CME Information & Abstract Book

45th Mohs College ANNUAL MEETING

Thursday, May 2—Sunday, May 5, 2013
WASHINGTON, D.C. · OMNI SHOREHAM

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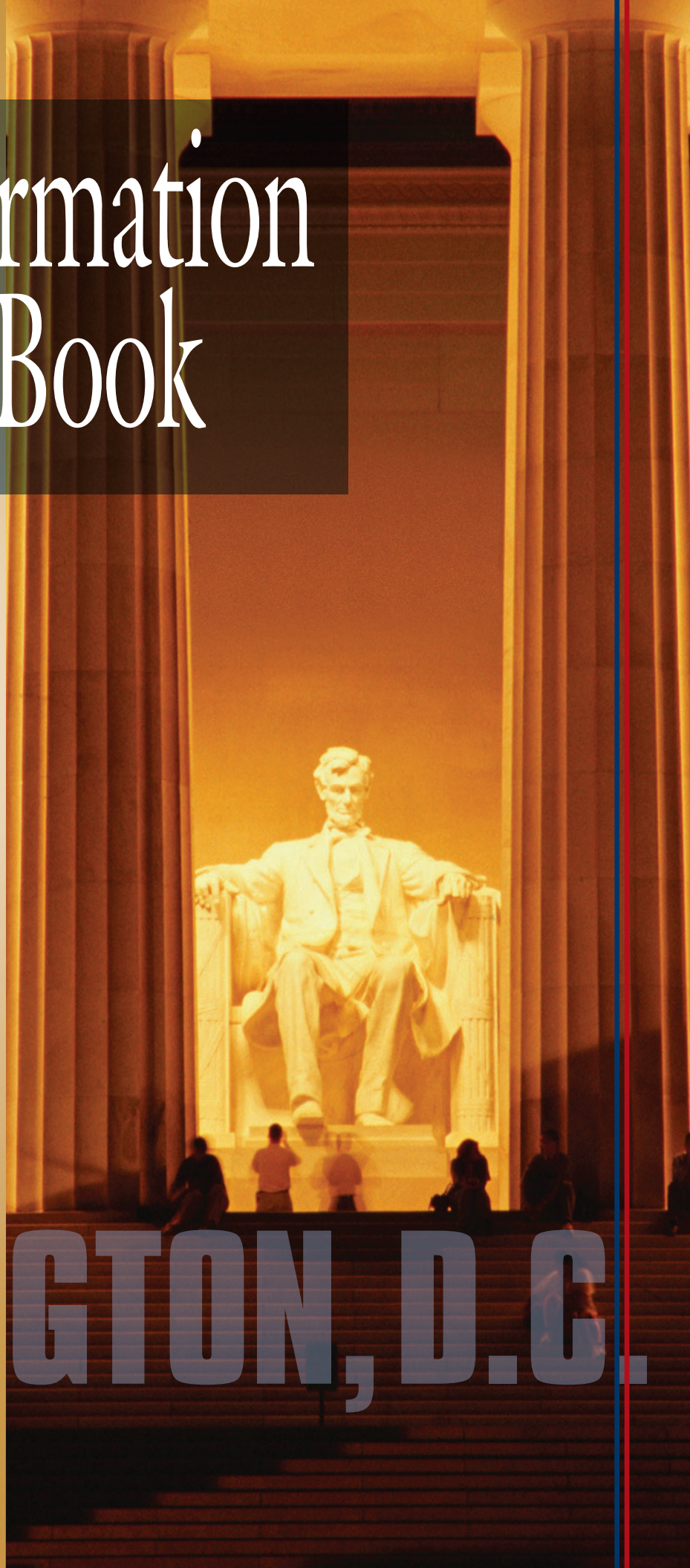

WASHINGTON, D.C.

ACMS American College of Mohs Surgery

45th Mohs College ANNUAL MEETING

Thursday, May 2—Sunday, May 5, 2013
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ACMS *Fellowship trained skin cancer and reconstructive surgeons*

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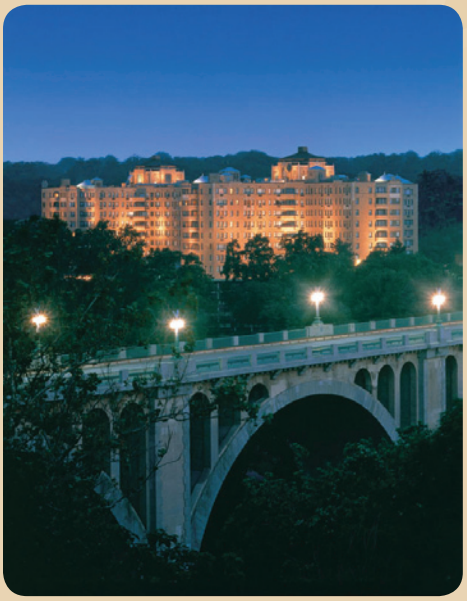

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CME Information

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Credit Designation Statement

The IAHB designates this live activity for a maximum of 24.5 *AMA PRA Category 1 Credit(s)*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

AAD Recognized Credit Approval Statement

The American College of Mohs Surgery Annual Meeting (Program #197100) is recognized by the American Academy of Dermatology for 24.5 AAD Recognized Credit(s) and may be used toward the American Academy of Dermatology's Continuing Medical Education Award. **AAD members must self-report their AAD recognized CME Credits via the AAD Online Transcript Program.**

Physician Assistant Credit

The American Academy of Physician Assistants accepts *AMA PRA Category 1 Credit(s)* ™ from organizations accredited by the ACCME. Physician Assistants attending the Annual Meeting can submit certificates or transcripts showing how many physician CME credits were offered for an activity to the American Association of Physician Assistants and get them "converted" to PA CME credit. The AAPA also grants and counts *AMA PRA Category 1 Credit(s)* ™, but those are specifically for PAs and have to come from a provider accredited by the AAPA. Both groups label their credits Category 1 CME, but the labels, though they read the same, refer to different evaluations.

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You may print your certificate immediately (encouraged) with internet access. No more waiting for the mail! A copy of the certificate will also be emailed to you for your records (check your spam filter and junk email folder if you do not see it).

IMPORTANT!

The online certificate site will be available the end of the day May 5, 2013 through June 13, 2013. After that date, the site will be removed and certificates will no longer be available. If you need a CME / CE certificate, you must complete the evaluation and certificate process prior to that date; otherwise you forfeit your credit for the course.

Please direct any questions regarding the process to: Jillian Davis at JDavis@smithbucklin.com; (651) 789-3722.

Faculty Disclosure Information

Interest Disclosures

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The IAHB requires that each speaker/planner participating in a program designated for *AMA Physician's Recognition Award Category 1 credit(s)*™ disclose any financial interest/arrangement or affiliation with a corporate organization that may impact on his/her presentation (i.e. grants, research support, honoraria, member of speakers' bureau, consultant, major stock shareholder, etc.). In addition, the faculty member/planner must disclose when an unlabeled use of a commercial product or an investigational use not yet approved for any purpose is discussed during the educational activity.

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Tromovitch Award Abstract Session – Thursday, May 2: 10:00 – 11:00 am

(1.00 Credit Hours)

At the conclusion of this session, participants should be able to:
1) Identify recent advances in cutaneous oncology and pathology;
2) Recognize the current state of the practice of Mohs surgery;
3) Recall young investigators' research and scholarly activities.
Moderators: Deborah F. MacFarlane, MD, MPH; Christopher W. Weyer, DO

10:04 – 10:12 am

Presenter: Tracey Newlove, MD

Title: The Safety of Staged Interpolation Flaps After Mohs Micrographic Surgery in an Outpatient Setting: A Single Center Experience

Authors: Tracey Newlove, MD[1]; Joel Cook, MD[1]
Institution: 1. Medical University of South Carolina, Charleston, SC, United States

Introduction: Facial reconstruction requiring multiply staged flaps has traditionally been performed in the operating room under general anesthesia by various medical specialties. Both the number and scope of outpatient surgical procedures under local anesthesia is growing rapidly with an estimated increase from 400,000 surgeries in 1984 to 8.3 million in 2000. With this transition, the safety of performing varied surgical procedures in an ambulatory setting has been questioned. Therefore it is imperative to provide high-quality data that establishes the safety of our medical practices. We sought to establish the safety of performing interpolation flaps under local anesthesia in an outpatient dermatologic surgery clinic after tumor extirpation by Mohs micrographic surgery.

Design: A retrospective chart review was performed of patients who underwent staged interpolation flap reconstruction from June 2000 to November 2012 by a single fellowship-trained dermatologic surgeon in an academic center after tumor clearance by Mohs micrographic surgery. Data was collected on age, sex, tumor location, tumor size and type, defect size, number of stages of Mohs surgery, type of repair as well as any surgical complications. A major complication was defined as death, adverse reaction to anesthetic, emergency medical intervention for any reason or admission to hospital as a result of a surgical complication. Minor complications include non-emergent active bleeding requiring physician intervention, hematoma, infection, partial (>10% of total flap area) or complete (>50% of total flap area) full-thickness flap necrosis or wound dehiscence of at least 2mm.

Summary: A total of 653 interpolated flaps were performed in 639 patients for the treatment of 674 tumors. The types of repairs included paramedian forehead flap (n=291,45%), melolabial interpolation flap (256,40%), retroauricular flap (58,9%), interpolated paranasal flap (40,6%) and Abbe flap or Abbe-Estlander flap (8,1%). Fifty-seven percent of patients were male with an average age of 65. The most common tumors treated were basal cell carcinoma (n=52, 86%), squamous cell carcinoma (n=52, 8%), and melanoma (n=28, 4%). No major complications were observed. Of the minor complications, issues related to bleeding were the most prevalent; active bleeding requiring physician intervention was seen in 8.4% and hematoma formation in 0.4% of flaps. Post-operative infections were seen in 1.7% of patients after the initial surgery and 3.4% after division of the pedicle. Primary or secondary dehiscence was seen in 0.5%. Partial full thickness flap necrosis was seen in 2.3%; total flap necrosis was seen in 0.6%.

Conclusion: The rate of complications associated with dermatologic surgeons performing interpolated flaps in an outpatient setting under local anesthesia is low. Our complication rates are equal to or lower than published complication rates from other surgical specialties.

10:12 – 10:20 am

Presenter: Nima M. Gharavi, MD, PhD

Title: Identifying Genetic Signatures in Subtypes of Squamous Cell Carcinoma

Authors: Nima M. Gharavi, MD, PhD[1]; Rajan P. Kulkarni, MD, PhD[1]; Philip O. Scumpia, MD, PhD[1]; Teresa T. Soriano, MD[1]
Institution: 1. University of California, Los Angeles, Los Angeles, CA, United States

Introduction: Squamous cell carcinoma (SCC) is the second most common cancer worldwide. In solid-organ transplant recipients, SCC is the most common malignancy, presents more aggressively, and with a higher metastatic rate. Conversely, keratoacanthomas (KA) are considered a low-grade subtype of SCC. In patients receiving the new RAF inhibitor vemurafenib, eruptive KAs may develop. The mechanisms by which SCC develop and clinically behave (aggressive vs. low-grade) remain unknown. In these studies, we examined and compared the genetic profiles of KAs, both spontaneous and vemurafenib-induced, as well as SCC, from patients with and without solid-organ transplantation.

Design: Tissue specimens were obtained from normal skin, vemurafenib-induced KAs, spontaneous KAs, and SCC from patients with and without solid-organ transplantation, during surgical treatment of the tumors using Mohs micrographic surgery. Five samples of each type of tumor were analyzed. RNA was extracted from lesional cells to create complementary DNA libraries, which were then screened either using the Affymetrix U133plus 2.0 array or the Illumina GAIIx RNA Seq instrument.

Summary: Unsupervised clustering of the most varying gene expression probes demonstrated that KAs were separable from cutaneous SCC, but that KAs from patients with and without drug treatment were not distinguishable from each other. Genes found to be highly differentially expressed in SCC vs. KA included TP63, MALAT1, FOLR, HAUS5, GMEB1, and ND6. Currently, we are stratifying our data further to identify specific pathways and to determine genetic differences between low and high-risk SCC, particularly from patients with solid-organ transplantation.

Conclusion: SCC has a different genetic profile compared to KAs. KAs, both spontaneous and drug-induced, have similar genetic profiles and should be treated in a similar manner. Molecular signatures may provide clues to the clinical behavior of these malignancies. Additional studies are needed to fully understand the underlying mechanisms of SCC, as well as the potential role for molecular markers in the algorithm/guidelines for surgical treatment and patient risk stratification.

Tromovitch Award Abstract Session – Thursday, May 2: 10:00 – 11:00 am

10:20 – 10:28 am

Presenter: Michelle F. Henry, MD

Title: **Prospective Randomized Study of Would Infections in Cutaneous Surgeries Comparing Clean and Sterile Gloves in the Absence of Prophylactic Antibiotics**

Authors: Michelle F. Henry, MD[1]; Kristina M. Collins, MD[1]; Navid Bouzari, MD[1]; Emily J. Fisher, MD[1]; Mollie A. MacCormack, MD[1]; Suzanne M. Olbricht, MD[1]

Institution: 1. Lahey Clinic/Harvard Medical School, Burlington, MA, United States

Introduction: Mohs micrographic surgery (MMS) is an outpatient procedure that utilizes a multistep surgical approach to skin cancer treatment. This technique is recognized as the gold-standard treatment for high risk non-melanoma skin cancer of the head and neck. Although the major steps regarding the procedure are relatively standardized, many physicians differ in their choices regarding the use of sterile gloves or nonsterile, clean gloves during the reconstruction phase of the procedure. Though sterile technique continues to be favored, studies supporting this practice are lacking. OBJECTIVE: To evaluate whether there is a difference in the infection rate when using clean, nonsterile gloves versus sterile gloves during the steps of wound reconstruction phase of MMS.

Design: This is a prospective patient-blinded single-institution study. To date, we have randomized 402 patients undergoing MMS. Data on tumor type, anatomic location, number of Mohs stages, closure type, size of final defect, and type of glove used were documented and analyzed.

Summary: Five clinical infections were identified. Four infections occurred in the sterile glove arm and one in the clean glove arm. Of the 5 clinical infections, four (three sterile and one clean) had culture positivity. Overall, there was no greater infection rate when using clean, nonsterile gloves than sterile gloves (p=.99).

Conclusion: Our preliminary results support the use of clean, nonsterile gloves as a safe and cost saving alternative to sterile gloves during the reconstructive phase of MMS. Our study is ongoing, however it has promising results. This is currently the largest study examining the influence of glove type on infection rates and will be powered to detect differences of 1.0% and 3.0% in infection rates, which are within the published infection rates for Mohs procedures. Ultimately this study will help us better understand the rate of infection using clean and sterile techniques and the variables involved, providing guidance and recommendations to improve patient outcomes and reduce healthcare costs.

10:28 – 10:36 am

Presenter: Sheila M. Valentin, MD

Title: **The Utility of MART-1 Immunostains in the Management of Invasive Melanoma and Melanoma In Situ with Mohs Micrographic Surgery**

Authors: Sheila M. Valentin, MD[1,2]; John A. Zitelli, MD[3]; David G. Brodland, MD[3]

Institutions: 1. AdvanceDermatology and Skin Cancer Center, Country Club Carolina, PR, United States 2. University of Puerto Rico, Department of Dermatology, San Juan, PR, United States 3. Zitelli & Brodland, PC, Pittsburgh, PA, United States

Introduction: The primary treatment for cutaneous melanoma (CM) is complete excision. Multiple modalities including wide excision, staged excision, and Mohs micrographic surgery (MMS), have been reported with variable success. MMS has achieved equivalent or superior survival rates, as well as lower recurrence rates, when compared to historical controls treated with wide local excision. Despite the evidence in support of MMS, its use is underutilized and controversial. Those who argue against MMS rely primarily on the presumption of the difficulty of interpreting atypical melanocytes on frozen sections. The use of immunostains like melanoma-associated antigen recognized by T cells (MART-1) alleviates this difficulty due to their melanocyte specificity and easy distinction from background tissue. The use of MART-1 during MMS has been proven to provide equivalent information from that obtained from MART-1 permanent sections and to be less time-consuming and improve the certainty of positive or negative margins when compared to hematoxylin and eosin (H&E) frozen sections. Redefined definitions of a positive margin, as compared to sun-damaged skin, have contributed to overcome the task of evaluating melanocytic proliferations on frozen sections. The purpose of this study is to evaluate the use of MMS with MART-1 in the management of 2,122 in-situ and invasive melanomas from a single institution.

Design: A prospectively collected series of 1,991 patients with 2, 122 CM was studied. Lesions were excised by MMS and frozen-section examination of the margin using MART-1 immunostain. The mean follow-up (n= 1, 709) was 1,334.5 days. Local recurrence rates, overall and disease-specific survival and mortality were calculated. The margin required to clear 97% of the cases was determined.

Summary: The mean patient age was 66.3 years. The most common location was the face (44.7%) and the mean Breslow thickness was 0.39mm. Margins between 12-15mm were required to clear 97% of the tumors. There was a statistically significant difference between margins required for excision for tumors on the head and neck when compared to other locations. There were 15 local recurrences in 14 patients, representing a recurrence rate of 0.7% for primary CM. During the maximum follow-up period of 9.54 years, the disease-specific mortality was 0.80%.

Conclusion: MMS with MART-1 is an effective treatment modality for CM while decreasing the uncertainty of H&E frozen section interpretation. Our results support previous data compiled by experienced Mohs surgeons using MMS with H&E with the additional advantage of easier interpretation.

Table I. Patients characteristics Total number of cases (n=2122)	
Age (n=2122)	
Mean	66.3 years
Median	69 years
Range	12 - 99
Sex (n=2122)	N (%)
Male	1307 (61.6%)
Female	815 (38.4%)
Total	2122
Location (n=2120)	N (%)
0=Palm	2 (0.1%)
1=Face	948 (44.7%)
2=Neck	82 (3.9%)
3=Trunk	455 (21.4%)
4=Extremity	473 (22.3%)
5=Hands/feet	60 (2.8%)
6=Scalp	99 (4.7%)
7=Genital	1 (0.1%)
Unspecified	2
Total	2122
Head & neck	1129 (53.25%)
Other location	991 (46.75%)
Tumor size (cm) (n=2122)	
Mean	1.66 cm (SD= 0.97)
Median	1.5 cm
Range	0.2 – 9.0 cm
Tumor thickness (mm) (n=2117)	
Mean	0.39 mm (SD= 0.90)
Median	0.0 mm
Range	0-10 mm
Tumor thickness by categories (mm)	
0	1269 (59.8%)
<0.76	554 (26.2%)
<1.01	646 (30.4%)
0.76-1.49	157 (7.4%)
1.01-2.00	107 (5.04%)
1.50-3.99	101 (4.76%)
2.01-3.99	59 (2.8%)
>3.99	36 (1.7%)
Unspecified	5
Tumor type (n=2118)	
Primary	1,886 (89.1%)
Recurrent	232 (10.9%)

Table II. Cumulative margins of excision: melanoma in situ (MIS) vs. Invasive melanoma			
Margin to clear	**All (n=2,122)**	**MIS (n=1,269)**	**Invasive MM (n=853)**
≤6mm	1, 637 (77.14%)	970 (76.44)	667 (78.19%)
≤9mm	310 (91.75%)	199 (92.12%)	111 (91.21%)
≤12mm	94 (96.18%)	56 (96.53%)	38 (95.66%)
≤15mm	21 (97.17%)	10 (97.32%)	11 (96.95%)
≤24mm	49 (99.48%)	31 (99.76%)	18 (99.06%)
24.1-50mm	11 (100%)	3 (100%)	8 (100%)
*The distribution of cases by thickness was not statistically significant (p= 0.016)			

Table III. Cumulative margins of excision: Location of MM in the head and neck vs. other locations			
Margin to clear	**All (n=2,122)**	**Head and neck (n=1,129)**	**Other location (n= 991)**
≤6mm	1, 637 (77.14%)	803 (71.12%)	833 (84.06%)
≤9mm	310 (91.75%)	187 (87.69%)	123 (96.47%)
≤12mm	94 (96.18%)	70 (93.89%)	23 (98.79%)
≤15mm	21 (97.17%)	19 (95.57%)	2 (98.99%)
≤24mm	49 (99.48%)	43 (99.38%)	6 (99.60%)
24.1-50mm	11 (100%)	7 (100.00%)	4 (100.00%)
*The distribution of cases according to the location (Head & Neck vs. other locations) was statistically significant (P< 0.0001)			

10:36 – 10:44 am

Presenter: Benjamin Bogucki, MD

Title: Bone Decortication in the Management of Large Scalp Defects

Authors: Benjamin Bogucki, MD[1]; Eva A. Hurst, MD[1]; M. Laurin Council, MD[1]

Institutions: 1. Washington University School of Medicine, St. Louis, MO, United States

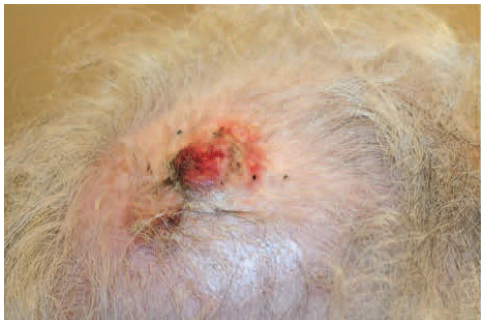
Introduction: Large full thickness Mohs defects on the scalp present a management challenge, particularly when they involve exposed bone. We have found that superficial bone decortication enhances wound healing, is generally well tolerated, and is relatively easy to perform. We will review our experience with bone decortication in the management of large surgical defects on the scalp in a series of 10 patients. We will review surgical technique (including a video of the procedure), post-operative management, and long-term outcomes following the procedure.

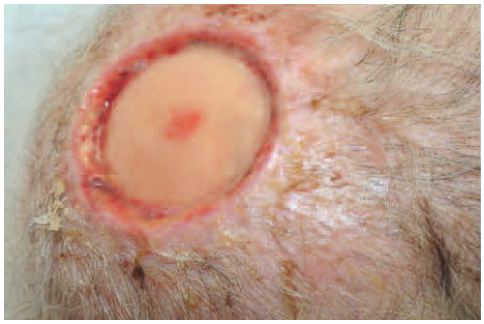
Design: We retrospectively reviewed our experience with bone decortication over a period of 5 years. We identified 10 patients who underwent decortication following Mohs surgery on the scalp. We collected demographic data and reviewed pre and post-operative photos. We reviewed each patient's post-operative course, documenting time to granulation in cases which healed by second intent, and noting graft survival in cases of skin grafting after decortication.

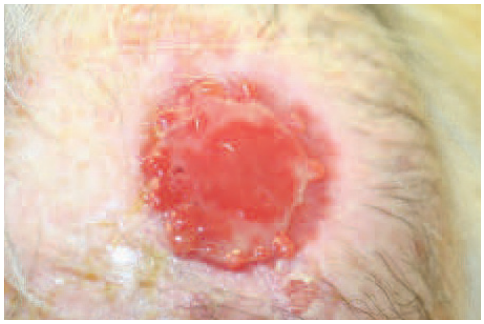
Summary: Our 10 patients ranged from 71 to 94 years of age. Of the 10 tumors, there were 7 squamous cell carcinomas, 1 basal cell carcinoma, 1 atypical fibroxanthoma, and 1 microcystic adnexal carcinoma. Post-operative defects ranged from 2.2 x 2.0 cm to 5.0 x 4.9 cm in size, with exposed bone area ranging from 1.2 x 1.9 cm to 5.0 x 4.9 cm. Six patients were allowed to heal by second intention after decortication. Five of these 6 completely granulated their surgical defects within 7 weeks of decortication. Healing times ranged from 4 to 7 weeks. One patient,

who had exposed bone for greater than 1 year following surgery and radiation, failed to granulate after decortication. Two patients underwent split thickness skin grafting after decortication. One had a full thickness skin graft, and one had a flap and full thickness skin graft combination. In these four patients, the skin grafts were a complete take. The most common complication of bone decortication in our series was post-operative headache. All patients tolerated the procedure well. No infections were noted and there were no serious adverse events.

Conclusion: Bone decortication is a valuable technique in the management of large surgical defects of the scalp following Mohs surgery. It can greatly reduce healing time in cases of second intention wound healing and can also allow for skin grafting. Bone decortication is well tolerated, has low incidence of complication, and provides a fast and effective method to manage difficult surgical defects, especially in patients who may not tolerate a more involved procedure.







10:44 – 10:52 am

Presenter: Richelle Knudson, MD

Title: **Incidence of Lentigo Maligna: A Population-based Study**

Authors: Richelle Knudson, MD[1]; Randall K. Roenigk, MD[1]; Clark C. Otley, MD[1]; Jerry D. Brewer, MD[1]; Kurtis B. Reed, MD[1]

Institution: 1. Mayo Clinic, Rochester, MN, United States

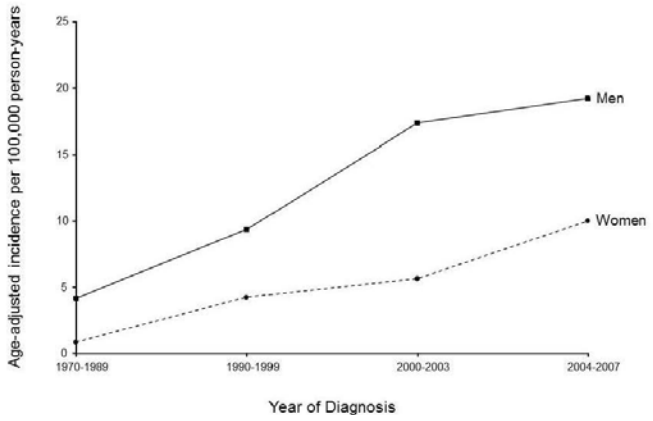
Introduction: Primary objectives included determining the incidence of lentigo maligna in Olmsted County, Minnesota, as well as overall survival and recurrence-free survival rates.

Design: All adult residents of Olmsted County, Minnesota, at their first lifetime diagnosis of lentigo maligna between 1970 and 2007 were identified. The medical records were then reviewed to determine the demographic, clinical, and surgical data.

Summary: Between 1970 and 2007, 147 residents of Olmsted County, Minnesota, were diagnosed with lentigo maligna. The mean age at diagnosis was 67.7 +/- 13.7 years (range: 33-97), with the mean surgical margin being 0.58 +/- 0.25 cm (range: 0.10 – 1.5 cm). Excision was used to treat 111 lesions (77%), Mohs micrographic surgery (MMS) for 26 lesions (18%), cryotherapy for 1 lesion (1%), and 7 lesions (5%) were not treated. The type of treatment changed over time, with MMS becoming more common in more recent years, due to the availability of this procedure. At last follow-up, 44 patients died at a mean of 7.5 years following diagnosis. None died from lentigo maligna melanoma. Estimated overall survival rates (95% CI; number still at risk) at 5, 10, 15, and 20 years following diagnosis were 87% (82-93; 104), 69% (61-79; 46), 59% (49-72; 21), and 49% (37-66; 10), respectively, with a mean follow-up of 9.5 years. Among the 146 patients with data available, 5 developed local recurrence. Estimated local recurrence-free survival rates (95% CI; number still at risk) at 5, 10, 15, and 20 years following diagnosis were 98% (95-100; 100), 96% (91-100; 44), 92% (84-100; 18), and 92% (84-100; 9), respectively. There were too few local recurrences observed to perform statistical tests to compare local recurrence-free survival by year of diagnosis and type of treatment. No patient developed distant metastases during follow-up. The overall age- and sex-adjusted incidence of lentigo maligna among adults was 6.4 per 100,000 person-years, increasing from 2.3 between 1970 and 1989 to 13.7 between 2004 and 2007.

Conclusion: This report documents the incidence of lentigo maligna within a county over an extended timeframe. Our results indicate a statistically significant increase in the incidence of lentigo maligna. MMS became a more common treatment in recent years due to the availability of this procedure in the study region. Because there were no disease-related deaths, there was no difference in survival based on the treatment modality used. The treatment of lentigo maligna in this population was very effective, with a 100% disease-specific survival rate.

Tromovitch Award Abstract Session – Thursday, May 2: 10:00 – 11:00 am



10:52 – 11:00 am

Presenter: Kurtis B. Reed, MD

Title: **Outcomes of Wide Excision and Mohs Micrographic Surgery for Primary Lentigo Maligna**

Authors: Kurtis B. Reed, MD[1]; Richelle Knudson, MD[1]; Jerry D. Brewer, MD[1]; Clark C. Otley, MD[1]; Randall K. Roenigk, MD[1]

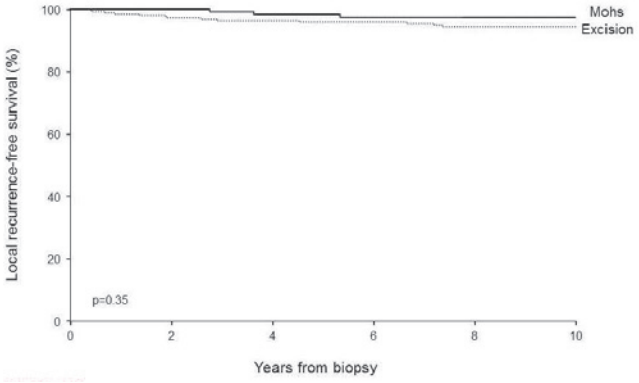
Institution: 1. Mayo Clinic, Rochester, MN, United States

Introduction: Of the multiple treatments available for lentigo maligna, wide excision with 5 mm margins has been the standard of care. Over the last decade, Mohs micrographic surgery, with or without intraoperative immunostaining, has been increasingly utilized for this condition. We retrospectively studied our experience using both procedures.

Design: All cases of primary lentigo maligna treated at our institution from January 1995 through December 2005 were retrospectively studied. For each case, the medical record was abstracted to identify relevant demographic, clinical, and surgical data. The primary endpoint studied was recurrence and final outcome if a recurrence occurred.

Summary: In total, 424 lentigo malignas on 408 patients were treated: 269 (63%) with wide excision and 155 (37%) with Mohs surgery. Thirteen lesions treated with wide excision and 3 treated with Mohs recurred at a mean of 3.2 years. 22 of 269 (8%) lentigo maligna lesions treated with wide excision had a positive margin on pathology and 20 of those 22 underwent reexcision with either wide excision or Mohs surgery. Estimated local recurrence-free survival rates (95% CI) at 5, and 10 years following biopsy were 96% (94-98),and 94% (91-97), respectively, for lesions treated with wide excision and 98% (96-100), and 97% (94-100), respectively, for lesions treated with Mohs. Although lesions treated with wide excision were more likely to recur, this difference was not statistically significant (hazard ratio for excision versus Mohs of 1.84; 95% CI 0.52-6.51; p=0.35). After adjusting for location of tumor, the hazard ratio for excision versus Mohs was 2.37 (95% CI 0.64-8.83; p=0.20). Each of the 16 cases of recurrence was biopsy-proven and subsequently treated with surgery; 6 by standard excision and 10 by Mohs surgery. None of the cases of recurrent lentigo maligna led to disease-specific mortality or significant morbidity.

Conclusion: The presented series of lentigo maligna cases treated at a single institution is the largest described to date. While this study shows a trend towards a decreased risk of recurrence in cases treated by Mohs surgery compared to standard excision, this difference is not statistically significant. All cases of recurrent lentigo maligna were manageable with further treatment and no tumors led to invasive or metastatic disease. Lentigo maligna has a high cure rate with both Mohs surgery and wide local excision.



Scientific Abstract Session – Thursday, May 2: 1:00 – 2:00 pm

(1.00 Credit Hours)

At the conclusion of this session, participants should be able to identify new research developments in Mohs surgery and oncology.
Moderator: Tatyana R. Humphreys, MD

1:04 – 1:12 pm

Presenter: Garrett Lowe, MD

Title: Comparison of Mohs Micrographic Surgery and Wide Local Excision (WLE) for Patients with Dermatofibrosarcoma Protuberans (DFSP)

Authors: Garrett Lowe, MD[1]; Oluwakemi Onajin, MSIV[1]; Randall K. Roenigk, MD[1]; Jerry D. Brewer, MD[1]

Institution: 1. Mayo Clinic, Rochester, MN, United States

Introduction: Dermatofibrosarcoma protuberans (DFSP) is a rare soft tissue tumor characterized by slow infiltrative growth and tendency to recur locally following inadequate excision. Traditionally, deep and wide local excision (WLE) has been considered the gold standard treatment. However, high recurrence rates have been reported after WLE, ranging from 11% to 60% depending on the tumor location and surgical margins. In recent years, Mohs micrographic surgery (MMS) has come into greater favor as an alternative to WLE due to its ability to detect almost entire (if not all) tumor limits and to allow maximum conservation of unaffected tissue. Our objective was to compare the use of MMS and WLE for the treatment of DFSP.

