b - 1c). This is a useful adjunct for learning and understanding head

and neck anatomy, including danger zones and planes for undermining. The "high-fidelity" model allows a close simulation of human tissue properties facilitating the instruction of flap dynamics and advanced reconstruction in a controlled, reproducible setting (Figures 2a – 2b). Ten skin-simulant samples composed of various mixtures of elastomers and fibers were tested on an Instron E3000 dynamic testing machine to simulate normal mechanical values of human skin. Sample four was selected for the cutaneous layer of the model. Values include: specimen width of 14.47 mm, thickness of 1.45 mm, strain at break of 93.36 percent, Young's Modulus of 12.76 MPa, and tensile strength of 9.05 MPa.



Summary: We believe this novel high-fidelity cutaneous surgical training model is optimal for teaching basic and advanced concepts of flap vectors, dissecting planes, danger zones, and tumor free margins (Figures 2a – 2d).



Conclusion: This cutting edge three-dimensional interactive high-fidelity surgical training model is unique and optimal to teach and evaluate dermatology residents and fellows. The training model can be integrated into dermatology training programs and procedural fellowships such that residents and fellows may develop an effective surgical technique prior to clinical practice. The surgical model has the potential to revolutionize dermsurgery training.

7:33 – 7:41 am

PRESENTER: Michael B. Colgan, MD

TITLE: The Predictive Value of Imaging Studies in Evaluating Regional Lymph Node Involvement in Merkel Cell Carcinoma

AUTHORS: Michael B. Colgan, MD[1]; Tina I. Tarantola, MD[1]; Laura A. Vallow, MD[4]; Michele Y. Halyard, MD[3]; Amy L. Weaver, MS[2]; Randall K. Roenigk, MD[1]; Jerry D. Brewer, MD[1]; Clark C. Otley, MD[1]

INSTITUTIONS: 1. Dermatology, Mayo Clinic-Rochester, Rochester, MN, United States 2. Biomedical Statistics & Informatics, Mayo Clinic-Rochester, Rochester, MN, United States 3. Radiation Oncology, Mayo Clinic-Scottsdale, Rochester, MN, United States 4. Radiation Oncology, Mayo Clinic-Jacksonville, Jacksonville, FL, United States

Purpose: To clarify the utility of various imaging modalities including CT, PET/CT, and MRI in detecting nodal involvement in patients with primary Merkel cell carcinoma.

Design: A multi-center, retrospective, consecutive study reviewing 105 patients diagnosed with known primary Merkel cell carcinoma (MCC) between 1986 and 2008 was completed. All patients had a documented imaging study evaluating their regional lymph node basin as part of the staging process, followed by an elective or therapeutic nodal dissection or sentinal lymph node biopsy. Data from three academic medical centers was collected and combined for analysis.

Summary: Of the 105 patients reviewed 75 patients had a CT, 33 patients had a PET/CT, and 10 had an MRI. CT scan (75 patients) demonstrated a sensitivity of 54%, a specificity of 95%, a positive predictive value of 90%, and a negative predictive value of 70% in detecting nodal basin involvement. PET/CT scan (33 patients) demonstrated a sensitivity of 77%, a specificity of 95%, a positive predictive value of 91%, and a negative predictive value of 87% in detecting nodal basin involvement. MRI (10 patients) demonstrated a sensitivity of 0%, a specificity of 86%, a positive predictive value of 0%, and a negative predictive value of 67% in detecting nodal basin involvement.

Conclusion: The use of PET/CT in the evaluation of a regional lymph node basin in primary MCC is significantly more sensitive and equally specific when compared to traditional CT. For this reason, it may be the most appropriate imaging study when determining regional nodal involvement in these patients. MRI does not appear to provide a high sensitivity or predictive value as an imaging technique for nodal involvement, although our study had too few numbers to draw any statistical significance.

7:41 – 7:49 am

PRESENTER: Mark Hyde, MMS, PA-C

TITLE: Utilization of Physician Assistants in Mohs Micrographic Surgery, a Survey of Fellowship Trained Mohs Micrographic Surgeons

AUTHORS: Mark Hyde, MMS, PA-C[1]; Michael L. Hadley, MD[3,1]; Conrad Roberson[1]; Lisa Pappas[2]; Abby A. Jacobson, MS, PA-C[4]; Glen M. Bowen, MD[3,1]

INSTITUTIONS: 1. Cutaneous Oncology, Huntsman Cancer Institute at the University of Utah, Salt Lake City, UT, United States 2. Biostatistics Shared Resources, Huntsman Cancer Institute at the University of Utah, Salt Lake City, UT, United States 3. Department of Dermatology, University of Utah, Salt Lake City, UT, United States 4. Physician Assistant Program, Hahnemann/Drexel University, Philadelphia, PA, United States

Purpose: An increasing number of dermatologists are using Physician Assistants (PAs) in their practices. A lack of information regarding the utilization of PAs in Mohs micrographic surgery (MMS) served as the driving force for this research.

Design: 576 fellow members of the American College of Mohs Surgery were sent surveys via the US postal service in January 2009. The survey was focused on what portion of Mohs surgeons are using PAs and how those PAs are being utilized.

Summary: Of the 576 surgeons surveyed, 143 (24.8%) responded. Of those, 43/143 (30.1%) currently employed 1 or more PA. 15/43 (34.9%) surgeons reported that PAs in their practice perform preoperative consults. 25/43 (58.1%) surgeons noted that PAs are performing the postoperative follow up. 18/43 (41.9%) surgeons reported that PAs were participating in some aspect of repairs. 35/43 (81.4%) surgeons reported that PAs were seeing general dermatology patients.

Conclusion: It appears that some Mohs surgeons are utilizing PAs for perioperative care as well as seeing general dermatology patients. A smaller percentage of Mohs surgeons are using PAs to perform portions of Mohs surgery or the consequent repairs.

Presurgical consults	15/43 (34.88%)
Excision of Mohs sections	1/43(2.33%)
Mapping Mohs sections	0/43
Inking excised tissue	1/43(2.33%)
Interpreting pathology	0/43
Primary repair-design	8/43(18.6%)
Primary repair-dermal sutures	12/43 (27.91%)
Primary repair-epidermal sutures	18/43 (41.86%)
Adjacent tissue transfer-design	2/43 (4.65%)
Adjacent tissue transfer-dermal sutures	8/43(18.6%)
Adjacent tissue transfer-epidermal sutures	14/43(32.56%)
Skin graft-design	6/43 (13.95%)
Skin graft-dermal sutures	10/43 (23.26%)
Skin graft-epidermal sutures	16/43 (37.21%)
Surgical follow-ups	25/43 (58.14%)

Breakdown of tasks delegated to Physician Assistants by Mohs Micrographic Surgeons

This data was in response to the question: "What portions of the MMS process are being delegated to PAs?"

7:49 – 7:57 am

PRESENTER: Kevan G. Lewis, MD

TITLE: Efficacy, Tolerability and Cost-effectiveness of Topical 5-Fluorouracil vs. Imiquimod for the Treatment of Superficial Basal Cell Carcinoma: A Randomized Double Blind Clinical Trial

AUTHORS: Kevan G. Lewis, MD[1, 2]; Katherine Cordova, MD[2]; Nathaniel J. Jellinek[2]

INSTITUTIONS: 1. Dermatology, Mayo Clinic, Rochester, MN, United States 2. Dermatology, Brown Medical School, Providence, RI, United States

Purpose: To compare the efficacy, tolerability and cost-effectiveness of topical 5-fluorouracil to imiquimod for the treatment of superficial basal cell carcinoma.

Design: A prospective, randomized, double blind, vehicle-controlled clinical trial.

Summary: Results are based on an intent-to-treat analysis of 18 subjects (9 female, 9 male; ages 39-77, mean 71y) meeting the criteria for inclusion who enrolled in the study. Subjects were randomized to one of two study groups: (N=7) 5-fluorouracil 5% cream (twice daily application for 6 weeks), or (N=11) imiquimod 5% cream (once daily application of drug and once daily application of vehicle cream for 6 weeks). Sixteen subjects completed the study; 2 terminated early due to exuberant local skin reactions. Primary lesions were located on the trunk (n=8), extremities (5), and head/neck (5). Histopathologic evaluation of formalin fixed, paraffin embedded, H&E stained step-sections of post-treatment excision specimens demonstrated residual basal cell carcinoma in 2 cases (both following treatment with imiquimod). Histopathologic assessment of complete response (no residual tumor) occurred in 7 of 7 (100%) subjects in the 5-fluorouracil group and in 9 of 11 (82%) subjects in the imiquimod group. The proportion of cases with histopathologic evidence of persistent tumor was not statistically different (p=0.23) between study groups. Subject reported symptoms of pain, burning or itching were similar between study groups. Investigator assessed signs of erythema, edema, induration, vesicles, ulceration, crusting, excoriation were similar between groups. Although insurance coverage and market price varies over time, the cost of 5-fluorouracil may be less than imiquimod for treatment of superficial BCC. One limitation of the study is less than 100% margin control with bread loaf sectioning of excision specimens.

Conclusion: The data suggest that 5-fluorouracil and imiquimod are effective and well tolerated topical medical therapies for superficial basal cell carcinoma.

7:57 – 8:05 am

PRESENTER: Joshua B. Wilson, MD

TITLE: Staged Excision for Lentigo Maligna and Lentigo Maligna Melanoma: Analysis of Surgical Margins and Long-term Recurrence in 71 Cases from a Single Practice

AUTHORS: Joshua B. Wilson, MD[1]; Hobart W. Walling, MD, PhD[3]; Roger I. Ceilley, MD[1]; Andrew K. Bean, MD[1]; Richard Scupham, MD[2]

INSTITUTIONS: 1. Dermatology PC, West Des Moines, IA, United States 2. Iowa Pathology Associates, Iowa Methodist Medical Center, Des Moines, IA, United States 3. Town Square Dermatology, Coralville, IA, United States

Purpose: Margin control surgery offers the highest cure rate for lentigo maligna (LM) and LM melanoma (LMM). However, recommended margins often prove inadequate. Limited data are available regarding recurrence after staged excision. The purpose of this was to assess the surgical margins necessary for clearance of LM and LMM and the long-term recurrence rate of LM/LMM treated by staged excision with rush permanent sections.

Design: Retrospective chart review of patients with LM treated by staged excision.

Summary: Seventy-one patients (41 male, 30 female, mean age 68.3 ± 10.1 years) were treated for LM (61) or LMM (10) from 1986 to 2005, with ongoing follow-up through 2009. Fifty-one tumors (72%) were located on the head and neck (32% cheek). Mean follow-up duration was 91.3 months (range 8-266 months). Four tumors (all facial LM) recurred after a mean interval of 24.3 months (range 8-35). The recurrent tumors did not vary significantly compared to the non-recurrent tumors in any parameter, including pre-operative size, post-operative size, or number of stages. The 5-year recurrence risk (via Kaplan-Meier calculations) was 5.8% (95% confidence interval 1.9% - 14.7%). This recurrence risk remained stable at 10 years. Among 67 tumors that did not recur, clear margins were obtained in one stage in 36 cases (54%), two stages in 19 cases (28%), three stages in 7 cases (10%), and four or more stages in 5 cases (7%) The overall margin for tumor clearance was 6.1 ± 0.5 mm for LM and 9.0 ± 1.5 mm for LMM. LM of the cheek required more stages (2.5 ± 0.4) and a wider margin (8.0 ± 1.2 mm) than LM at other sites ($p<0.04$). Recommended margins (0.5 cm for LM, 1 cm for LMM) would have been adequate for 29/54 (54%) LM cases, 19/40 (48%) of head/neck LM, and 7/8 (88%) cases of LMM.