Design: After institutional review board approval 189 patients diagnosed with DFSP between January 1, 1955 and March 31, 2012 at a single institution were identified and included for study. The primary end point was tumor recurrence rate following WLE and MMS. Post-operative defect size and the type of closure were secondary end points evaluated in our study. Patients were excluded from the study if they were not treated at our institution.

Summary: Our retrospective study represents the largest (189 patients) to date comparing WLE and MMS for the treatment of DFSP with long-term follow-up at a single institution. 154 patients with information regarding recurrence were identified. Of these, 91 were treated with WLE and 63 patients were treated with MMS. 41.7% recurred at a mean of 3.4 years following WLE, while only two patients (3.2%) treated with MMS recurred at 1.0 and 2.6 years. Recurrence-free survival rates at 1, 5, 10, and 15 years were statistically higher in patients treated with Mohs ($p<0.001$). Mean post-operative defect size for WLE and MMS were 10.9 ± 4.4 cm and 8.8 ± 5.6 cm, respectively ($p<0.003$). On average, two Mohs layers were required to achieve margin control. Primary closure followed MMS 75% of the time while WLE employed flaps and/or grafts much more commonly (50%).

Conclusion: Our large retrospective review supports the growing body of evidence demonstrating Mohs micrographic surgery is the treatment modality yielding better margin control, lower recurrence rates, and ultimately less morbidity.

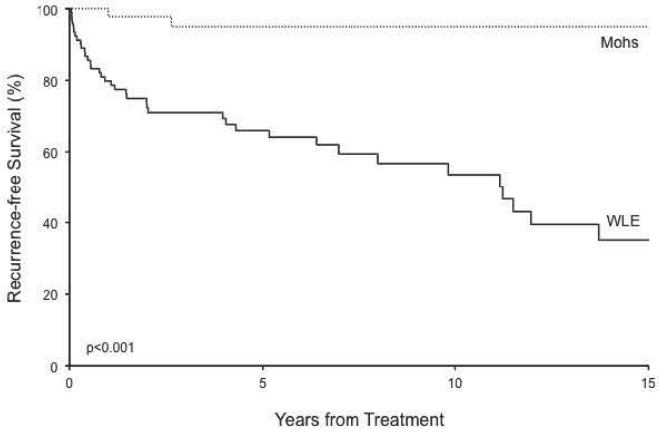


Table 1: Comparison of features by type of treatment, N=187

Feature	WLE N=105	Mohs N=82	P-value
	Mean ± SD (Median; Range)		
Age at diagnosis (years)	40.0 ± 16.9 (39; 3 – 88)	40.2 ± 15.2 (40; 10 – 77)	0.92
Preoperative maximum size (cm; *N=86*)	5.7 ± 2.7 (5.0; 3.0 – 10.0)	6.1 ± 3.1 (5.8; 0.3 – 15.0)	0.79
Postoperative maximum size (cm; *N=107*)	10.9 ± 4.4 (10.0; 4.0 – 22.0)	8.8 ± 5.6 (7.6; 3.1 – 44.5)	0.003
Sex	*N (%)*		
Male	55 (52)	29 (35)	0.020
Female	50 (48)	53 (65)	
Race (*N=159*)			
White	88 (99)	66 (94)	0.24
Black	1 (1)	1 (2)	
Native American	0	1 (2)	
Other	0	2 (3)	
Location category			
Head and neck	24 (23)	10 (12)	0.063
Trunk	38 (36)	45 (55)	
Upper extremity	27 (26)	17 (21)	
Lower extremity	16 (15)	10 (12)	
Side (*N=181*)			
Right	50 (49)	35 (44)	0.61
Left	44 (43)	35 (44)	
Central	8 (8)	9 (11)	
Type of closure (*N=161*)			
Primary	42 (51)	59 (75)	Not Reported
Graft	16 (20)	6 (8)	
Flap	19 (23)	10 (13)	
Secondary	0	2 (3)	
Primary and secondary	0	1 (1)	
Graft and flap	4 (5)	0	
Graft and secondary	1 (1)	1 (1)	
Type of closure category (*N=161*)			
Primary	42 (51)	59 (75)	0.016
Graft	16 (20)	6 (8)	
Flap	19 (23)	10 (13)	
Other	5 (6)	4 (5)	
Pathologic review (*N=186*)			
No	1 (1)	1 (1)	1.0
Yes	86 (99)	78 (99)	
Margins at initial incision (*N=159*)			
Negative	34 (40)	33 (45)	0.56
Positive	51 (60)	41 (55)	
Metastases			
No	102 (97)	82 (100)	0.26
Yes	3 (3)	0	
Muscle or bone involvement (*N=117*)			
No	39 (66)	46 (79)	0.11
Yes	20 (34)	12 (21)	
MRI (*N=103*)			
Not done	23 (45)	40 (77)	0.004
True negative	13 (25)	3 (6)	
False negative	5 (10)	2 (4)	
True positive	10 (20)	7 (13)	
History of skin cancer (*N=168*)			
No	86 (97)	70 (89)	0.044
Yes	3 (3)	9 (11)	
Fitzpatrick (*N=82*)			
1	5 (19)	8 (14)	0.98
2	13 (50)	26 (46)	
3	2 (8)	14 (25)	
4	4 (15)	6 (11)	
5	2 (8)	2 (4)	
History of tobacco exposure (*N=183*)			
No	63 (62)	59 (72)	0.17
Yes	38 (38)	23 (28)	

Table 2: Summary of features at first recurrence for 41 DFSP patients who recurred, N

Feature	WLE N=39	Mohs N=2
Number of recurrences (*N=40*)		
1	22	2
2	11	0
3	1	0
4	1	0
>4	3	0
Location (*N=40*)		
Scalp	2	1
Forehead	3	0
Temple	1	0
Cheek	2	0
Lip	1	0
Neck	1	0
Shoulder	5	0
Chest	4	1
Abdomen	1	0
Back	3	0
Arm	3	0
Forearm	1	0
Leg	1	0
Eye	1	0
Breast	1	0
Ankle	1	0
Groin	2	0
Vulva	1	0
Lungs	1	0
Neck and shoulder	1	0
Thigh and ankle	2	0
Side (*N=40*)		
Right	16	1
Left	16	0
Bilateral	1	0
Central	4	1
Right, left, and bilateral	1	0
Treatment (*N=39*)		
WLE	28	1
WLE and radiation	1	0
WLE and Mohs	1	0
Mohs	7	1
Type of closure (*N=34*)		
Primary	14	0
Graft	7	1
Flap	7	1
Partial	1	0
Graft and flap	2	0
Second intention	1	0

1:12 – 1:20 pm

Presenter: Blake Dowdle, MS III

Title: **Analysis of Clinical Factors That Lead To Improved Efficacy In Treating Lentigo Maligna With Imiquimod 5% Followed By Staged Excision**

Authors: Blake Dowdle, MS III[1]; Mark A. Hyde, PA[1]; Nicholas Blickenstaff, MS III[1]; Glen M. Bowen, MD[1]

Institution: 1. University of Utah, Department of Dermatology, Salt Lake City, UT, United States

Introduction: The primary goal of this study was to determine which clinical factors lead to improved efficacy in treating lentigo maligna (LM) with imiquimod 5% followed by staged excision. Factors that were evaluated included: degree of inflammation after imiquimod therapy, duration of treatment, addition of tazarotene 1% gel, and number of stages required. We also evaluated the difference in the size of margins needed to clear the tumor.

Design: Two hundred ninety-two patients with LM who were treated with imiquimod followed by surgery were retrospectively reviewed, obtaining key data points including, demographics, treatment duration, degree of inflammation, pre-operative tumor size, and post-operative defect size. Inflammation scores were assigned to patients according to the degree of inflammation observed and scaled from 0-3 where; 0 = no inflammation, 1= mild erythema, 2 = moderate erythema, 3 = severe erythema/ erosion. Treatment was given for 1-3 months depending on the degree of inflammation observed. We used two-sample t-tests to assess the statistical significance of inflammation and its effects on surgical outcomes. Logistic regression was used to predict the odds of tumor clearance based on degree of inflammation, months of treatment, pre-operative size and demographics.

Summary: Patients with an inflammation score of 2-3 were less likely to have residual tumor versus those who achieved an inflammation score of 0-1 ($p=0.0005$). Logistic regression showed that patients who achieved an inflammation score of 0-1 were 2.8 times more likely to have residual tumor after the first stage of excision ($p=0.002$). The mean number of stages required for clearance was measured as 1.25 stages (range 1-5), with an average of 3mm. Approximately 80.5% ($n=235$) of patients were clear after 1 stage with a 2mm margin while 95.8% ($n=280$) were clear after 2 stages with a 6mm margin. Patients who achieved an inflammatory score of 2-3 required less stages (1.18) than those with an inflammatory score of 0-1 (1.38, $p=0.015$).

Conclusion: In our retrospective review we showed a significant correlation between the degree of inflammation and the likelihood of having residual tumor. We showed a correlation between the degree of inflammation seen pre-operatively and the post-operative defect size. This surgical margin compares very favorably to the previously reported average requirement of 7.1-9.0 mm for staged excision alone. These findings might suggest a new standard in LM therapy and lead to further studies to evaluate the type of inflammatory infiltrate necessary to create a robust LM response and improved clearance.

1:20 – 1:28 pm

Presenter: Danielle Levine, MD

Title: **Outcomes of Cutaneous Squamous Cell Carcinoma in the Immunosuppressed Versus the Non-immunosuppressed: A 10-year Single Institution Cohort Study**

Authors: Danielle Levine, MD[1]; Pritesh Karia, MPH[1]; Chrysalyne D. Schmults, MD, MSCE[1]

Institution: 1. Department of Dermatology, Brigham and Women's Hospital, Jamaica Plain, MA, United States

Introduction: Immunosuppressed (IS) patients with cutaneous squamous cell carcinoma (SCC) reportedly have more aggressive tumors and worse outcomes than non-immunosuppressed (non-IS) patients. However, few studies directly compare outcomes in these two populations. This current study compares SCC tumor profiles and outcomes in IS versus non-IS patients.

Design: In this retrospective single-institution cohort study, pathology and electronic medical records were reviewed for cases of SCC, clinical and histologic tumor characteristics, IS versus non-IS status, and outcomes of local recurrence (LR), nodal metastasis (NM), death due to SCC (DSD), and non-SCC death. Tumor stage and outcomes of IS and non-IS patients were compared via chi square analysis and Cox modeling.

Summary: The cohort contained 985 patients with 1,832 SSCs. Of these, 143 patients were immunosuppressed [post-organ transplant therapy ($n=58$), rheumatoid arthritis (RA) therapy ($n=36$), chronic lymphocytic leukemia ($n=23$), and other causes ($n=26$)]. The median follow-up time was 50 months (range 2-142). Skin cancer tumor (T) stage was the same in IS and non-IS patients (Table 1). SCC outcomes were also similar between IS and non-IS patients (Table 2). IS patients were significantly more likely to have multiple ≥5 SCCs (22 vs. 3%, $p<0.001$). Patients with ≥5 SCCs had a higher risk of LR and NM compared with patients with <5 SCCs regardless of immune status (hazard ratios (HR) 4.8 and 4.3,

respectively: Table 3). The risk of non-SCC death was nearly 2 fold higher in patients with ≥5 SCCs (HR 1.7).

Conclusion: Regardless of immune status, patients with high-stage SCC do worse than those with low-stage tumors. IS patients are more likely to have multiple SCCs and patients with multiple SCCs do worse, again regardless of immune status. Importantly, patients with multiple SCCs have an increased risk of death from other causes indicating that multiple SCC formation (which is common in the immunosuppressed) may indicate immune dysfunction which adversely impacts overall health and survival.

Table 1. Baseline Patient and Tumor Characteristics

	Immunosuppressed (n=143 patients)	Non-Immunosuppressed (n=842 patients)	*p*-value
Age, mean (range)	66 (34-93)	70 (33-97)	0.011
Gender, male, n (%)	86 (60)	433 (51)	0.054
Number of SCC tumors >1 ≥5	 74 (52) 32 (22)	 189 (22) 22 (3)	<0.001 <0.001
	n=581 tumors	n=1,251 tumors	
Tumor (T) Stage Low (T1, T2a) High (T2b, T3)	 539 (93) 42 (7)	 1179 (94) 72 (6)	0.224

Table 2. SCC Outcomes by Immunosuppresion Status

SCC Outcome	Immunosuppressed n (%) (n=581 tumors)	Non-Immunosuppressed n (%) (n=1,251 tumors)	HR (95% CI)	*p*
Local recurrence	10 (2)	40 (3)	0.5 (0.3-1.2)	0.072
Nodal metastasis	7 (1)	29 (2)	0.6 (0.3-1.4)	0.218
SCC death	2 (0.3)	19 (2)	0.3 (0.1-1.2)	0.059
Non-SCC death	241 (41)	351 (28)	1.4 (1.2-1.7)	<0.001

Table 3. SCC Outcomes by Patients with ≥5 SCC vs. Patients with <5 SCC

SCC Outcome	≥5 SCC, n (%) (n=54 patients)	<5 SCC, n (%) (n=931 patients)	HR (95% CI)	*p*
Local Recurrence	10 (19)	35 (4)	4.8 (2.4-9.6)	<0.001
Nodal Metastasis	7 (13)	29 (3)	4.3 (1.9-10.0)	0.001
SCC Death	0 (0)	21 (2)	1.0 (0.2-5.3)	0.232
Non-SCC Death	26 (48)	237 (25)	1.7 (1.1-2.6)	<0.001

1:28 – 1:36 pm

Presenter: Dhwani S. Mehta, BS

Title: Comparison of Surgical Site Infection Rate with Use of Sterile versus Non-sterile Gloves for Resection and Reconstruction During Mohs Surgery

Authors: Dhwani S. Mehta, BS[1]; Nicole Chambers, BS[1]; Brian Adams, MD, MPH[1]; Hugh M. Gloster, Jr., MD[1]

Institution: 1. University of Cincinnati College of Medicine, Cincinnati, OH, United States

Introduction: Many studies have shown that the surgical site infection (SSI) rate is typically low with Mohs micrographic surgery (MMS), but no set protocol exists as to whether sterile gloves (SG) or non-sterile gloves (NSG) should be used for the resection and reconstruction of the post-operative defect. We compared the SSI rate with the use of SG versus NSG throughout the entire Mohs procedure including the reconstruction with the goal of determining whether SG (compared to NSG) helps prevent SSI during MMS.

Design: Data was collected from November 2011 – May 2012 for Mohs cases in which SG were used and from Jun 2012- December 2012 for Mohs cases in which NSG were used. The same tray was used for the entire procedure including closure for all cases. One Mohs surgeon performed all the cases. Age, gender, tumor diagnoses, anatomic location, area of pre-operative and post-operative defect, type of closure, medications taken, and comorbidities were recorded for each case. Patients on systemic antibiotics at the time of surgery or who received Post-operative antibiotics were excluded from the study. Cases with infection and SSI rate for SG and NSG were also recorded. Chi square analysis was performed to compare infection rates.

Summary: Nine hundred forty two patients accounted for 1004 cases in the SG group, and 941 patients accounted for 1021 cases in the NSG group. Patient demographics and tumor data were all comparable between the two groups. The infection rate was 0.50% for the SG group and 0.59% for the NSG group (p=0.78). The average age and number of stages for infected cases were comparable to the overall cases. The pre-operative and post-operative sizes were higher for both infected groups in comparison to the overall cases undergoing MMS. Most cases were infected with S. Aureus, while one case in the SG group was infected with P. Aureginosa. Finally, the gloves cost for one SG case was $5.66 and $1.63 for one NSG case.

Conclusion: The infection rate with the use of SG versus NSG was almost identical and within the published infection rate of cutaneous surgery procedures of less than 4%. The larger pre-operative and post-operative sizes were more likely to become infected. Also, the cost to use NSG is 3.5 times lower than using SG. Thus, the use of NSG for MMS is a safe and a cost-effective practice even when used for the reconstruction of the defect after Mohs excision.

Table 1: Patient Demographics

	Sterile Gloves	Non-sterile gloves
Total patients	942	941
Total cases	1004	1021
Average age for cases	69.9	70.51
Sex		
Female	414	444
Male	590	577
Smoker	102	80
Smoking not assessed	9	12
Diabetes	132	110
Aspirin	378	373
Other anticoagulation		
Warfarin	79	71
Clopidogrel	43	44
Dabigatran	3	4
Systemic steroids	11	27
Other immunosuppressants	15	13
Other immunosuppressants (≥2)	6	8

Table 2: Tumor Data

	Sterile gloves	Non-sterile gloves
Total skin cancers	1004	1021
Histology of skin cancer		
BCC	676	703
SCC	180	242
SCCis	134	61
Keratoacanthoma	2	4
Malignant melanoma in situ	1	4
Other	10	7
Tumor location		
Scalp	72	61
Forehead	196	166
Cheek/chin	210	203
Eye	64	50
Nose	216	240
Ear	71	95
Lip	36	41
Neck	39	38
Trunk	44	57
Extremities	29	46
Hands/feet	26	24
Pelvic area	1	0
Number of stages		
1	755	737
2	213	240
3	27	34
4	6	9
5	3	1
Avg number of stages	1.29	1.33
Type of Closure		
Primary	618	670
Partial	115	79
Skin Graft	8	16
Skin flap	34	24
Secondary intention	115	140
Plastics Referral	114	92
Avg preop defect size (cm^2)	2.59	2.71
Avg postop defect size (cm^2)	3.5	3.32

Table 3. Comparison of Rate of SSI with the use of sterile gloves vs non-sterile gloves

	Sterile gloves	Non-sterile gloves
Total Cases	1004	1021
Number of Infections	5	6
Rate of Infection	0.50%	0.59%

Table 4. Demographics of Infected Patients in the sterile and the non-sterile group

	Sterile gloves	Non-sterile gloves
Number of cases	5	6
Average age	70.6	69.66
Sex		
Male	5	4
Female		2
Indication		
BCC	4	5
SCC	1	1
Location of tumor		
Forehead	1	
Cheek/chin		2
Eye	1	
Nose		2
Ear	2	
Neck		
Trunk		2
Extremities	1	
Preoperative size (cm^2)	5.27	4.78
Postoperative size (cm^2)	6.92	5.88
Average number of stages	1.2	1.4
Type of closure		
Primary	4	6
Flap	1	0
Number of cases who are smokers	1	1
Medications that patients were on		
Aspirin	2	1
Aspirin and clopidogrel		1
Type of Infection		
S. Aureus	4	6
P. Aureginosa	1	0

Table 5. Cost Difference

	Cost
Sterile gloves	$37.70
Cost per unit	$0.68
Number of Pairs used per case	6 pairs (2 for surgeon, 2 for resident, 2 for MA)
Total cost for 1 case	$5.66
Non-sterile gloves	$13.60
Cost per unit	$0.27
Number of Pairs used per case	6 pairs (2 for surgeon, 2 for resident, 2 for MA)
Total cost for 1 case	$1.63

1:36 – 1:44 pm

Presenter: Theresa N. Canavan, BS

Title: Organ Transplant Recipients with Merkel Cell Carcinoma have Reduced Overall, Disease-specific and Progression-free Survival Independent of Stage at Presentation

Authors: Theresa N. Canavan, BS[1]; Sarah Arron, MD, PhD[1]; Siegrid S. Yu, MD[1]

Institution: 1. University of California, San Francisco, San Francisco, CA, United States

Introduction: Merkel cell carcinoma (MCC) is an aggressive neuroendocrine carcinoma of the skin. Various forms of immunosuppression have been associated with increased incidence of MCC and decreased MCC-specific survival. We sought to identify whether solid organ transplant recipients (SOTR) with MCC had decreased progression-free, disease-specific, and overall survival compared to immunocompetent (IC) patients.

Design: This is a single center retrospective cohort study examining MCC in SOTR and IC controls. Complete medical records were reviewed to collect information pertaining to diagnosis and clinical course. Cox regression models were generated for the outcomes of progression, disease-specific death, and death from any cause, adjusted for patient sex, age at diagnosis, and stage at presentation.

Summary: 8 SOTR with MCC and 89 IC controls were followed for a median follow-up time of 1.12 ± 0.94 and 3.11 ± 2.77 years, respectively. Seven SOTR (87.5%) and 30 IC patients (33.7%) had disease progression during follow up. Four SOTR (50%) and 11 IC patients (12.4%) died of MCC, while 5 SOTR (62.5%) and 30 IC patients (33.7%) died of any cause. Primary tumor location and treatment modalities did not differ significantly between SOTR and IC patients, with the exception of the fact that radiation therapy was used more frequently in SOTR. Solid organ transplantation predicted worse outcomes from MCC, independent of sex, age, and stage at presentation. SOTR had a 4.1-fold increased hazard for progression (95% Confidence Interval (CI) 1.57-10.95, p=0.004), a 10.5-fold increased hazard for all-cause mortality (95% CI 3.06-35.98, p<0.0001) and an 11.9-fold increased hazard for MCC-specific death (95% CI 2.67-53.08, p=0.001), adjusted for sex, age, and stage at presentation. SOTR had decreased 1-year overall survival, 46.8% vs. 88.6%, and decreased 1-year MCC-specific survival, 56.3% vs. 95.2%.

Conclusion: SOTR have a significantly reduced progression-free, MCC-specific, and overall survival compared to IC patients with MCC, even when adjusted for stage at presentation. More research is needed in order to improve MCC outcomes and to determine the best course of follow-up and treatment for this high risk population.

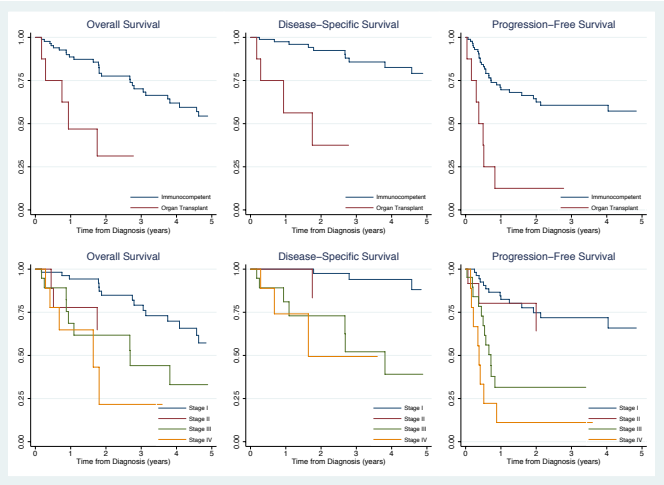


Table 1. Demographics. Data presented as n (%) or mean ± SD. p values obtained by 2-sided Fisher's exact or Wilcoxon rank-sum test.

	Immunocompetent (n=89)	Organ Transplant (n=8)	p
Male	61 (68.5)	6 (75.0)	0.49
Female	28 (31.5)	2 (25.0)	
Age at Diagnosis	72.3 ± 12.3	59.1 ± 7.6	0.004
Stage at Diagnosis			0.09
I	53 (59.6)	2 (25.0)	
II	11 (12.4)	1 (12.5)	
III	18 (20.2)	3 (37.5)	
IV	7 (7.9)	2 (25.0)	
Location			0.35
Head/Neck	49 (55.1)	5 (62.5)	
Trunk	12 (13.5)	0	
Buttock	1 (1.1)	1 (12.5)	
Upper Limb	12 (13.5)	1 (12.5)	
Lower Limb	10 (11.2)	1 (12.5)	
Occult/No Primary	5 (5.6)	0	
Treatment			
Surgery	79 (88.7)	8 (100)	1
Radiation	57 (64.0)	8 (100)	0.05
Chemotherapy	11 (12.4)	1 (12.5)	1
Progression	30 (33.7)	7 (87.5)	0.005
All-Cause Death	30 (33.7)	5 (62.5)	0.11
Disease-Specific Death	11 (12.4)	4 (50.0)	0.02
Followup (years)	3.11 ± 2.77	1.21 ± 0.94	0.04

Table 2. Multivariate survival models.

Progression		Hazard Ratio	p	95% CI
	Organ Transplant	**4.14**	**0.004**	**1.57 - 10.95**
	Male	1.07	0.86	0.51 - 2.28
	Age at Diagnosis	1.03	0.09	1.00 - 1.06
	Stage			
	I	ref		
	II	1.13	0.7	0.37 - 4.47
	III	3.64	0.002	1.59 - 8.33
	IV	9.30	<0.0001	3.47 - 24.95
			(linear test for trend p <0.0001)	

Disease-Specific Death		Hazard Ratio	p	95% CI
	Organ Transplant	**11.91**	**0.001**	**2.67 - 53.08**
	Male	3.94	0.08	0.81 - 19.10
	Age at Diagnosis	1.01	0.6	0.96 - 1.07
	Stage			
	I	ref		
	II	0.94	0.6	0.10 - 8.70
	III	6.11	0.004	1.76 - 21.23
	IV	15.43	0.001	2.87 - 83.10
			(linear test for trend p = 0.0004)	

Overall Mortality		Hazard Ratio	p	95% CI
	Organ Transplant	**10.50**	**<0.0001**	**3.06 - 35.98**
	Male	4.71	0.004	1.62 - 13.68
	Age at Diagnosis	1.06	0.005	1.02 - 1.10
	Stage			
	I	ref		
	II	1.08	0.89	0.36 - 3.29
	III	1.75	0.19	0.76 - 4.03
	IV	6.65	0.001	2.26 - 19.61
			(linear test for trend p = 0.0005)	

Table 3. One year survival.

	IC	OTR	logrank p
Progression-Free	69.6%	12.5%	<0.0001
Disease-Specific	97.4%	56.2%	<0.0001
Overall	88.6%	46.8%	0.0009

1:44 – 1:52 pm

Presenter: Logan D'Souza, MD

Title: Medical Professional Liability Claims for Mohs Micrographic Surgery from 1989-2011

Authors: Logan D'Souza, MD[1]; H. Ray Jalian, MD[2,3]; Chris Jalian, JD[4]; Murad Alam, MD, MSCI[5]; Daniel B. Eisen, MD[6]; Omar A. Ibrahimi, MD, PhD[2,7]

Institutions: 1. University of Connecticut Health Center, Farmington, CT, United States 2. Wellman Center for Photomedicine, Harvard Medical School Department of Dermatology, Massachusetts General Hospital, Boston, MA, United States 3. Division of Dermatology, David Geffen School of Medicine at UCLA, Los Angeles, CA, United States 4. Columbia Law School, New York, NY, United States 5. Northwestern University Department of Dermatology, Chicago, IL, United States 6. UC Davis Department of Dermatology, Sacramento, CA, United States 7. Connecticut Skin Institute, Stamford, CT, United States

Introduction: There is a relative paucity of data that specifically addresses lawsuits involving Mohs surgery.

Design: Using an online legal database, we reviewed publicly available legal documents involving Mohs surgery for factors including year of litigation, location, specialty of provider, injury sustained, cause of legal action, and verdict.

Summary: From 1989-2011, we identified 42 cases involving Mohs surgery. The majority of the cases (26/42) involved non-Mohs surgeons, mostly due to a delay or failure in diagnosis (16/26), cosmetic outcome issues (8/26), lack of informed consent (7/26), and a delay or failure in referral to a Mohs surgeon (5/26). Common causes for litigation against Mohs surgeons (16/42) were a lack of proper informed consent (5/16) and cosmetic outcome issues (4/16). Of the cases against Mohs surgeons, only 1/16 was found in favor of the plaintiff. The most frequent anatomic site of surgery in these cases involved the nose (14/42). The most common locations of lawsuits were New York (8/42) and California (8/42), with the Northeast United States being the region with the highest number of cases (15/42). An additional 7 cases involved Mohs surgeons outside of the scope of their practice of Mohs surgery.

Conclusion: Successful lawsuits against Mohs surgeons are exceedingly rare, indicative of a low-risk malpractice field. The most common lawsuits involving Mohs surgery are against non-Mohs surgeons (26/42), with predominant themes of cosmetic outcome issues (8/26) and a delay or failure in referral to a Mohs surgeon (5/26). Closer coordination between non-Mohs surgeons and Mohs surgeons may help minimize risk to both parties and lead to better patient care.

Figure 1: Specialty of Defendant in Lawsuits Referring to Mohs Surgery

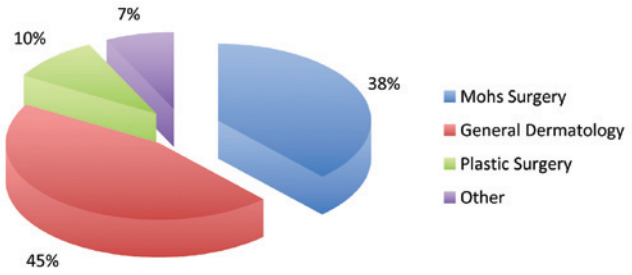
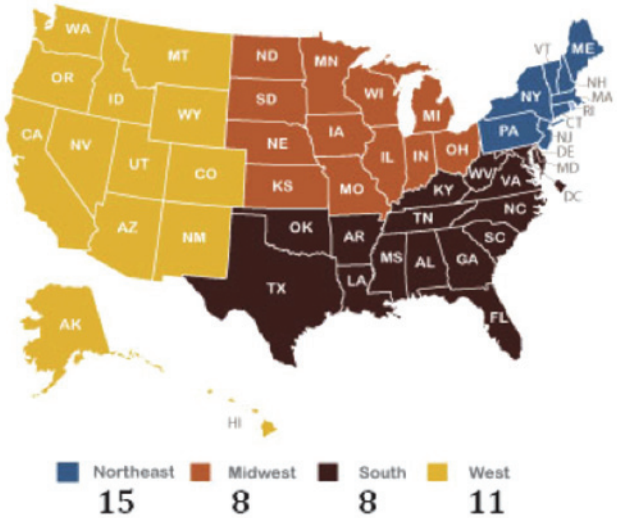
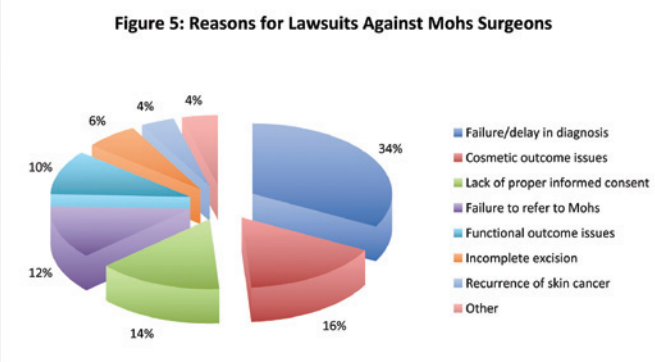


Figure 4: Number of Lawsuits by Geographic Area





1:52 – 2:00 pm

Presenter: Mark A. Hyde, PA

Title: **The Use of Sentinel Lymph Node Biopsy in Lentigo Malignant Melanoma; A Retrospective Chart Review**

Authors: Tera Grant, BS[1]; Mark A. Hyde, PA[2]; Glen M. Bowen, MD[2]; Robert Andtbacka, MD[3]

Institutions: 1. University of Utah, Salt Lake City, UT, United States 2. University of Utah Department of Dermatology, Salt Lake City, UT, United States 3. Huntsman Cancer Institute, Salt Lake City, UT, United States

Introduction: Lymph node metastasis is the strongest predictor of a poor outcome in patients with malignant melanoma. Identifying lymph node metastasis when the metastasis is microscopic has been shown to have a better prognosis compared to macrometastatic disease. Sentinel lymph node biopsy (SLNB) allows for identification of lymph nodes with micrometastatic disease and is widely used in melanoma surgery. However, the incidence of lymph node metastasis and the role of SLNB in patients with lentigo maligna melanoma (LMM) of the head and neck is not well established. The purpose of this study was to evaluate these factors in patients with LMM at our institution.

Design: Our multidisciplinary melanoma database was queried for patients with LMM undergoing SLNB after institutional review board approval. Data was collected for: demographics, melanoma characteristics, SLN status, and patient outcome.

Summary: 209 patients with complete SLN data were identified. The majority (71.3%) of patients were male. The mean age at diagnosis was 66.7 years (range 22-96 years). Mean LMM Breslow thickness was 1.31 mm (range, 0.15 – 10.0 mm) and the majority (68.6%) of LMM were Clark level IV. Ulceration was present in 19.6% of melanomas. The mean mitotic count was 2.51 / mm2. Of the 209 patients, 12 (5.7%) patients had evidence of nodal metastasis. The mean Breslow thickness was significantly greater in patients with nodal metastasis compared to patients without metastasis, 2.42 mm vs. 1.24 mm ($p<.002$). A logistic regression model including age, gender, Breslow thickness, Clark level, mitotic count, and ulceration status failed to significantly predict SLNB positivity. Tumor related death was reported in 12 patients (5.7%) at an average of 31.5 months from diagnosis (range 0-111 months). Of patients with positive SLNB (n=12, 5.7%), 3 patients (25%) died of the disease while only 9 of 197 patients (4.6%) with negative SLNB died of disease. Chi squared analysis showed this difference to be significant ($p=0.024$).

Conclusion: While the use of SLNB in melanoma has been included in current guidelines, it has also been surrounded by controversy. This issue seems to be receiving scrutiny primarily based on the lack of a proven survival benefit. While our review does not include survival analyses, it suggests that SLNB data may help predict prognosis. Further research and consideration are necessary to evaluate the utility of this test. These data may be used to compare LMM to other subtypes of melanoma to determine if LMM differs in malignant potential from other melanomas.

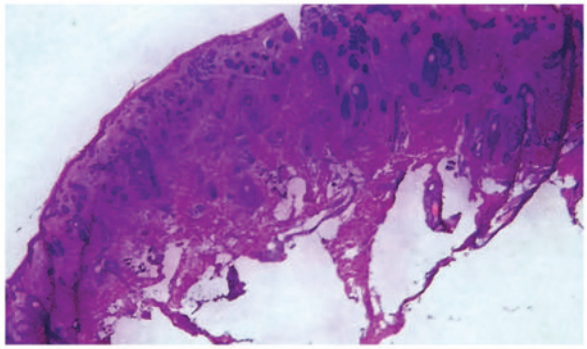
Clinical Pearls Abstract Session – Saturday, May 3: 3:00 – 4:00 pm

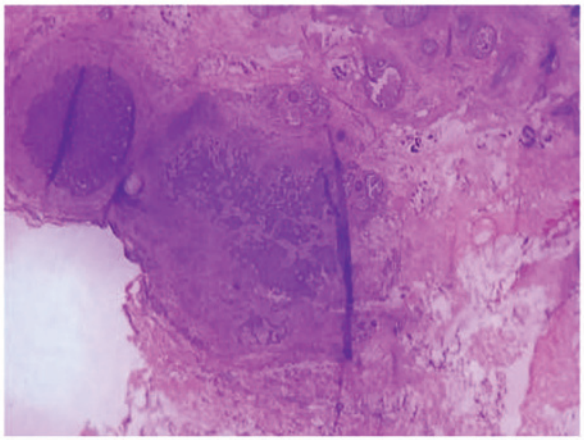
(1.00 Credit Hours)

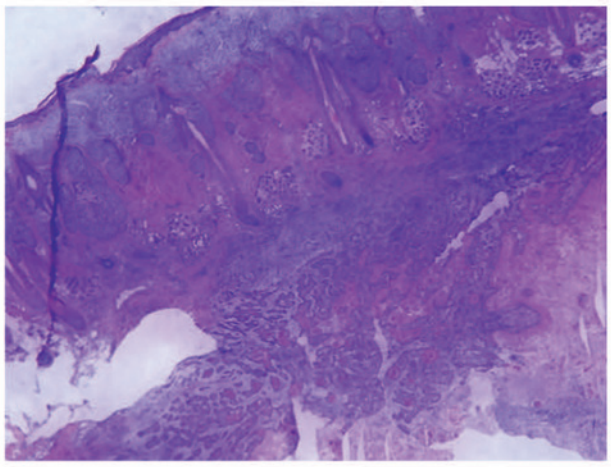
At the conclusion of this session, participants should be able to identify new research developments in Mohs surgery and oncology.
Moderator: Theresa Soriano, MD

3:04 – 3:10 pm

Presenter: Adam Ingraffea, MD
Title: **An Innovative Use for a Dermlite Pro and an iPhone; A Simple Microscope**
Author: Adam Ingraffea, MD[1]
Institution: 1. University of Cincinnati, West Chester, OH, United States
Introduction: The Dermlite Pro is a 10x polarized, magnifier normally utilized for in-vivo imaging of both pigmented and non-pigmented skin lesions. A simple plastic sleeve allows the Dermlite to be attached to an iPhone 4, 4S or 5 for digital photographic dermoscopy. A novel use for the combination of the Dermlite and the iPhone is for ex-vivo imaging of Mohs frozen sections to obtain low cost, high quality histopathologic images.
Design: After routine preparation and processing of Mohs frozen sections we use the Dermlite and iPhone to obtain digital histopathologic images. The combination of the Dermlite and the iPhone's zoom feature allows approximately 20-30x magnification with good resolution. The combination of the Dermlite and the iPhone allows one to obtain simple, high quality, low cost digital histopathologic images. These images are of sufficient resolution and quality to visualize superficial, nodular and micronodular BCC as well as SCC and Bowen's disease. We have used the digital images for rapid consults with our dermatopathology department and with other Mohs surgeons. Another use for the images is to share what we are seeing with curious patients. Patients find it especially gratifying to see the final clear layer of Mohs. It is also possible to use the combination as a simple microscope substitute in the case of a power outage or a burnt out microscope bulb.
Summary: I plan to show multiple images obtained from the digital imaging system described above.
Conclusion: For many practices a microscope and attachment for a digital camera are prohibitively expensive, we describe a simple, cost-effective alternative using the Dermlite Pro and an iPhone 4S.







3:11 – 3:17 pm

Presenter: Jeremy Davis, MD
Title: **Solving the Problem of Biopsy Site Identification: A Novel Method Using UV-fluorescent Tattoos**
Authors: Jeremy Davis, MD[1]; W. Elliot Love, DO[1]
Institution: 1. Case Western – MetroHealth, Department of Dermatology, Cleveland, OH, United States
Introduction: Accurate biopsy site identification at the time of cutaneous surgery often presents a challenge. Skin biopsies typically heal with minimal visible scarring, and prior studies indicate that a patient's memory of the correct site is unreliable, particularly if multiple lesions are sampled. Such challenges may lead to delayed or wrong site surgeries. Previous attempts to solve this problem have included diagrams and photographs; these methods, while helpful, are flawed due to being time-consuming, expensive, and prone to human error. We sought to develop an improved method which is straightforward, cost-effective, and near-infallible to solve this pervasive problem.
Design: Ultraviolet (UV)-fluorescent ink is used to place a small tattoo directly adjacent to the biopsy site which can be identified by Wood's lamp prior to surgery. The use of UV-fluorescent ink instead of traditional pigment-based ink allows the tattoo to become invisible to the naked eye after healing, and makes it impossible to mistake for a naturally occurring lesion. Previous work by Drs. Chuang and Gilchrest proved the validity of this concept by using UV-Fluorescent ink applied to the stylet of a punch

prior to biopsy. Limitations of their method include the inability to control the size of the resultant mark, the increased depth of the ink placed, and the lack of utility for marking shave-biopsy sites. In this protocol, a handheld needle is used to place a <1 mm sized dot of UV-fluorescent ink adjacent to the biopsy site. The needle is designed for use in a tattoo gun and consists of a large number of solid-bore needles soldered together in a tight group at the tip. The needle is individually packaged, sterile, and can be purchased in bulk at about 22 cents each. At the time of this writing, there has been no reduction in fluorescence or visibility of a tattoo placed 6 months prior. There are several reports of granulomatous reactions to UV-fluorescent ink in the literature, however, all reports were in patients with large cosmetic tattoos. Due to the small size and superficial nature of the tattoo placed, complications are unlikely and if complications arise, the tattoo could be easily removed with a 2 mm punch.

Conclusion: We believe we have developed a straightforward, cost-effective, and clearly identifiable method of marking biopsy sites. Patients can be assured that an efficient and effective process is in place, which prevents unnecessary delays in treatment of potentially life-threatening cutaneous lesions.

3:18 – 3:24 pm

Presenter: Scott W. Dunbar, MD

Title: Pseudoaneurysm Formation and Repair following Mohs Micrographic Surgery: Three Cases and Repair Videography

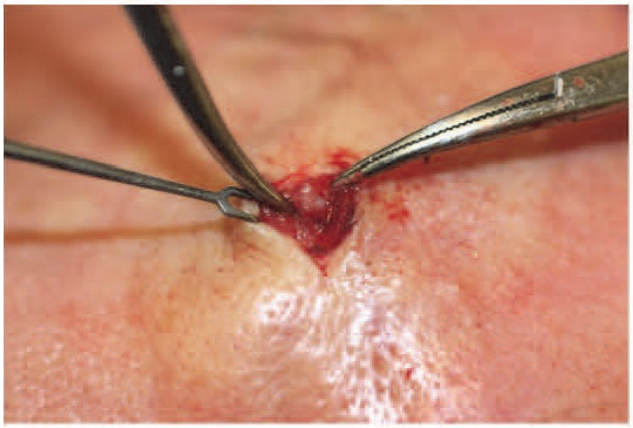
Authors: Scott W. Dunbar, MD[1]; Benjamin Bogucki, MD[2]; Eva A. Hurst, MD[1]

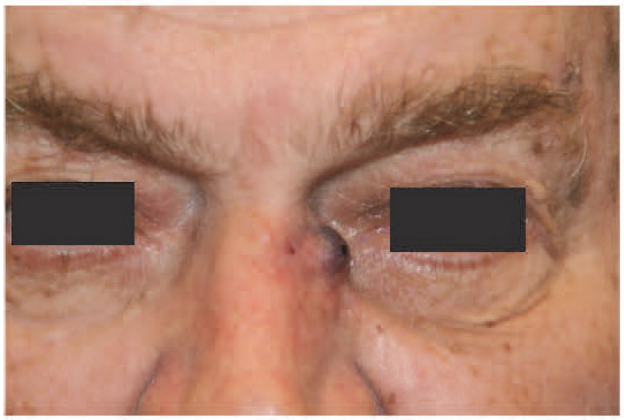
Institutions: 1. Washington University in St. Louis, Department of Dermatology, St. Louis, MO, United States 2. Washington University School of Medicine, Department of Dermatology, St. Louis, MO, United States

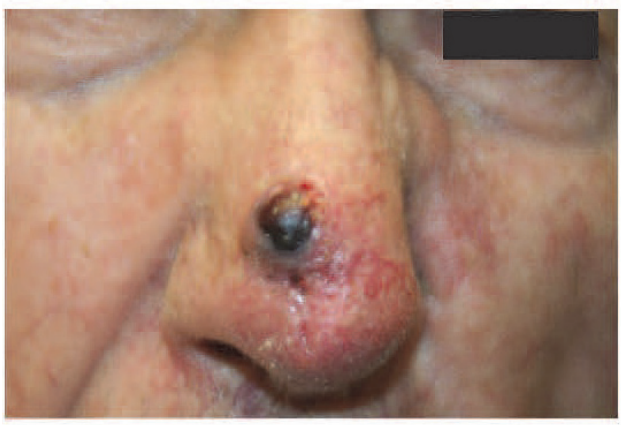
Introduction: We report three cases of pseudoaneurysm complicating Mohs surgery for non-melanoma skin cancer. Pseudoaneurysm is a well-known sequela of trauma and iatrogenic injury, but to our knowledge has never been reported as a complication of Mohs surgery. Of the cases thus far reported in the general surgical literature, only a few have occurred outside the superficial temporal arterial system. One of our cases indeed occurred in the superficial temporal, with the other two involving the lateral nasal artery and the angular artery.

Design: Our cases were in men who had Mohs for NMSCs. The lesions were located on the nasal tip, nasal sidewall, and forehead. Closure was done with linear, transposition flap, and linear closure respectively. Each patient returned two to three weeks post-operatively complaining of enlarging blue-red nodules within his suture line. Physical examination in each case revealed pulsatile sub-cutaneous nodules. These lesions were diagnosed as post-surgical pseudoaneurysms. All three were surgically ligated, and the tissue re-approximated in line with the original repair. We present videography of one repair highlighting intra-operative Doppler use. None of the three experienced any recurrence or further post-operative complications, and all healed well with minimal scarring.

Conclusion: Arterial walls are frequently injured in cutaneous surgery and this damage can result in blood extravasation and hematoma formation. A pseudoaneurysm develops when such a hematoma organizes to form a canal in persistent communication with the lumen of the injured vessel. The pressure from surrounding tissues provides the structural support necessary for the hematoma to remain patent and connected to the injured vessel through the thin false lumen. The affected vessels in our cases were likely injured during the course of routine Mohs with unremarkable bleeding. The slowly leaking vessels formed hematoma and pseudoaneurysm. Small lesions can spontaneously clot and be resorbed, but surgical management is typically recommended as the pseudoaneurysm can rupture, cause pain, and result in scarring and local deformity. Other reported treatment options include ultrasound-guided compression, embolization, and percutaneous thrombin injection. In our cases, surgery was deemed appropriate given the small size, ease of repair, and that wound healing in each case was compromised by the pseudoaneurysm. This is an important diagnosis for dermatologists and surgeons to consider. Iatrogenic injury to the facial vasculature is frequent in cutaneous surgery, and this is likely an under-recognized complication of Mohs procedures.







Clinical Pearls Abstract Session – Saturday, May 3: 3:00 – 4:00 pm

3:25 – 3:31 pm

Presenter: Blake Dowdle, MS III[1]

Title: A Method of Creating an Electronic Mohs Map

Authors: Blake Dowdle, MS III[1]; Mark A. Hyde, PA[1]; Glen M. Bowen, MD[1]

Institution: 1. University of Utah, Department of Dermatology, Salt Lake City, UT, United States

Introduction: The purpose of this study was to create an electronic Mohs map that is e-chart ready. The study had 2 goals; 1. To comply with the new requirements of the Affordable Care Act (ACA) for electronic medical records, 2. To create seamless and rapid communication between surgeon, laboratory, and the referring physician.

Design: Using the iPad we downloaded the free Notability application directly from the App Store. Using this application we were able to create a Mohs map that can be shared between those involved in the patients care. The application is able to take photographs directly in the application. Thus the surgeon can take pictures of the tumor margins before surgery, and additional pictures during each step of the surgery as deemed necessary by the surgeon. After taking the pictures, the application has the ability to create ink notations directly on the pictures, indicating dye used by the laboratory and areas of continued tumor involvement requiring additional stages. The application also has the ability to create a template of patient identification information, which can be tailored to each physicians personal preference and practice standards. The seamless use of the map occurs over the Mac Cloud as laboratory technicians can log into the shared file and document receipt of tissue, time out of the lab and time required to process the tissue. Nursing staff has the ability to use the application to document time-out and the start of the surgery.

Conclusion: Medicine has become increasingly more reliant on computers and the electronic medical record (EMR) for the past decade. Many dermatologists have been reluctant to move from paper to the paperless EMR due to the difficulty of creating a paperless Mohs' map. However, we believe that we have created a electronic map that has improved our patient care by increasing productivity through the lab, and increasing the communication between surgeon, lab, referring physician and patient. Limitations of the software used include; no ability to rotate photographs, ink notations lock in image size, there is no tab function, and recent photos go to the end of the photo roll. Although the limitations may hinder a surgeon's personal preference or style of map creating, the application remains user friendly and a great tool in the hands of a Mohs surgeon.

3:32 – 3:38 pm

Presenter: Mary Alice Mina, MD

Title: The Recruitment and Retention of Mohs Surgeons in Academic Dermatology

Authors: Shali Zhang, BA[1]; Mary Alice Mina, MD[2]; Marc D. Brown, MD[3]; Fiona Zwald, MD[2]

Institutions: 1. New York University, Department of Dermatology, New York, NY, United States 2. Emory University, Department of Dermatology, Atlanta, GA, United States 3. University of Rochester, Rochester, NY, United States

Introduction: A greater proportion of fellowship-trained Mohs surgeons enter academic careers compared to dermatology residency graduates in general. However, Mohs surgeons who remain in academics represent a minority. This study will examine what factors influence the decision to stay in academics, and provide insight into improving retention of academic Mohs surgeons.

Design: An 18-question survey was electronically distributed to members of the American College of Mohs Surgery, directed specifically towards Mohs surgeons in academia. Respondents were asked to rate the importance of several variables on their decision to remain in academics, as well as factors that may influence them to leave. Questions complemented an earlier survey by Dr. Marc D. Brown, the results of which were presented at the American Academy of Dermatologic Surgery 10 years prior, but never published.

Summary: A total of 250 dermatologic surgeons completed the survey. Of the respondents, 32% practiced in a full-time academic setting, 8% part-time academics and 60% in private practice. Mohs surgeons in the academic setting have all completed a Mohs/procedural dermatology fellowship and have been in practice, on average, for approximately 12.7 years. Similar to a decade ago, the most common reasons cited for practicing in the academic setting were intellectual stimulation, teaching opportunities, and collaboration with other university physicians and researchers. Factors that were less important included financial compensation, job security, and administrative opportunities. When asked whether they would stay in academic dermatology, 71% reported yes while 7% said no and 22% were unsure. A change in income or unfair compensation, inadequate support staff, poor leadership, increase in bureaucracy, and decreased autonomy were among the top five reasons which would make an academic Mohs surgeon consider leaving academics. Many respondents also indicated that a warm, collegial environment, support from departmental leadership, competitive compensation, and respect from fellow colleagues were also important factors to address in the academic setting. A follow-up survey will be distributed to Mohs surgeons in private practice examining their reasons for leaving academia.

Conclusion: The recruitment and retention of academic Mohs surgeons is not only essential to the treatment and management of cutaneous malignancies, but also to the continued growth of this specialty. Attitudes by Mohs surgeons toward their specialty have not changed drastically in the last decade. While opportunities for intellectual stimulation, collaboration and teaching remain the main draw for those in academics, having a supportive environment and strong leadership, while establishing fair compensation, are imperative in ensuring they stay.

Table 1. Demographics and Characteristics of Academic Mohs Surgeons in 2013

Characteristic	*Value*
Sex, n (%)	
Male	55 (65%)
Female	30 (35%)
Geographic Location, n (%)	
Northeast	29 (34%)
Mid-Atlantic	5 (6%)
Southeast	12 (14%)
Midwest	20 (24%)
Northwest	5 (6%)
Southwest	11 (13%)
Outside Continental US	3 (4%)
Academic Rank, n (%)	
Instructor	4 (5%)
Assistant Professor	40 (47%)
Associate Professor	17 (20%)
Full Professor	21 (25%)
Chairman	3 (4%)
Years Since Completing Mohs/ Procedural Dermatology Fellowship, n (%)	
1-5 Years	28 (33%)
6-10 Years	13 (15%)
11-20 Years	22 (26%)
>20 Years	22 (26%)
Number of Years in Academic Mohs Surgery (average)	12.7 years
Range	1-33 years

3:39 – 3:45 pm

Presenter: Navara Anjum, BM, MRCP Derm

Title: **Management of Lentigo Maligna: A Surgical Conundrum**

Authors: Navara Anjum, BM, MRCP Derm[1]; Deirdre McCormack, MBBS[1]; Philippa Shepherd, BSc[1]; Stephen Keohane, MBBS, FASMS, FRCP[1]

Institution: 1. Portsmouth Hospitals NHS Trust, St. Mary's Hospital, Portsmouth, Hampshire, United Kingdom

Introduction: Lentigo Maligna (LM) is a common skin malignancy and is best treated by surgical excision due to risk of subclinical microinvasion. The recommended surgical margin is 5mm however; these tumors can often have indistinct margins, therefore excision via Mohs surgery is preferential. Variety exists when processing specimens during slow Mohs with some operators using frozen sections (FS) whilst others preferring paraffin-embedded sections (PES).

Design: The technique employed by our department involves initially removing the entire pigmented lesion with 2mm margins. By sampling the whole clinically visible lesion we aim to reduce the risk of missing LM melanoma which can occur if only part of the lesion is biopsied. The second stage comprises standard Mohs technique by removing a disc of tissue around the original defect with a further 2mm margin to include both the deep and superficial aspects using a 45 degree angle. These specimens are then flattened, paraffin embedded and horizontal sections are cut which allows both the deep and peripheral margins to be analyzed. Alternate sections are stained for haematoxylin and eosin (H&E) followed by immunohistochemistry (IHC). Subsequent staged sections are then guided by histology. In our experience analysis of LM is superior when using PES as opposed to FS. Considerable artefact can occur with FS and IHC can be more difficult to interpret. LM is a difficult tumor to diagnose histologically and this together with the difficulties experienced with FS, can result in incomplete tumor excision especially when assessing the subtle peripheral changes. This technique can be demonstrated by a patient referred for slow Mohs surgery of LM at the left nasal alar. PES were analyzed initially using H&E. During examination of the second stage, 2 seemingly separate suspicious areas were noted with H&E but IHC revealed the true extent of the tumor to be far greater than initially delineated, with most of the inferior-anterior margin involved.

Conclusion: This case highlights the surgical conundrum posed by LM and emphasizes the need for IHC. H&E stain alone may underestimate the true extent of the lesion especially in later stages when peripheral changes maybe subtle thus increasing the risk of incomplete excision. We advocate the removal of the whole clinically visible lesion initially to reduce the risk of sampling error and recommend the use of PES to allow for a more accurate histological analysis of a tumor which poses histological difficulties.

3:46 – 3:52 pm

Presenter: S. Tyler Hollmig, MD

Title: **The Hinged Turnover Flap as a Versatile and Single-staged Option for Full-thickness Defects of the Nasal Ala and Soft Triangle**

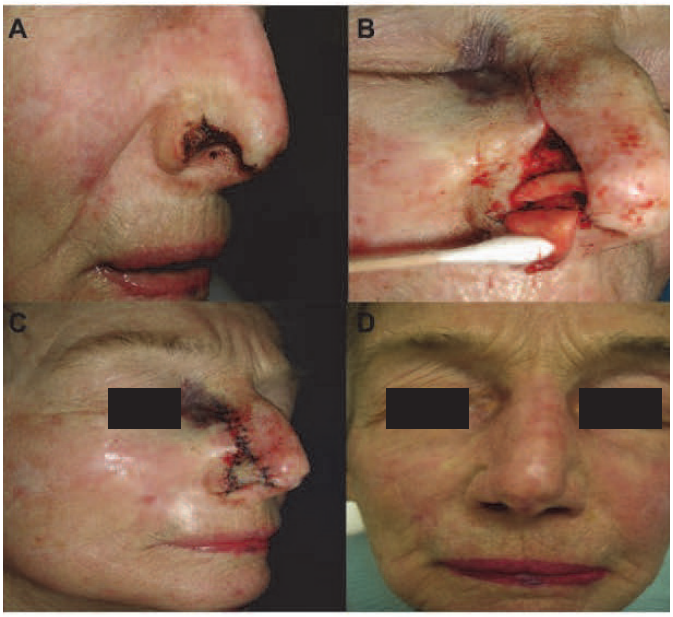
Authors: S. Tyler Hollmig, MD[1]; Sumaira Z. Aasi, MD[1]

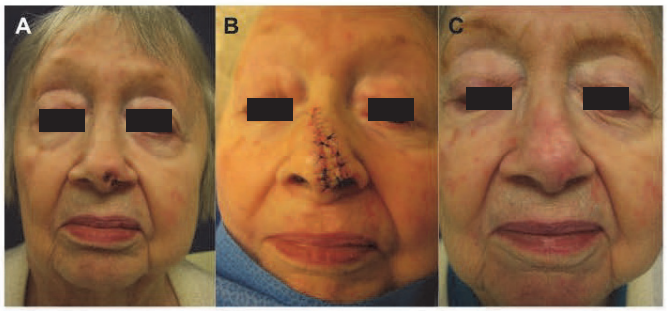
Institutions: 1. Stanford University School of Medicine, Dermatology, Redwood City, CA, United States

Introduction: Full-thickness defects of the nasal ala and soft triangle present unique reconstructive challenges. Lining, structural support, and cutaneous covering must be restored in such a manner that preserves inspiratory function while recreating a complex and delicate topographic contour. Even small defects can be devastatingly striking if not repaired appropriately. These small yet perplexing wounds often demand rather extensive and multi-staged repair, which may seem excessive and counterintuitive from the patient's perspective. Examples of single-staged flaps for reconstruction of small full-thickness wounds of the ala and, particularly, the soft triangle are lacking in the literature. In this presentation, we will describe the utility of the hinged turnover flap for a diverse cohort of these defects.

Design: We present a series of 5 patients with full-thickness wounds (ranging from 5mm to 13mm in diameter) of the nasal ala and/or soft triangle following Mohs surgery repaired with the hinged turnover flap. The flap length and width must be designed sufficient to recreate both inner and outer aspects of the ala and restore the contour of the alar rim. The flap is raised in the subcutaneous plane, above the periosteum starting at superior apex, with dissection continuing until a few millimeters of tissue attachment remains at the superior portion of the wound. The "hinge" or base of the flap includes part of the transverse and alar nasalis muscles as well as a small portion of skin and subcutaneous tissue. The secondary defect is closed primarily after the flap is sutured into place. We have successfully used this flap to repair a variety of nasal defects, ranging from involvement of the delicate soft triangle alone to broad defects requiring incorporation of a cartilage strut graft to prevent inspiratory collapse.

Summary: The hinged turnover flap is an effective reconstructive option for small full-thickness nasal ala and soft triangle defects. Cosmetic and functional outcomes in our patients were uniformly excellent, with the exception of one patient developing mild alar notching due to a flap design of insufficient length, which serves as an important teaching point. **Conclusion:** When properly designed and executed, the hinged turnover flap serves as a reliable single-staged, local flap with minimal patient morbidity for repair of a variety of full-thickness defects of the nasal ala and soft triangle.





3:53 – 3:59 pm

Presenter: Ali Hendi, MD

Title: Tissue Conserving Technique for Reconstruction of Nasal Lining Defects

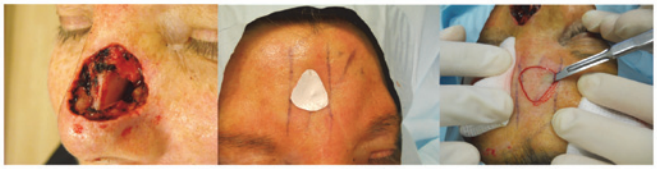
Author: Ali Hendi, MD[1,2]

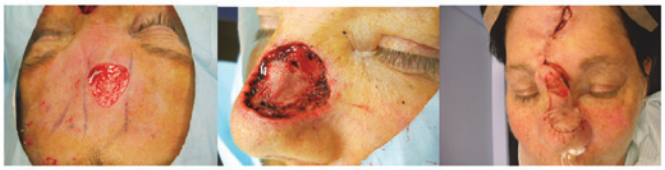
Institutions: 1. Private Practice, Chevy Chase, MD, United States 2. Georgetown University Medical Center, Department of Dermatology, Chevy Chase, MD, United States

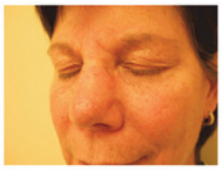
Introduction: Reconstruction of the nasal lining in repair of full thickness nasal defects often involves harvesting a STSG from a remote site. A novel and tissue sparing STSG donor site is presented in this case series.

Design: A case series will be presented outlining the technique and benefits of harvesting STSG for reconstruction of nasal lining using the pedicle of the forehead flap. This is followed by inset of the forehead flap. With this technique there is no additional surgical site for patient to care for, no additional surgical equipment is needed, and the results are reproducible.

Conclusion: The pedicle of the forehead flap offers a viable donor site for harvesting STSG that may be used for reconstruction of nasal lining defects.







Poster Presentation List

Posters will be displayed inside the Exhibit Hall from 12:00 pm Thursday, May 2 through 2:00 pm Saturday, May 4.