Conclusion: Staged excision of LM and LMM is associated with a low recurrence rate. Tumors of the cheek required more stages and a greater margin for clearance. The finding that nearly half of tumors were not cleared with the recommended surgical margin underscores the importance of margin-control surgery.

8:05 – 8:13 am

PRESENTER: John A. Carucci, MD, PhD

TITLE: Human Cutaneous Squamous Cell Carcinoma is Associated with Increased Lymphatic Density in the Tumor Microenvironment and Increased Expression of Macrophage Derived VEGF-C

AUTHORS: John A. Carucci, MD, PhD[1]; Dariush Moussai, MD[1]; Hiroshi Matsui, MD[2]; Katherine C. Pierson[2]; James G. Krueger, MD, PhD[2]

INSTITUTIONS: 1. Dermatology, Weill Medical College of Cornell, New York, NY, United States 2. Investigative Dermatology, Rockefeller University, New York, NY, United States

Purpose: Metastases from primary cutaneous SCC account for the majority of deaths from non-melanoma skin cancer in the United States each year. We studied lymphangiogenesis in human SCC because of the potential link to metastasis.

Design: Human SCC samples were stained for lymphatic endothelial vessel marker LYVE-1 and positive cells were counted in tumors and compared with normal skin. Gene set enrichment analysis and RT-PCR was performed on SCC, adjacent non-tumor bearing skin and normal skin to determine differential expression of lymphangiogenesis associated genes. Laser capture microdissection was performed to isolate tumor and tumor-associated inflammatory cells for further gene expression analysis. Immunofluorescence microscopy was performed to determine the source of VEGF-C in the tumor microenvironment.

Summary: We found increased lymphatic density and reorganized lymphatic endothelial vessels in the dermis adjacent immediately to SCC tumor nests. RT-PCR confirmed the presence of VEGF-C in skin immediately adjacent to SCC. Laser capture microdissection allowed us to isolate the inflammatory infiltrate adjacent to SCC which confirmed the increased expression of VEGF-C. The presence of CD163+/VEGFC+ cells by immunofluorescence microscopy suggested that VEGF-C is macrophage derived.

Conclusion: Tumor associated macrophages may be an important source of VEGF-C contributing to increased lymphatic vessel density surrounding SCC. Based on this, a higher density of tumor associated macrophages may be associated with a "pro-tumor" rather than "anti-tumor" effect. Clarification of mechanisms governing lymphangiogenesis in the tumor microenvironment may lead to identification of novel targets for therapeutic intervention for high risk SCC.

8:13 – 8:21 am

PRESENTER: Leonid Izikson, MD

TITLE: Prevalence of Underdiagnosed Aggressive Non-melanoma Skin Cancers Treated with Mohs Micrographic Surgery: Analysis of 468 Cases

AUTHORS: Leonid Izikson, MD; Marie Seyler; Nathalie C. Zeitouni, MDCM, FRCPC

INSTITUTION: Dermatology, Roswell Park Cancer Institute, Buffalo, NY, United States

Purpose: To examine the prevalence of biopsy-based underdiagnosis of aggressive non-melanoma skin cancer (NMSCA) subtypes in cases referred for Mohs micrographic surgery (MMS).

Design: A retrospective chart review was performed of 468 consecutive cases of primary NMSCA with a biopsy-proven diagnosis of basal (BCC) or squamous cell (SCC) carcinoma treated with MMS. All histological tumor layers were reexamined by two dermatologists to establish an intraoperative diagnosis. Correlation was then made between the preoperative lesion diagnosis and the histological tumor layer diagnosis. Tumors were classified as aggressive subtypes (invasive SCC, as well as basosquamous carcinoma and infiltrating, morpheaform, micronodular, and keratinizing BCC) or non-aggressive subtypes (SCCIS, as well as superficial, nodular, adenoid cystic, and follicular BCC). Cases were divided into categories based on whether the preoperative and intraoperative diagnosis showed discordance in identifying tumor subtypes. The total number of cases in each category was tabulated, and percentages calculated based on the total number of 468 examined cases.

Summary: In 52.4% of the cases, biopsy and intraoperative examination of NMSCA showed concordance in the diagnosis of an aggressive or a non-aggressive tumor subtype. In 17.3% of the cases, intraoperative examination revealed an aggressive tumor

subtype that was not diagnosed by biopsy. In 23.3% of the cases, intraoperative examination found no residual tumor in the biopsied site.

Conclusion: In the majority of cases, there was concordance between the initial NMSCA diagnosis and the final Mohs tumor layer diagnosis. The prevalence of aggressive SCC and BCC subtypes underdiagnosed by biopsy in this study suggests that a significant proportion of biopsied NMSCA may be treated sub-optimally in the clinical settings.

8:21 – 8:29 am

PRESENTER: Hillary Johnson-Jahangir, MD, PhD

TITLE: Modified Flap Design for Symmetric Reconstruction of the Apical Triangle of the Upper Lip

AUTHORS: Hillary Johnson-Jahangir, MD, PhD; Mary Stevenson, BA; Désirée Ratner, MD

INSTITUTION: Dermatology, Columbia University, New York, NY, United States

Purpose: The apical triangle of the upper lip, described by Burget, is a subunit of the cutaneous upper lip located at the confluence of the nose, lip, and cheek (Figure 1a). Defects of the apical triangle present a reconstructive challenge in terms of proper placement of the upper nasolabial fold and preservation of facial symmetry. If the apical triangle is not taken into account when repairing such defects, the upper nasolabial fold may be displaced inferiorly with asymmetric loss of the apical triangle subunit, which may lead to visible facial asymmetry. We present a further modification of the cheek advancement flap for repair of apical triangle defects to address this concern.

Design: Twenty-seven patients with defects involving the apical triangle of the upper lip after Mohs micrographic surgery for BCC or SCC were followed between 2002 through 2008 (Table 1). Patients were reconstructed with or without modification of the cheek advancement flap. The modified cheek advancement flap was performed by making an incision extending from the alar crease onto the nasal sill in order to optimize facial symmetry. For larger defects extending onto the nose or including additional subunits of the upper lip, Burrow's full thickness skin grafts were sometimes required to repair a portion of the defects. Photographs taken at the time of surgery were reviewed for evaluation of symmetry of the bilateral apical triangle.

Characteristic	Modified Advancement Flap	Standard Advancement Flap
Patients, n	17	10
Sex, % male	6	40
Sex, % female	94	60
Age, range (mean, median)	53-95 (74,76)	51-81 (72,76)
Defect size, cm2,%		
<1.0	12	0
1.0-3.0	40	60
3.1-5.0	6	10
5.1-7.0	18	10
7.1-9.0	12	10
>9.0	12	10
Burrow's FTSG, n	13	4

Table 1: Patient Characteristics

Summary: Apical triangle defects were repaired utilizing a standard cheek advancement flap (Figure 1b) or a modified cheek advancement flap (Figure 1c) in which an additional incision was made inferiorly along the alar crease onto the nasal sill. The modification allowed for advancement of the upper cutaneous lip to meet the apex of the hairless triangle with symmetrical placement of the nasolabial fold. For larger defects involving significant portions of the upper lip or nasal sidewall, Burrow's full thickness skin grafts were required to fully repair the defects.

No difference in complications was noted between the two reconstructive methods. Complications included hypertrophic scarring, foreign body reaction to ingrown hair, suture granuloma, or pyogenic granuloma. Hemorrhage, necrosis, and infection did not occur.

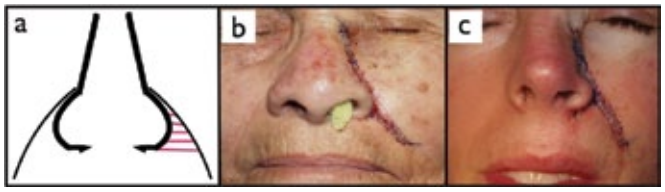


Figure 1.

Conclusion: Modification of the cheek advancement flap for reconstruction of perialar defects involving the apical triangle subunit of the upper lip is a simple and reliable technique for aesthetic preservation of facial symmetry. Rotation flaps may be a useful alternative for recreating defects of the upper lip involving the lower portion of the apical triangle. Other reconstructive alternatives, including crescentic advancement flaps, nasolabial transposition flaps, or island pedicle flaps, may not be as effective in recreating the apical subunit and may present additional aesthetic challenges.

8:29 – 8:37 am

PRESENTER: Yang Xia, MD

TITLE: Randomized Study to Assess the Wound Infection Incidence Using Clean versus Sterile Gloves for Mohs Micrographic Surgery (MMS) Wound Repairs

AUTHORS: Yang Xia, MD[1]; Sunghun Cho, MD[2]; Daniel E. Zelac, MD[1]; Hubert T. Greenway, Jr., MD[1]

INSTITUTIONS: 1. Division of Mohs Surgery, Scripps Clinic, La Jolla, CA, United States 2. Dermatology, Darnall Army Medical Center, Ft. Hood, TX, United States

Purpose: The purpose of this study is to assess the difference in the wound infection rate when using clean, non-sterile gloves versus sterile gloves for wound repairs in Mohs micrographic surgery.

Design: This is a prospective subject-blinded single institution pilot study with plans to expand to a multi-institutional study within one year. The study is designed to investigate the difference in infection rate using clean, non-sterile gloves versus sterile gloves when repairing surgical defects during Mohs surgery. Enrollment for this pilot study will include 60 patients. Patients who are repaired by an outside physician, take antibiotics prior to

the procedure, or have other serious medical conditions are excluded. Subjects will be stratified and randomized to have their repairs performed with either clean, non-sterile gloves or sterile gloves. The particular glove type will be used throughout the entire repair, even if the physician or surgical assistant requires multiple glove changes. Sterile patient prep and sterile surgical trays will still be used during all wound repairs. In addition to the glove type, data to include patient's age, sex, anatomic location of skin cancer, number of Mohs stages, closure type, final surgical defect size, and total surgical time (from first cut to closure) will be collected. After wound repair, each patient will follow-up between 5 to 21 days for suture removal and wound assessment. Wound assessment is performed by a healthcare professional (i.e. a nurse or a medical assistant) outside of the study and the wound is scored based on the following scale. A score of 0 is given to wounds with zero or slight erythema. A score of 1 is given to wounds with erythema less than 1 cm from suture line. A score of 2 is given to wounds with erythema greater than 1 cm from suture line with or without edema. A score of 3 is given to wounds with exudates and purulent drainage.

Summary: Three months of data have been collected from the 29 patients enrolled in the study. Eighteen patients were repaired with clean gloves and 11 patients were repaired with sterile gloves. One patient from the clean glove arm of the study had clinical infection during follow-up and 2 patients from the sterile glove arm of the study had clinical infection during follow-up. Seven months of data, to include information on patient demographics and characteristics of the skin cancer excised, will be available at the time of the Mohs College meeting.

Conclusion: (Preliminary) the infection rate in MMS wound repairs between clean, non-sterile gloves versus sterile gloves is not statistically significant. From our pilot study, dermatologic surgeons can use clean, non-sterile gloves for simple uncomplicated wound repairs. The implication from this study may lead to significant cost savings when using clean, non-sterile gloves instead of sterile gloves for Mohs surgical repairs.