Authors are requested to stand by their poster to answer questions during the following time frames:

Even Number Posters (002 – 056): Thursday, May 2 from 12:00 – 1:00 pm

Odd Number Posters (001 – 055): Saturday, May 4 from 12:00 – 1:00 pm

001

Melanoma Incidence in Children and Adolescents: Decreasing Trends from 2000-09

Laura Campbell, BS[1]; Jill Barnholtz-Sloan, PhD[1]; Kyle Strodtbeck, BS[1]; Jeremy S. Bordeaux, MD, MPH[2]

1. Case Western Reserve University School of Medicine, Cleveland, OH, United States
2. University Hospitals Case Medical Center, Case Western Reserve University, Cleveland, OH, United States

002

A Retrospective Survey Assessing Patient Satisfaction with Cosmesis of Full-thickness Skin Grafting following Mohs Micrographic Surgery

Kimberly L. Brady, MD[1]; Franki Lambert Smith, MD[1]; Lance B. Henry, MD[2]; Julie L. Ryan, PhD, MPH[1]; Marc D. Brown, MD[1]

1. University of Rochester, Rochester, NY, United States
2. Advanced Dermatology and Skin Cancer Center, Fayetteville, AR, United States

003

Factors that Influence Disease Progression in Patients with Head and Neck Melanoma

Ugur Uslu, MD[1]; H. William Higgins, II, MD, MBE[2]; Kachiu C. Lee, MD, MPH[2]; Antonio P. Cruz, MD[2]; Raymond G. Dufresne, Jr., MD[2]; Helmut Breuninger, MD[1]

1. Tubingen University, Department of Dermatology, Tubingen, Germany
2. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

004

Mohs Micrographic Surgery for Lentigo Maligna and Lentigo Maligna Melanoma using Mel-5 Immunostaining: an Update from the University of Minnesota

Matthew Beal, MD[1]; Jesse Fark, MS4[1]; Jing Liu, MD[2]; Sarah E. Schram, MD[2]; Peter K. Lee, MD, PhD[2]

1. University of Minnesota, Minneapolis, MN, United States
2. University of Minnesota, Department of Dermatology, Minneapolis, MN, United States

005

Non-aggressive Treatment of Residual Superficial Non-melanoma Skin Cancer Encountered during Mohs Micrographic Surgery for Invasive Components

Razieh Soltani-Arabshahi, MD[1]; Keith L. Duffy, MD[1]; Glen M. Bowen, MD[1]; Payam Tristani-Firouzi, MD[1]; Michael L. Hadley, MD[1]

1. University of Utah, Department of Dermatology, Salt Lake City, Utah, United States

006

Oral Capecitabine for Skin Cancer Prevention in Solid Organ Transplant Recipients with End Stage Renal Disease on Hemodialysis

Matthew Beal, MD[1]; Sarah J. Jepperson, MS4[1]; Peter K. Lee, MD, PhD[2]

1. University of Minnesota, Minneapolis, MN, United States
2. University of Minnesota, Department of Dermatology, Minneapolis, MN, United States

007

Upstaging from Melanoma In Situ to Invasive Melanoma on the Head and Neck following Complete Surgical Resection

Kevin Gardner, DO[1]; Adam Wright, MD[1]; Jerry D. Brewer, MD[1]; Randall K. Roenigk, MD[1]; Clark C. Otley, MD[1]; Christopher J. Arpey, MD[1]; Christian L. Baum, MD[1]

1. Mayo Clinic, Rochester, MN, United States

008

Incidence and Risk Factors for Non-melanoma Skin Cancer after Liver Transplantation

Ivette Sosa Seda, MD[1]; Janice Cho[1]; Ana Velazquez[1,2]; Amy Weaver[1]; Kymberly Watt, MD[1]; Jerry D. Brewer, MD[1]

1. Mayo Clinic, Rochester, MN, United States
2. University of Puerto Rico, School of Medicine, San Juan, PR, United States

009

Profile of Mohs Patients 40 Years and Younger

Steven A. Altmayer, MD[1]; Kachiu C. Lee, MD, MPH[1]; H. William Higgins, II, MD, MBE[1]; Raymond G. Dufresne, Jr., MD[1]; Antonio P. Cruz, MD[1]

1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

010

An Evidence-based Review of Dermatologic Surgery in the Pregnant Patient

Kachiu C. Lee, MD, MPH[1]; H. William Higgins, II, MD, MBE[1]; Raymond G. Dufresne, Jr., MD[1]

1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

Poster Presentation List

011

Incidence of Squamous Cell Carcinoma in Biopsy Proven Transected Squamous Cell Carcinoma In Situ Referred for Mohs Micrographic Surgery

Thomas J. Knackstedt, MD[1]; Faramarz H. Samie, MD, PhD[1]
1. Dartmouth Hitchcock Medical Center, Lebanon, NH, United States

012

Prospective Study of Adverse Events in Dermatologic Surgery

Jenna O'Neill, MD[1]; Steven R. Feldman, MD, PhD[1]; James Solomon, MD, PhD[2]; Phillip M. Williford, MD[1]; Daniel J. Pearce, MD[1]
1. Wake Forest Baptist Health, Department of Dermatology, Winston-Salem, NC, United States
2. Ameriderm Research, Ormond Beach, FL, United States

013

Incidence of Metastatic Basal Cell Carcinoma: A Systematic Review

Kelly Fox, BA[1]; Ellen S. Marmur, MD[1]
1. Icahn School of Medicine at Mount Sinai, New York, NY, United States

014

The Z-advancement Flap for Reconstruction of Lateral Nasal Tip and Medial Ala Defects

Bichchau Michelle T. Nguyen, MD[1], Kyle R. Eberlin, MD[2], Pritesh S. Karia, MPH[1], Joi B. Carter, MD[2]; Christine Liang, MD[1]; Chrysalyne D. Schmults, MD, MSCE[1]
1. Brigham & Women's Hospital, Department of Dermatology, Jamaica Plain, MA, United States
2. Massachusetts General Hospital, Boston, MA, United States

015

Trends in Mohs Surgery from 1995 to 2009: A Review of the National Ambulatory Care Survey

Scott A. Davis, MA[1]; Cheryl L. Gustafson, MD[1,2]; Steven R. Feldman, MD, PhD[1]; Kenyatta Mireku, BS[1,3]; Daniel J. Pearce, MD[1]
1. Wake Forest Baptist Health, Department of Dermatology, Winston-Salem, NC, United States
2. Emory University, Department of Dermatology, Atlanta, GA, United States
3. University of Georgia, Department of Dermatology, Athens, GA, United States

016

Vismodegib to Downregulate ATP-Binding Cassette Protein ABCG2 Leading to Enhancement of Photodynamic Therapy

Joseph P. Housel, MD[1]; Nathalie C. Zeitouni, MD[1]
1. Roswell Park Cancer Institute, Department of Dermatology, Buffalo, NY, United States

017

No Evidence for Viral DNA in Whole Genome Sequence of Cutaneous Squamous Cell Carcinoma

Michelle Dimon, PhD[1]; Henry Wood, PhD[2]; Pamela Rabbitts, PhD[2]; Wilson Liao, MD[1]; Raymond Cho, MD, PhD[1]; Sarah Tuttleton Arron, MD, PhD[3]
1. University of California, San Francisco, San Francisco, CA, United States
2. Leeds Institute of Molecular Medicine, Leeds, United Kingdom
3. University of California, San Francisco, Department of Dermatology, San Francisco, CA, United States

018

Using Advanced Healthcare Data Analytics to Identify Patients with Advanced Basal Cell Carcinoma in a Large Nationwide Healthcare Institution

Scott L. DuVall, PhD[1,2,3]; Olga V. Patterson, PhD[1,3]; Tyler B. Forbush[1]; Aaron W.C. Kamauu, MD, MS, MPH[4]; Carolina Reyes, PhD[5]; Yeun Mi Yim, MPH[5]; Glen M. Bowen, MD[6]
1. VA Salt Lake City Health Care System, Salt Lake City, UT, United States
2. University of Utah Collage of Pharmacy, Department of Pharmacotherapy, Salt Lake City, UT, United States
3. University of Utah School of Medicine, Department of Internal Medicine Division of Epidemiology, Salt Lake City, UT, United States
4. Anolinx, Salt Lake City, UT, United States
5. Genentech, Inc., South San Francisco, CA, United States
6. University of Utah School of Medicine, Department of Dermatology, Salt Lake City, UT, United States

019

Vismodegib as a Neoadjuvant to Mohs Micrographic Surgery for Operable Basal Cell Carcinomas

Ashley Wysong, MD, MS[1]; Mina S. Ally, BSc MBBS[1]; Anne L. Chang, MD[1]; Anthony Oro, MD, PhD[2]; Jinah Kim, MD, PhD[3]; Jean Y. Tang, MD, PhD[1]; Sumaira Z. Aasi, MD[1]
1. Stanford University, Department of Dermatology, Redwood City, CA, United States
2. Stanford University, Redwood City, CA, United States
3. Stanford University, Dermatology and Pathology, Stanford, CA, United States

020

Update on Advanced Non-melanoma Skin Cancer: Status of AJCC Staging

Anthony P. Tufaro, MD[1]; Alice Chuang, MD[2]; Thomas Lardaro, MD[3]; Nanette Liegeois, MD, PhD[1]
1. Johns Hopkins, Plastic Surgery, Baltimore, MD, United States
2. University of Chicago, Internal Medicine, Chicago, IL, United States
3. Vanderbilt, Emergency Medicine, Philadelphia, PA, United States

Poster Presentation List

021

Comparative Genomic Hybridization as a Tool for Characterizing Multiple Merkel Cell Carcinomas in a Single Patient

Iris Abronowitz, MD[1]; Timothy McCalmont, MD[2]; Siegrid S. Yu, MD[1]
1. UC San Francisco, Department of Dermatology, San Francisco, CA, United States
2. UC San Francisco, Dermatology and Pathology, San Francisco, CA, United States

022

Comparison of Referred Pathology and Final Pathology in Pigmented Lesions Treated with Mohs Micrographic Surgery

Michael A. Sorace, MD[1]; R. Stan Taylor, III, MD[1]
1. University of Texas Southwestern Medical Center, Dallas, TX, United States

024

Immunophenotypic Profiles of Conjunctival Primary Acquired Melanosis and Cutaneous In Situ Melanoma are Similar

Douglas J. Heiner, MD[1]; Jaymie Panuncialman, MD[2]; Zsolt Argenyi, MD[3]; Satori Iwamoto, MD, PhD[1,4]
1. Roger Williams Medical Center, Department of Dermatology and Skin Surgery, Providence, RI, United States
2. Sky Lakes Dermatology, Klamath Falls, OR, United States
3. University of Washington, Seattle, WA, United States
4. Boston University School of Medicine, Boston, MA, United States

025

Tumor Suppressive Activities of Deleted in Liver Cancer 1 (DLC-1) in Cutaneous Squamous Cell Carcinoma

Alice Chuang, MD[1]; Hazel Richardson, BA[2]; Feng Wu, PhD[1]; Joseph Califano, MD[2]; John Kwon, MD, PhD[1]; Nanette Liegeois, MD, PhD[2]
1. University of Chicago, Chicago, IL, United States
2. Johns Hopkins, Baltimore, MD, United States

026

Determinants of Survival in Dermatofibrosarcoma Protuberans Patients Developing Subsequent Primary Cancers

David E. Kurlander, BS[1]; Jill S. Barnholtz-Sloan, PhD[2]; Haley Gittleman, MS[2]; Yanwen Chen, PhD[2]; Meg R. Gerstenblith, MD[3]; Jeremy S. Bordeaux, MD, MPH[4]
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2. Case Western Reserve University School of Medicine, Case Comprehensive Cancer Center, Cleveland, OH, United States
3. Case Western Reserve University School of Medicine, University Hospitals Case Medical Center, Cleveland, OH, United States
4. University Hospitals Case Medical Center, Case Western Reserve University, Cleveland, OH, United States

027

Application of Appropriate Use Criteria to Skin Cancers at an Academic Health System

Adam B. Blechman, BS[1]; James W. Patterson, MD[2]; Mark A. Russell, MD[3]
1. University of Virginia School of Medicine, Charlottesville, VA, United States
2. University of Virginia Health System, Department of Pathology, Charlottesville, VA, United States
3. University of Virginia Health System, Department of Dermatology, Charlottesville, VA, United States

028

Metastatic Cutaneous SCC (cSCC): Retrospective Analysis of Patients Managed with Otolaryngology-Head and Neck Surgery in a Tertiary Care Center (ENT)

Jordan B. Slutsky, MD[1]; Melinda B. Chu, MD[1]; Brandon T. Beal, BS[2]; Maulik Dhandha, BS[2]; Eric S. Armbrecht, PhD[3]; Ronald Walker, MD[4]; Mark A. Varvares, MD[4]; Scott W. Fosko, MD[1,4]
1. Saint Louis University, Department of Dermatology, Saint Louis, MO, United States
2. Saint Louis University, School of Medicine, Saint Louis, MO, United States
3. Saint Louis University, Center for Outcomes Research, Saint Louis, MO, United States
4. Saint Louis University, Department of Otolaryngology – Head & Neck Surgery, Saint Louis, MO, United States

029

Analysis of Mohs Micrographic Surgery Cases for Previously Undiagnosed Invasion

Andrew Breithaupt, MD[1]; Nima M. Gharavi, MD, PhD[1]; Eric Sako, BS[2]; Joseph F. Greco, MD[3]
1. University of California, Los Angeles, Department of Dermatology, Los Angeles, CA, United States
2. UCLA School of Medicine, Los Angeles, CA, United States
3. UCLA Medical Center, Santa Monica, CA, United States

030

Histopathologic Assessment of Depth of Invasion of Squamous Cell Carcinoma In Situ: Implications for Treatment Approach

Sean R. Christensen, MD, PhD[1]; Jennifer M. McNiff, MD[1]; Alicia J. Cool, MD[2]; Sumaira Z. Aasi, MD[3]; Allison M. Hanlon, MD[1]; David J. Leffell, MD[1]
1. Yale University School of Medicine, Department of Dermatology, New Haven, CT, United States
2. DermAssociates, Silver Spring, MD, United States
3. Stanford University School of Medicine, Department of Dermatology, Redwood City, CA, United States

Poster Presentation List

031

A Novel Suture for High-Tension Wound Closure: The Tandem Pulley Stitch

Catherine L. Tran, MD[1]; Timothy S. Wang, MD[1]

1. Johns Hopkins, Dermatology Department, Baltimore, MD, United States

032

The Merits of Using Alternate Staining with Toluidine Blue and Hematoxylin and Eosin during Mohs Micrographic Surgery for BCCS

Navara Anjum, BM, MRCP Derm[1]; Philippa Shepherd, BSc[1]; Geraldine Sega-Hall, MBBS, MRCP[1]

1. Portsmouth Hospitals NHS Trust, Portsmouth, Hampshire, United Kingdom

033

Inferiorly Based Naso-facial Interpolation Flap for Closure of Distal Nasal Defects

Hilary C. Reich, MD[1]; Sarah E. Schram, MD[1]; Bart T. Endrizzi, MD, PhD[1]; Peter K. Lee, MD, PhD[1]

1. University of Minnesota, Dermatology Department, Minneapolis, MN, United States

034

Rapid Rebound in Squamous Cell Carcinoma Tumor Burden in a Transplant Patient upon Discontinuation of Sirolimus

Elizabeth Foley, MD[1]; Victoria Lazareth, NP, MA, MSN[2]; Dori Goldberg, MD[1]

1. University of Massachusetts Medical School, Worcester, MA, United States

035

The Prognostic Value of Sentinel Lymph Node Biopsy Compared to Breslow Thickness Alone: Implications for Informed Consent in Melanoma Patients

Scott Freeman, MD[1]; John A. Zitelli, MD [2]

1. Sunrise Dermatology, Mobile, AL, United States
2. Zitelli & Brodland, PC, Pittsburgh, PA, United States

036

Merkel Cell Carcinoma in Solid Organ Transplant Recipients: A Case Series and Review of the Literature

Ilya Lim, MD[1]; Marc D. Brown, MD[1]; Glynis A. Scott, MD[1]; Sherrif F. Ibrahim, MD, PhD[1]

1. University of Rochester Medical Center, Rochester, NY, United States

037

The Supply and Demand for Mohs Surgery: An Analysis Based on Utilization Rates and Appropriate Use Criteria

Adam B. Blechman, BS[1]; Mark A. Russell, MD[2]

1. University of Virginia School of Medicine, Charlottesville, VA, United States
2. University of Virginia Health System, Department of Dermatology, Charlottesville, VA, United States

038

Prospective Evaluation of Patients on Warfarin Presenting to a Mohs Practice/Data Analysis: INR Values Correlated with a Bleeding Score

Elias E. Ayli, DO[1]; Daven Doshi, MD[2]; David E. Kent, MD[1,3]

1. Dermatologic Surgery Specialists, PC, Macon, GA, United States
2. Gainesville Skin Cancer Center, Gainesville, FL, United States
3. Mercer Medical School, Macon, GA, United States

039

The Incidence and Significance of Monckenberg's Calcinosis in Mohs Frozen Sections from Lower Leg lesions

Hina Ahmad, MD[1]; Richard G. Bennett, MD[1]

1. Keck School of Medicine at USC, Department of Dermatology, Los Angeles, CA, United States

040

Novice vs. Experienced Mohs Surgeon

H. William Higgins, II, MD, MBE[1]; Kachiu C. Lee, MD, MPH[1]; Patrick Mulvaney, BA[2]; Steven A. Altmayer, MD[1]; Raymond G. Dufresne, Jr., MD[1]; Antonio P. Cruz, MD[1]

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2. The Warren Alpert School of Medicine of Brown University, Providence, RI, United States

041

Use of Dehydrated Human Amniotic Membrane Allograft for Reconstruction of Mohs Micrographic Surgical Defects and Dehisced Wounds

Janice M. Warner, MD[1]; Catherine Warner, BA[2]

1. Atlanta West Dermatology, Austell, GA, United States
2. Georgia Health Sciences University, Medical College of Georgia, Augusta, GA, United States

042

To Determine if Fecal Bacteria are a Significant Cause of Surgical Site Infections (SSI) of Wounds Below the Waist

James Keane, MD[1]; Conway Huang, MD[1]

1. University of Alabama Birmingham, Birmingham, AL, United States

Poster Presentation List

043

Mohs for Melanoma and Melanoma In Situ: Do Head and Neck Lesions Differ from Other Locations?

Jeremy Etzkorn, MD[1]; Christopher J. Miller, MD[1]; Joseph F. Sobanko, MD[1]
1. University of Pennsylvania, Philadelphia, PA, United States

044

Management of Recurrent Skin Cancer for the Mohs Surgeon

Jonathan Olson, MD[1]; Daniel Berg, MD[1]; Linda C. Chang, MD[1]
1. University of Washington, Division of Dermatologic Surgery, Seattle, WA, United STates

045

Eversion in Dermatologic Surgery: Is Cosmetic Appearance Improved?

Stefani Kappel, MD[1]; Daniel B. Eisen, MD[1]; Rebecca Kleinerman, MD[2]
1. UC Davis, Department of Dermatology, Sacramento, CA, United States
2. Schweiger Dermatology, New York, NY, United States

046

Preparation of Mohs Micrographic Surgery Frozen Sections: Three New Pearls Leading to a Simplified and More Effective Process

Ilya Shoimer, MD[1]; Larry Warman, MLT[1]; Habib A. Kurwa, MD, MBBCh, FRCP (UK)[1]
1. University of Calgary, Division of Dermatology, Calgary, Alberta, Canada

047

Prediction of Post-operative Pain Following Mohs Micrographic Surgery with Two Validated Pain Anxiety Scales

Andrea Chen, MD[1,3]; David C. Landy, PhD[2]; Gerard Smith, BS[2]; Erik Kumetz, BS, MA[2]; Eduardo Weiss, MD[3]; Eli R. Saleeby, MD[1]
1. The Skin Institute of South Florida, Coral Springs, FL, United States
2. University of Miami, Miami, FL, United States
3. Hollywood Dermatology, Hollywood, FL, United States

048

P63 as a Marker for Primary Cutaneous Carcinosarcoma and Treatment with Mohs Surgery

Joshua Tarpley, MS[1]; Cort McCaughey, MD[1]; Andrew M. Swanson, MD[1]; B. Jack Longley, MD[1]; Daniel Bennett, MD[1]
1. University of Wisconsin, Department of Dermatology, Madison, WI, United States

049

The Management of Intravascular Invasion in Basal Cell Carcinomas

Francis C. Hsiao, MD, PhD[1,2]; Liliana Saap, MD[1]; Heidi Anderson-Docktor, MD[1]; Stephen N. Snow, MD[3]; Rosemarie H. Liu, MD[3]; Peter K. Odland, MD[4]; Vincent Falanga, MD[1,2]; Catherine Breen, MD[1]; Todd Vinovriski, MD[1]; Annalisa Gorman, MD[3,5]; Ming Liu, MD[1]; Fang Xiong, BA[1]; David Fiori, BA[1]; Satori Iwamoto, MD, PhD[1,2]
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2. Boston University School of Medicine, Boston, MA, United States
3. University of Wisconsin, School of Medicine, Madison, WI, United States
4. Skin Surgery Center, Seattle, WA, United States
5. University of Washington, Seattle, WA, United States

050

SCC In Situ with Invasive Component Noted on Mohs Histology: A 5-year, Single Institution Retrospective Review

Sasima Eimpunth, MD[1,2]; Michael S. Hamman, MD[2]; Robert Lee, MD[3]; Soohyun Kim, BS[4]; Tanya Greywal, BS[4]; Gagik Oganesyan, MD, PhD[5]; S. Brian Jiang, MD[2]
1. Siriraj Hospital, Faculty of Medicine, Bangkoknoi, Bangkok, Thailand
2. University of California San Diego, Department of Dermatology, San Diego, CA, United States
3. University of California San Diego, San Diego, CA, United States
4. University of California San Diego Medical School, San Diego, CA, United States
5. Sutter Medical Group of the Redwoods, Dermatology, Santa Rosa, CA, United States

051

Neuroendocrine Tumor of the Skin Arising in the Background of Imatinib Mesylate Therapy

Blanca E. Ochoa, MD[1]; Valencia D. Thomas, MD[1]
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052

Full-thickness Skin Grafts Secured with 2-octylcyanoacrylate and Adhesive Strips: A Case Series

Jennifer S. Ranario, MD, MBA[1]; Ikue Shimizu, MD[1]
1. Texas Tech University Health Sciences Center, Lubbock, TX, United States

053

Increased Utilization of Second-intent Healing in Mohs Micrographic Surgery

H. William Higgins, II, MD, MBE[1]; Kachiu C. Lee, MD, MPH[1]; Patrick Mulvaney, MD[1]; Antonio P. Cruz, MD[1]; Raymond G. Dufresne, Jr., MD[1]
1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

Poster Presentation List

055

Dynamic Infrared Imaging: A Non-invasive Approach for the Detection of Skin Cancer

Erica G. Lau, DO[1]; Sebastian Godoy, MS[2,3]; David Ramirez, PhD[3]; Greg von Winckel, MD[2,3]; Pradeep Sen, PhD[3]; Sanchita Krishna, PhD[3]; Sanjay Krishna, PhD[2,3]; R. Steven Padilla, MD[1]

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3. SKINfared LLC, Albuquerque, NM, United States

056

Partial Success of Intralesional Methotrexate in Treatment of Reactive Squamous Cell Carcinoma after Mohs Surgery

Felipe B. Cerci, MD[1,2]; Jenna L. O'Neill, MD[1]; Daniel J. Pearce, MD[1]

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2. Hospital Santa Casa de Misericórdia de Curitiba, Curitiba, Paraná, Brazil

Poster Presentation Summaries

001

Title: **Melanoma Incidence in Children and Adolescents: Decreasing Trends from 2000-09**

Authors: Laura Campbell, BS[1]; Jill Barnholtz-Sloan, PhD[1]; Kyle Strodtbeck, BS[1]; Jeremy S. Bordeaux, MD, MPH[2]

Institutions: 1. Case Western Reserve University School of Medicine, Cleveland, OH, United States 2. University Hospitals Case Medical Center, Case Western Reserve University, Cleveland, OH, United States

Introduction: Melanoma incidence in adults has been increasing since the 1970's, yet melanoma incidence has not been widely studied in younger populations. This study examines melanoma incidence patterns in children and adolescents from 1973-2009.

Design: Surveillance, Epidemiology, and End Results (SEER-9) registries data were used to calculate annual melanoma incidence from 1973-2009 for the age groups 0-4, 5-9, 10-14, and 15-19 years. SEER-18 registries were also used to calculate melanoma incidence for the same age groups from 2000-2009, as SEER-18 provided the most cases with detailed, clinically relevant information. Incidence rates were stratified by gender, tumor site, Breslow depth, ulceration status, lymph node involvement, and distant metastases. Age-adjusted incidence trends were calculated, generating the annual percent change.

Summary: From 1973-2002, melanoma incidence rates increased in adolescents (ages 15-19), peaked in 2002, then trended downward. In 10-14 year olds, rates increased from 1973-2004, peaked in 2004, then trended downward. In 5-9 year olds, rates seemed stable from 1973-2001, peaked in 2001, then decreased. In 0-4 year olds, rates peaked in 1986, but otherwise seemed stable from 1973-2009. SEER-18 data from 2000-2009 showed a statistically significant decreasing trend in melanoma incidence in 15-19 year olds ($p=0.04$). Significant decreasing melanoma incidence trends ($p<0.05$) were also found in: males age 15-19; nodular melanoma in 10-14 year olds; truncal melanoma in 15-19 year olds; melanoma with thin depth (0.01-1.00mm) in 15-19 year olds; melanoma without ulceration in 15-19 year olds; and melanoma without distant metastases in 15-19 year olds.

Conclusion: Melanoma incidence increased in children (age 10-14) and adolescents (age 15-19) from 1973-2004 and 2002, respectively, then decreased. From 2000-2009 overall, incidence significantly decreased in 15-19 year olds. This decreasing trend was significant in males and melanomas with better prognostic indicators. In contrast, past pediatric and adult studies reported increasing melanoma incidence over broader time periods. Decreasing trends, however, have been reported in other countries for children. Perhaps increased adherence to sun protective measures, or increased time spent indoors engaging in TV and electronics rather than outdoors (and thus less exposure to UV radiation) contributes to recent trends in 15-19 year olds.

002

Title: **A Retrospective Survey Assessing Patient Satisfaction with Cosmesis of Full-thickness Skin Grafting following Mohs Micrographic Surgery**

Authors: Kimberly L. Brady, MD[1]; Franki Lambert Smith, MD[1]; Lance B. Henry, MD[2]; Julie L. Ryan, PhD, MPH[1]; Marc D. Brown, MD[1]

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Introduction: Full thickness skin grafts (FTSG) are commonly referred to as an "inferior alternative" to other reconstructive methods; however, the investigators have noticed that patients are aesthetically pleased with the outcome of the FTSG repair. Additionally, the literature reveals excellent aesthetic results with FTSG based on physician rating. This study aims to assess patient satisfaction with the cosmetic result of FTSG used for the repair of defects following surgical removal of skin cancers by Mohs micrographic surgery (MMS).

Design: A retrospective survey was mailed to all 490 patients who were repaired with FTSG after MMS between 1/2004 and 12/2006. Patients were asked to rate the "appearance" of their skin graft one week, 6 months, and one year after surgery, and currently, at the time of survey completion. Appearance was graded on a scale of 0 to 10 anchored by 0 = very poor cosmetic result and 10 = excellent cosmetic result. Change in satisfaction from one week post-surgery to one year post-surgery was calculated by subtracting the patients' ratings at one week from the patients' ratings at one year. The patients also rated their "overall expectation" of the cosmetic appearance of the skin graft on a scale of 1 to 5 anchored by 1 = much worse than expected and 5 = much better than expected. Data were analyzed according to age, sex, skin tumor type, defect location, defect size, donor site, and time post-surgery using analysis of variance (ANOVA) at a significance level of 0.05.

Summary: Two hundred and thirteen patients of 490 (43.4%) completed and returned the questionnaire. Patient characteristics are shown in Table 1. There were no significant differences in age, defect size, or time post-surgery between men and women ($p>0.05$). Results of analyses are shown in Table 2.

Conclusion: Although physicians often consider FTSG after MMS an inferior alternative to local flaps, this study shows that overall patients are satisfied with the cosmetic outcomes of reconstruction with FTSG following MMS. The patients' satisfaction and overall expectations did not appear to have been influenced by sex, age, skin tumor type, defect location, time post-surgery, defect size, or donor site. The change in satisfaction over the course of the year following surgery revealed some trends, including greater change in satisfaction by women, patients with smaller defects, and younger patients.

Table 1.

	All Patients (N=213)	Male (N=128)	Female (N=85)
Mean Age (SE)	72.80 (1.08)	73.43 (0.94)	72.34 (1.22)
Mean Defect Size (cm^2) (SE)	10.14 (0.93)	10.83 (0.76)	9.45 (1.10)
Mean Months Post-FTSG (SE)	33.57 (0.99)	33.61 (0.89)	33.53 (1.08)
Cancer Type:			
Basal cell carcinoma	171 (80.3%)	97 (75.8%)	74 (87.1%)
Squamous cell carcinoma	31 (14.6%)	25 (19.5%)	6 (7.1%)
Lentigo maligna	7 (3.3%)	3 (2.3%)	4 (4.7%)
Dysplastic nevus	2 (0.9%)	1 (0.8%)	1 (1.2%)
Basosquamous cell carcinoma	2 (0.9%)	2 (1.6%)	0 (0%)
FTSG Location:			
Tip (nose)	35 (16.4%)	15 (11.7%)	20 (23.5%)
Sidewall/Dorsum (nose)	16 (7.5%)	9 (7.0%)	7 (8.2%)
Ala/Crease (nose)	16 (7.5%)	8 (6.3%)	8 (9.4%)
Extremities/Trunk	54 (25.4%)	21 (16.4%)	33 (38.8%)
Ear	66 (31.0%)	62 (48.4%)	4 (4.7%)
Periorbital	16 (7.5%)	9 (7.0%)	7 (8.2%)
Scalp (excluding face)	10 (4.7%)	4 (3.1%)	6 (7.1%)
Donor Site:			
Preauricular	99 (46.5%)	46 (35.9%)	53 (62.4%)
Postauricular	9 (4.2%)	8 (6.3%)	1 (1.2%)
Chest	79 (37.1%)	57 (44.5%)	22 (25.9%)
Burow's	10 (4.7%)	6 (4.7%)	4 (4.7%)
Other	16 (7.5%)	11 (8.6%)	5 (5.9%)

Table 2.

Survey Question	Association	Comment
Appearance FTSG at current time	No association with sex, age, skin tumor type, defect location, time post-surgery, defect size, or donor site (p>0.05).	Mean ± standard error = 9.39 ± 1.91
Overall expectation of the cosmetic appearance of FTSG		Mean ± standard error = 4.31 ± 0.93
Appearance of FTSG at current time for small defect size (<1 cm^2)	Women appeared to be more currently satisfied than men as shown by two-sided ANOVA (p=0.006).	Mean = 9.6 vs. 7.4, respectively
Overall expectation of cosmetic appearance of FTSG for small defect size (<1 cm^2)	Women had their expectations met more compared to men as shown by two-sided ANOVA (p=0.0001).	Mean = 4.7 vs. 3.3, respectively
Change in satisfaction from one week post-surgery to one year post-surgery	No significant associations, but did reveal some trends: 1) Women appeared to have greater change in satisfaction (p=0.075). 2) The change in satisfaction appeared to be greatest in patients with smaller defect sizes (the group between 1 and 4 cm^2) (p=0.077). 3) The age group ≤ 60 years appeared to have the greatest change in satisfaction (p=0.059).	Due to the retrospective survey design, there is substantial recall in the change in satisfaction analyses.

003

Title: Factors that Influence Disease Progression in Patients with Head and Neck Melanoma

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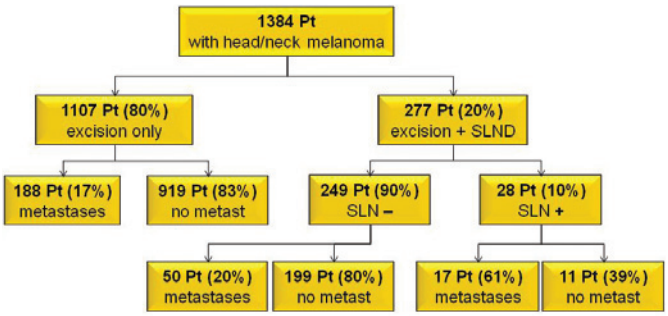
Introduction: Sentinel lymph node status is considered by some a strong prognostic tool in melanoma patients. Because thicker primary tumors are associated with a higher risk of metastases, sentinel lymph node dissection (SLND) has been used in patients with tumor thickness of ≥ 1mm. If the sentinel lymph node (SLN) is positive, a total lymphadenectomy is performed. However, the benefit of surgical lymph node procedures like the SLND or total lymphadenectomy is still a matter of controversy.

Design: A retrospective review was performed of all patients diagnosed with a primary cutaneous melanoma of the head and neck from 1976 to 2010. All cases were documented in the Central Malignant Melanoma Registry of Tubingen University, Germany. All patients underwent follow-up examinations as per the recommendations of the German Society of Dermatology. Including the effect of SLND and neck dissection, we analyzed and compared different groups in regard to prognostic factors (tumor thickness, level of invasion, ulceration, histological subtype, localization and gender), overall survival and disease-free survival. All tumor thicknesses were considered.

Summary: Of 1384 patients reviewed, 277 had a SLND (20%). There was no overall survival benefit in patients with SLND compared to patients who only received excision (p=0.07). Of those that received SLND, 28 had a positive SLN (10.1%). Compared to the SLN-negative group, the SLN positive group showed a significantly worse disease-free period (p<0.001) and a significantly worse overall survival (p<0.001). SLND positivity was a risk factor for metastases, as 60.7% of the SLN-positive patients, 20% of the SLN-negative, and 17% of patients without SLND developed metastases during the review time period. Altogether 130 patients of the study group were SLN-positive or developed lymph node (LN) metastases. Of those with metastasis, 79 received a neck dissection, and other 51 patients refused a neck dissection. These two groups (neck dissection vs. no neck dissection) did not differ in regard to overall survival (p=0.50). Patients without metastases were mostly diagnosed with lentigo maligna melanoma. Of patients with metastases, nodular melanoma was the most common subtype.

Conclusion: A positive SLN is a marker for a worse outcome without benefit for patients' overall survival. The rate of positive SLN was low. That can be explained by the large number of lentigo maligna melanomas, which is known to metastasize less likely compared to other subtypes. Regional lymphadenectomy in case of positive SLN or neck LN metastases does not influence overall survival.



004

Title: Mohs Micrographic Surgery for Lentigo Maligna and Lentigo Maligna Melanoma using Mel-5 Immunostaining: an Update from the University of Minnesota

Authors: Matthew Beal, MD[1]; Jesse Fark, MS4[1]; Jing Liu, MD[2]; Sarah E. Schram, MD[2]; Peter K. Lee, MD, PhD[2]

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Introduction: Mohs micrographic surgery (MMS) continues to become a more common and accepted treatment for lentigo maligna (LM) and lentigo maligna melanoma (LMM). The primary difficulty encountered lies in the accurate identification of atypical single melanocytes to determine tumor-free margins. In 2006, we presented our 4-year study at the ASDS with Mel-5 immunostaining to better visualize single melanocytes. Only one recurrence noted in 200 patients in a mean follow-up time of 38.4 months. Here, we present an update regarding our now

thirteen-year experience with the use of Mel-5 immunostaining in MMS for treatment of LM and LMM.

Design: Two hundred and sixty patients with primary or recurrent LM or LMM were treated using MMS from January 2004 to December 2011 at the University of Minnesota. The initial clinical margins were determined by Wood's light examination, and a debulk specimen was obtained. A small portion of this debulk specimen, representing the primary tumor, was secured for intraoperative processing as the positive control, while the rest of the debulk was fixed in formalin for review by a dermatopathologist. The first Mohs layer was then removed, and both this and the positive control obtained from the debulk specimen were then stained with Mel-5 intraoperatively. One hundred seventy-four patients were followed up to evaluate for recurrence, with a mean follow-up time of 34 months. The 200 patients described in the initial case series from 1999 to 2003, wherein one recurrence was noted, were also followed through December 2011.

Summary: Of the 460 patients treated from January 1999 to December 2011, five recurrences were noted in four patients; one recurrence in the initial case series and four in this new, updated series. Three of the recurrences noted in this updated series were primary, whereas one of the recurrences noted was a second recurrence from the initial 200 patients treated from 1999 - 2004. One melanoma-related death occurred in a patient intermittently lost to follow-up. Use of Mel-5 immunostaining added approximately 41 minutes to each stage. We have continued to find Mel-5 superior to MART-1/Melan-A staining in ease of identification of atypical melanocytes.

Conclusion: MMS with Mel-5 immunostaining continues to yield excellent results in the treatment of LM and LMM, with only three recurrences noted in 260 patients in this new case series. In our thirteen-year experience with this technique, we have noted only five recurrences of LM or LMM in 460 patients treated.