8:37 – 8:45 am

PRESENTER: Daniel I. Wasserman, MD

TITLE: A Prospective Pilot Study of the Alexandrite Laser on Basal Cell Carcinomas

AUTHORS: Daniel I. Wasserman, MD[1]; Zeina S. Tannous, MD[2]; Gary D. Monheit, MD[1].

INSTITUTIONS: 1. Total Skin & Beauty Dermatology Center, Birmingham, AL, United States 2. Dermatology, Massachusetts General Hospital, Boston, MA, United States

Purpose: Skin cancer represents the most common form of human cancer. Basal cell carcinomas (BCC) are slow growing tumors that comprise roughly 80% of all non-melanoma skin cancers (NMSCs). Due to the lack of its emergent nature, several approaches have evolved for the treatment of this slow growing, locally destructive cancer. They include Mohs micrographic surgery (MMS), excision, electrodessication and curettage (ED&C), cryosurgery, topical immunomodulators, photodynamic therapy, and radiotherapy. Recently, the pulsed-dye laser (PDL) (595 nm) has demonstrated considerable efficacy for superficial BCCs. The PDL for the use of BCCs is limited by its penetration of approximately 2 mm. Increasing the penetration 50% to a depth of 3 mm, achieved by the 755-nm alexandrite laser, could potentially provide increased complete clearance rates for not only superficial BCCs, but also perhaps nodular BCCs. Based on the deep penetration of long wavelength visible and near infrared light, and a small peak of hemoglobin absorption in the 800–900 nm range, long-pulsed millisecond-domain alexandrite lasers (755-nm) have been developed to treat moderately deep, larger caliber spider and feeding reticular veins. Currently, there are no reports for the use of the 755-nm alexandrite laser for the purpose of treating basal cell carcinomas. The goal of this pilot study is to determine whether superficial and nodular basal cell carcinomas can be successfully treated using the 755-nm alexandrite laser.

Design: Approximately 12 patients with biopsy-proven nodular or superficial basal cell carcinomas less than 2 cm located on the trunk or extremities (chest, abdomen, back, arms or legs), suitable for treatment by standard surgical excision were enrolled in this study. Following a standard baseline screening visit, each tumor was treated with the 755-nm alexandrite laser (GentleLASE®, Candela Corporation, Wayland, MA) either once or 4 times at 2-4 week intervals. Two-to-four weeks following the final treatment, all tumors were excised according to standard of care. All excisional specimens were then reviewed histologically for the complete clearance or partial clearance of tumors. In addition to efficacy, pain, purpura, edema, and blistering following treatments were measured during the study. Photos were taken throughout the study.

Summary: This study is currently in progress and preliminary results will be discussed at the Annual Meeting.

Conclusion: Conclusion will be discussed at the Mohs College Annual Meeting pending analysis of all available data.

Clinical Pearls Abstract Session – Saturday, May 1: 12:30 – 2:30 pm

12:30 – 12:38 pm

PRESENTER: Christopher J. Miller, MD

TITLE: Revisiting the One-stage Nasolabial Transposition Flap

AUTHORS: Christopher J. Miller, MD[2, 1]; Aerlyn G. Dawn, MD, MBA[1]

INSTITUTIONS: 1. Dermatology, University of Pennsylvania, Philadelphia, PA, United States 2. Division of Dermatologic Surgery, University of Pennsylvania, Philadelphia, PA, United States

Purpose: The small size of the alar subunit forces the surgeon to recruit donor tissue from outside cosmetic subunits to repair all but the smallest defects. One-stage reconstruction with local flaps risks deformity of the subtle contours of the convex ala, its free margin, and the concave transition to the neighboring cosmetic subunits. The one-staged nasolabial transposition flap provides excellent color and texture match for alar defects. However, the flap can succumb to trapdoor deformity and interrupt contour by blunting the concave boundaries of the ala. We present a simple, reliable approach to the nasolabial transposition flap that minimizes these common complications, reliably produces a cosmetic outcome that rivals or surpasses other reconstruction options, and offers patients the convenience of a one-stage flap that rarely requires secondary scar revision.

Design: We present flap indications, design, execution, and tips for success in a step-by-step manner using clinical photos. We report our experience in 21 patients using a one-stage nasolabial transposition flap for reconstruction of alar defects.

Summary: Twenty-one patients underwent Mohs micrographic surgery for tumors of the ala. All patients were successfully repaired with a nasolabial transposition flap. All patients had excellent cosmetic and functional outcomes with preservation of the subtle concavity of the superior alar crease. Scar revision was rare and primarily used to address focal inversion of the scar.

Conclusion: The one-stage nasolabial transposition flap is a reliable reconstruction option that results in reproducibly excellent cosmetic and functional outcomes for alar defects. This approach to the nasolabial transposition flap provides an excellent alternative to traditional multi-staged flaps. This technique offers advantages including single-stage procedure, suitable color and texture match, excellent vascular supply, abundant tissue laxity from the medial cheek, and well-concealed donor site scar along the melolabial fold.

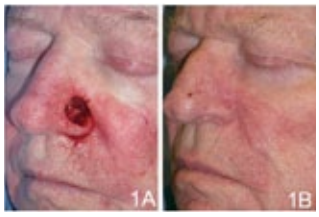


Figure 1. Defect (A) and postoperative result (B) 2 months after reconstruction with NLT flap.

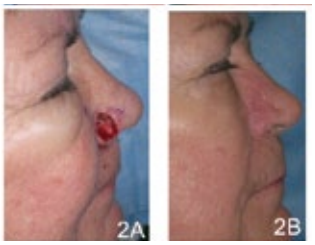


Figure 2. Defect (A) and postoperative result (B) 4 months after reconstruction with NLT flap.

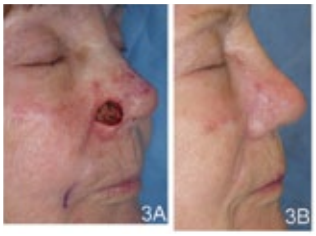


Figure 3. Defect (A) and postoperative result (B) 5 months after reconstruction with NLT flap.

12:38 – 12:46 pm

PRESENTER: Theresa L. Ray, MD

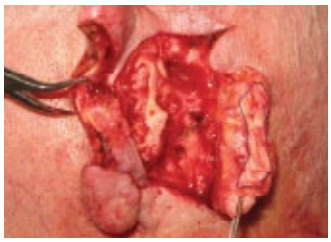
TITLE: Retroauricular Chondrocutaneous Interpolation Flap for Reconstruction of Large Helical Defects

AUTHORS: Theresa L. Ray, MD; Rehana L. Ahmed, MD; Peter K. Lee, MD, PhD

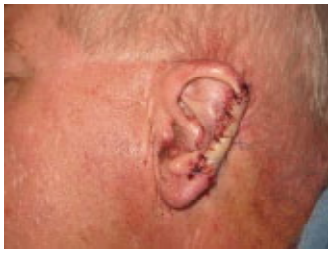
INSTITUTION: Dermatology, University of Minnesota, St. Louis Park, MN, United States

Purpose: Full thickness defects of the helical rim present a reconstructive challenge. If the defect is large, the ear may be structurally compromised leading to difficulty with use of hearing aids and eyeglasses. Further, the loss of cartilage presents a challenge cosmetically, as a loss of helical contour is unacceptable for many patients. The classic retroauricular interpolation flap can be used for large helical defects and can provide superior cosmetic results; however, if the helical cartilage is lost, a cartilage graft should be placed under the flap to maintain structural integrity. Harvesting a separate cartilage graft adds time to reconstruction and could leave an additional donor-site scar if taken from the contralateral ear. We propose a retroauricular interpolation flap for reconstruction of large helical defects, which incorporates retroauricular cartilage into the flap itself. To our knowledge, this has not yet been described in the literature. Herein is our experience with 18 patients.

Design: All defects resulted from Mohs micrographic surgery and were large enough to risk structural compromise to the ear. A traditional retroauricular interpolation flap was outlined posterior to the defect. A portion of the underlying cartilage just behind the leading edge of the flap was taken as part of the flap and used to reconstruct the helix. The cartilage is attached to the flap, thereby maintaining its innate vascular supply. The flap is then sutured into place and the leading edge of the flap, anterior to the cartilage graft, wrapped around the front of the ear to recreate the anterior helical rim. Buried vertical mattress sutures using 5-0 polyglactin were used for deep closure followed by interrupted anchoring sutures using 5-0 polypropylene. The remainder of the superficial closure was then achieved using a running stitch with 5-0 chromic gut. A through and through basting stitch is then placed through the scapha to hold the cartilage in place at the helix. After 3 weeks the flap is divided and inset in the standard fashion. The secondary defect continues to heal by second intent.



Flap after elevation. A large full thickness defect of the helix is seen on the left. The cartilage portion of the flap is outlined on the right.



Results immediately after flap placement showing excellent restoration of auricular contour and structural integrity.

Summary: All 18 patients had successful reconstruction with restoration of the auricle's structural integrity and excellent cosmetic results. We experienced no cases of flap failure or necrosis. We had one case of postoperative infection, which resolved with oral antibiotics and no long term complications. Post-operative pain was minimal for all patients.

Conclusion: In our experience, the retroauricular chondrocutaneous interpolation flap is an excellent option to reliably restore auricular structure after large, full thickness helical defects. It offers a faster, more reliable alternative to the standard interpolation flap over a cartilage graft, with lack of an additional scar at the cartilage donor site. Since the cartilage's innate blood supply is maintained, the potential for graft/flap failure is reduced as compared to the previous combination. As an additional benefit, it gives excellent cosmetic results with restoration of normal helical contour without shortening the ear.

12:46 – 12:54 pm

PRESENTER: David E. Kent, MD

TITLE: Massive Hemorrhage and Platelet Dysfunction Following Mohs Surgery and Nasal Reconstruction with Cartilage Graft and Interpolation Flap: Lessons Learned

AUTHORS: David E. Kent, MD[1, 2]; Keith M. Harrigill, MD[1]

INSTITUTIONS: 1. Medicine, Mercer Medical School, Macon, GA, United States 2. Dermatology, Medical College of Georgia, Augusta, GA, United States

Purpose: The purpose of this presentation is to highlight the potential results of platelet dysfunction that occurred during Mohs surgery and a nasal composite reconstruction. The dysfunction was caused by use of two platelet inhibitors (aspirin and clopidogrel) and co-morbid conditions including renal insufficiency. We will discuss the use and interpretation of platelet function studies, patient management protocol for platelet dysfunction and attempt to identify those patients with specific co-morbid conditions that might benefit from preoperative platelet function testing.

Design: We present a case of a 73 y/o male that underwent Mohs surgery for a basal cell carcinoma of the left nose resulting in a 3.8 x 3.0 cm soft tissue defect. The defect involved the left nasal ala, underlying cartilage and portion of the side wall. His co-morbid conditions were numerous and included chronic tobacco use, anticoagulation with two anti-platelet agents, and chronic renal insufficiency. The patient experienced persistent perioperative bleeding during the Mohs resection and later that night requiring a trip to the ER. A delayed reconstruction had been planned the next day under monitored anesthesia care at the patient's request. He underwent a cartilage graft with a cheek interpolation flap accompanied by extensive bleeding difficult to control. Because of his bleeding, he was admitted for 24 hour observation. Within 2 hours post-op he experienced profuse bleeding from all operative sites. A presumptive diagnosis of platelet dysfunction of uncertain cause was made. Platelet function tests were drawn. The patient required a return to the OR with general anesthesia, administration of DDAVP based on patient's body weight, transfusion of phoresed platelets, and other blood products during the 24 hours perioperatively. His platelet function studies returned grossly abnormal and his hemoglobin dropped from 10.6 to 7.3. Hematologic evaluation revealed findings consistent with drug induced platelet dysfunction. Prior to an uneventful division and inset of the flap, repeat platelet function studies were normal.

Conclusion: Platelet dysfunction due to antiplatelet agents can result in massive bleeding. Identification of these patients preoperatively is desirable. Management may require blood products as well as DDAVP. Recognition of these patients preoperatively with platelet function testing may help to avoid such bleeding. Specific patient profiles may help the physician identify these patients.

Post op hemorrhage due to platelet dysfunction.

12:54 – 1:02 pm

PRESENTER: Christopher Kearney, MD

TITLE: A Tunneled and Turned-over Nasolabial Flap for Reconstruction of Full Thickness Nasal ala Defects

AUTHORS: Christopher Kearney, MD; Adam T. Sheridan, MBBS, FACD; Carl Vinciullo, MD; Timothy G. Elliott, MD

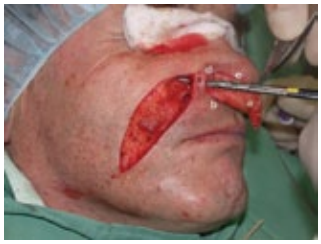
INSTITUTION: Skin and Cancer Foundation, Sydney, Australia, Bondi Junction, NSW, Australia

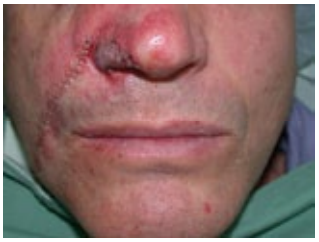
Purpose: We describe, with illustrative cases, a single stage flap for repair of full thickness nasal alar rim where the lateral portion of the alar and the alar groove has been preserved during excisional surgery.

Design: This utilized a nasolabial turnover flap as described by Spear and colleague with the additional maneuver of tunneling the flap beneath the alar groove to its recipient site at the alar rim.

Summary: Before, during, immediately post-procedure, and long term follow up of multiple cases are shown.

Conclusion: This procedure has the advantages over alternative repairs of preserving the important lateral alar groove, having a reliable vascular supply, providing a single stage solution, and providing a good cosmetic outcome.





1:02 – 1:10 pm

PRESENTER: Tracy M. Campbell, MD

TITLE: Using Electrosurgery for Scar Revision

AUTHORS: Tracy M. Campbell, MD; Daniel B. Eisen, MD

INSTITUTION: Department of Dermatology, UC Davis Medical Center, Sacramento, CA, United States

Purpose: Many techniques have been advocated for scar revision over the years to improve both contour and color match between the surgery site or scar and that of the normal surrounding skin. Dermabrasion is one of the most utilized, however, the need for specialized equipment, inability to address redundant tissue such as surgery dog-ears, and bleeding after completion of the procedure are disadvantages. We describe two alternative scar revision methods using electrosurgery that address some of the shortcomings of dermabrasion. Electrosurgical instruments are readily available and settings are adjusted to provide different depths of tissue ablation. Low power settings and short dwell time results in superficial tissue ablation where as higher power settings or longer dwell times cause deeper tissue ablation. The distance between the electrode tip and the tissue can be varied which also results in different levels of ablation. Using these various techniques the scar or surgery site can be quickly ablated to the desired level similar to that of dermabrasion. We have coined the term "electroblation" for this technique. Alternatively, when presented with redundant tissue, such as a surgery dog-ear, a fine tipped electrosurgery epilating tip can be used to burn into the subcutaneous tissue. When performed in a grid like pattern over the affected area it causes significant dermal tissue contraction while sparing the intervening overlying tissue. We have termed this method "fractionated electroblation."

Design: For scars where better color or contour match with surrounding normal tissue is desired an electrosurgical device maybe used in lieu of dermabrasion. The site is identified, cleansed, numbed, and ablated with a standard hyfrecator needle using low power on a setting of 10. A sweeping motion is used to paint the scar and several millimeters of adjacent skin to the level of the superficial papillary dermis. Figure 1 illustrates this technique for scar revision on a forehead flap repair. For areas with cutaneous redundancies or bulky type of scars where the color match is already good and complete deep ablation of the entire skin surface is likely to cause atrophic scars we use fractionated electroblation. A fine epilating needle is used on lower power on a setting of 5-10 and advanced into the deep dermis or subcutaneous plane depending on the size of the redundancy. Treatment is continued in a grid like pattern until the contour of the treated tissue is made to match that of the surrounding skin. Figure 2 illustrates this technique on a graft which has pin cushioned with contour irregularities. Petroleum jelly is applied to the treatment area until re-epithelialization.

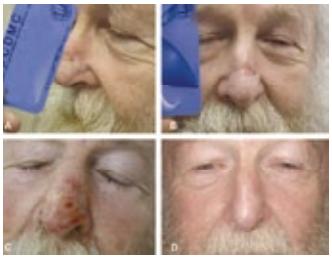


Figure 1. (A, B) 10 wks s/p forehead flap repair (C) Electroblation. (D) 6 wks s/p electroblation

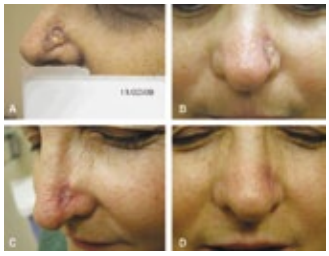


Figure 2. (A, B) 6 wks s/p FTSG (C, D) 4 wks s/p fractionated electroblation

Summary: The primary advantages of electroblation are the ability to treat cutaneous redundancies or bulky flaps, no need for specialized equipment that is typically present on hand in most dermatologic surgeon's offices, greatly reduced bleeding, and faster procedure time.

Conclusion: Electroblation is a convenient and easy method for scar revision. Potential advantages of electroblation over dermabrasion and laser systems include decreased expense, ease of use, diminished bleeding, and ability to treat cutaneous redundancies.

1:10 – 1:18 pm

PRESENTER: John M. Strasswimmer, MD, PhD

TITLE: Challenges to Marketing the Mohs College: A Florida Experience

AUTHORS: John M. Strasswimmer, MD, PhD; Richard Krathen, MD

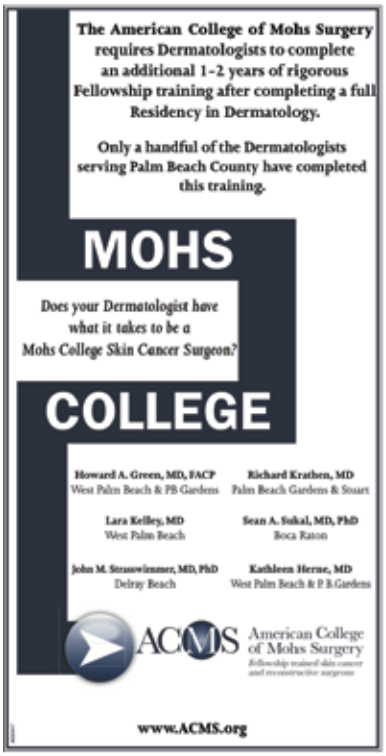
INSTITUTION: www.MohsForSnowbirds.com, Palm Beach County, Delray Beach, FL, United States

Purpose: We describe the challenges of growing an ACMS Mohs surgery practice in Florida and the creation of a cooperative marketing approach to promote local Mohs College members.

Design: We provide a description of the challenges posed to ACMS members in a county in Florida. These include the practice of dermatologic surgery by non-ACMS members, non-dermatologists, non ABD-certified dermatologists and non MD physicians. The public's lack of knowledge about the ACMS fellowship program is a limitation to growing a practice by ACMS members. In response, we describe genesis of an initial cooperative marketing plan. The plan might serve for other grass-roots Mohs Surgery ACMS marketing in other locations in the US.

Summary: An informal review revealed that the vast majority of Mohs surgery providers in a county in Florida are not ACMS certified. Moreover, the public did not understand the significance of ACMS training and the potential advantages that provides. We will describe an initial cooperative advertising approach which has met with great satisfaction from the participants.

Conclusion: A cost-effective advertising approach promoting the ACMS resulted in conversion of patients from dermatologists who did not participate in this plan. Patient feedback was positive and the ACMS member expressed universal satisfaction with this program. We hope this approach will be used elsewhere in the US to promote the "branding" of the ACMS.



Initial advertisement used for print

1:18 – 1:26 pm

PRESENTER: Christian L. Baum, MD

TITLE: Detection and Treatment of Nasal Valve Insufficiency Despite Complete Preservation of Cartilage Following Mohs Surgery and Reconstruction

AUTHORS: Christian L. Baum, MD; Christopher J. Arpey, MD

INSTITUTION: Department of Dermatology, University of Iowa Hospitals and Clinics, Iowa City, IA, United States

Purpose: The nasal valve is often altered during Mohs surgery and reconstruction. As a result of nasal valve insufficiency (NVI), patient morbidity may be limited at best to a sensation of nasal fullness and, at worst, to a physiologically significant diminution of airflow. Therefore, a working knowledge of the nasal valve and management of NVI may facilitate optimal clinical outcomes and patient satisfaction. Readily applicable clinical pearls regarding the nasal valve will be reviewed in order to provide a practical understanding of nasal valve anatomy and physiology, a framework for perioperative assessment, and recommendations for surgical management.

Design: Anatomy and physiology pearl: Soft tissue is a key structural component of the nasal valve.

The nasal valve is a dynamic structure that may move physiologically with sufficiently deep inspiration. It imparts the locus of highest resistance in the respiratory system. Although the precise boundaries and components of the valve have been debated from a physiologic and a surgical perspective, a reasonably practical view may consider the entire valve as being composed of an internal and external valve. The internal valve is formed by the anterior caudal edge of the upper lateral cartilage the septum while the external valve is formed by the fibrofatty tissues of the alar lobule and overlying skin, the lateral crus of the alar cartilage, the caudal septum, and the piriform aperture. The corresponding surface landmarks of the valve may be approximated by the distal lateral nasal sidewall, the alar groove, and the alar lobule.

Preoperative assessment pearl: A thorough preoperative evaluation may facilitate identification of patients at high-risk of NVI. At a minimum the surgeon should take into careful consideration the native structure and rigidity of the nose, any baseline nasal valve dysfunction, and the precise anatomic location of the tumor. Several methods have been described to assess nasal valve function, including the Cottle test and Adamson nasal patency test. Patients at high risk for nasal valve impingement include those with long, thin noses, a deviated septum, atrophy of the intrinsic nasal muscles, and tip ptosis. Specific tumoral characteristic that impart an increased risk of nasal valve collapse include: 1.) lesions or defects that cross the alar crease; 2.) lesions greater than 1 cm in diameter on the ala or lateral sidewall and within 1 mm of the alar crease.

Surgical management pearl: NVI may develop despite complete preservation of native cartilage.

Though surgical loss of nasal cartilage is likely the most obvious risk for NVI, other, more subtle factors may occur intraoperatively. In our practice, we have identified at least two settings in which NVI may develop even though native cartilage may be preserved. First, tumor extirpation may lead to sufficient loss of fibrofatty, soft tissue, and intrinsic nasal muscle to compromise the structural integrity of the nasal valve, resulting in NVI. In such cases we have found the application of a polypropylene suspension suture to the medial cheek to be useful in mitigating NVI. This technique decreases the morbidity associated with harvesting a cartilaginous graft while affording more predictable results. In another setting, NVI may develop as a result of sub-optimally placed tension vectors during reconstruction, rather than as a direct consequent of tumor extirpation. In such cases, re-orientation of the tension vector or, perhaps, consideration of another reconstructive option may be necessary. Thus, we recommend careful and periodic assessment of nasal valve patency during all phases of Mohs surgery and reconstruction.