005

Title: Non-aggressive Treatment of Residual Superficial Non-melanoma Skin Cancer Encountered during Mohs Micrographic Surgery for Invasive Components

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Introduction: Treatment of non-melanoma skin cancers (NMSC) with mixed histology including invasive and superficial components is a challenge encountered frequently in Mohs surgery. While the goal for Mohs surgery is to achieve 100% pathologic clearance, performing Mohs layers to ensure complete clearance of superficial forms of NMSC (sBCC or SCCIS) can result in extremely large defects. Based on our recent survey of Mohs College surgeons, 40-50% of Mohs surgeons use an adjuvant modality (topical therapy or curettage) if there is residual sBCC or SCCIS after taking 1-4 additional stages. There is little data on the cure rate of this non-aggressive approach. The purpose of this study was to evaluate our experience with non-aggressive management of sBCC or SCCIS encountered during Mohs surgery.

Design: After approval from institutional review board, we acquired and reviewed the records of patients who underwent Mohs surgery for SCC or BCC at our academic center between 2008-2009 and had residual sBCC or SCCIS at the final Mohs section. Demographic data and tumor characteristics were collected. A follow-up skin exam was scheduled to evaluate the Mohs site. If there was any evidence of recurrence, a biopsy was performed. The result section below reflects the preliminary results from chart review. The prospective part of the study is ongoing and the results will be presented at the meeting.

Summary: 52 patients met the inclusion criteria (24 with BCC, 28 with SCC; mean age 73.8 years). Thirty-six patients (69.2%) had prior history of NMSC. Eight cases (15.4%) were considered immunosuppressed. In 43 cases (82.7%) the encountered superficial tumor was the same type as the original tumor. Between 1-5 Mohs stages were taken. Adjuvant treatments used included topical 5-fluorouracil or imiquimod in 14 (26.9%), curettage with or without electrodessication in 33 (63.5%), and curettage followed by a topical therapy in 5 (9.6%). The defect healed by second intent in 26 (50%), repaired by primary linear closure in 16 (30.8%) and repaired using flaps or grafts in 10 cases (19.2%). The 3-year recurrence rate will be presented at the meeting.

Conclusion: This is the first large prospective study on non-aggressive treatment of sBCC or SCCIS encountered during Mohs surgery. Mixed superficial and invasive histology is more frequently seen in patients with prior history of NMSC (surrogate for diffuse actinic damage) and immunosuppression. Non-invasive treatment of the superficial tumor leads to smaller defects, manifested here by less aggressive repair types.

006

Title: Oral Capecitabine for Skin Cancer Prevention in Solid Organ Transplant Recipients with End Stage Renal Disease on Hemodialysis

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Introduction: Management of squamous cell carcinomas in solid organ transplant recipients (SOTR) is a difficult issue, as these cancers are the most common malignancies observed in this population and frequently result in significant morbidity. Recently, we have shown that oral capecitabine has been effective in decreasing the incidence of SCC development in SOTR. The use of capecitabine, however, has been limited by patients' renal insufficiency, as this medication is almost entirely excreted by the kidneys (95.5%) and has been observed to cause significant adverse events (grades 3 and 4) in patients with GFR <30mL/min in Phase II trials. Many SOTRs, however, are receiving anti-rejection medications for solid organ transplantation other than kidney, including lung, heart, pancreas, or liver, and have coincident end stage renal disease (ESRD) requiring hemodialysis (HD). We report the use of low-dose oral capecitabine for the prevention of squamous cell carcinoma in SOTRs with ESRD requiring HD.

Design: A case-observational, retrospective study was performed to determine the safety and efficacy of low-dose capecitabine in the secondary prevention of skin cancers in SOTRs with ESRD on HD. Four patients with history of solid organ transplants and extensive SCC development associated with long-term immunosuppression were treated with oral capecitabine 500 mg daily. The total number of SCCs developed in the 12

months prior to treatment, as well as in the 12 months after treatment were recorded every 1 – 3 months with regular skin surveillance by dermatologist. Adverse reactions were also monitored.

Summary: On average, there was an 82% reduction in SCC development in the four patients treated with 12 months of oral capecitabine, with no significant side effects observed. The capecitabine appears to be cleared effectively with each round of HD.

Conclusion: We conclude that low-dose oral capecitabine therapy is an effective and well-tolerated adjuvant therapy for the treatment of cutaneous SCC in SOTRs with ESRD undergoing HD.

007

Title: Upstaging from Melanoma In Situ to Invasive Melanoma on the Head and Neck following Complete Surgical Resection

Authors: Kevin Gardner, DO[1]; Adam Wright, MD[1]; Jerry D. Brewer, MD[1]; Randall K. Roenigk, MD[1]; Clark C. Otley, MD[1]; Christopher J. Arpey, MD[1]; Christian L. Baum, MD[1]

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Introduction: Melanoma in situ diagnosed from a subtotal biopsy may be upstaged to invasive melanoma following resection of the entire lesion. There is significant variability in the reports of this phenomenon with rates ranging from 5% to 67%. Furthermore, the location of invasion in relation to the clinically-evident lesion and the trend of this phenomenon over time have not been completely characterized. The purposes of this report: 1.) Quantify the rate of upstaging melanoma in situ on the head and neck following resection in a single institution 2.) Characterize the location of the invasive component with regard to the clinically-evident lesion 3.) Evaluate the rate of upstaging over time.

Design: An IRB-approved retrospective review of clinical records in our institution was performed and included all patients over the age of 18 with a pre-operative diagnosis of melanoma in situ on the head and neck from 2005 to 2012. Patient demographics and tumor characteristics were tabulated.

Summary: A total of 282 patients met the inclusion criteria and 6% (n=16) were upstaged following resection. Mohs micrographic surgery (MMS) was performed in 72% and wide local excision (WLE) in 28%. Among the upstaged cases, 88% (n=14) were treated with MMS and 12% (n=2) were treated with WLE (5 mm margins). Among the patients treated with MMS, 9 were upstaged on permanent sections of debulking specimen and 5 were upstaged by frozen sections (confirmed with permanent sections), including two patients with invasive disease beyond the clinically-evident lesion at margins of 5 mm and 10 mm. The percentage of upstaged lesions on an annual basis trended as follows: 0% (2006); 5% (2007); 5% (2008); 5% (2009); 10% (2010); 13% (2011).

Conclusion: This study describes the largest series to quantify the rate of upstaging melanoma in situ on the head and neck following resection, and it suggests a rate (6%) that is relatively low compared to several prior reports. Most invasive disease was identified in a debulking or WLE specimen. However, invasive disease also occurred at margins of 5 mm and 10 mm beyond the clinically-evident lesion. Therefore, histologic examination of as much of the surgical specimen as possible should be considered for purposes of optimal staging and treatment of melanoma in situ. These data also suggest an increasing rate of upstaging over time. Possible explanations for these results include sampling technique, referral bias, or perhaps a true biologic trend. Future studies may help elucidate the details regarding this phenomenon.

008

Title: Incidence and Risk Factors for Non-melanoma Skin Cancer after Liver Transplantation

Authors: Ivette Sosa Seda, MD[1]; Janice Cho[1]; Ana Velazquez[1,2]; Amy Weaver[1]; Kymberly Watt, MD[1]; Jerry D. Brewer, MD[1]

Institutions: 1. Mayo Clinic, Rochester, MN, United States 2. University of Puerto Rico, School of Medicine, San Juan, PR, United States

Introduction: Non-melanoma skin cancer is a well recognize long term complication of transplantation and immunosuppression. The purpose of this study is to examine the incidence, tumor burden and risks factors for non-melanoma skin cancer in patients post liver transplantation.

Design: A retrospective cohort study of all liver transplant recipients diagnosed from 2002-2008. Abstracted information included standard and non-standard immunosuppression regimen, rejection, tumor histology, tumor burden, tumor location, treatment and recurrence. Cumulative incidence and Cox proportional hazards regression models were used to evaluate risks factors for posttransplant primary and secondary non-melanoma skin cancer.

Summary: Among 577 liver transplant patients, the mean age at transplant was 53.0 years (range, 19.3-73.1), 67% were male, and 86% were Caucasian. Over a total of 3486 person-years of follow-up (mean, 6.0 years per patient), 85 of the 577 liver transplant patients developed a total of 222 NMSC post-transplant including 52 squamous cell carcinoma (SCC), 70 SCCIS, and 100 basal cell carcinoma (BCC). Twenty-nine patients developed a SCC (range, 1 to 5 per patient) and the median time to first SCC was 3.0 years (IQR, 1.7-4.0). Fifty-three patients developed a BCC (range, 1 to 8 per patient) and the median time to first BCC was 2.3 years (IQR, 1.0-4.4). The cumulative incidence (CI) of any NMSC was 3.6%, 8.5%, and 12.7% at 1, 3, and 5 years after liver transplantation, respectively. The CI of SCC was 0.5%, 2.3%, and 4.6%, and the CI of BCC was 2.8%, 5.2%, and 7.0%, respectively. Of the 53 who developed a BCC, 1 had a prior SCC, 4 had SCC diagnosed at the same time, and 8 developed subsequent SCC. Multivariate analysis showed that the following risk factors: older age, male gender, and Caucasian race were associated with an increased risk of developing SCCis, SCC or BCC.

Conclusion: Non-melanoma skin cancer causes substantial morbidity among liver transplant recipients. Vigilant strategies focus on regular full skin and nodal examination, aggressive initial treatment and skin cancer education to reduce the risk of malignant transformation are appropriate interventions in these high-risk patients.

009

Title: Profile of Mohs Patients 40 Years and Younger

Authors: Steven A. Altmayer, MD[1]; Kachiu C. Lee, MD, MPH[1]; H. William Higgins, II, MD, MBE[1]; Raymond G. Dufresne, Jr., MD[1]; Antonio P. Cruz, MD[1]

Institution: 1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

Introduction: Non-melanoma skin cancer in young adults is a growing problem. The purpose of this review is to better define the characteristics

of basal cell carcinoma (BCC), squamous cell carcinoma (SCC), and squamous cell carcinoma in situ (SCCIS), in young Mohs patients compared to older Mohs patients.

Design: A retrospective review of all Mohs patients treated at our academic facility from 2005-2011 was performed. The following data were examined: gender, age, tumor type/subtype, initial tumor area, and sub-clinical extension (post-operative defect area and number of stages required for tumor removal). Young Mohs patients (≤40 years old) were compared to older Mohs patients (≥90 years old). Data analysis was completed using the t-test and χ^2 test.

Summary: 170 young Mohs patients and 399 older Mohs patients were identified. The average age of young patients was 36 years (range, 18-40). Young patients were significantly more likely to be female (52% female vs. 48% male) compared to older patients (42% female vs. 58% male) (p=0.03). Young patients had a greater frequency of BCCs compared to older patients (85% vs. 62%; p=0.001). Less aggressive BCC subtypes (nodular and superficial) were relatively more common than aggressive BCC subtypes (i.e. infiltrative, morpheaform) in young patients (p=0.002). There was no significant difference in the average number of stages required for tumor clearance between age groups. Despite similar initial defect areas, the post-operative defect area was significantly smaller in young patients (2.89 cm^2 vs. 5.49 cm^2; p=0.001).

Conclusion: Young Mohs patients were more likely to be women and to present with BCCs, generally exhibiting less aggressive histology, compared to older patients. Post-operative defects were smaller in young patients, though initial tumor size and the number of stages needed for tumor clearance were similar. The propensity for less aggressive BCCs and fewer SCCs in young patients, as well as a greater importance placed on maximal tissue conservation in this age group, suggest that the average margin taken for each stage was smaller for young patients. The study reminds us that while the overall ratio of BCCs to SCCs may be approximately 4:1 in the general population, there are significant differences in the relative frequencies of BCCs and SCCs over time, with the ratio of BCCs higher in younger patients.

010

Title: An Evidence-based Review of Dermatologic Surgery in the Pregnant Patient

Authors: Kachiu C. Lee, MD, MPH[1]; H. William Higgins, II, MD, MBE[1]; Raymond G. Dufresne, Jr., MD[1]

Institution: 1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

Introduction: Performing dermatologic surgery on pregnant patients requires careful consideration. This review addresses the safety of surgical and other dermatologic procedures in the pregnant patient and postpartum period.

Design: We performed a comprehensive review of English-language literature indexed in PubMed from 1960 onwards. References within relevant articles were also reviewed.

Summary: Anesthetic considerations are of great importance. Recommendations for local anesthesia during the first trimester have been fairly nonspecific. Therefore, it is advisable to wait until the second trimester before performing non-emergent dermatological surgery. Lidocaine and prilocaine are Category B, and can be used safely locally or topically. Epinephrine, tetracaine, mepivacaine and benzocaine are Category C. Mepivacaine has been shown to cause fetal bradycardia and needs to be used with caution. Pentafluoropropane is associated with negligible systemic absorption and is considered safe in pregnancy. The effects of tumescent anesthesia on pregnancy have not been evaluated. The safety and use of antibiotics will also be reviewed. In regards to procedures, electrocautery is considered safe although concern has been raised about fetal exposure to potentially harmful particles in electrocautery fumes. Therefore, placing a mask on the patient is recommended. Biopsies, curettage, and cryotherapy pose no significant risks. For procedures performed on the extended abdomen, one may need to use a slowly absorbing buried suture with increased strength and knot security. Due to slower wound healing associated with pregnancy, sutures may need to remain in the skin longer. Risk of dehiscence decreases with staged suture removal, especially on the distended abdomen. Various cosmetic procedures are also safe during pregnancy. Botulinum toxin (up to 600 units) has been used safely during pregnancy in the neurology literature. There is an absolute contraindication about performing sclerotherapy in the 1st trimester and after the 36th week. Pulse-dye laser can be safely used during pregnancy for pyogenic granulomas and warts. Treatment of condylomata acuminata with carbon dioxide laser prior to delivery, to prevent intrapartum spread, has not been associated with harmful fetal effects. Electrolysis for hair removal during pregnancy should be avoided, as its safety in pregnancy has not been studied. Collagen and hyaluronic acid injections have not been extensively studied during pregnancy.

Conclusion: Performing dermatologic surgery on pregnant patients requires careful consideration. Maternal and fetal health can influence surgical timing, use of antibiotics and anesthetic agents, and type of procedure. The surgeon must weigh the risks and benefits to both patient and fetus prior to proceeding.

011

Title: Incidence of Squamous Cell Carcinoma in Biopsy Proven Transected Squamous Cell Carcinoma In Situ Referred for Mohs Micrographic Surgery

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Introduction: Approximately 3.6 million non-melanoma skin cancers are diagnosed annually in the USA and squamous cell carcinoma accounts for 20-25%. A variety of treatments exist, however, Mohs micrographic surgery (MMS) is considered first line therapy for head and neck tumors. In an era of increasing healthcare cost, it is important to match the treatment to the diagnosis. Transected biopsies of SCC in situ (SCCIS) are often qualified with the caveat 'cannot rule out invasion,' prompting more aggressive treatment. Here, we investigated the incidence of invasive SCC in biopsy proven transected SCCIS referred for MMS.

Design: After IRB approval, a retrospective chart review of patients with biopsy-proven transected SCCIS referred for MMS between 1/1/12 and 12/31/12 was performed. The tumor location, biopsy scar area, and biopsy technique were documented. Case slides were reviewed. Diagnosis of the tumor layer, which was excised as part of the first stage and processed, final histological diagnosis of the peripheral margin, and number of stages required for tumor clearance were recorded.

Summary: 51 patients with biopsy-proven transected SCCIS were identified. 49 (96%) cases were on the head and neck. Of these tumors, 33 (64.7%) were in the 'H-zone', 16 (31.7%) were on the cheeks or forehead, and 2 (3.9%) were on the hand and foot. 45 (88%) of the initial biopsies were obtained by shave technique, 3 (6%) by punch biopsy, and in 3 (6%) cases a method was not reported. Biopsy dimensions varied from 0.2 – 2.0 cm with an average area of 0.71 cm^2 (SD 0.6). Of the 51 cases, 33 (64%) were cleared in one stage. The average number required was 1.58 (SD 1.04) stages. Examination of the tumor layer revealed scar/inflammation in 27 cases (52.9%), actinic keratosis/cheilitis in 2 (3.9%) cases, SCCIS in 16 (31.4%) cases, and invasive SCC in 1 (0.9%) case. In 2 (3.9%) cases superficially invasive SCC could not be rule out and were considered invasive in the analysis. The tumor layer was not analyzed in 3 cases. Lesions with invasion were present for one year or longer and were on average larger than noninvasive cancers (1.32 vs. 0.67 cm2, p = 0.047). In analyzing the peripheral margins across all stages, no diagnosis more advanced than SCCIS was encountered.

Conclusion: Although our findings are limited to a single institution, the results are significant in that they demonstrate that the vast majority of biopsy proven transected SCCIS, in fact, remain in situ.

012

Title: Prospective Study of Adverse Events in Dermatologic Surgery

Authors: Jenna O'Neill, MD[1]; Steven R. Feldman, MD, PhD[1]; James Solomon, MD, PhD[2]; Phillip M. Williford, MD[1]; **Daniel J. Pearce, MD**[1]

Institutions: 1. Wake Forest Baptist Health, Department of Dermatology, Winston-Salem, NC, United States 2. Ameriderm Research, Ormond Beach, FL, United States

Introduction: Although office-based dermatological procedures are generally considered safe, there is a lack of prospective data on the rate of adverse events (AEs) associated with these procedures. Objective: We sought to determine the frequency of AEs after dermatologic surgery, and to characterize the most commonly encountered AEs.

Design: A web-based interface was designed to track AEs with the input of four dermatologic surgeons. Patient demographic and operative data were collected at the time of the dermatologic surgery procedure. AEs occurring at any time during the data collection period were logged according to an a priori categorization scheme.

Summary: The AE rate was 1.99% in this series of 2418 subjects undergoing dermatologic surgery from 2/1/2010 through 12/14/2010. The most commonly reported AEs were suspicion of infection (64%), post-operative hemorrhage (20%), and wound dehiscence (8%). Suspicion of infection was slightly less frequent in subjects who received prophylactic pre-operative antibiotics (0.43%) versus those who did not (1.5%, p = 0.07). There were no serious AEs and no deaths.

Conclusion: AEs are uncommon after office-based dermatologic surgery procedures. Pre-operative antibiotics may further decrease the infection rate after dermatologic surgery; however, the risks and benefits must be weighed given the already very low AE rate.

013

Title: Incidence of Metastatic Basal Cell Carcinoma: A Systematic Review

Authors: Kelly Fox, BA[1]; Ellen S. Marmur, MD[2]

Institution: 1. Icahn School of Medicine at Mount Sinai, New York, NY, United States 2. Mount Sinai Medical Center, Department of Dermatology, New York, NY, United States

Introduction: Despite numerous case reports and case series, there has been no attempt to systematically determine, based on all available data, the percentage of basal cell carcinomas (BCCs) that metastasize. Estimates in the literature range from 0.0028% to 0.4%, a difference of two orders of magnitude. Given the high and increasing incidence of BCC, the high mortality rate of metastatic basal cell carcinoma (mBCC), and the many emerging therapies for mBCC, a systematic calculation of incidence is important. However, sparse statistical infrastructure, due to lack of reporting standards or regulations, makes this a difficult task.

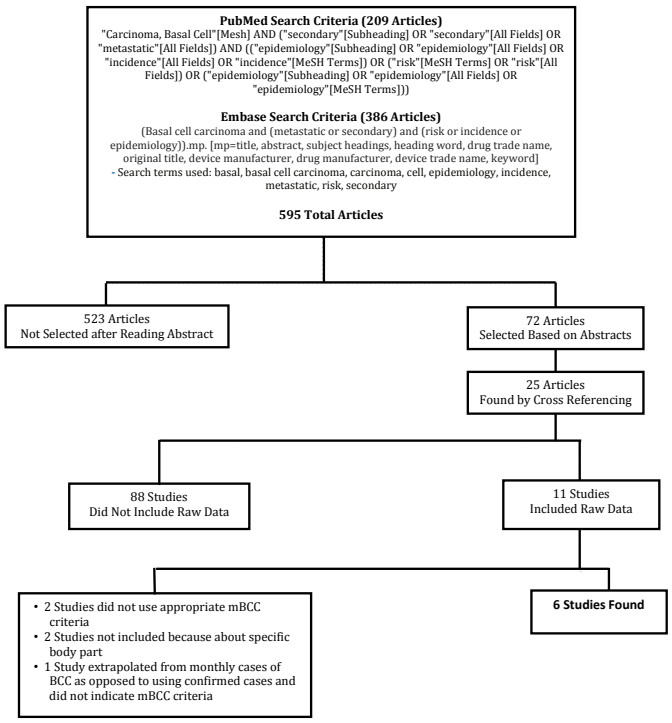
Design: A systematic computerized search using the MEDLINE (through PubMed) and Embase databases was performed to identify all relevant studies published in any language through 2012. Studies that met the following criteria were included: 1) Study included raw data, including the number of BCCs and mBCCs over the specified time period of the study. 2) Study did not solely deal with one area of the body (e.g. cases of BCC and mBCC on the hand). 3) Study used the criteria established in detail by Lattes and Kessler, which are a) The primary tumor and metastasis were histologically basal cell carcinomas. b) The presumed metastatic nodule or nodules were proved to have occurred in lymph nodes, and could not be interpreted as new primary growths or direct extensions from the original tumor. c) The tumors must not have their origin in mucous membranes or glands even if they were classified by the authors as basal cell carcinomas or epitheliomas. 4) Study reported on confirmed cases of BCC as opposed to extrapolating or assuming how many basal cell carcinomas were seen.

In cases where the fourth inclusion criterion was not met, but the number of confirmed cases could be obtained from study data, the study was included with the modification noted.

To obtain a better estimate of the incidence of mBCC, the acceptable data from the studies found using the aforementioned inclusion criteria were amalgamated to provide one estimate. Specifically, the total number of cases of mBCC over the six studies were treated as if they had come from the summed pool of basal cell carcinomas from those studies.

Summary: Six eligible case series were found from Australia, United States, England, and Poland. Each reported the number of cases of BCC and number of cases of mBCC over the studies' respective time periods. Individual incidences in the studies ranged from 0.0036% to 0.40%. A total of 81,628 cases of BCC were seen over the six studies and 32 cases of mBCC were seen.

Conclusion: Integration of all available data that met the inclusion criteria provided an overall mBCC incidence of 0.04%, which is consistent with its widely reported low incidence. However, creation of a registry for cases of basal cell carcinoma and metastatic basal cell carcinoma could improve these estimates.



014

Title: The Z-advancement Flap for Reconstruction of Lateral Nasal Tip and Medial Ala Defects

Authors: **Bichchau Michelle T. Nguyen, MD**[1]; Kyle R. Eberlin, MD[2]; Pritesh S. Karia, MPH[1]; Joi B. Carter, MD[2]; Christine Liang, MD[1]; Chrysalyne D. Schmults, MD, MSCE[1]

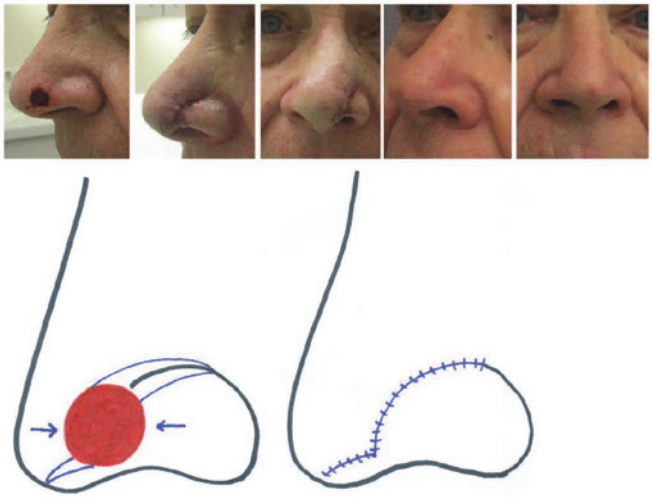
Institutions: 1. Brigham & Women's Hospital, Department of Dermatology, Jamaica Plain, MA, United States 2. Massachusetts General Hospital, Boston, MA, United States

Introduction: Reconstruction of surgical defects on the lateral nasal tip and medial ala optimally should preserve contour, symmetry, and skin texture of the ala while maintaining adequate nasal airway patency. Traditional repair options for small to medium (0.5-1cm) defects include primary closures, bilobe transposition flaps, melolabial 1 or 2 stage transposition flaps, full thickness skin grafts and secondary intention healing. Complications such as distortion or loss of alar rim and crease, trap-door deformity, obvious scarlines, and poor texture and color match of skin grafts can preclude an optimal cosmetic outcome. The Z-advancement flap is a novel reconstruction technique developed by our group to address some of these common difficulties in repairing small to medium defects on the lateral nasal tip and medial ala.

Design: The current study assesses the cosmetic and functional outcomes of a series of 29 patients who underwent Z-flap advancement repair of defects ≤ 1cm on the lateral nasal tip and medial ala. Three physicians independently graded standardized pre and post-operative (≥1 month) photos on visibility of scar lines, erythema/telangiectasia, and contour and symmetry of the ala and nostril opening. Patient satisfaction with cosmesis and nasal airway patency were queried via survey questionnaires.

Summary: 28/28 (100%) patients who completed the survey were satisfied with the look and feel of the nose post repair, and only 4/28 (14%) noticed any scar or abnormality in the area. Although about half of the patients experienced a stuffy nose sensation (due to minor airway obstruction) on inspiration immediately post-op, only 1 patient had significant persistent symptoms at time of survey. Post-op photos ≥1 month after surgery were available for 17/29 (58%) patients. Standardized evaluation showed moderate to excellent agreement amongst the three physicians based on intra-class correlation. Post-operative scar line was deemed not visible in 71% of the cases, and only slightly visible in another 25%. Similarly, erythema and telangiectasia were rated as unchanged or slightly worse in 96% of the cases. Contour of the alar crease was unchanged in 78% of patients, while symmetry of alae and nostril openings were unchanged in over half of patients and only slightly asymmetric in another third. Four patients underwent superficial shave removal of redundant tissue inside the nostril which relieved minor airway obstructive symptoms. No patients had bleeding, infection, or other post-op complications.

Conclusion: The z-flap advancement is a novel, safe, and minimally invasive repair technique for small to medium size defects ≤1 cm on the lateral nasal tip and medial ala. The technique provides excellent cosmesis by utilizing cosmetic unit junction lines. Patient expressed high satisfaction with both the aesthetic and functional outcomes of the repair.



015

Title: Trends in Mohs Surgery from 1995 to 2009: A Review of the National Ambulatory Care Survey

Authors: Scott A. Davis, MA[1]; Cheryl L. Gustafson, MD[1,2]; Steven R. Feldman, MD, PhD[1]; Kenyatta Mireku, BS[1,3]; **Daniel J. Pearce, MD**[1]

Institutions: 1. Wake Forest Baptist Health, Department of Dermatology, Winston-Salem, NC, United States 2. Emory University, Department of Dermatology, Atlanta, GA, United States 3. University of Georgia, Department of Dermatology, Athens, GA, United States

Introduction: In Mohs surgery the histologic verification of tumor removal at the time of the procedure results in a lower rate of cancer recurrence compared to simple excision. In light of the increasing incidence of skin cancer, there are concerns about proper utilization of various modalities. Purpose: To investigate trends in the utilization of Mohs surgery.

Design: The National Ambulatory Medical Care Survey (NAMCS) was queried for patient visits associated with Mohs surgery from 1995 to 2009. Primary endpoints included: trends in the percentage of skin cancers managed with Mohs surgery, the most common locations of skin cancer managed with Mohs surgery, and patient demographics associated with Mohs surgery.

Summary: Although there was an upward trend in the use of Mohs surgery, a low percentage of skin cancers (2.8%) were managed with this technique. When the surgical location was specified, Mohs surgery was most commonly utilized for the head and neck region. Compared to other age groups, patients in the 70-79 year range underwent the highest percentage (34.0%) of Mohs surgeries. Male patients (60.0%) underwent Mohs surgery more frequently than females. Patients of white race accounted for 90.2% of Mohs surgery cases. In comparison, patients of African American race accounted for 2.9% of Mohs surgical procedures. After adjusting NAMCS data to take into account the proportions of each race in the U.S. population, the percentage of white patients managed with Mohs surgery was 2.7%; whereas, Mohs surgery was utilized for 10.0% of African American patients with a diagnosis of skin cancer.
Conclusion: Mohs surgery is primarily reserved for skin cancers having an inherent high risk of recurrence and involves body sites where tissue preservation is essential, such as the head and neck region. Evaluation of patient demographics demonstrates the frequency of Mohs surgery closely parallels the frequency of skin cancers such that patient subpopulations associated with higher rates of skin cancer are treated the most frequently with Mohs surgery.

016

Title: Vismodegib to Downregulate ATP-Binding Cassette Protein ABCG2 Leading to Enhancement of Photodynamic Therapy

Authors: Joseph P. Housel, MD[1]; Nathalie C. Zeitouni, MD[1]
Institution: 1. Roswell Park Cancer Institute, Department of Dermatology, Buffalo, NY, United States

Introduction: Photodynamic therapy (PDT) with the topical photosensitizer aminolevulinic acid (ALA) is a useful treatment for selected basal cell carcinomas (BCC) but results may vary based on tumor characteristics such as rapid efflux of protoporphyrin IX (PpIX) from the cell. If PDT could be enhanced by inhibiting this efflux it is theorized that the efficacy would be enhanced leading to greater destruction of tumor cells. Imatinib mesylate has been shown in previous studies to enhance PpIX levels in both murine and human cells due to its effect on the ATP-binding cassette protein ABCG2. ABCG2 has been shown to efflux some of the photosensitizers used in photodynamic therapy (PDT) leading to resistance to this treatment modality. Hedgehog inhibitors such as vismodegib may also be useful when combined with PDT. Upon binding of the Hedgehog (Hh) ligand to the Hh receptor, Patched-1, loss of inhibition of Smoothened (Smo) occurs. Downstream transcriptional events are then triggered through the Gli family of transcription factors, promoting tumor growth through four major mechanisms: 1. Inhibiting Gli transcription factors which mediate growth and proliferation. 2. Inhibiting Gli thus inhibiting ABCG2. 3. Directly inhibiting ABCG2. 4. Inhibiting Smo which leads to normalization of tumor vasculature. Taking advantage of these effects prior to PDT may be a useful adjunct.
Design: Vismodegib and imatinib mesylate's effects on intracellular retention of photosensitizers 5-ALA and HPPH (2-(1-hexyloxethyl)-2-devinyl pyropheophorbide-a, Photochlor) were studied by measuring fluorescence in murine and human cells. HeLA cells and mouse endothelial cells were incubated with varying levels of vismodegib or imatinib mesylate followed by 5-ALA or HPPH and then ultraviolet excitement was measured.
Summary: Energy-dependent efflux of HPPH and endogenous PpIX synthesized from 5-ALA, was verified in ABCG2+ cell lines. Vismodegib and imatinib mesylate increased accumulation of PpIX and HPPH in ABCG2+ cells. Imatinib mesylate increased the levels of PpIX by 34% while vismodegib increased PpIX levels by 29%. HPPH was increased only by 7% with imatinib mesylate and 16% with vismodegib.
Conclusion: ALA and HPPH are transported out of cells by ABCG2, and this effect can be decreased by coadministration with either imatinib mesylate or vismodegib. The efficacy of clinical PDT may be enhanced by increasing intracellular photosensitizer levels in ABCG2+ tumors with Hh and ABCG2 inhibitors vismodegib or imatinib mesylate. This combination will likely prove to be a useful adjunctive therapy for patients with multiple or large BCCs.