Conclusion: The nasal valve may be compromised during Mohs surgery solely due to sufficient soft tissue loss, or as a direct result of reconstruction. Awareness of the nasal valve at all times, even when native cartilage has been preserved, may facilitate avoidance of NVI, minimize postoperative morbidity, and improve patient satisfaction.

1:26 – 1:34 pm

PRESENTER: David E. Geist, MD

TITLE: A Reconstructive Pearl: The "Bottom-Up" Cheek Advancement Flap

AUTHORS: David E. Geist, MD; Dori Goldberg, MD; Jason D. Givan, MD; Mary E. Maloney, MD

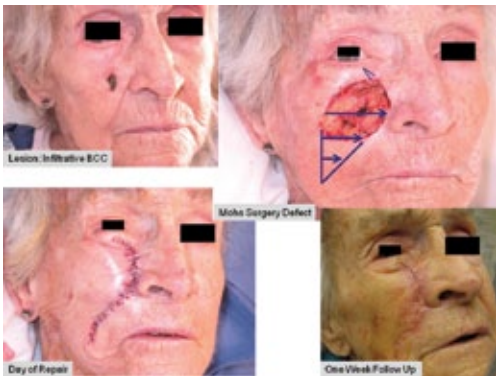
INSTITUTION: Dermatology, UMass Medical School, Worcester, MA, United States

Purpose: Large medial cheek and combined nasal sidewall-cheek defects can be challenging to repair. A classic approach is to use a laterally based advancement or rotation flap with a horizontal infraorbital incision. A disadvantage of this approach is long-lasting residual eyelid edema and a large flap. When the defect extends onto the nasal sidewall, an additional challenge is effectively tacking the flap down to prevent tenting over the melonasal junction.

Design: An alternate approach to these defects is a modified cheek advancement flap in which an inferior redundancy is designed and immediately removed as the first step. The flap and wound are then undermined without releasing the superior pole of the flap. The closure is then performed from the "bottom-up" placing deep and superficial sutures from the inferior pole upwards gradually closing the defect. Tacking sutures can be placed along the melonasal junction either to maxillary periosteum, if it can be reached, or simply to subcutaneous tissue and/or SMAS and tightened variably to recreate the appropriate contour and avoid tenting. With this contour recreated, nasal sidewall portions of the defects can be closed as well.

During the closure, the relatively elastic skin of the superior cheek and lower eyelid tends to stretch allowing closure of the superior pole, again without a releasing incision. A small burrows wedge or M-plasty can be performed at the medial lower eyelid, healing almost imperceptibly. There is minimal residual eyelid edema and the overall suture lines are shorter. In a short case series there have been several excellent cosmetic and functional outcomes. In one case under high tension, hypertrophic scarring was seen along the suture line.

Conclusion: The "bottom-up" cheek advancement flap offers an alternative approach for repairing large cheek and cheek-nasal sidewall defects. Advantages include shorter scar lines and limited eyelid edema versus traditional approaches.



"Bottom-up" cheek advancement flap: A large inferior cone is taken initially. Then deep sutures are placed from bottom to top. Only a small superior cone is needed on the eyelid to complete the closure.

1:34 – 1:42 pm

PRESENTER: Jeremy Cook, MD

TITLE: Use of the Temporary Suspension Suture in Melolabial Interpolation Flap Nasal Reconstruction: A Tool to Prevent Distal Flap Necrosis and Dehiscence

AUTHORS: Jeremy Cook, MD; Sarah Schram, MD; Peter K. Lee, MD, PhD

INSTITUTION: Dermatology, University of Minnesota, Minneapolis, MN, United States

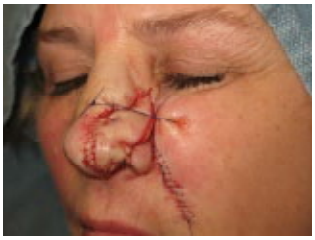
Purpose: Nasal defects involving the inferior third of the nose can be challenging to repair. For extensive or complex defects, reconstruction utilizing distant flaps is often necessary. The melolabial interpolation flap, and variations thereof, has been reported to provide adequate tissue match in terms of color, texture, and thickness, while preserving nasal architecture. Necrosis of the distal flap may complicate this repair, however, and in the authors' experience, often results from tension at the distal margin. Here we present a series of 6 cases of melolabial interpolation flap repairs of nasal defects in which temporary suspension sutures were placed to reduce tension and thereby prevent distal flap necrosis and dehiscence.

Design: We used the melolabial interpolation flap with placement of a temporary suspension suture for closure of 6 medium to large nasal tip and alar defects generated after Mohs micrographic surgery. After proper positioning of the flap, a single 3-0 polypropylene suture was passed through the skin into the subcutaneous tissue lateral to the flap donor site and then again over the nasal dorsum, where a knot was tied to secure it. In this manner, tension was displaced from the distal flap margin to the temporary suspension suture. After three weeks, the suspension suture was removed and takedown of the melolabial interpolation flap was performed in the typical fashion.

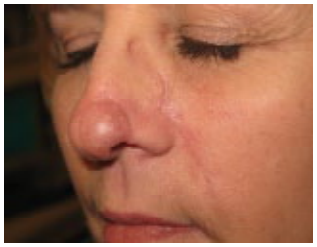
Summary: All patients in our series had successful reconstructions. Restoration of nasal architecture and good cosmetic outcomes were obtained in all cases. There were no cases in which necrosis or dehiscence

of the distal flap occurred. No complications related to placement or removal of the temporary suspension sutures was observed.

Conclusion: Previously described as a method to prevent ectropion in oculoplastic procedures, the temporary suspension suture was used in our series to reduce tension across melolabial interpolation flaps used in nasal reconstruction. In contrast to the axial blood supply of the paramedian forehead flap, the melolabial interpolation flap is a random-based flap and has a more tenuous blood supply. The additional effect of gravity on the flap may further compromise blood flow to the distal margin, resulting in an increased susceptibility to excess tension. We found the temporary suspension suture to be an effective tool for reducing tension across the distal flap margin and preventing associated necrosis and dehiscence.



Temporary suspension suture placement at time of flap repair.



Four weeks status/post flap takedown and removal of temporary suspension suture.

1:42 – 1:50 pm

PRESENTER: Juan Vasquez, MD

TITLE: Curvilinear Advancement Flap for Infraorbital Defects: A Case Series

AUTHORS: Juan Vasquez, MD; Oliver Perez, MD; Hakeem Sam, MD, PhD

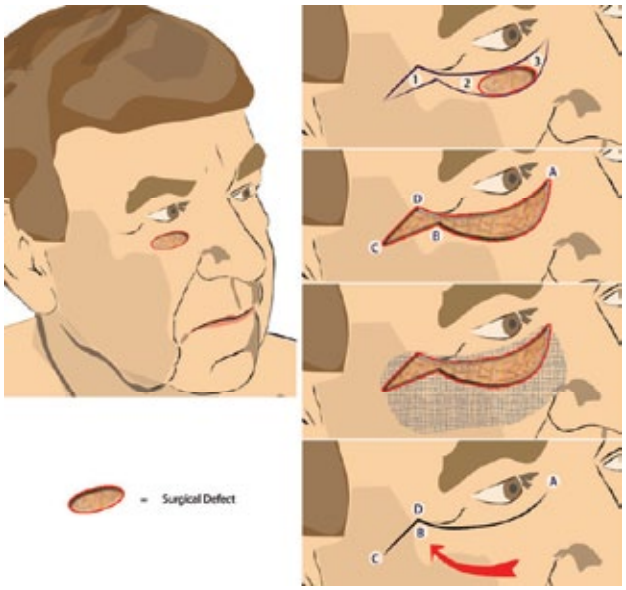
INSTITUTION: Dermatology, University of Pittsburgh, Pittsburgh, PA, United States

Purpose: Infraorbital defects from surgical excisions arise commonly and numerous methods for closure of these lesions exist. However, many befitting repairs for this area result in less-than-ideal geometric scars, while others are rather tedious to execute. We describe an alternative flap for closure which is aesthetically pleasing, functional, and avoids either ectropion or lower eyelid traction. Our closure is also less involved than others flaps.

Design: We present a case series of 5 patients with defects in the infraorbital region repaired by the curvilinear advancement flap.

Summary: Functional and aesthetic outcomes were excellent. No serious complications were encountered.

Conclusion: This flap enhances the dermatologic surgeon's repertoire and should be considered for appropriately located lesions found in the infraorbital cheek, close to the lower eyelid.



1:50 – 1:58 pm

PRESENTER: Yaohui G. Xu, MD, PhD

TITLE: Bilateral Transposition Flap for Reconstruction of Circular Mohs Surgery Defects

AUTHORS: Yaohui G. Xu, MD, PhD; Stephen N. Snow, MD

INSTITUTION: Dermatology, University of Wisconsin, Madison, Madison, WI, United States

Purpose: Bilateral transposition flap, also described as a double opposing semicircular flap, a modified opposing Z-plasty, has been proven reliable and elegant in the reconstruction of circular defects in various body parts. We propose that it is likely underutilized in daily practice due to the relatively complicated preoperative planning and the lack of experience in comparing to other more commonly conducted closures. We report our successful experience using symmetric or asymmetric bilateral transposition flap for closure of large circular defects on the face and neck in 12 patients.

Design: All defects were the result of Mohs micrographic surgery. The defects were located on the forehead, brow, nose, chin, cheek, ear lobe, temple, and neck, ranging from 1 to 4 cm in size. Bilateral transposition flaps were designed to orientate opposing parallel straight lines in the junction of cosmetic subunits and relaxed skin tension lines. Flaps were transposed to the circular defect and then sutured.

Summary: All 12 patients had successful reconstruction with good cosmetic outcome assessed immediately and long-term up to one to three years. There were no flap failures, infection, dehiscence, or necrosis. There was only one patient who was not entirely pleased with her scar on the nasal dorsum due to mildly asymmetric elevation of the alar rim.

Conclusion: In our experience, the bilateral transposition flap is a valuable option providing a functionally and aesthetically pleasing reconstruction of circular defects on the face and neck. It is particularly useful when there is insufficient unilateral donor skin. Having techniques that

use bilateral donor skin increases the options for closure of large defects. Additionally, a utilization of modified Z-plasty principles permits reliable cosmesis by minimizing the later contracture of the scar.

1:58 – 2:06 pm

PRESENTER: Galen H. Fisher, MD

TITLE: Interpolated Paranasal Flap: An Advantageous Alar Reconstructive Option for Selected Defects

AUTHORS: Galen H. Fisher, MD[1]; Joel Cook, MD[2]

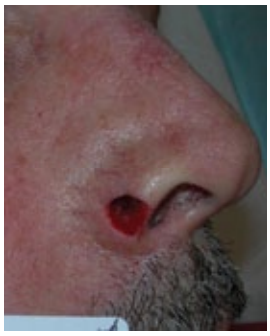
INSTITUTIONS: 1. Galen Fisher, Laser & Skin Surgery Center of Richmond, Richmond, VA, United States 2. Dermatologic Surgery, Medical University of South Carolina, Charleston, SC, United States

Purpose: Alar reconstruction is often accomplished with superiorly based melolabial interpolation flaps. In men this can be problematic due to transfer terminal hairs to the nose. To circumvent this problem we have used an inferiorly based paranasal interpolation flap that sidesteps the issue of terminal hair transfer and has fewer tendencies towards medial cheek distortion when compared to the traditional interpolated melolabial flap.