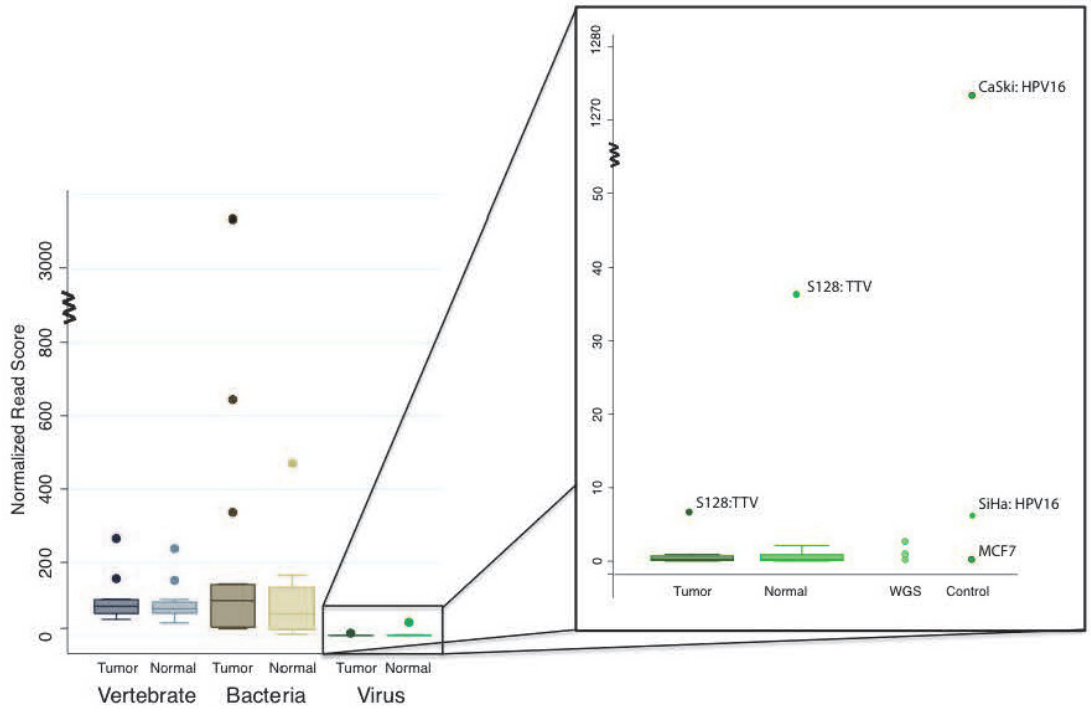
017

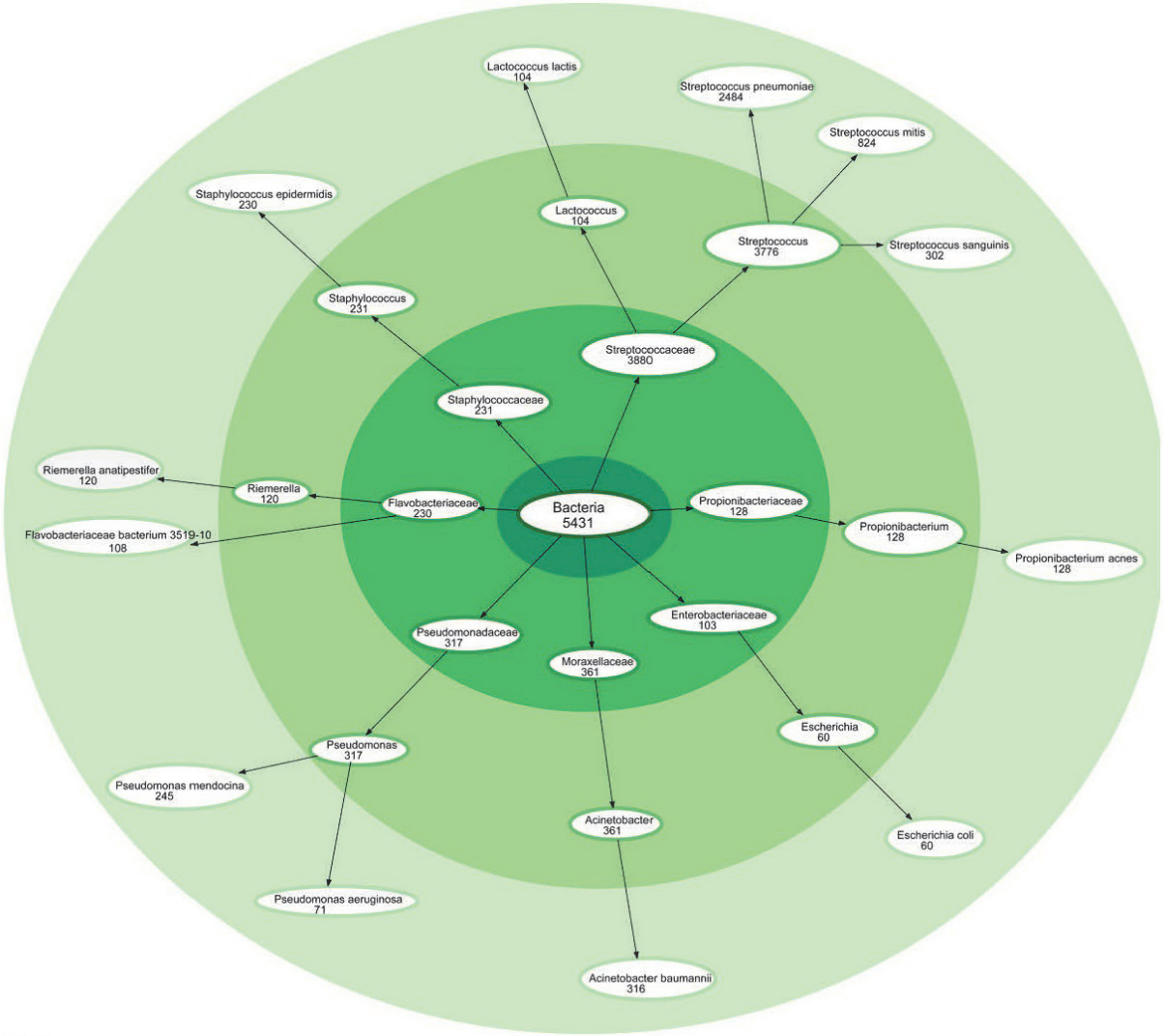
Title: No Evidence for Viral DNA in Whole Genome Sequence of Cutaneous Squamous Cell Carcinoma

Authors: Michelle Dimon, PhD[1]; Henry Wood, PhD[2]; Pamela Rabbitts, PhD[2]; Wilson Liao, MD[1]; Raymond Cho, MD, PhD[1]; **Sarah Tuttleton Arron, MD, PhD**[3]
Institutions: 1. University of California, San Francisco, San Francisco, CA, United States 2. Leeds Institute of Molecular Medicine, Leeds, United Kingdom 3. University of California, San Francisco, Department of Dermatology, San Francisco, CA, United States

Introduction: Multiple lines of evidence suggest a viral etiology for cutaneous squamous cell carcinoma (SCC). Human papillomavirus (HPV) DNA has been detected at low levels in a subset of SCC, but no mechanism exists for viral transformation. HPV is not transcriptionally active in SCC and is present at viral loads of only one copy to 100-10,000 cells. Our objective was to determine whether any virus is present in the genome sequence of SCC.
Design: DNA was extracted from 12 SCC and matched normal tissue. Exomes were isolated using oligonucleotide-based hybrid capture for sequencing; whole genome libraries were prepared for three samples. Libraries were sequenced with the Illumina sequencing-by-synthesis platform. Pathogen analysis was performed with Integrated Metagenomic Sequence Analysis (IMSA) software; whole genome sequence from SiHa and CaSki cell lines were used as positive controls for HPV detection.
Summary: We estimated exome capture efficiency of 60%, with ample skin flora (staphylococcus and proprionibacterium) detected in all skin samples. HPV was not detected in the exome sequence of any of the 12 tumors sequenced; whole genome sequencing confirmed the absence of HPV DNA. In contrast, HPV16 was readily detected in the genome sequence of CaSki and SiHa cell lines. No other episomal or integrated virus was detected in these tumors; one tumor and normal pair from a lung transplant recipient both carried torque teno virus, reflective of the patient's level of immunosuppression.
Conclusion: IMSA is a fast, flexible software algorithm for detection of pathogen sequence in high throughput datasets. We used high throughput exome and whole genome sequence to demonstrate the absence of detectible HPV or other viral DNA in SCC. Low-level HPV DNA detected by nested PCR in prior studies likely reflects commensalism rather than oncogenicity of this virus.

Poster Presentation Summaries





018

Title: Using Advanced Healthcare Data Analytics to Identify Patients with Advanced Basal Cell Carcinoma in a Large Nationwide Healthcare Institution

Authors: Scott L. DuVall, PhD[1,2,3]; Olga V. Patterson, PhD[1,3]; Tyler B. Forbush[1]; Aaron W.C. Kamauu, MD, MS, MPH[4]; Carolina Reyes, PhD[5]; Yeun Mi Yim, MPH[5]; Glen M. Bowen, MD[6]

Institutions: 1. VA Salt Lake City Health Care System, Salt Lake City, UT, United States 2. University of Utah College of Pharmacy, Department of Pharmacotherapy, Salt Lake City, UT, United States 3. University of Utah, School of Medicine, Department of Internal Medicine Division of Epidemiology, Salt Lake City, UT, United States 4. Anolinx, Salt Lake City, UT, United States 5. Genentech, Inc., South San Francisco, CA, United States 6. University of Utah School of Medicine, Department of Dermatology, Salt Lake City, UT, United States

Introduction: Basal cell carcinoma (BCC), a form of non-melanoma skin cancer (NMSC), is the most common form of cancer in the United States. Some BCC patients may develop locally advanced (laBCC) or metastatic BCC (mBCC). Currently, there is insufficient population-based data on patients who have advanced forms of BCC in a multidisciplinary setting, in part because it is not possible to identify laBCC or mBCC using diagnosis codes.

Design: Our objective was to use natural language processing (NLP) to identify patients with BCC, laBCC and mBCC from a large, population-based database using electronic medical records. NMSC patients were identified with ICD-9 codes (173.xx) from a large, nation-wide integrated delivery healthcare system. Clinicians, chart reviewers, and NLP specialists determined ways that BCC, laBCC, and mBCC could be documented by care providers. This became the basis of the NLP algorithms. A sample of 1,000 mentions of BCC were reviewed for accuracy. BCC patient notes were then searched for concepts denoting laBCC and mBCC. laBCC was defined as those who were non candidates for surgery/inoperable, non candidates for radiation therapy, or had recurrent BCC with mention of "advanced" or "locally advanced" within 6 months of the recurrence. mBCC was defined as those with metastases or lymph node involvement. Manual review confirmed advanced cases of BCC.

Summary: There were 528,497 patients found with at least one ICD-9 code for NMSC between 1/1/1999 and 12/31/2011. Of those 363,627 (68.8%) were found with a diagnosis of BCC via NLP. Among the BCC patients, 1,171 (0.3%) had laBCC: 229 qualified as non candidates for radiation, 935 qualified as non candidates for surgery/inoperable, and 81 qualified as having a recurrence plus mention of "advanced" or "locally advanced" within 6 months of the recurrence. 475 (0.1%) patients had mBCC: 397 qualified as those with metastases and 137 qualified as those with lymph node involvement. Concepts for laBCC and mBCC are not mutually exclusive as a patient may meet both criteria. NLP classification accuracy was 95.2% for BCC. NLP reduced the number of documents needing manual review from 197.0 million clinical notes associated with the NMSC cohort to 19,875 for laBCC and 9,256 for mBCC.

Conclusion: This study demonstrated the successful use of NLP to identify patients with advanced BCC and to minimize the amount of human effort needed to identify laBCC and mBCC. Additional research utilizing NLP is underway to further characterize the disease, treatment patterns, and clinical outcomes in the advanced BCC population.

019

Title: Vismodegib as a Neoadjuvant to Mohs Micrographic Surgery for Operable Basal Cell Carcinomas

Authors: Ashley Wysong, MD, MS[1]; Mina S. Ally, BSc MBBS[1]; Anne L. Chang, MD[1]; Anthony Oro, MD, PhD[2]; Jinah Kim, MD, PhD[3]; Jean Y. Tang, MD, PhD[1]; Sumaira Z. Aasi, MD[1]

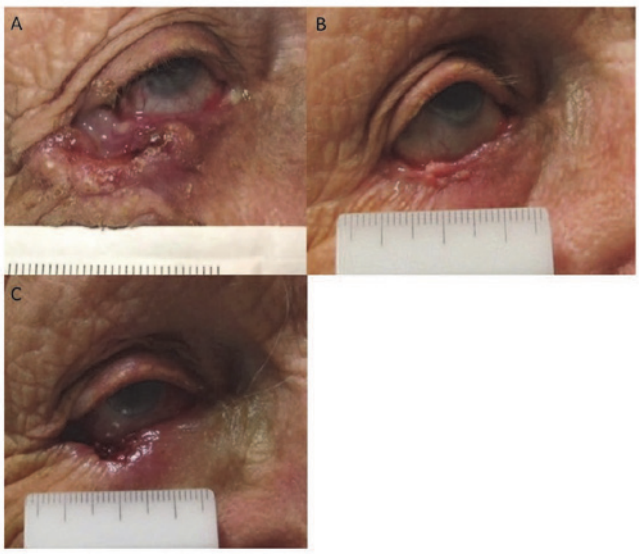
Institutions: 1. Stanford University, Department of Dermatology, Redwood City, CA, United States 2. Stanford University, Redwood City, CA, United States 3. Stanford University, Dermatology and Pathology, Stanford, CA, United States

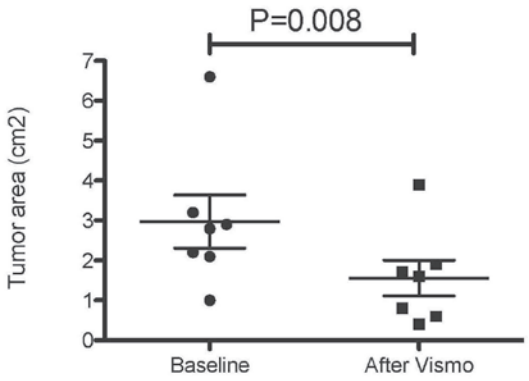
Introduction: Aberrant Hedgehog (HH) signaling pathway is responsible for basal cell carcinoma (BCC) development. Vismodegib is an oral HH-pathway inhibitor that is FDA approved for the treatment of advanced/metastatic BCCs and is taken indefinitely. The purpose of this study is to determine the safety and efficacy of 3 months minimum of vismodegib as a neoadjuvant therapy prior to Mohs surgery.

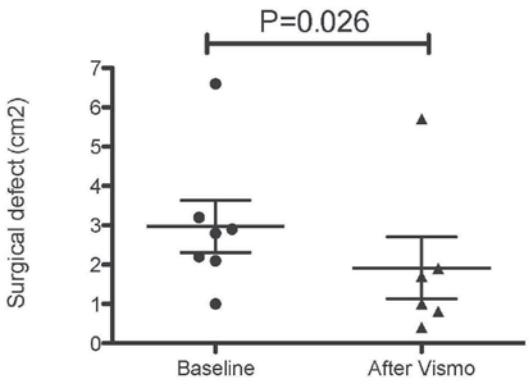
Design: A total of 10 subjects with operable BCCs of any subtype were enrolled in an open label, single arm, interventional trial of vismodegib 150mg daily. The study was powered to determine a 30% reduction in surgical defect size. We report the interim analysis.

Summary: Five patients with a total of 7 BCCs were treated for an average of 3.4 months (SD: 0.9). The mean size of baseline tumors was 3 cm^2 (range: 1 to 6.6 cm^2) and occurred primarily on the face (6/7 tumors). All subjects experienced mild side effects (Grade 1) of taste loss, muscle cramps and hair loss while on vismodegib. Vismodegib was stopped early in 1 subject due to Grade 2 elevation of liver enzymes. Vismodegib reduced the mean size of the Mohs surgical defect by -1.1cm^2 (95%CI: -0.19 to- 2.0, P=0.026) or -38% from the baseline expected surgical defect size with 2mm margins (lesion size plus 2 mm margins for a presumptive one stage Mohs resection). Vismodegib also reduced tumor area by -1.4cm^2 (95%CI: -0.19 to- 2.0, P=0.008) or -46% from baseline. All patients who completed at least 3 months of therapy required only one Mohs stage for excision. All Mohs specimens were further sectioned and evaluated via standard stepwise pathologic sectioning to determine the presence of residual carcinoma post vismodegib treatment. Three of 7 tumors had no evidence of BCC after therapy, and diagnosis in 4 tumors were equivocal and the histopathologic feature resembled infundibular cysts that stained positively for BerEp4 and BCL2. No tumors recurred over a median follow-up of 3 months (range: 2-6 mo).

Conclusion: Vismodegib reduced the Mohs surgical defect by 38% and the tumor area by 46% from baseline in interim analyses. Data on all enrolled 10 subjects and longer follow-up will be available and presented along with clinical and histologic photographs. Future challenges include the interpretation of histology for the presence of residual BCC after vismodegib and the presence of structures resembling infundibular cysts and vellus telogen hair follicles that may confound tumor margin clearance.







020

Title: Update on Advanced Non-melanoma Skin Cancer: Status of AJCC Staging

Authors: Anthony P. Tufaro, MD[1]; Alice Chuang, MD[2]; Thomas Lardaro, MD[3]; Nanette Liegeois, MD, PhD[1]

Institutions: 1. Johns Hopkins, Plastic Surgery, Baltimore, MD, United States 2. University of Chicago, Internal Medicine, Chicago, IL, United States 3. Vanderbilt, Emergency Medicine, Philadelphia, PA, United States

Introduction: The 7th edition AJCC staging represents an improved method for risk stratifying NMSC patients. The system is based on strict Tumor, Node, Metastasis (TNM) staging and plans for revised staging are underway. For the current AJCC NMSC staging system, there is also a need for validation with prospective studies. At this point, recently initiated prospective studies based on AJCC staging lack long-term outcome results. In addition, as plans for further revisions of AJCC NMSC staging commence, identification of other factors for patient risk stratification may be helpful. The goal of this study was to validate the 7th edition AJCC staging and investigate additional risk factors influencing NMSC prognosis.

Design: 285 patients with cSCC were identified by the tumor registry since 1990 and followed prospectively. This prospective cohort of patients was re-staged using 7th edition AJCC criteria and risk factors were identified and documented for each tumor. Additional data was also documented including: presence and type of immunosuppression, male versus female, prior exposure to radiation, type(s) of prior treatments and patient outcomes.

Summary: Preliminary analysis of the registry cSCC cohort was performed. Analyses indicate that the vast majority of cases are advanced stage with nodal disease. Finally, advanced disease cases included immunosuppressed patients or cases where prior treatment(s) for localized cSCC had failed.

Conclusion: The 7th edition NMSC AJCC staging system is the subject of review and consideration for revision. Results from multiple studies of prospective cohort data, based upon AJCC NMSC staging criteria, are required for further revision of the AJCC NMSC staging system. An expansion of analyzed risk factors will assist in making the staging system more precise. A rigorous scientific analysis is required for revision(s) to be accepted by the Executive AJCC Committee for the 8th edition AJCC manual.

021

Title: Comparative Genomic Hybridization as a Tool for Characterizing Multiple Merkel Cell Carcinomas in a Single Patient

Authors: Iris Ahronowitz, MD[1]; Timothy McCalmont, MD[2]; Siegrid S. Yu, MD[1]

Institutions: 1. UC San Francisco, Department of Dermatology, San Francisco, CA, United States 2. UC San Francisco, Dermatology and Pathology, San Francisco, CA, United States

Introduction: Merkel cell carcinoma (MCC) is an aggressive neuroendocrine carcinoma of the skin that can occasionally present with multiple tumors in the same patient, with the relationship between the tumors (metastatic versus multiple primaries) sometimes uncertain. This situation poses a clinical challenge with regard to disease staging and treatment. Our aim was to clarify the relationship between multiple MCC tumors in a single patient using a readily available genetic assay.

Design: We collected tumor tissue from five patients presenting with multiple histopathologically proven MCCs. Three of these patients had what clinically appeared to be in-transit metastases from a primary tumor, and two had multiple tumors at distant body sites, with an unclear relationship between these tumors. DNA was extracted from each tumor and then underwent array-based comparative genomic hybridization (aCGH) to assess chromosomal copy number gains and losses.

Summary: In three control patients with the clinical impression of in-transit metastases, all tumors demonstrated identical aCGH profiles, consistent with the clinical presentation. In one patient who developed

an MCC on her right cheek followed four months later by a second MCC on the left ankle, aCGH revealed identical genetic profiles: both tumors demonstrated distal amplification of chromosome 12p with loss of 8p and 17p, suggestive of metastatic disease. Finally, in one patient who sequentially developed three subcutaneous nodular MCC tumors (of the left lower back, followed nine months later by the left thigh, and 15 months later a third tumor of the right lower back), aCGH analysis of the left lower back tumor revealed possible gain in chromosome 2q and clear loss of 13q and 14q; the left thigh showed gain in 11 and 6q and loss in distal 3q; and the right lower back tumor showed gain in 5p and loss in 3, 4, 5q, and 10, proving three genetically distinct primary tumors, a phenomenon not previously reported in the MCC literature.
Conclusion: We have established that isolated MCC metastasis at a distant cutaneous site is rare, but does occur, and may not behave like stage IV disease (this patient has been recurrence-free on three years of followup). This scenario also illustrates that while lymphatic spread may be more frequent in MCC, hematogenous spread is also possible and is a more plausible mechanism for distant contralateral spread. Array CGH is one relatively convenient and cost-effective method for ascertaining the relationship between multiple MCC tumors, which has important implications for disease staging, management and prognosis.

022

Title: Comparison of Referred Pathology and Final Pathology in Pigmented Lesions Treated with Mohs Micrographic Surgery

Authors: Michael A. Sorace, MD[1]; R. Stan Taylor, III, MD[1]
Institution: 1. University of Texas Southwestern Medical Center, Dallas, TX, United States

Introduction: We aimed to evaluate the agreement between the initial biopsy diagnosis of pigmented lesions treated with Mohs Micrographic Surgery (MMS) with the final pathology from the Mohs debulk specimen.
Design: We reviewed all the pigmented lesions treated with MMS from May 24, 2006 through May 31, 2011. 377 cases were reviewed in total. We compared the referral biopsy with the pathology from the debulk specimen at the time of surgery. We also reviewed each case for invasion identified in the Mohs layers processed by frozen section.
Summary: From May 24, 2006 through June 31, 2011, pre-operative and debulking specimen pathology was available for 377 pigmented lesions treated with MMS in our practice. There were 53 atypical pigmented lesions (APL), 292 Melanoma in situs (MIS), and 32 invasive malignant melanoma (MM). 25 (6.6%) of all lesions were upgraded from the original diagnosis after evaluation of the debulking specimen. 15 (28.3%) of the APLs were upgraded to MIS. None of the APLs were found to harbor invasion. Of the 345 lesions treated which did not display invasion in the pre-operative biopsy, only 8 (2.3%) were ultimately found to have invasion. 8 (2.7%) of the MISs were upgraded to MM. 2 (0.7%) of MIS were found to be MM with Breslow depth of >1mm. 2 (6.3%) of the MMs were found to have a deeper Breslow depth than the original biopsy.
Conclusion: Our data represents the largest series of pigmented lesions treated with MMS in which the initial biopsy was compared with the final pathology. The high fidelity between the initial biopsy and the Mohs debulk specimen supports the use of Mohs surgery in the treatment of these lesions since a wider excision or sentinel lymph node biopsy would only be indicated in a small percentage of cases. In our study, 28.3% of APLs were upgraded to melanoma in situ. Further research into the use of Mohs surgery for these lesions may be warranted.

024

Title: Immunophenotypic Profiles of Conjunctival Primary Acquired Melanosis and Cutaneous In Situ Melanoma are Similar

Authors: Douglas J. Heiner, MD[1]; Jaymie Panuncialman, MD[2]; Zsolt Argenyi, MD[3]; Satori Iwamoto, MD, PhD[1,4]
Institutions: 1. Roger Williams Medical Center, Department of Dermatology and Skin Surgery, Providence, RI, United States 2. Sky Lakes Dermatology, Klamath Falls, OR, United States 3. University of Washington, Seattle, WA, United States 4. Boston University School of Medicine, Boston, MA, United States

Introduction: To evaluate the immunohistochemical similarities of primary acquired melanosis and cutaneous in situ melanoma and the role of immunohistochemical methods in the diagnosis of primary acquired melanosis.
Design: Retrospective immunohistopathologic study.
Summary: S-100 stained all specimens of primary acquired melanosis (PAM) with or without atypia equally with moderate intensity, while S-100 staining of in situ melanomas showed some variability. HMB-45 showed consistent moderate to high intensity staining of all specimens from the conjunctiva and skin. Tyrosinase and Melan-A consistently showed a high intensity staining pattern with all specimens from the conjunctiva and skin except for one specimen. MITF failed to stain one of three specimens of PAM without atypia. The rest of the specimens from the skin and conjunctiva exhibited moderate to high intensity staining with MITF. P75NTR stained only 2 of the specimens from the conjunctiva and skin. In terms of pervasiveness, 1 of 3 specimens of PAM without atypia and 1 of 2 specimens of PAM with atypia had <75% of cells stained with S-100. HMB-45 showed staining of greater than 75% of the melanocytes for the majority of the cutaneous specimens. Two-thirds of specimens of PAM without atypia and half of specimens of PAM with atypia had greater than 75% staining of the cells with HMB-45. Tyrosinase stained greater than 75% of the cells in all of the specimens from the skin and eye. Melan-A stained all specimens except for one specimen of PAM without atypia with greater than 75% pervasiveness. MITF showed variability in terms of pervasiveness of the staining pattern.
Conclusion: In situ melanomas of the skin and conjunctiva have a similar immunophenotype. Thus, the same markers useful in the evaluation of cutaneous in situ melanomas may also be considered when evaluating pigmented lesions of the conjunctiva. The use of a combination of these markers is recommended as not one marker is specific for melanocytes. The use of these markers may also be considered intraoperatively and will be useful in cases of primary acquired melanosis with atypia to minimize removal of unaffected conjunctiva.

025

Title: Tumor Suppressive Activities of Deleted in Liver Cancer 1 (DLC-1) in Cutaneous Squamous Cell Carcinoma

Authors: Alice Chuang, MD[1]; Hazel Richardson, BA[2]; Feng Wu, PhD[1]; Joseph Califano, MD[2]; John Kwon, MD, PhD[1]; **Nanette Liegeois, MD, PhD[2]**

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Introduction: Cutaneous squamous cell carcinoma (cSCC) is the second most common cancer in the world, with significant morbidity and mortality associated with advanced or metastatic cSCC. Given the high prevalence of cSCC and mortality rate of advanced cSCC, identification of potential molecular markers is critical given their diagnostic and prognostic relevance. Furthermore, the molecular and genetic mechanisms of cSCC progression have not been elucidated. Genetic and epigenetic alterations in DLC-1 (deleted in liver cancer 1) distinguish and functionally regulate tumorigenesis in several cancers. This study was designed to determine whether DLC-1 is i) differentially expressed in cSCC, ii) silenced through promoter methylation and iii) functionally regulates cSCC.

Design: Primary cSCC tumors, normal skin and cSCC cell lines were examined for DLC-1 expression using quantitative RT-PCR and immunohistochemistry. Methylation of DLC-1 was assessed in skin tissues using quantitative methylation-specific PCR (QMSP). DLC-1 was transiently expressed in cSCC cell lines and its effects on cell growth, cell migration and apoptosis were assessed.

Summary: The expression DLC-1 was significantly lower ($p<0.001$) in primary cSCC tumors as compared to adjacent normal skin. QMSP results demonstrated that DLC-1 promoter methylation was more frequent in primary cSCC (60.4%) as compared to adjacent normal skin (28.6%; cut-off value of 0.016, $p=0.0004$). Decreased DLC-1 expression was found in six cSCC cell lines. Induced expression of DLC-1 in cSCC cell lines resulted in significant inhibition of cSCC cell proliferation, colony formation, and invasiveness and induced caspase-3-mediated apoptosis.

Conclusion: Reduced expression of DLC-1 and DLC-1 promoter methylation are common features of cSCC. In cSCC cell lines, DLC-1 functions as a tumor suppressor by inducing apoptosis and inhibiting cell proliferation, colony formation and invasiveness. DLC-1 may be a useful candidate for the development of future tools to assess cSCC prognosis as well as targeted therapies.

026

Title: Determinants of Survival in Dermatofibrosarcoma Protuberans Patients Developing Subsequent Primary Cancers

Authors: David E. Kurlander, BS[1]; Jill S. Barnholtz-Sloan, PhD[2]; Haley Gittleman, MS[2]; Yanwen Chen, PhD[2]; Meg R. Gerstenblith, MD[3]; Jeremy S. Bordeaux, MD, MPH[4]

Institutions: 1. Case Western Reserve University School of Medicine, Cleveland, OH, United States 2. Case Western Reserve University School of Medicine, Case Comprehensive Cancer Center,Cleveland, OH, United States 3. Case Western Reserve University School of Medicine, University Hospitals Case Medical Center, Cleveland, OH, United States 4. University Hospitals Case Medical Center, Case Western Reserve University, Cleveland, OH, United States

Introduction: Recently the research team found patients with dermatofibrosarcoma protuberans (DFSP) to be at increased risk of subsequent primary melanoma, female breast, soft tissue, and other non-epithelial skin cancers, and at decreased risk of colon cancer. This study describes survival of DFSP patients stratified by subsequent primary cancers.

Design: Data from the Surveillance, Epidemiology and End Results Program's 9 registries with dates 1973-2009 were used for analysis. Three cohorts were used: Cohort 1, individuals with DFSP and no secondary cancer; Cohort 2, individuals with DFSP with the following secondary cancers: female breast, soft tissue, other non-epithelial skin, colon, and melanoma; and Cohort 3, individuals with DFSP and any other secondary cancer. Kaplan-Meier survival analyses were performed within each Cohort to assess potential survival differences by age at diagnosis, sex, race, and primary site of the tumor. Multivariable Cox proportional hazards models were performed to further assess survival differences adjusting for all factors.

Summary: For all Cohorts, survival decreased as age at diagnosis increased, in the univariate and multivariate models. For Cohort 1 (N=3459), in the multivariable model black race, male sex, and tumor location on the lower extremity, head, or other site were associated with a significantly increased risk of death. For Cohort 2 (N=131), in the multivariable model black race and tumor location on the genitals were associated with a significantly increased risk of death. For Cohort 3 (N=268), in the multivariable model tumor location on the upper extremity was associated with a significant increased risk of death.

Conclusion: Decreased survival by specific key factors is variable for those with and without secondary cancers after DFSP diagnosis. Further analyses will tease out these differences.

027

Title: Application of Appropriate Use Criteria to Skin Cancers at an Academic Health System

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Institutions: 1. University of Virginia School of Medicine, Charlottesville, VA, United States 2. University of Virginia Health System, Department of Pathology, Charlottesville, VA, United States 3. University of Virginia Health System, Department of Dermatology, Charlottesville, VA, United States

Introduction: Mohs micrographic surgery (MMS) remains an effective treatment option for skin cancer. Until recently, it has been difficult to estimate the percentage of skin cancers appropriate for MMS. The introduction of the Appropriate Use Criteria (AUC) represents an opportunity to more accurately estimate this number. This retrospective study will apply the AUC to past skin cancers at this institution to determine the proportion that would have met appropriate use.

Design: A list of all skin biopsy proven skin cancers at this institution from the beginning of May 2011 to the end of December 2011 was generated. Patient and tumor data was collected retrospectively from hospital records and each skin cancer was classified as appropriate, inappropriate or uncertain based on the AUC.

Summary: Among 1059 skin cancers, MMS was appropriate in 72.0% of cases, inappropriate in 20.4% and uncertain in 7.6%. Altogether, 59.3% of skin cancers occurred in the H and M areas.

Conclusion: Using the recently published AUC, 72.0% of skin cancers at this institution were appropriate for MMS. Tumor location was the most

important factor in determining appropriate use. Widespread understanding of the AUC could influence MMS referrals.

028

Title: Metastatic Cutaneous SCC (cSCC): Retrospective Analysis of Patients Managed with Otolaryngology-Head and Neck Surgery in a Tertiary Care Center (ENT)

Authors: Jordan B. Slutsky, MD[1]; Melinda B. Chu, MD[1]; Brandon T. Beal, BS[2]; Maulik Dhandha, BS[2]; Eric S. Armbrecht, PhD[3]; Ronald Walker, MD[4]; Mark A. Varvares, MD[4]; Scott W. Fosko, MD[1, 4]

Institutions: 1. Saint Louis University, Department of Dermatology, Saint Louis, MO, United States 2. Saint Louis University, School of Medicine, Saint Louis, MO, United States 3. Saint Louis University, Center for Outcomes Research, Saint Louis, MO, United States 4. Saint Louis University, Department of Otolaryngology – Head & Neck Surgery, Saint Louis, MO, United States

Introduction: This study evaluates aggressive cSCC cases managed with ENT to better understand risk factors predicting metastasis/poor outcomes, and optimal treatment modalities.

Design: Retrospective analysis was performed on a cohort of 56 patients with cSCCs managed from 07/2010-11/2011 with or by ENT.

Summary: Most patients were referred from the Mohs service (MMS) (75%; 42/56) for head and neck evaluation (N=30), reconstruction (N=7), or both (N=5). Community physicians referred 14 patients (25%; 14/56). Palpable lymph nodes (PLN) indicating regional metastasis were present in 26.7% (15/56) of patients. 63.2% (12/19) of patients who were sent directly to ENT without MMS had PLNs, while 6.7% (2/30) who underwent MMS had clinical lymphadenopathy. The scalp was the most common anatomical location for cSCC (25%; 14/56); despite this not being a high-risk location in AJCC criteria. 76.7% (23/30) of MMS cases did not have metastasis, whereas 84.2% (16/19) of patients who did not have Mohs had metastasis. 26.7% (8/30) of the MMS cohort had recurrent disease and 52.6% (10/19) of other cases were recurrent. 17 cases had perineural invasion (PNInv), 8 were identified prior to ENT evaluation by MMS, 7 were found during ENT treatment, and 2 were identified during pre-ENT management in the community. A tumor-based analysis found 47.8% (22/46) had metastases which were associated with large size: 4.3cm versus 2.8cm for non-metastatic cases (p-value=0.021). PNInv was a risk factor for metastasis with 40.9% (9/22) of metastatic cases having this histologic finding versus 16.7% (4/24) of non-metastatic cases (p-value=0.067). Four recurrences from the metastatic cohort referred straight to ENT were found on follow-up; 75% (3/4) had PNInv.

Conclusion: This study is consistent with previous research indicating tumor size and PNInv are high-risk features associated with metastasis. MMS cases had less metastatic/recurrent disease. Many in the MMS cohort had PNInv, yet their outcomes were favorable. These findings are consistent with our hypothesis that MMS can positively impact cSCC prognosis by providing meticulous local margin control; especially with PNInv which we believe can be better identified/managed with MMS. However, this retrospective study cannot provide the statistical power to support such a hypothesis; prospective RCTs are needed. A unified staging system and documentation of tumor characteristics such as depth of invasion would facilitate such studies. Limitations: ENT cohorts do not reflect the broad spectrum of cSCC encountered in MMS practices; depth of invasion was not recorded, despite the AJCC and NCCN criteria including it. To our knowledge, depth of invasion is not routinely measured or reported in cSCC as is done for melanoma.

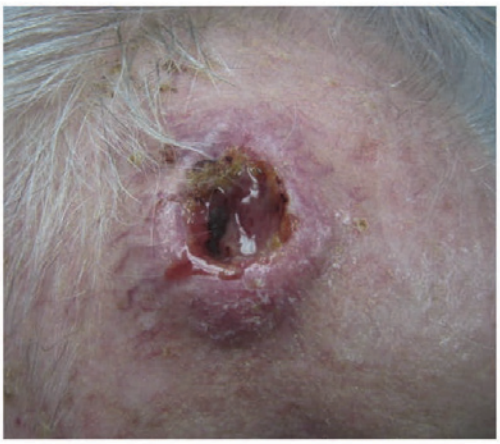


Figure 1. Recurrent acantholytic SCC on the right scalp, 4.0x3.8cm. Perineural invasion found with "slow" Mohs.

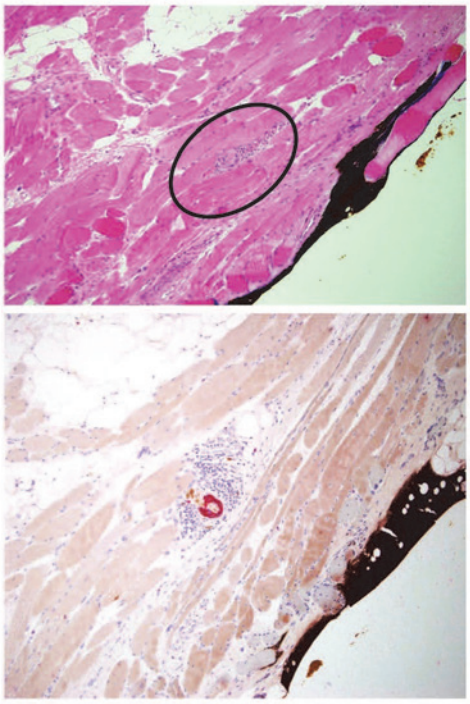


Figure 2. Squamous cell carcinoma with perineural invasion. Subtle on H&E (A) and highlighted with Pan-cytokeratin/S100 dual stain (B).

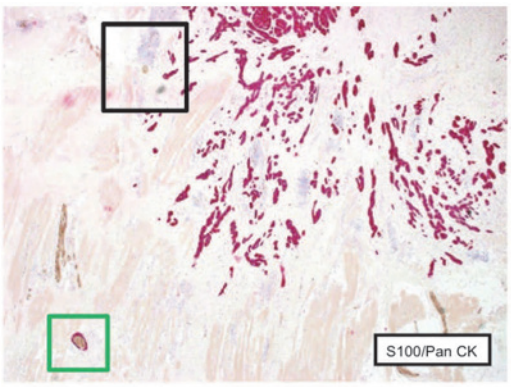


Figure 3. Squamous Cell Carcinoma (red staining tumor) with perineural inflammation without tumor (black box) and perineural invasion distant from bulk of tumor mass (green box); Pan-cytokeratin/S100 dual stain.

029

Title: Analysis of Mohs Micrographic Surgery Cases for Previously Undiagnosed Invasion

Authors: Andrew Breithaupt, MD[1]; Nima M. Gharavi, MD, PhD[1]; Eric Sako, BS[2]; Joseph F. Greco, MD[3]

Institutions: 1. University of California, Los Angeles, Department of Dermatology, Los Angeles, CA, United States 2. UCLA School of Medicine, Los Angeles, CA, United States 3. UCLA Medical Center, Santa Monica, CA, United States

Introduction: Non-melanoma skin cancer (NSMC), including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), is the leading malignancy worldwide. While treatment of invasive NMSC typically requires surgical excision, including Mohs micrographic surgery (Mohs), superficial and/or in situ cases may be treated with other modalities including topical agents such as imiquimod and/or 5-fluorouracil. A typical biopsy specimen is only a sampling of a lesion while Mohs surgery examines 100% of the margin. This study sought to determine the incidence of invasion of biopsy proven superficial/in situ NMSC following treatment with Mohs. We hypothesized that a significant portion of NMSC diagnosed as superficial/in situ on biopsy actually harbor invasive disease on complete histological evaluation. This study also sought to identify predictive factors of invasion.

Design: A retrospective study was performed across two Mohs surgery centers, analyzing cases from January 1, 2012 - December 31, 2012, with initial biopsies evaluated by 5 different dermatopathologists, and surgically removed by 7 different Mohs surgeons. All cases identified as "superficial BCC," "SCC in situ," or "Bowen's disease" that were treated with Mohs surgery were included. Operative notes and Mohs maps were reviewed for documentation of tumor invasion beyond the epidermis. Data regarding demographics and tumor characteristics was also collected and analyzed.

Summary: Two-hundred thirty cases met the inclusion criteria for the study. Our results demonstrated that 58 of the 230 cases (25.2%) were invasive when reviewed during Mohs surgery (p-value < 0.01). Analysis of predictive risk factors (including age, sex, history of immunosuppressive medications, and/or tumor size) did not show statistical significance.

Conclusion: Our study indicates that a significant portion (25.2%) of non-melanoma skin cancers that are initially diagnosed as superficial actually harbor an invasive component. These data indicate that treatment modalities that include a histologic confirmation of clearance should be strongly considered for these types of malignancies.

030

Title: Histopathologic Assessment of Depth of Invasion of Squamous Cell Carcinoma In Situ: Implications for Treatment Approach

Authors: Sean R. Christensen, MD, PhD[1]; Jennifer M. McNiff, MD[1]; Alicia J. Cool, MD [2]; Sumaira Z. Aasi, MD [3]; Allison M. Hanlon, MD[1]; David J. Leffell, MD[1]

Institutions: 1. Yale University School of Medicine, Department of Dermatology, New Haven, CT, United States 2. DermAssociates, Silver Spring, MD, United States 3. Stanford University School of Medicine, Department of Dermatology, Redwood City, CA, United States

Introduction: Cutaneous squamous cell carcinoma in situ (SCCis) has been reported to have the potential to extend into the hair follicle and sebaceous gland, but the true incidence and depth of follicular invasion have not been quantified. Follicular extension has been cited as one reason why excisional treatment of SCCis is preferred. We sought to define the frequency and depth of follicular involvement in SCCis.

Design: We previously reported the incidence of follicular invasion observed at the marginal edge of 42 cases of SCCis treated with Mohs micrographic surgery (MMS). Here, we extend our study with a comprehensive histopathologic analysis of 18 additional cases of MMS-treated SCCis, from which all excised tissue was serially sectioned at 1mm increments through the entire tissue mass. After exclusion of cases without evidence of SCCis (n=5) and cases with invasive SCC (n=1), sections from the remaining cases were scored by four independent readers for involvement of SCCis both in the follicular infundibulum and the deeper pilosebaceous unit below the sebaceous duct. Linear depth of invasion was measured from the granular layer of the epidermis for both intra-epidermal SCCis and for SCCis of the deeper follicle.

Summary: In our original analysis of the marginal edge of 42 cases of SCCis, cancer was present in the superficial follicular infundibulum in 61.3% of cases, and extended below the sebaceous duct in 8.3% of cases. In the current analysis of serial sections through the entire tumor of a second cohort (156 sections from 12 cases), SCCis was identified in the superficial follicular infundibulum in 87.5% of cases, and observed below the sebaceous duct in 12.5% of cases. Among the cases with deeper follicular involvement, the deepest level of SCCis invasion was the follicular isthmus, and SCCis was never observed in the lower follicle or bulb. Mean linear depth of invasion was 0.34 mm (range 0.09 - 0.67 mm) for cases without deep follicular SCCis, and 0.66 mm (range 0.52 - 0.82 mm) for cases with follicular invasion below the sebaceous duct.

Conclusion: This comprehensive histopathologic analysis of SCCis confirms our earlier finding that deep invasion of SCCis along pilosebaceous units is uncommon. Moreover, when follicular invasion was observed, it was only focally within the tumor, did not progress below the follicular isthmus, and was no more than 0.82 mm deep. This suggests that a range of therapeutic options may be appropriate for SCCis depending on the clinical circumstances.

031

Title: A Novel Suture for High-Tension Wound Closure: The Tandem Pulley Stitch

Authors: Catherine L. Tran, MD[1]; Timothy S. Wang, MD[1]
Institution: 1. Johns Hopkins, Dermatology Department, Baltimore, MD, United States

Introduction: Closing surgical defects that require high tension such as larger defects on the back and scalp can be challenging. Commonly utilized techniques include the Horizontal mattress stitch, Pulley stitch and even the use of a towel clamp for mechanical creep. These methods can be useful during initial closure of a wound by off-loading tension thus facilitating placement of buried sutures. The Horizontal mattress stitch distributes wound tension over two sutures that cross the wound and laterally between them. It is especially useful to redistribute tension and close dead space and variations include the running, partially buried, fully buried and locked. The Pulley stitch utilizes mechanical advantage to distribute forces over a greater length of suture in a single vertical plane across the wound. We describe a combination of the Horizontal mattress and Pulley stitch we term the Tandem Pulley stitch.

Design: To investigate if the novel suture technique confers a mechanical advantage in closing wound under tension compared to conventional techniques (Horizontal mattress stitch, Pulley stitch, towel clamp for mechanical creep)

Summary: The novel suture technique demonstrates easier wound closure with good wound-edge approximation, off-loading of tension, and dead space elimination.

Conclusion: In the novel tandem pulley suture that we describe, forces are distributed in two vertical planes and laterally and the mechanical advantage of two Pulley stitches is gained. This stitch is especially useful for closures requiring high tension as an initial stitch, off-loading tension and allowing for easier placement of buried sutures. It can be retained or removed immediately after closure.

Figure 1. Tandem Pulley Stitch

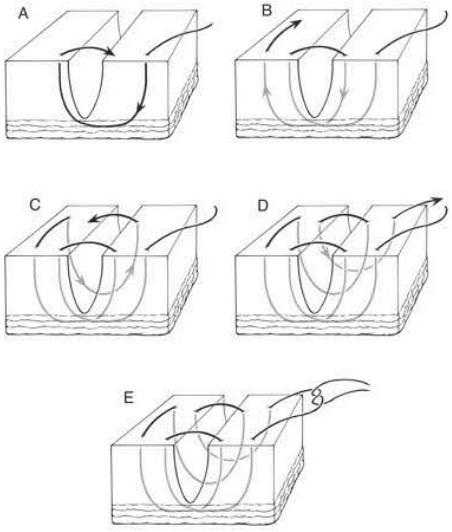


Figure 2. Tandem Pulley Stitch

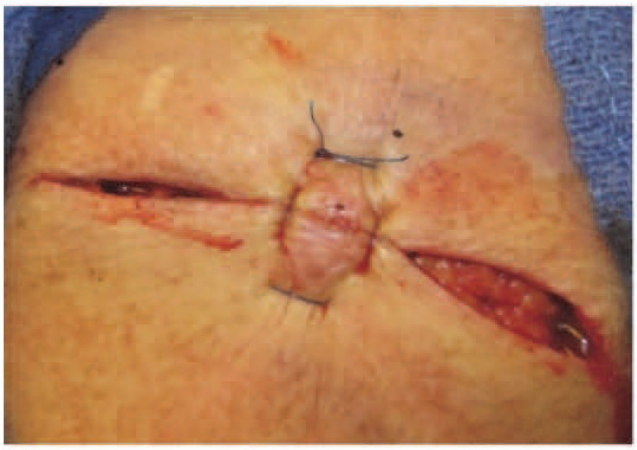
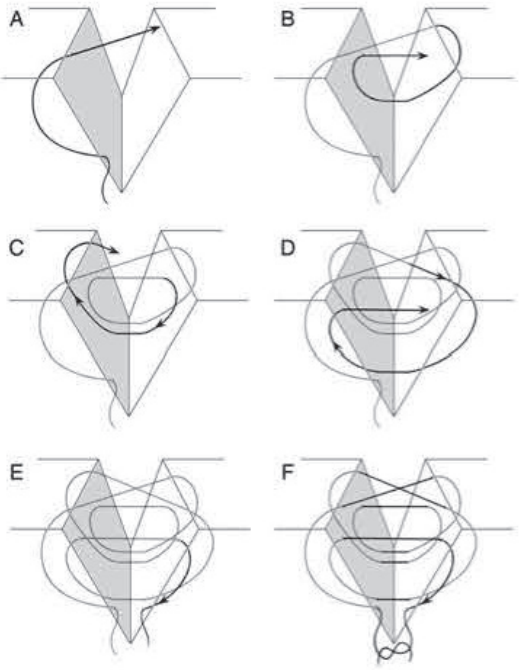


Figure 3. Buried Tandem Pulley Stitch



032

Title: The Merits of Using Alternate Staining with Toluidine Blue and Hematoxylin and Eosin during Mohs Micrographic Surgery for BCCS

Authors: Navara Anjum, BM, MRCP Derm[1]; Philippa Shepherd, BSc[1]; Geraldine Sega-Hall, MBBS, MRCP[1]
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Introduction: Mohs micrographic surgery (MMS) enables efficient treatment of a number of cutaneous malignancies including basal cell carcinomas (BCC). The success of MMS is dependent on a number

of factors however; tissue staining is paramount to allow for correct histological diagnosis and to ensure tumor clearance.

Design: Hematoxylin and eosin (H&E) has been found to be the most commonly used stain in MMS. The hematoxylin component of this stain is a basic dye that stains cell nuclei blue-purple whereas cell cytoplasm, collagen and erythrocytes are stained red-pink by the acidic eosin dye. Therefore the combination of the two provides a contrast between cellular components allowing for improved histological analysis. The advantages of H&E include simplicity of use and low cost. Toluidine blue (T-blue) is used less frequently in MMS compared with H&E, with one survey suggesting use by only 16.8% of surveyed Mohs surgeons.[1] T-blue is a basic dye that stains acidic matter. This stain has the ability to produce metachromasia, staining proteoglycans red, as well as orthochromasia, staining islands of BCC blue. This phenomenon is especially useful for detecting small nests of BCC where the pink or magenta color of the stroma can highlight the tumor. A study comparing T-blue and H&E staining during Mohs surgery concluded a preference for T-blue when analyzing BCCs.[2] T-blue was particularly advantageous when visualizing the mucopolysaccarides commonly found in the stroma of BCCs, which can be important when detecting residual BCC in cases where tumor cells are sparse.[2] The stain was also found to be useful in differentiating between tangentially cut hair follicles and BCC.[2]

Conclusion: In our experience we have found using T-blue and H&E to stain alternating sections of the same specimen far superior than using these stains individually, thereby gaining the benefit of both. This therefore improves histological analysis and reduces the risk of incomplete tumor excision. We have several histological examples to demonstrate this and in particular, have found this technique to increase diagnostic accuracy when examining infiltrating BCCs, suspected perineural involvement and differentiating between hair follicles and BCC.

1. Silapunt S et al. Mohs Tissue Mapping & Processing: A Survey Study. Dermatol. Surg. 2003 Nov;29(11):1109-12

2. Humphreys T et al. A Pilot Study Comparing Toluidine Blue & Haematoxylin & Eosin Staining of BCCs & SCCs during Mohs Surgery. Dermatol. Surg. 1996 Aug;22(8):693-7

033

Title: Inferiorly Based Naso-facial Interpolation Flap for Closure of Distal Nasal Defects

Authors: Hilary C. Reich, MD[1]; Sarah E. Schram, MD[1]; Bart T. Endrizzi, MD, PhD[1]; Peter K. Lee, MD, PhD[1]

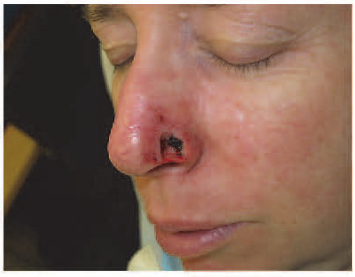
Institution: 1. University of Minnesota, Dermatology Department, Minneapolis, MN, United States

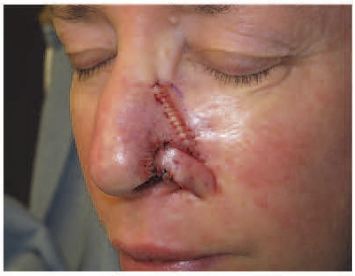
Introduction: Satisfactory cosmetic repair of surgical defects of the distal nose is challenging for several reasons. Not only is the nose the central focus of the face, but it is comprised of several (optimally) symmetrical subunits. Several techniques for closure of small-to-medium size defects have been described, including full-thickness grafting, local tissue transposition (such as the bi-lobed flap), or larger more complex repairs such as superiorly-based melolabial interpolation flaps or the paramedian forehead flap. We present a revolutionary technique for closure of small to medium distal nasal defects: the inferiorly based naso-facial interpolation flap. This technique offers many advantages over a superiorly-based melolabial flap. Firstly, as an axially based flap using the angular artery, the blood supply is excellent which promotes flap survival; the superiorly-based approach provides a random flap. Second, the angle of rotation of the flap is approximately 60 , compared with 120 of a superiorly based melolabial flap. Skin color and texture match is often superior to that of superiorly based melolabial flap as well.

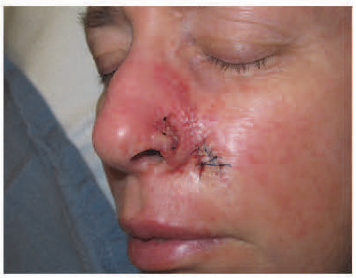
Design: After Mohs micrographic surgery is used to ensure complete excision of the neoplasm on the distal nasal tip or ala, a flap is raised from the apex of the nasolabial fold superiorly along the supramedial cheek following the path of the angular artery. The distal end of the flap is elevated off the underlying subcutaneous tissue taking care to maintain vascular supply, and rotated toward the nasal defect where it is thinned and shaped to fit flawlessly. The flap is then sutured in place and the donor site closed. The patient returns 21-28 days later for flap take-down. The pedicle is divided and the donor site closed, concealing the residual wound in the superior nasolabial fold. The proximal portion of the flap is thinned, shaped and sutured in place. The patient returns for final suture removal in 1 week.

Summary: At this time, we have performed this repair on more than 12 patients with no incidents of flap necrosis and excellent cosmetic result. Alar notching, blunting of the nasofacial angle, and flap necrosis, complications reported with superiorly-based melolabial interpolation flaps, have not been seen in our patient group.

Conclusion: The inferiorly-based naso-facial interpolation flap is a revolutionary technique for closure of distal nasal surgical defects that has shown excellent cosmetic results. This axially-based flap has shown excellent blood supply and healing without evidence of flap necrosis in our study population.







034

Title: Rapid Rebound in Squamous Cell Carcinoma Tumor Burden in a Transplant Patient upon Discontinuation of Sirolimus

Authors: Elizabeth Foley, MD[1]; Victoria Lazareth, NP, MA, MSN[2]; Dori Goldberg, MD[1]

Institution: 1. University of Massachusetts Medical School, Worcester, MA, United States

Introduction: An anti-tumor effect has been shown in organ transplant patients with previous cutaneous squamous cell carcinoma (SCC) switched to sirolimus from calcineurin inhibitor therapy. Unfortunately, many patients are unable to remain on sirolimus long-term due to side effects. Presented here is a case of rapid rebound in SCC development in a renal transplant patient after discontinuation of sirolimus.

Design: A 58 year old woman with history of renal transplant in 1971 and 2009 was followed in our clinic approximately every six months for complete skin examination (CSE) beginning in 2000. For a 25 month period, she was switched from calcineurin inhibitor to sirolimus for immunosuppression. A retrospective review of her chart was performed to determine the number of SCCs she developed prior to and during sirolimus therapy and following drug discontinuation.

Summary: Between 2000 and 2010, 21 SCCs were diagnosed in this patient. Eleven tumors occurred in 2008 and 2009 alone. In August 2010, the patient was switched from calcineurin inhibitor therapy to sirolimus. In the first four months following the switch, the patient was diagnosed with two SCCs. For the remaining 21 months of sirolimus therapy, she developed no new cutaneous malignancies. In September 2012, sirolimus was discontinued due to poor healing of a leg wound unrelated to her cutaneous malignancies. Within six weeks of discontinuation of the drug, she presented to us for an urgent appointment complaining of multiple growing, crusted, non-healing skin lesions. By eight weeks following sirolimus discontinuation, she had six biopsy proven SCCs. By 16 weeks, she had a total of twelve tumors.

Conclusion: The anti-tumor effect of sirolimus in transplant recipients with history of SCC has been proven. Not yet studied is a potential rebound phenomenon in tumor development upon drug cessation. It is likely the rapid rebound in tumor formation in this case was multifactorial, related to withdrawal of the anti-tumor effect of sirolimus and also resumption of calcineurin inhibitor therapy, which has been shown to increase the risk of UV-induced cutaneous malignancy in transplant patients. Additionally, our patient is not compliant with UV avoidance. Further studies are needed to assess whether we might expect to see a rapid induction of tumor formation in organ transplant patients who experience anti-tumor benefits on sirolimus therapy but are forced to discontinue the drug due to side effects. These patients may warrant more frequent dermatology visits in the initial months following drug discontinuation.

035

Title: The Prognostic Value of Sentinel Lymph Node Biopsy Compared to Breslow Thickness Alone: Implications for Informed Consent in Melanoma Patients

Authors: Scott Freeman, MD[1]; John A. Zitelli, MD[2]

Institutions: 1. Sunrise Dermatology, Mobile, AL, United States 2. Zitelli & Brodland, PC, Pittsburgh, PA, United States

Introduction: To assess overall survival in melanoma patients, by depth of tumor, based on sentinel lymph node status.

Design: We searched MEDLINE, EMBASE, and the Cochrane Central Database for studies evaluating overall survival by SLNB results either stratified by Breslow thickness or restricted to a single Breslow thickness category. Retrospective and prospective studies were included. Study characteristics, outcomes, and quality were abstracted by one reviewer and checked by a second reviewer. A nonparametric sign test evaluated whether or not SLN positive patients had worse survival compared to SLN negative patients across studies. Meta-analysis was performed within any category for which 3 or more studies reported estimates of risk along with a measure of variability.

Summary: Two authors screened 508 abstracts with titles of possible relevance and thoroughly examined the full text of 155 potentially relevant articles. Twenty-seven articles met our inclusion criteria and two additional articles were identified by hand-searching, yielding 29 articles included in our systematic review. Of these, six met the criteria to be included in the meta-analysis. Systematic review: In patients with thin melanoma (<1mm), 11 comparisons of overall survival/mortality indicated that SLN negative patients did not have a survival advantage over SLN positive patients with thin melanoma (sign test, p=1.0). For intermediate depths, few studies were available (n= 5 for 1-2mm, n=4 for 2-4mm) and mostly reported worse survival in SLN positive patients, yet a statistical difference was not detected (p>0.05). For thick melanoma (>4mm), SLN positivity was clearly related to worse prognosis (sign test, p=0.004). Meta-analysis: Pooled across these six studies of patients with tumors ≥4mm, those with a positive SLN had an increased hazard of mortality (HR=2.42, 95%CI 2.00, 2.92) compared to SLN negative patients. Other thicknesses did not meet inclusion criteria for meta-analysis.

Conclusion: The data analysis suggests that Breslow thickness is still the best prognostic tool for most melanomas. For thin tumors (<1mm), SLNB results are no better at predicting survival than Breslow thickness. For intermediate tumors (1-4mm), the evidence is too weak to endorse SLNB as a necessary prognostic tool. For thick tumors (>4mm) there is a demonstrated survival difference, but the significance of the clinical effect should be determined through thorough discussion with the patient. Informed consent discussions should compare prognostic information from Breslow thickness to possible results of SLNB, in light of known false positive and negative rates associated with SLNB.

036

Title: Merkel Cell Carcinoma in Solid Organ Transplant Recipients: A Case Series and Review of the Literature

Authors: Ilya Lim, MD[1]; Marc D. Brown, MD[1]; Glynis A. Scott, MD[1]; Sherrif F. Ibrahim, MD, PhD[1]

Institution: 1. University of Rochester Medical Center, Rochester, NY, United States

Introduction: Merkel cell carcinoma is a rare but potentially aggressive cutaneous neuroendocrine malignancy that has higher prevalence and more aggressive behavior in the solid organ transplant (OTR) population. The purpose of this study was to present our experience with Merkel cell carcinoma (MCC) in 3 solid organ transplant recipients (OTR) seen at our institution and to review the current literature describing MCC in the OTR population.

Design: A retrospective chart review of three patients who developed MCC after solid organ transplantation. A PubMed database search using the MeSH terms "Merkel cell carcinoma" and "organ transplant".
Summary: All patients were kidney transplant recipients on chronic immunosuppressive medications. All 3 were fair skinned Caucasian males with a mean age at diagnosis of 57 years. Stages at presentation were I, II and IV; with mean duration between transplant and primary tumor being 19.3 years. In two of the three patients the tumors developed in sun exposed areas of the head and neck. All primary tumors were treated with wide local excision with negative margins. One patient underwent additional regional radiotherapy and remains disease free 8 years later. Another patient had metastatic disease of the bilateral axillary lymph nodes detected at staging, however due to his multiple co-morbidities adjuvant radiation or chemotherapy was not an option, and the patient died 2 years after diagnosis. The third patient had recurrent disease 4 years after excision of the primary tumor, presenting with a large unresectable neck mass, extending into the mediastinum, with disease progression despite radiation. Our findings are in line with those reported previously for MCC in transplant patients, with higher incidence (Relative Risk 5-10) and younger age (mean age of 53 vs. 75) as compared to the general population. MCC typically develops 7-8 years after transplantation, preferentially affecting the head and neck region, and has more aggressive behavior (68% metastasize to lymph nodes, ultimately causing death in 56%).
Conclusion: MCC is an uncommon but aggressive cutaneous neuroendocrine carcinoma; which is more prevalent, more aggressive, and occurs at a younger age in the OTR population. Our findings are consistent with those previously reported for MCC in OTR patients in terms of age of onset, distribution and aggressive nature. The mean duration between transplant and primary tumor in our patients was longer (19.3 years) compared to the reported literature (7 years). Early diagnosis and aggressive treatment are important in managing the disease.

037

Title: The Supply and Demand for Mohs Surgery: An Analysis Based on Utilization Rates and Appropriate Use Criteria

Authors: Adam B. Blechman, BS[1]; Mark A. Russell, MD[2]
Institutions: 1. University of Virginia School of Medicine, Charlottesville, VA, United States 2. University of Virginia Health System, Department of Dermatology, Charlottesville, VA, United States

Introduction: A prior study found that 72.0% of non-melanoma skin cancers (NMSCs) at the authors' institution were appropriate for Mohs micrographic surgery (MMS) based on the Appropriate Use Criteria (AUC). Previous reports have shown that 30-36% of NMSCs are actually being treated with MMS. Using national estimates of 4 million annual NMSCs in the United States, the authors extrapolated that 2.8 million of these would be appropriate for MMS while 1.2 to 1.4 million are actually being treated with MMS. This study will estimate the annual number of MMS procedures currently performed in the United States and compare it to the national demand for MMS based on the AUC.
Design: The number of MMS procedures performed annually will be estimated using two methods. First, MMS utilization rates will be obtained from a literature review. Utilization rates will be multiplied by estimates for the number of NMSCs in the United States. Second, the number of practicing Mohs surgeons will be determined using membership data from the American College of Mohs Surgery and American Society for Mohs Surgery. These figures will be multiplied by the average number of cases each surgeon performs annually. Both methods will develop a range for the number of annual MMS procedures, which will be compared to the potential demand for MMS based on the AUC.
Summary: The number of MMS procedures performed annually in the United States will be calculated and presented.
Conclusion: The current capacity for Mohs surgeons to treat NMSC in the United States will be presented.

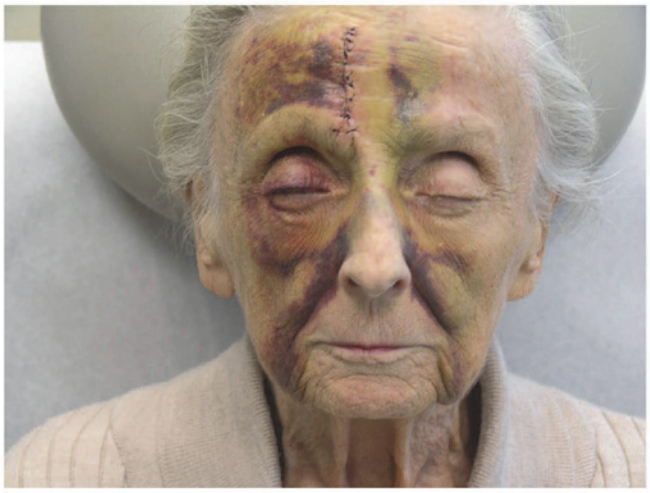
038

Title: Prospective Evaluation of Patients on Warfarin Presenting to a Mohs Practice/Data Analysis: INR Values Correlated with a Bleeding Score

Authors: Elias E. Ayli, DO[1]; Daven Doshi, MD[2]; David E. Kent, MD[1,3]
Institutions: 1. Dermatologic Surgery Specialists, PC, Macon, GA, United States 2. Gainesville Skin Cancer Center, Gainesville, FL, United States 3. Mercer Medical School, Macon, GA, United States

Introduction: Multiple studies in the dermatologic surgery literature have demonstrated that the benefit of continuing warfarin outweighs the risk of perioperative bleeding. In our practice, those patients undergoing Mohs micrographic surgery (MMS) are instructed to continue their warfarin and physician-directed anticoagulants. Occasionally, these patients have developed significant perioperative bleeding. INR values taken around the time of return to the OR were substantially supratherapeutic. To date, there are no prospective studies in the literature correlating "real- time" INR values to bleeding outcomes. The purpose of this study is to evaluate patient's INR values immediately prior to MMS and attempt to answer the following questions: What is the percent of patients with an elevated INR at the time of MMS? Can we correlate a patient's INR value with a simple bleeding score? Lastly, does a supra-therapeutic INR correlate with increased bleeding risk?
Design: Fifty-four patients on warfarin presented for MMS. A pre-operative INR value was measured using a desktop INR machine and the physicians were blinded to this value. A simple bleeding score was assigned to each patient based on perioperative observations and were as follows: 0 defined as no adverse bleeding problems, 1 as mild difficulty controlling bleeding, 2 moderate difficulty, and 3 severe difficulty. A bleeding score of 4 is defined as an unscheduled return to the OR for uncontrolled bleeding. At the completion of the patient's surgery the INR value was revealed to the physicians and was correlated with the patient's bleeding score.
Summary: 9.3% (N=5) patients in our study had an elevated INR defined as a value greater than 3.5 at the time of MMS; 72.2% (N=39) were therapeutic. Of these patients with an elevated INR, 40.0% (N=2) had bleeding severe bleeding defined as bleeding scores of 3 or higher. Zero percent of patients with a bleeding score of 4 had a supra-therapeutic INR. Overall, 17% (N=9) of patients in our study had a bleeding score of 3 or higher. Of these, 44.4% (N=4) were on other physician-directed anticoagulants.
Conclusion: A majority of patients (72.2%) presenting for MMS on warfarin were therapeutic (2.0-3.5). 14.8% of patients had an elevated INR. In this initial single center study, a supra-therapeutic INR was not directly associated with a bleeding score of 4; however, several patients did

have difficulty with perioperative bleeding (bleeding score=3). Multicenter studies are warranted to further evaluate the risk of excessive bleeding for patients on warfarin.