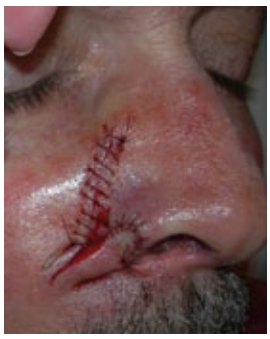
Design: Presentation of two representative cases where this flap was used to fix a partial and total alar skin subunit loss.

Summary: To date the presenting author has used this flap in well over 50 patients and has had no significant complications such as infection, hemorrhage, necrosis or pin cushioning. It is a fast reconstruction to execute, reliable vascularity and can be used for a variety of defects with a high degree of predictability.

Conclusion: A superiorly based paranasal interpolation flap adds a versatile and reliable option to the reconstructive repertoire of the contemporary Mohs and reconstructive surgeon.



Alar defect



Interpolated paranasal flap in place

2:06 – 2:14 pm

PRESENTER: Justin J. Vujevich, MD

TITLE: Digital Photography Mohs Mapping for the Electronic Health Record

AUTHORS: Justin J. Vujevich, MD[1]; Arash Kimyai-Asadi, MD[2]; Leonard H. Goldberg, MD[2]

INSTITUTIONS: 1. Vujevich Dermatology Associates, PC, Pittsburgh, PA, United States 2. DermSurgery Associates, PC, Houston, TX, United States

Purpose: Accurate mapping is crucial to the Mohs surgeon to orient removed tissue and to identify residual neoplasm for subsequent stages. While the majority of Mohs surgeons use a pen and paper for Mohs mapping, digital photography Mohs mapping is an effective alternative, particularly in the age of electronic health records.

Design: We describe our six-year experience with digital photography Mohs mapping. After the first stage is excised, the tissue is placed on non-stick gauze (with a notch at 12 o'clock for anatomic orientation) and photographed adjacent to the Mohs surgical defect. Using the pre-installed Microsoft Windows Paint program and computer mouse, the histologist marks on the same photograph where the tissue was stained. After the slides are processed, the Mohs surgeon uses the Paint program and computer mouse to mark any remaining neoplasm on the same photograph. All digital photographs can be opened, modified, and imported into the electronic health record on any computer desktop in the practice using a shared external hard drive.

Summary: Advantages of digital photography Mohs mapping include superior tissue orientation, easy storage of images, quick retrieval and interpretation of Mohs maps, and low-cost of equipment. Disadvantages include a reliance of an operating computer and the learning curve of training your staff.

Conclusion: Digital photography Mohs mapping is an easy, accurate, cost-effective means of providing tissue orientation and assessing surgical margins for the Mohs surgeon.

2:14 – 2:22 pm

PRESENTER: Paul J.M. Salmon, MD

TITLE: The Nasal Sidewall Rotation Flap: A Workhorse Flap for Small Defects of the Distal Nose

AUTHORS: Paul J.M. Salmon, MD[1]; Eugene Tan, MD[2]; Neil J. Mortimer, MBChB[1]; Syed W. Hussain, MD[1]

INSTITUTIONS: 1. Dermatologic Surgery Unit, Skin Cancer Institute, Tauranga, New Zealand. 2. Dermatology Department, Waikato Hospital, Hamilton, New Zealand

Purpose: Skin cancers of the nasal tip present a challenge for the dermatologic surgeon. The bilobed flap has widely been utilized as the 'workhorse' flap for such defects but requires meticulous design and may be complicated by a tendency for pin-cushioning.

We describe the use of the nasal sidewall rotation flap for reconstructing defects on the nasal tip.

Design: A retrospective analysis of the Mohs micrographic surgery database over a 4 year period was performed. All cases where the nasal sidewall rotation flap was used were identified. Defect location, size and any post-operative complications were noted. All patients were reviewed at the time of suture removal and at 6-weeks.

Summary: There were 65 cases in total (19 men and 46 women). Their age ranged from 39-86 years old with a mean of 60.5 years (median age 59 years old). Defect size varied from 0.4 cm to 2.0 cm in diameter with the majority (63%) measuring 1.0-1.4 cm. Good to excellent results

were seen in all patients and postoperative complications were uncommon and minor.

Conclusion: The nasal sidewall rotation flap is a versatile and useful alternative for reconstructing surgical defects of the nasal tip.

2:22 – 2:30 pm

PRESENTER: Lorraine Jennings, MD

TITLE: Metastatic Nasopharyngeal Carcinoma Presenting as a Soft Tissue Scalp Tumor: Cautionary Tales in Two Patients

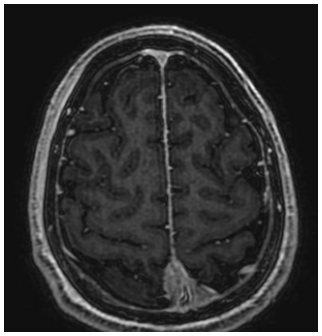
AUTHORS: Lorraine Jennings, MD; Chrysalyne D. Schmults, MD

INSTITUTION: Mohs micrographic surgery center, Brigham and Women's Hospital, Harvard Medical School, Jamaica Plain, MA, United States

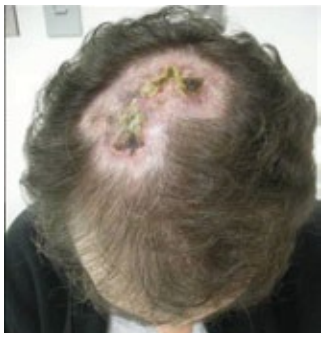
Purpose: Metastatic carcinoma of nasopharyngeal origin should be considered in patients presenting with rapidly growing soft tissue tumors of the scalp.

Design: Two patients present with a similar history of rapidly growing tumors of the scalp over three months. A 50-year old gentleman with a past history significant for right tonsillar squamous cell carcinoma (SCC) two years ago and a 70-year old lady with a history of nasopharyngeal SCC nine years ago, both treated with chemoradiation. Initial histology of the scalp tumors reported basal cell carcinoma (BCC) and SCC respectively and patients were referred for Mohs surgery. On review, the gentleman mentioned severe headaches, while the lady was asymptomatic. Imaging work-up revealed intracranial extension of both subcutaneous masses, erosion through the calvarium with parenchymal compression and, in the gentleman, involvement of the superior sagittal sinus with associated non-occlusive clot, warranting urgent surgical decompression due to high stroke risk. Repeat biopsies were performed in both patients and histology was compared with the original biopsy results. Both confirmed infiltrative squamous carcinoma, consistent with metastasis from a nasopharyngeal primary.

Conclusion: These cases demonstrate that rapidly growing soft tissue tumors of the scalp may represent secondary metastatic spread from an ENT source. One should consider repeat biopsy and appropriate radiological imaging in the management of these tumors



Non-occlusive clot in the posterior aspect of the superior sagittal sinus (arrow) - Surgical emergency due to stroke risk.



Rapidly growing tumor of the scalp over 3 months.

11:04 – 11:12 am

PRESENTER: Larisa Ravitskiy, MD

TITLE: Cost Analysis: Mohs Micrographic Surgery

AUTHORS: Larisa Ravitskiy, MD[1]; David G. Brodland, MD[2]; John A. Zitelli, MD[2]

INSTITUTIONS: 1. Dermatology, OSU Medical Center, Columbus, OH, United States 2. Dermatology and ENT, University of Pittsburgh, Pittsburgh, PA, United States

Purpose: As the incidence of skin cancer continues to increase following the trend of our aging population, delivery of cost efficient skin cancer treatment is a top priority. As with any therapeutic intervention, the intent is to achieve high cure rates, with minimal morbidity and cost effectiveness. Attempts to control costs have resulted in repeated re-examinations of relative values for physician's work and practice expenses as well as policy changes such as the loss of exemption of Mohs micrographic surgery (MMS) from the multiple surgery reduction rule (MSRR).

Design: We compared the costs associated with removal of skin cancers using each of four methods: (1) MMS, (2) Office-based standard surgical excision (SSE) with permanent margin control, (3) Office-based SSE with frozen margin control followed by permanent margin examination, and (4) Ambulatory surgical center (ASC)-based SSE with frozen margin control followed by permanent margin examination. SSE margins were based on current recommendations of National Comprehensive Cancer Network. Subsequently, the simplest and most functionally and cosmetically pleasing reconstruction of the resulting SSE defect was designed. An assumption was made that all SSE defects would be reconstructed. The plan was recorded and coded based on preoperative determination of clinical tumor and excision margins. Next, MMS was performed on all tumors and codes for MMS and reconstruction, if performed, were recorded. Costs for actual MMS and calculated costs for all SSE were calculated based on 2009 CPT and, when applicable, CMS ASC fees. For patients with multiple tumors, the MSRR was applied. Based on historical estimates, 11% of tumors treated with SSE and permanent sections margin control would be expected to have positive margin(s). The cost of subsequent re-excision and reconstruction for tumors with positive margins was added to the total cost of treatment. Based on prior studies, 21% of tumors treated with SSE and frozen sections margin control would have positive margin(s) thus translating into 1.21 stages to clear. It was presumed that the final margin would be evaluated with permanent sections to confirm tumor clearance. Tumor recurrence was included in the calculations as well: 10.1% of SSE tumors and 1.0% of tumors treated with MMS would recur. The cost of treating recurrences with MMS (equal to the average cost of Mohs surgery calculated herein) was added to the final estimate.

Summary: A total of 344 patients with 406 tumors were included in the study. Of 344 patients, 12.5% had multiple tumors. Data on previous treatment were available on 379 tumors: 341 (90%) were primary and 38 (10%) were recurrent. An average tumor was cleared in 1.6 stages (median 1.0; range 1-8), with nearly 60% of patients cleared in one stage. Of tumors treated with MMS, 37.9% were allowed to heal by secondary intention, while another 37.5% were closed primarily (complex or intermediate linear closures). Only 13.8% and 8.9% of MMS defects required a flap or graft, respectively. Conversely, due to larger expected size of defects, tumors treated with SSE necessitated nearly 3 times as many flaps and grafts. Complicated repairs, such as two- and more staged procedures, compound and cartilage grafts, were twice as likely to occur in the SSE groups. Of surgical procedures evaluated, MMS was the least expensive at $805 per tumor. Office-based SSEs with permanent margins were more expensive than MMS, but less than office-based SSE with frozen margins ($1026 vs. $1200, respectively) and ASC-based SSE with frozen margins ($2507).

	Cost ($)	Range ($)
MMS	805	545 — 8398
Office excision/permanent	1026	438 — 13459
Office excision/frozen	1200	693 — 13702
ASC excision/frozen	2507	1142 — 16761

Costs for treatment per tumor: MMS (actual), SSE (calculated).

	Nose	Ear	Eyelid	Face	Scalp/ Neck	Trunk/ Extremity	Hands/ Feet	Genitalia
MMS	996	803	1043	876	783	828	652	596
Office SSE/permanent	1219	1347	1330	1143	922	863	1036	886
Office SSE/frozen	1323	1451	1434	1247	1026	967	1140	990
ASC SSE/frozen	3853	4004	4060	2983	2686	2310	3179	2641

Cost for treatment per tumor: MMS (actual), Traditional Excision (calculated).

Conclusion: When adjusted for inflation, the cost of MMS, inclusive of initial work up, biopsy, and 5 year follow up, in 2009 is in fact lower than in 1998 ($1376 vs. $1635, respectively). Based on previously published costs of non-surgical modalities, MMS ($805) is less expensive option (radiation ($2559 to 4558), imiquimod ($959), all SSEs) and only more expensive than electrodessication and curettage ($471 to $652). Low recurrence rates, smaller defects resulting in simpler, less costly repairs or secondary intention healing, and the demonstrated cost effectiveness confirm Mohs surgery as the cornerstone of efficacious and cost effective treatment when compared to standard surgical excision, regardless of place of service (office or ASC) or type of margin control pathology.

11:12 – 11:20 am

PRESENTER: Tina I. Tarantola, MD

TITLE: Prognostic Factors in Merkel Cell Carcinoma

AUTHORS: Tina I. Tarantola, MD[1,3]; Laura A. Vallow, MD[2]; Michele Y. Halyard, MD[4]; Roger Weenig, MD[1]; Karen E. Warschaw, MD [4]; Randall K. Roenigk, MD[1]; Jerry D. Brewer, MD[1]; Clark C. Otley, MD[1]

INSTITUTIONS: 1. Dermatology, Mayo Clinic, Rochester, MN, United States 2. Radiation Oncology, Mayo Clinic, Jacksonville, FL, United States 3. Dermatology, Mayo Clinic, Scottsdale, AZ, United States 4. Radiation Oncology, Mayo Clinic, Scottsdale, AZ, United States

Purpose: To determine factors that impact prognosis in patients with a known primary Merkel cell carcinoma.

Design: A multi-center, retrospective, consecutive study reviewing 240 subjects diagnosed with known primary Merkel cell carcinoma (MCC) between 1981 and 2008 was completed. Data from three academic medical centers was collected and combined for analysis. Each diagnosis was confirmed histologically at one of the three institutions.

Summary: The average age at diagnosis was 69.6 years, and the majority of subjects were male (70%) and Caucasian (98.3% of those reported). Immunosuppressed subjects - those with solid organ transplant, on immunosuppressive medication, or with a diagnosis of CLL or HIV - comprised 13.8% of the patients. The majority of tumors occurred on the head and neck (46.3%), followed by the extremities (37.9%) and the buttock (8.8%). The most common clinical impression was cyst or non-melanoma skin cancer, 11.7% and 10% respectively. The average size at diagnosis was 1.7 cm on the head and neck, and 2.6 cm below the head and neck. At diagnosis, 31.3% were Stage I, 17.1% Stage II, 22.9% Stage III, 2.5% Stage IV, and 26.3% could not be staged based on the current AJCC staging system as no initial tumor size was recorded. Diameter on biopsy histology was available in 46 subjects with stage I or II disease, with median diameter being 7 mm.

Wide local excision was the most common primary intervention, followed by Mohs micrographic surgery. When wide local excision was used, and surgical margins recorded, 1 cm and 2 cm margins were used equally at 39.4%. Histologic nodal evaluation was completed in 120 subjects, 72 with sentinel lymph node biopsy (SLNB), 29 with elective lymph node dissection (ELND), and 40 with therapeutic lymph node dissection (TLND). Of the 120 subjects, 41.7% had positive nodes at diagnosis. Tumor size did not predict nodal involvement. The positive predictive value of a clinical lymph node exam was 79.2% (19/24), with SLNB and TLND used for histologic nodal evaluation. The negative predictive value of a clinical lymph node exam was 75.3% (58/77), with SLNB and ELND used for histologic nodal evaluation. Adjuvant radiation therapy was administered in 107 subjects, 52% of stage I patients and 51.2% of stage II patients. Adjuvant chemotherapy was administered in 30 patients, 19 of which were stage III or IV. Among the 116 stage I and II patients, there were a total of 17 local recurrences all of which occurred within 1.5 years of the primary diagnosis.

A log rank test revealed no statistically significant difference in survival between stage I and II patients. Stage III patients had a statistically significant decrease in survival compared with stage I and II patients. Immunosuppressed patients had a significant decrease in survival with an overall two year survival of 47.9% compared with 74.3% in the immunocompetent.

When combining stage I and II patients for analysis, no statistically significant difference in overall survival or survival free of local recurrence was demonstrated with: histologic diameter less than 7 mm versus greater than 7 mm; male versus female gender; location on head and neck, versus extremities, versus all other locations combined; timely diagnosis versus delayed diagnosis – greater than 90 days from appearance of the lesion; timely treatment versus delayed treatment – greater than 30 days from diagnosis; SLNB versus no SLNB; or ELND versus no ELND. In this same group, those with a history of other cancer demonstrated a statistically significant decrease in overall survival ($p<0.001$), and those with age beyond 70 years demonstrated a statistical trend toward decreased survival ($p=0.064$). Additionally, though there was no significant difference in overall survival between patients treated with local or locoregional radiation therapy versus untreated patients in this group, there was a statistical trend demonstrating improved survival free of local recurrence when locoregional radiation therapy was used versus none or local only ($p=0.089$).

Conclusion: The data presented represents one of the largest collections of data on primary MCC in the literature. Our data confirm the findings of other studies that suggest that MCC of all sizes has metastatic potential, supporting the NCCN recommendations to consider SLNB for all primary MCC. The trend toward survival free of local recurrence demonstrated by stage I and II patients treated with adjuvant locoregional radiation supports recommendations to strongly consider adjuvant radiation for MCC in this group. Because immunosuppressed patients had a worse prognosis, we recommend aggressive treatment of this population, with timely surgical excision and adjuvant radiation. Due to the unpredictable natural history of MCC, we recommend individualization of care based on the details of each patient's tumor and clinical presentation.

11:20 – 11:28 am

PRESENTER: Tracy M. Campbell, MD

TITLE: A Case Controlled Study of Mohs Recurrences and the Role of Surgeon Error and Tissue Processing

AUTHORS: Tracy M. Campbell, MD; Daniel B. Eisen, MD

INSTITUTION: Department of Dermatology, UC Davis Medical Center, Sacramento, CA, United States

Purpose: To determine the role of surgeon error vs. adequate tissue processing in Mohs recurrences.

Design: Our study is a case controlled study looking at Mohs recurrences at an academic center involving 2 Mohs surgeons ranging from 2002-2009. The Mohs recurrences were identified, tallied, and an extensive chart review was done for demographic information. For all 18 recurrences the original slides and Mohs maps were pulled, compared, and analyzed by 2 Mohs surgeons and a dermatopathologist. Parameters were outlined and set for various histotechnician errors, surgeon error, and slide quality. A random sampling of slides without recurrences from 2002-2009 were also analyzed by same physicians and parameters. Each recurrence could fill more than 1 parameter.

Summary: Of the 18 recurrences: 7 were aggressive subtypes, 6 were due to tissue drop out, 5 were inadequate tissue staining, 5 dense lymphoid like inflammation, 4 of them were due to surgeon error, 4 had a large number of stages (>3) (surgeon stage averages 1.78 and 1.64), 3 had less than 100% visibility of the epidermal border, 3 had large specimen size (>4

pieces per stage), 2 had indeterminate cell types, 1 was inadequate tissue processing, 1 was too superficial of a layer (above a scar), and 1 the tissue was folded on all cuts.

None had PNIV, inconsistent staining, too thick of tissue cut, a busy adenexal slide, a residual floater not removed, tumor present deep in the block, or fibrosis without obvious tumor. The random sampling slide analysis is pending. The final data analysis is pending but will be presented at the ACMS meeting.

Conclusion: In this case control study will hope to highlight the role of surgeon error in Mohs recurrences and the importance of adequate tissue processing.

11:28 – 11:36 am

PRESENTER: Bart T. Endrizzi, MD, PhD

TITLE: A Two-year Perspective on the Efficacy of Capecitabine in Tumor Reduction for Transplant Patients

AUTHORS: Bart T. Endrizzi, MD, PhD; Theresa L. Ray, MD; Peter K. Lee, MD, PhD

INSTITUTION: Dermatology, University of Minnesota, Minneapolis, MN, United States

Purpose: This study was initiated to evaluate the efficacy and tolerance of capecitabine in reducing the development of cutaneous squamous cell carcinomas of the skin in transplant patients.

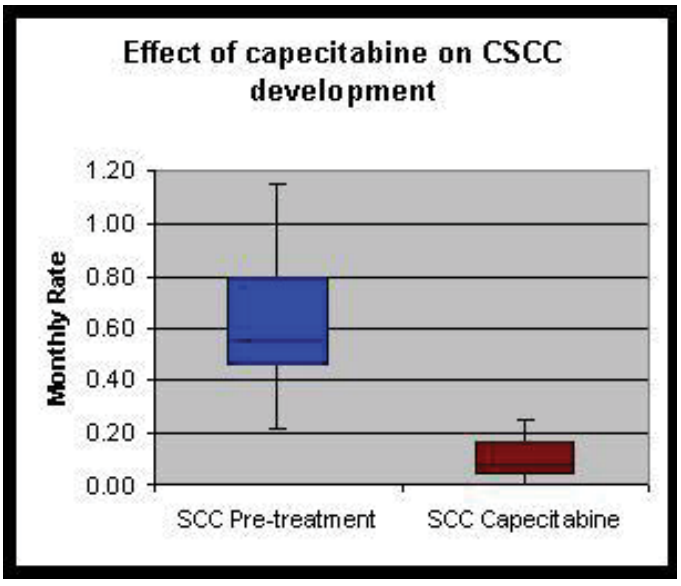
Design: Screening was performed during regular skin checks of a transplant patient population. Patents were identified who had a high level of actinic damage and a rate of cutaneous squamous cell carcinoma (CSCC) development that was refractory to standard therapy. Upon induction into the study other skin cancer adjunctive treatment modalities were halted, and patients were initiated on oral capecitabine. Cryotherapy for precancerous lesions was continued at monthly visits. Initiation on capecitabine was performed in conjunction with the Hematology and Oncology department in a protocol that was previously designed for treatment of colorectal cancer, but with a lower dose of capecitabine. Capecitabine was administered on a 14 days-on/7 days-off schedule for a total of 1000-1500 mg/m2/day, with cycles repeated every three weeks. Monthly follow up to assess side effects of the medication and impact on transplant were performed, including repeat laboratory assessments. The rate of CSCC development was assessed following capecitabine induction with monthly full body skin checks.

Summary: To date, 15 patients have undergone treatment with capecitabine for an average of 11 months (range 4-22 months). Prior to the study the average rate CSCC development was just above 0.6 per month, that represents a rate of greater than 7 tumors per year. (Range of 0.25 to 1.15 per month) This high rate of tumor development reflected the selection process and could be roughly correlated with a high level of immunosuppression and multiple solid organ transplants.

Following initiation on capecitabine the rate of tumor development for all patients was reduced. The overall reduction in the rate of CSCC development was 6-fold, or an average rate of 0.1 per month. (The range in rate reduction was between 2 to 15-fold, with 2 patients not developing any tumors while on the study.) This rate would extrapolate to the development of just over 1 tumor per year for each individual. A general trend was seen where the higher the rate of tumor development prior to study enrollment, the greater the response to capecitabine.

There are common serious side effects reported in approximately 30% of the patients who have used capecitabine, most of which can be treated symptomatically, with dose reduction, or delay of dose administration. Some form of side effects was noted in all patients on capecitabine. Fatigue was the most common side effect seen in the study patients. This side effect ranged from mild to rate-limiting. A few patients also developed neutropenia which necessitated a dose reduction or delay in treatment. Renal function was closely monitored, and 2 patients developed elevation in creatinine. After reducing the capecitabine dose, their creatinine level resolved to baseline and the patients were able to continue with the study. Other common side effects included hand and foot syndrome, mild diarrhea, and abdominal pain.

Conclusion: The use of capecitabine in our study showed a significant reduction in the development of CSCC in transplant patients. This drug does have common side effects. Patients need close monitoring of fatigue, neutropenia, and renal function, and a reduction in dose may need to be performed. A tendency to delay biopsy of inflamed lesions while on capecitabine was evident in a review of clinical visits, which may have an impact on the study results. While the results are very exciting, a future study needs to occur where the patients and the physician are blinded to the treatment to determine conclusively the level of response and the true level of tumor reduction.



11:36 – 11:44 am

PRESENTER: Sheri A. Nemeth, MD

TITLE: The Risk of Wrong Site Surgery and the Mohs Surgeon

AUTHORS: Shari A. Nemeth, MD[1]; Naomi Lawrence, MD[2]

INSTITUTIONS: 1. Dermatology, Mayo Clinic Arizona, Scottsdale, AZ, United States 2. Center for Dermasurgery, Cooper University Hospital, Marlton, NJ, United States

Purpose: Patients presenting for Mohs micrographic surgery in our practice were noted to have significant difficulty in identifying their surgical site on the day of surgery. Unfortunately, records from the referring physician are often inadequate to allow the Mohs surgeon to identify the site based on biopsy records, pathology reports, diagrams, or photographs. Lack of accurate or inaccurate documentation of biopsy sites at a minimum can result in a significant inconvenience for the patients who may need to cancel or delay their surgery until they can return to the referring physician to help identify the biopsy site. The most severe consequence of poor biopsy site documentation is wrong site surgery and eventual tumor recurrence.

Design: A retrospective chart review of 996 Mohs cases in a single physician academic surgical practice was performed. IRB approval was obtained. For each Mohs surgery, the presence of a photograph, measurement from anatomic landmarks, diagram, and location as listed on the pathology report were recorded. The quality of the diagrams was assessed as being of good quality if it allowed easy localization of the cancer based on day of surgery photographs. Poor quality diagrams were assessed as such because they did not provide specific enough anatomic detail to enable localization of the biopsy site. The location listed on the pathology report was compared to the actual anatomic location of the tumor and considered concordant if it accurately identified the site of the lesion versus providing a generalized location (i.e. right ear vs. right tragus).

Summary: In our study, 2.3% patient referrals for Mohs had a photo. A measurement from an anatomic landmark was provided in 0.6%. Diagrams were provided for 16.8% of referred patients. Of these, 49.1% were classified as high quality (i.e. 8.2% of referred patients had diagram of good quality). Overall, 29.1% of biopsy sites on the pathology report specifically and correctly identified the anatomic location of the tumor. Locations on the nose were correctly named on the pathology report 45.3% of the time, 49.1% of ear tumors were correctly named, 18.7% of tumors on the trunk were correctly named, 14.5% of extremity lesions were correctly identified, 0% of genital tumors were correctly labeled.

Conclusion: Few patient referrals to the Mohs practice were accompanied by adequate documentation of the biopsy site. As all lesions must be biopsied prior to Mohs surgery, the pathology report always accompanies the patient referral. Unfortunately, the location on the pathology report only corresponds to the anatomic location of the tumor in 29.1% of cases. The most useful form of documentation is in the form of a photograph which provides detailed skin topography and anatomic landmarks to enable site identification despite patient confusion. Given that the number of patients who struggle to identify their site on the day or surgery, it would be greatly beneficial for referring physicians to provide the Mohs surgeon with accurate and detailed site identifying information to minimize the risk of wrong site surgery which is one reason for "recurrence" after Mohs surgery.

11:44 – 11:52 am

PRESENTER: Emily P. Tierney, MD

TITLE: Mohs Surgery Workforce: Trends in Career Paths, Job Satisfaction and Academic Productivity

AUTHORS: Emily P. Tierney, MD[1, 2]; C. William Hanke, MD[2]; Alexa B. Kimball, MD, MPH[3]

INSTITUTIONS: 1. Dermatology, Boston University, Boston, MA, United States 2. Dermatologic Surgery, Laser and Skin Surgery Center of Indiana, Carmel, IN, United States 3. Dermatology, Harvard University School of Medicine, Boston, MA, United States

Purpose: While many residents and fellows in Mohs surgery express an interest in academics early in their career, departure from academics occurs at the level of many trainees or junior faculty, with an adverse effect on the training and recruitment of the next generation of dermatologic surgeons. We designed a survey to specifically criteria affecting initial selection and subsequent changes in practice setting for Mohs surgeons.

Design: The survey was issued to all members of the ACMS in 2009. A response rate of 58.3% (315/540) was obtained.

Summary: A total of 315 Mohs surgeons completed the survey with a total of 84 female surgeons (26.7%) and 231 male surgeons (73.3%). A total of 52 surgeons (16.4%) were in full time academics, 238 (75.6%) were in full time private practice and 28 were in partial private/academic practice (8.8%). Of those in private practice, 116 (48.7%) had a clinical appointment in academics.

In terms of fellowship training setting, the largest majority of surgeons, 179 (56.9%), trained in Mohs fellowships in academics. A total of 137 Mohs surgeons (53.1%) trained in fellowships in private practice. A total of 72 Mohs surgeons (40.2%) who trained in fellowships in academic practices entered academics whereas, 107 Mohs surgeons (59.8%) who trained in academics entered into private practice. In contrast, Mohs surgeons who trained in private practice settings were significantly less likely to enter academia. For the Mohs surgeons who trained in private practice, 107 (78.1%) entered into careers in private practice and 30 (29.9%) entered into careers in academia ($p<.01$).

For Mohs surgeons entering into academics after fellowship, the strongest factors influencing job selection were an interest in teaching (3.82, on a scale of 0-5, where 0=not important and 5=very important), referral base (3.29), professional ties to institution (3.03). The least important factors were salary (2.25) and opportunities in cosmetics (1.39). For Mohs surgeons entering into private practice after fellowship, the strongest factors influencing job selection were the referral base (3.88), geographic location (3.797), excellent facilities (3.107) and competitive salary (2.89). The least important factors were opportunities in research (.6), teaching (1.099), and cosmetics (1.244).

The survey data also analyzed reasons for departure of surgeons from each practice setting. The most common

reason for departure from academic Mohs surgery to private practice was lack of support from the academic chair (4.00), potential for increased salary (3.47), inadequate support staff (2.57) and facilities (2.03). For Mohs surgeons who left one private practice setting for another, the most common reasons were increased salary (3.3), geographic move (2.28), greater referral base (2.20) and lack of support from colleagues (2.03).

Mohs surgeons were asked to evaluate their overall job satisfaction in each practice setting. The practice settings with the highest satisfaction were solo practice (1.29, 1-5 scale where 1=excellent, 5=poor) and dermatology group practice (1.66), both of which were significantly higher than academics (2.72) ($p<.01$).

In terms of academic productivity, the practice setting with the highest productivity was academics, where the mean number of publications was 24.8, lectures 92.8, clinical trials 2.9 and research grants 1.3 ($p<.01$). However, Mohs surgeons in private practice were also highly academically productive. In private solo practices the mean number of publications was 6.1, lectures 23.5, clinical trials 4.2 and research grants .2. In dermatology group practices the mean number of publications was 5.8, lectures 23.5, clinical trials 1.9 and research grants .7. Interestingly, the same individuals who were highly academically productive in academics were often more productive later in their careers upon moving to private practice.

Conclusion: Our study demonstrates that similar to previous studies in dermatology, pursuit of an academic career is most highly correlated with interest in the academic pursuits of teaching, research and scientific writing. One novel finding uncovered by this study is the reasons for departure from academic Mohs surgery, including lack of support from the academic chair, potential for increased salary in private practice and inadequate support staff and facilities. The majority of Mohs fellowships remain in academic practices or academically affiliated private practices. Training and recruitment of the next generation of leaders and teachers in Mohs surgery is essential to the continued success of the specialty. Novel efforts to recruit and retain academic Mohs surgeons are highly needed. Interestingly, the most senior and tenured Mohs surgeons today are primarily in private practice; however, their early exposure to academics may have ensured their continued pursuit of academic interests throughout their career.

11:52 am – 12:00 pm

PRESENTER: John Starling, III, MD

TITLE: Outcome of Six Years of Protocol Use for Preventing Wrong Site Office Surgery

AUTHORS: John Starling, III, MD; Brett M. Coldiron, MD, FACP

INSTITUTION: The Skin Cancer Center, Cincinnati, OH, United States

Purpose: As future medical legislation brings increased emphasis on both patient outcomes and measures of quality, patient safety is emerging as an integral part of the overall strategy to improve healthcare in the United States. Wrong site, wrong procedure, and wrong person surgery are considered sentinel events (an unexpected occurrence involving death or serious physical or psychological injury) by the Joint Commission and have been identified by the American Academy of Dermatology Association (AADA) Ad Hoc Task Force as major patient safety issues in dermatology. The true incidence of wrong site surgery is difficult to determine as the medical literature on the subject mostly limited to operating room situations. A recent survey of 300 Mohs surgeons revealed that 14% of malpractice cases were due to wrong site surgery. We sought to determine the incidence of wrong site, wrong procedure, and wrong person surgery following implementation of a preoperative protocol in patients presenting for treatment of skin cancer at a high-volume, Joint Commission accredited, tertiary referral center for dermatologic surgery.

Design: Over six years we prospectively collected a series of 7983 cases of Mohs micrographic surgery (MMS) performed on patients presenting for treatment of skin cancer. The three components of the Joint Commission Universal Protocol (i.e. pre-procedure verification of patient identity, site identification, and performance of a "time-out"), were applied to daily patient care. Patient identity was established during consultation prior to the procedure by confirming patient name and date of birth on office provided disposable wristbands placed on patients' left wrists at registration. Patients personally confirmed operative sites in the presence of the operating physician via use of a mirror, and the sites were then both clearly circled and initialed with surgical marker by the dermatologic surgeon performing the procedure. Digital photos of each marked surgical site were taken and printed for inclusion in the medical record. A "time-out" confirming correct patient, correct site, and correct procedure was taken prior to performing all procedures, and recorded with doctor's initials on the reverse side of the patient's micrographic surgery map. Numbers of wrong site office skin surgery were then obtained from prospective mandatory adverse reporting data from the last ten years in the state of Florida and the last six years in the state of Alabama.

Summary: Analysis of 7983 cases of MMS for treatment of skin cancer revealed no cases of wrong site, wrong procedure, or wrong person surgery in a dermatologic surgery practice. Detailed study of mandatory adverse reporting data from ten years in the state of Florida and six years in the state of Alabama revealed one account of wrong site skin surgery performed by a dermatologist.

Conclusion: Wrong site office surgery is a rare but unacceptable event. It is one of the major causes of medical lawsuits in the United States, and was the most frequently reported event in the Joint Commission sentinel event statistics database in 2008. The incidence of wrong site surgery is unknown in the outpatient clinic setting, and there are no universal mandatory reporting guidelines in most states. Integration of a correct surgery site protocol into a daily patient care model is a vital step in preventing occurrences of wrong site dermatologic surgery. Our experiences with integration of a correct surgery site protocol into an everyday patient care model are presented so that hopefully more dermatologic surgeons will include this protocol when adopting a zero-tolerance policy for wrong site cutaneous surgery.