039

Title: The Incidence and Significance of Monckenberg's Calcinosis in Mohs Frozen Sections from Lower Leg lesions

Authors: Hina Ahmad, MD[1]; Richard G. Bennett, MD[1]

Institution: 1. Keck School of Medicine at USC, Department of Dermatology, Los Angeles, CA, United States

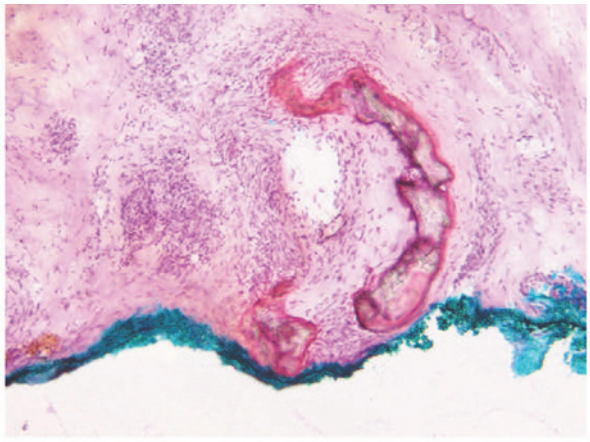
Introduction: Monckenberg's calcinosis (MC), defined as medial intimal calcification of small to medium size arteries, is occasionally seen during Mohs surgery on the legs (Figure 1). The literature suggests that MC is associated with older age, kidney disease, and diabetes. Additionally, the presence of MC in breast tissue has been described. The purpose of our study was to determine the incidence of MC in lower extremity Mohs cases, its effect on wound healing, and any significant systemic associations.

Design: A retrospective slide and chart review was conducted on Mohs cases performed on the legs over one year at our practice. Mohs sections were reviewed for the presence of MC. Subsequently, patient charts were reviewed, recording patient gender, age, lesion location (thigh, lower leg, foot), tumor type, repair type, healing time, infection, and associated medical conditions.

Summary: A total of 102 lower extremity lesions were treated by Mohs surgery in 84 patients. Of these patients, 59.5% were women and 40.5% men. Of the patients with MC, 64.3% were women and 35.7% were men. The incidence of MC in our patients was found to be 16.6%. The average age of MC patients was 87.2 years versus 74.6 years for those without MC. Of 102 wounds, 52% were allowed to granulate. The mean healing time in granulating wounds was 128.6 days in MC patients versus 91.3 days in those without MC (Figure 2). In granulating wounds, post-operative infection rate was 40% in MC patients versus 9.1% in those without MC (p value = 0.035) (Figure 3). We found that 21.4% of MC patients also had diabetes, 21.4% had coronary artery disease, and 0% had chronic kidney disease, compared to 5.7%, 15.7%, 1.4% patients without MC respectively. Finally, breast biopsy incidence in women with MC was 60% versus 22.5% in those without MC (p value = 0.025). Upon further review, 66.7% of women with MC had breast biopsies that revealed breast cancer, versus 33.3% in women without MC.

Conclusion: Monckenberg's calcinosis may be seen occasionally on histologic sections when performing Mohs surgery on the lower extremities. Our results suggest that it is more likely to find MC in older patients and in those with diabetes, which has also been suggested in the literature. Furthermore, patients with MC may have a higher incidence of post-operative wound infection and delayed healing. Finally, our data suggests that women with MC have high breast biopsy rates with subsequent discovery of breast cancer.

Figure 1.



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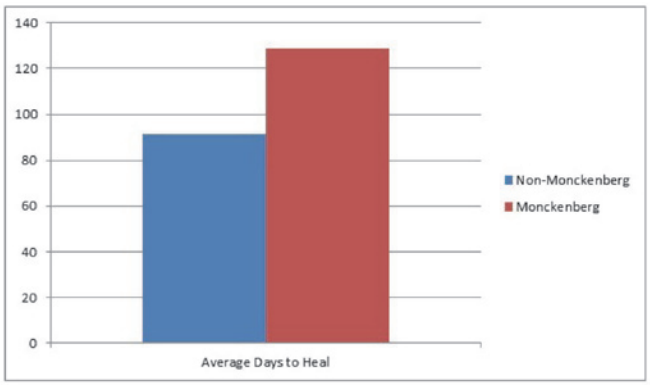
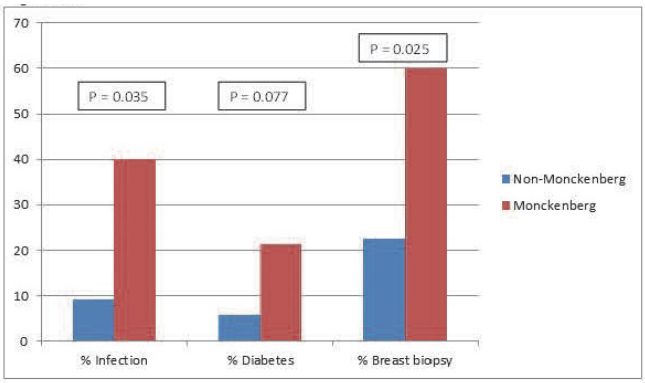


Figure 3.



Poster Presentation Summaries

040

Title: Novice vs. Experienced Mohs Surgeon

Authors: H. William Higgins, II, MD, MBE[1]; Kachiu C. Lee, MD, MPH[1]; Patrick Mulvaney, BA[1]; Steven A. Altmayer, MD[1]; Raymond G. Dufresne, Jr., MD[1]; Antonio P. Cruz, MD[1]

Institutions: 1. Warren Alpert Medical School of Brown University, Department of Dermatology, Providence, RI, United States

Introduction: To compare surgical differences between "novice" vs. "experienced" Mohs surgeons. Novice surgeons were defined as having ≤5 years of Mohs micrographic surgery (MMS) practice. Experienced surgeons were defined as having >5 years of MMS practice.

Design: We conducted a retrospective 7-year review of all cases performed by 3 novice Mohs surgeons vs. 1 experienced Mohs surgeon with >25 years of experience. All cases completed between 2005-2011 were included. Data on the following variables were collected: gender, age, primary versus recurrent tumor, initial recorded surface area, sub-clinical extension (e.g., defect size and number of Mohs layers), and type of repair. 2, and linear and multivariate regresses were used for analysis.

Summary: A total of 3,979 Mohs cases (2,459 males, 1,520 females) were performed by novice Mohs surgeons, while 4,962 cases (3,274 males, 1,688 females) were performed by the experienced surgeon. There were several significant findings. Tumors labeled as "recurrent after prior treatment" were more often referred to the experienced surgeon ($p<.01$). The novice surgeons' took significantly more layers (1.66 vs. 1.54; $p<.01$), and their final area after complete tumor extirpation was larger (3.95 vs. 3.63; $p<.01$) after controlling for initial tumor size. The experienced surgeon treated more lesions with secondary intention healing ($p<.01$) while the younger surgeon utilized more split and full-thickness skin grafts ($p<.01$).

Conclusion: Our findings show that, by comparison, the experienced Mohs surgeon operated on a significantly larger percentage of recurrent tumors. This finding may imply a higher comfort level with treating recurrent lesions or perhaps a skewed referral bias to the more experienced surgeon. The more experienced surgeon had smaller final defect sizes and took fewer layers than the novice. Conceivably, the experienced surgeon was better able to visually estimate subclinical spread, resulting in a smaller final defect and the need for fewer layers. Alternatively, the experienced surgeon can more efficiently extirpate positive histologic margins. The experienced surgeon was more likely to treat lesions with closure by secondary intent, which may imply difference in comfort level and/or experience with good outcomes with this method in lieu of sutured closure.

041

Title: Use of Dehydrated Human Amniotic Membrane Allograft for Reconstruction of Mohs Micrographic Surgical Defects and Dehisced Wounds

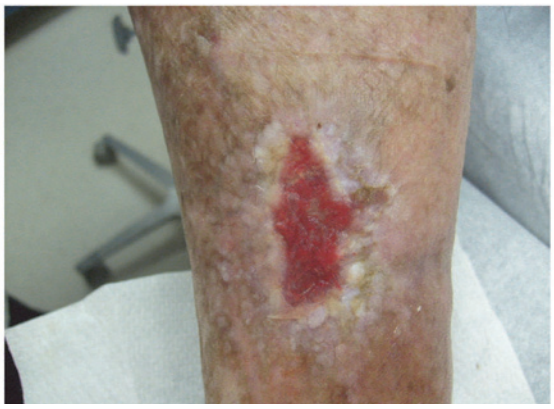
Authors: Janice M. Warner, MD[1]; Catherine Warner, BA[2]

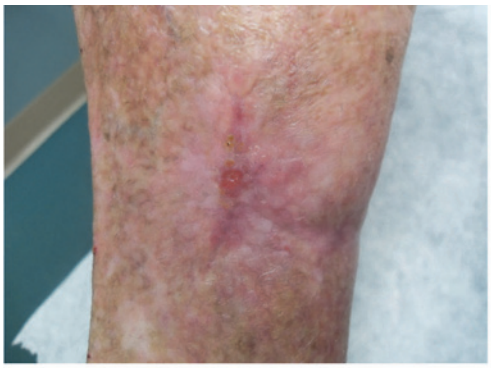
Institutions: 1. Atlanta West Dermatology, Austell, GA, United States 2. Georgia Health Sciences University, Medical College of Georgia, Augusta, GA, United States

Introduction: Cadaveric and porcine allografts, as well as a large variety of other biologic dressings have been reported as being useful for the post-operative management of Mohs micrographic surgical (MMS) defects. A new human amniotic membrane, which is derived from the submucosa of human placenta and processed according to the American Association of Tissue Banks (AATB) standards, has been identified as a potent facilitator of wound healing in a variety of situations including lower extremity vascular ulcers, conjunctival reconstruction, burns, gynecologic surgery, and orthopedics. Numerous beneficial properties, including enhanced healing rates due to its anti-inflammatory, antifibrotic and antimicrobial effects, have been attributed to human amniotic membrane. This product has also been shown to have antibacterial and pain reduction properties, is self-signaling and mediates tissue repair via the contained growth factors. Our purpose is to describe the use of a new dehydrated human amniotic membrane allograft for the treatment of post-operative defects created after Mohs micrographic surgical excisions and post-operative dehisced wounds.

Design: Presentation of a retrospective case series comprised of 10 patients having Mohs surgery where a dehydrated human amniotic membrane allograft was applied to the wound, either immediately post-operatively or delayed, after dehiscence of a wound. Pertinent medical history, initial patient presentation, treatment, post-op follow-up and outcome will be presented. The allograft material was applied to the wound bed and hydrated with sterile saline. Wounds were covered with a non-adhesive dressing, 4x4's, kling, and a compression dressing. Weekly office visits for wound evaluation and dressing change were conducted. Photographs were taken of the wound at each office visit.

Conclusion: Dehydrated human amniotic membrane allografts may be a useful alternative to granulation, allogenic or autologous skin grafts for defects created through Mohs surgical excisions as well as dehisced wounds.





042

Title: To Determine if Fecal Bacteria are a Significant Cause of Surgical Site Infections (SSI) of Wounds below the Waist

Authors: James Keane, MD[1]; Conway Huang, MD[1]
Institution: 1. University of Alabama Birmingham, Birmingham, AL, United States

Introduction: To determine if there is significant bacterial variance in surgical site infections (SSI) below the waist compared to above the waist.

Design: Retrospective analysis. Setting: Academic procedural dermatology division within a department of dermatology. Patients: Adults with SSI resulting from full thickness surgical wounds resulting from typical procedures performed in an academic procedural dermatology practice from 2008 to 2012. Both granulating wounds and primarily closed wounds were eligible for inclusion.

Summary: There were a total of 72 SSI identified. Over this period of time, approximately 8,800 Mohs surgeries and 1,300 standard excisions were performed in the division. All SSI were associated with full thickness wounds. 55 SSI were located above the waist. Of these 55, 14 were polymicrobial. The following bacteria were isolated: Methicillin Sensitive Staph Aureus (MSSA) 26 times, Methicillin Resistant Staph Aureus (MRSA) 20 times, Enterobacter species 7 times, Pseudomonas species 5 times, Proteus species 5 times, Klebsiella species 4 times, Enterococcus Faecalis twice, Group B strep once, Strep viridans once, Citrobacter species once, and Morganella species once. Seventeen SSI occurred below the waist. Of these, 8 were polymicrobial. MSSA was isolated 7 times, E. Faecalis 5 times, Proteus species 3 times, Enterobacter species twice, Klebsiella species twice, Morganella species twice, Pseudomonas species twice, Serratia species twice, E. Coli once, Group B Strep once, and MRSA once. The 2 most specific fecal bacteria isolated were E. Coli and E. Faecalis. E. Faecalis was isolated from 7 patients. Five of these were below the waist. E. Coli was isolated from only 1 patient. This infection was located below the waist.

Conclusion: Statistical analysis revealed that Staph Aureus infections were significantly less likely below the waist (P=0.002). The same was true for MRSA infections (P=0.016). Analysis also revealed that bacteria of fecal origin (E. Coli and E. Faecalis) were significantly more likely on the lower body (P=0.0003). Polymicrobial infections directionally favored the lower body (P=0.091). These results indicate that the bacterial composition of lower body SSI differ from that of the upper body. This should affect the choice of empiric antibiotic therapy as often times the bacterial resistance profiles vary between bacteria. Given our finding of increased rate of fecal bacterial SSI below the waist, it is also recommended that wound care instruction be modified for surgical wounds of this area. These modifications would include emphasis on cleansing the wound appropriately and doing so at the completion of the bathing process to address contamination occurring during that time.

043

Title: Mohs for Melanoma and Melanoma In Situ: Do Head and Neck Lesions Differ from Other Locations?

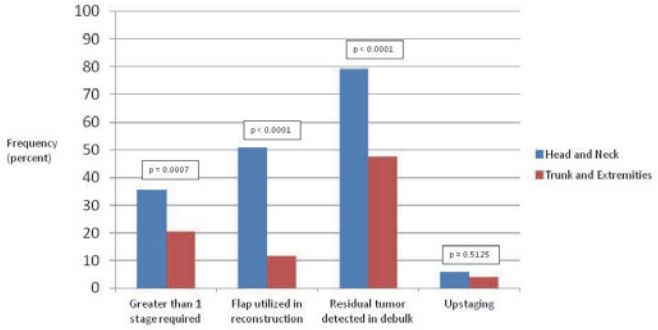
Authors: Jeremy Etzkorn, MD[1]; Christopher J. Miller, MD[1]; Joseph F. Sobanko, MD[1]
Institution: 1. University of Pennsylvania, Philadelphia, PA, United States

Introduction: This study compares characteristics of invasive and in situ melanomas on the head and neck versus those on the trunk and extremities

Design: A retrospective review of the institution's Mohs surgery database and medical charts was conducted on 645 consecutive lesions of primary cutaneous invasive and in situ melanoma treated between March 2006 and September 2012 with Mohs surgery aided by frozen section MART-1 immunostains. The following characteristics were compared for melanomas on the head and neck versus on the trunk and extremities: number of lesions requiring greater than one stage for complete removal, presence of residual tumor on debulking specimen, flap utilized in reconstruction, and upstaging (defined as an increase in the T stage). Lesions with missing data were excluded from analysis. Fisher's exact test was used to calculate a two-tailed p-value.

Summary: A total of 645 cases were reviewed; 508 cases were located on the head and neck. Greater than one stage of Mohs was required in 181 of 508 (35.6%) cases on the head and neck and in 28 of 137 (20.4%) cases on the trunk and extremities (p=0.0007). Utilization of a flap in reconstruction occurred in 253 of 498 (50.8%) cases on the head and neck and in 16 of 136 (11.8%) cases on the trunk and extremities (p<0.0001). Residual tumor on the debulking excision was noted in 395 of 499 (79.2%) cases on the head and neck and in 63 of 133 (47.4%) cases on the trunk and extremities (p<0.0001). Upstaging occurred in 28 of 498 (5.6%) cases on the head and neck and in 5 of 132 (3.8%) cases on the trunk and extremities (p=0.5125).

Conclusion: Compared to melanomas of the trunk and extremities, melanomas on the head and neck have unique characteristics that can affect management. Melanomas of the head and neck are more likely to have subclinical spread (indicated by a higher likelihood of requiring more than one stage of Mohs) and are more likely to require complex reconstruction (indicated by a higher likelihood or flap reconstruction). Mohs surgery or a similar method of complete microscopic margin evaluation prior to reconstructive surgery is especially important for melanomas of the head and neck. Residual tumor is more common after diagnostic biopsies of head and neck melanomas, perhaps due to less aggressive biopsy techniques. Upstaging to a higher T stage was more common on the head and neck, although the difference was not statistically significant.



044

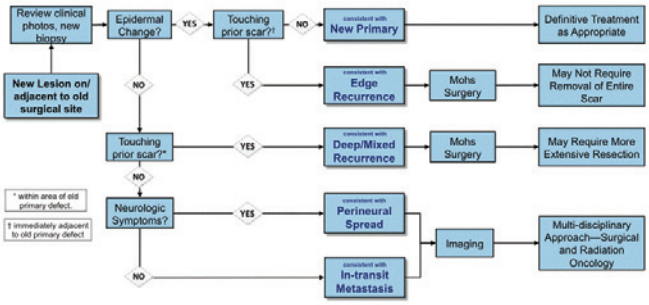
Title: Management of Recurrent Skin Cancer for the Mohs Surgeon

Authors: Jonathan Olson, MD[1]; Daniel Berg, MD[1]; Linda C. Chang, MD[1]
Institution: 1. University of Washington, Division of Dermatologic Surgery, Seattle, WA, United States

Introduction: The recurrence rate for non-melanoma skin cancer (NMSC) following surgical treatment, including squamous cell carcinoma (SCC) and basal cell carcinoma (BCC), is less than 5%.[1] There are more than 3.5 million estimated new NMSCs each year in the U.S.[2], so recurrence is a common phenomenon. There is little guidance in the scientific literature on management, though there is consensus that Mohs surgery is the most appropriate treatment for recurrent tumors.[3] Primary SCC has an 8% recurrence rate over five years,[4] and risk factors are relatively well-defined.[1,4,5] Metastasis is uncommon, but when it does occur, mortality is significant, with 30% and 10% 5-year survival for regional and distant metastases, respectively.[4,6] Previous work has shown wide discordance in management of high risk SCC among Mohs surgeons.[7] Risk factors and recurrence rates for BCC are similar, though metastatic disease is far rarer, and mortality is lower.[8,9] As with SCC, there is no consensus or clear guidance available in the literature on the management. For the Mohs surgeon evaluating a potentially recurrent lesion, issues include the need to remove the entire previous surgical scar (vs. the lesion only), use of imaging, and the need for a multidisciplinary approach, which may include adjuvant radiation and more aggressive surgical oncology intervention. In addition, tumors can recur in multiple ways and management is hampered in part by a lack of precise definitions. The purpose of this abstract is to present working definitions or the various classes of recurrent NMSC and an algorithmic approach to aid in management.

Design: We present cases from our practice with clinical and pathologic correlation, describing five categories of recurrent NMSC: 1) edge, 2) deep, 3) perineural spread, 4) in-transit metastasis, and 5) nodal metastasis. In addition, new primary NMSC in the near vicinity can be hard to differentiate. We also present an algorithmic approach to treatment based on what literature does exist. Some recommendations can be made regarding use of imaging (CT or MRI), and a multi-disciplinary approach, which may include adjuvant radiation and in some cases, sentinel lymph node biopsy.

Conclusion: Recurrent NMSC is a challenge for the Mohs surgeon. We present working definitions for five types of recurrence as well as a management strategy. More research is clearly needed, and we hope this will help serve as a framework for both clinical management and further research and development of evidence-based guidelines.



045

Title: Eversion in Dermatologic Surgery: Is Cosmetic Appearance Improved?

Authors: Stefani Kappel, MD[1]; Daniel B. Eisen, MD[1]; Rebecca Kleinerman, MD[2]
Institutions: 1. UC Davis, Department of Dermatology, Sacramento, CA, United States 2. Schweiger Dermatology, New York, NY, United States

Introduction: Current dogma states that wound eversion prevents sunken scars and results in superior aesthetic results, however data to support this hypothesis is sparse. We sought to determine whether wound edge eversion, achieved by placement of dermal sutures, improves outcomes following wound closure.

Design: A randomized, evaluator and patient blinded, split-scar comparative effectiveness study was conducted. Half the wound was closed with a subcuticular knot such as the buried inverted vertical mattress or set-back suture to achieve visible eversion, and the other half of the wound closed with traditional buried subcuticular sutures which approximated, rather than everted, wound edges. All body sites were eligible for inclusion. In order to reduce the confounding effect of cuticular closure, steri-strips were used for most wounds. Cuticular sutures were only utilized when wound edges were not approximated following subcuticular suturing in which case running fast-absorbing gut sutures were utilized along the entire length of the wound. The primary outcome measure was the averaged scores of two blinded reviewers who used the Patient and Observer Scar Assessment Scale (POSAS), a validated wound assessment instrument. An apriori power analysis assuming a standard deviation of 7 in POSAS score assessments indicated that with 42 patients we would have a 90% power to detect a mean difference of 5 between treatment groups. We predicted a 20% dropout rate and thus enrolled 50 patients into our study. Follow-up assessments were planned for 3 and 6 months.

Summary: Sixty-five patients were screened, to enroll 50 patients (31 men and 19 women) ranging in age from 30 to 88 years (mean, 61.8 years) (Table 1). Reasons for exclusion included: non-English speaking (1, 14.3%), <18 years (4, 57.1%), inability to return (3, 39.3%), concerned about scar (6, 75%) and other (1, 14.3%). Preliminary data included 40 subjects, with ten patients remaining to capture 3-month follow-up data. The post-operative defects followed Mohs micrographic surgery (24) and local excision (26) of cutaneous neoplasms. The mean scar width was 1.5mm and 1.3mm for the everted and non-everted side, respectively. The mean patient POSAS score was 13.8 and 13 for the everted and non-everted side. The mean observer POSAS score was 16.5 and 15.1 for the everted and non-everted side, respectively (Table 2).

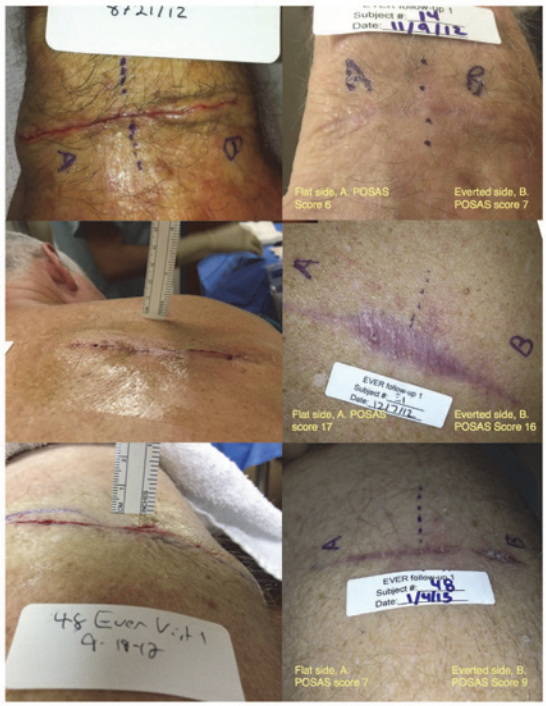
Conclusion: Interim analysis at 3-month follow-up with 80% of our patient data collected does not suggest numerically superior outcomes with the use of wound eversion relative to wounds sutured in a flat manner.

Table 1. Demographics and Surgery Data

Average Age (years)	61.8 (range 30-88)							
Male gender	31 (58.5%)							
Race	American Indian/Alaska native (1, 1.9%)	Asian (0, 0%)	Native Hawaiian/Pacific Islander (1, 1.9%)	Black or African American (1, 1.9%)	White (49, 92.5%)	Unknown (1, 1.9%)		
Average Length of wound closure (cm)	6.10 (range 3-12)							
Surgical site location	Forehead (1, 2%)	Scalp (5, 10%)	Cheeks (4, 8%)	Neck (13, 26%)	Arm (11, 22%)	Leg (2, 4%)	Back (11, 22%	Chest (3, 6%)
Surgeon experience	Resident (7, 13.7%)	Fellow (34, 66%)	Attending (10, 19.6%)					
Indication for surgery	Mohs (24, 48%)	Excision (26, 52%)						

Table 2. Results

Observer POSAS	Vascularity	Pigmentation	Thickness	Relief	Pliability	Surface Area	Overall Opinion	POSAS Sum
Everted	2.7	1.7	2.5	2.2	2.4	2.3	2.5	13.8
Flat	2.8	1.8	2.2	1.9	2.1	2.2	2.3	13
Patient POSAS	Pain	Pruritus	Color	Stiffness	Thickness	Irregularity	Overall Opinion	PSOAS Sum
Everted	1.2	1.4	3.9	3.6	2.1	4.3	3.7	16.5
Flat	1.3	1.3	3.8	2.9	2.1	3.7	3.2	15.1
Scar width (mm) at 3 month follow up								
Everted	1.5							
Flat	1.3							



046

Title: Preparation of Mohs Micrographic Surgery Frozen Sections: Three New Pearls Leading to a Simplified and More Effective Process

Authors: Ilya Shoimer, MD[1]; Larry Warman, MLT[1]; **Habib A. Kurwa, MD, MBBCh, FRCP (UK)**[1]

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Introduction: This abstract presents three processing pearls for the preparation of frozen sections that achieve complete margin visualization with fewer artifacts. These pearls include embedding the specimen on a frozen glass slide, using an altered embedding mould, and sectioning with a colored optimal cutting temperature medium (OCT).

Design: Pearl #1 The frozen glass slide technique: Cooled glass slides and a brass plate are removed from a cryostat; the glass slides remain on top of the brass plate to maintain the cold temperature. A specimen is transferred to the slide with all margins contacting the glass surface. The specimen becomes frozen to the glass slide and may be inverted allowing the technician to visualize all margins and identify air pockets (Figure 1). Pearl #2 Using an altered embedding mould: A plastic embedding mould, with the base cut away using a utility knife, is placed over the specimen on the glass slide while on the Peltier unit in the cryostat. The mould is filled with OCT to completely embed the specimen and allowed to freeze (Figure 2). The glass slide is then transferred to a hotplate to allow for the OCT block to detach. This technique minimizes embedding irregularities as well as gives the OCT block a level surface on both sides which removes the need for rough cutting, and sectioning can begin immediately. Pearl #3 Sectioning with a colored OCT: The OCT block is placed onto the chuck over a layer of OCT and the superior surface is coated with blue OCT, which is created by adding ten drops of food coloring into any OCT. A heat extractor cylinder is compressed onto the block to freeze the superficial blue OCT before sectioning (Figure 3a). The colored OCT seals any remaining crevices in the OCT block and, once all the blue OCT is sectioned off, a full face specimen will be obtained where all margins will be visualized (Figure 3b).

Conclusion: The described technique is simple, effective and inexpensive. Utilizing the frozen glass slide allows the user to work with an inverted specimen and visualize all the margins and artifacts in real time. The cut-out embedding mould allows for a smooth block with en face tissue specimen. Finally, the colored OCT on a block face indicates the level at which sectioning of the block achieves an accurate surgical margin. Other labs are encouraged to utilize this technique to help decrease processing errors and ensure complete margin visualization.

Figure 1.

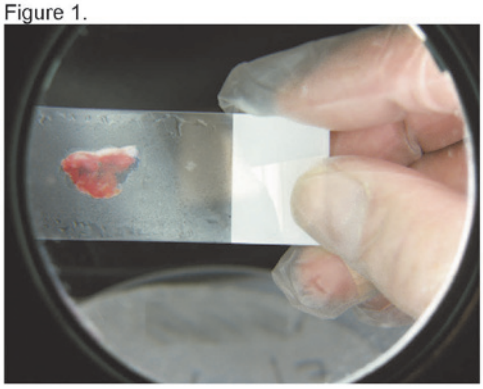


Figure 2.

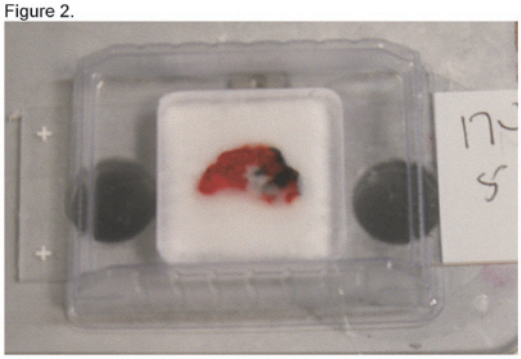
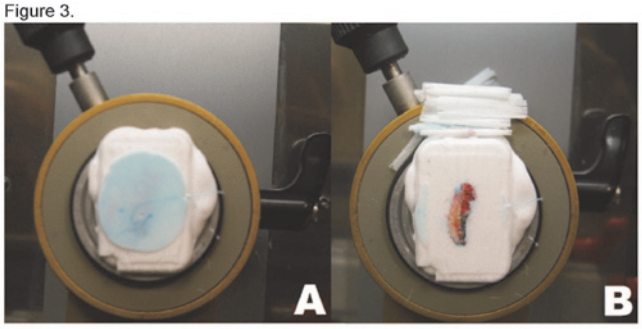


Figure 3.



047

Title: Prediction of Post-operative Pain Following Mohs Micrographic Surgery with Two Validated Pain Anxiety Scales

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Introduction: Post-operative pain levels following Mohs micrographic surgery (MMS) are often minimal, but a subset of patients experience significant pain. The Pain Catastrophizing Scale (PCS) and the Pain Anxiety Symptoms Scale (PASS) are two validated scales that measure pain anxiety, and studies in other surgical specialties have shown these scales to accurately predict patients who had more post-operative pain and less improvement in pre-operative symptoms. This study will determine if the correlation between pain anxiety and post-operative pain applies to patients undergoing MMS.

Design: Patients were recruited from two private Mohs practices, and recruitment is ongoing. On the day of MMS, patients who agreed to participate filled out the PCS and PASS questionnaires. They were then called by phone the following day to assess their pain on a scale from 0 to 10. Additionally, demographic information was collected. The association between pain anxiety scores (PCS and PASS) and pain following surgery were first assessed visually using score-specific scatter plots which suggested a non-linear and piecewise relationship. Next, Spearman's Rho was used to assess the association, with P values generated. Then, locally weighted regression curves of the third order were fit with the 95% confidence intervals of the predicted means used to evaluate the statistical significance of differences in pain following surgery across pain anxiety scores.

Summary: One hundred and ninety-six patients out of an ongoing recruitment goal of 400 completed the study to date. Patient and tumor characteristics are summarized in Table 1. Overall, the scores on the PCS and PASS questionnaires correlated positively with maximum post-operative pain score (Rho=0.21, p=0.003 and Rho=0.22, p=0.002, respectively). Interestingly, the association was limited in patients who had little to no anxiety toward pain, but was much more significant in patients with higher anxiety scores (Figures 1 and 2).

Conclusion: Anxiety toward pain as measured by two validated pain anxiety questionnaires is positively and significantly associated with increased pain following Mohs micrographic surgery. Inquiring about a patient's expectations toward pain prior to performing MMS can identify patients who may require additional analgesia and closer follow-up in the immediate post-operative period.

Table 1: Characteristics of 196 Patients Undergoing Mohs Surgery

Characteristic	N (%)	Mean (SD), [Range]
Sex		--
Female	69 (35%)	
Male	127 (65%)	
Age, years		72 (12), [37 to 97]
44 years or younger	2 (1%)	
45 to 64 years	47 (25%)	
65 to 79 years	86 (45%)	
80 years or older	55 (29%)	
Cancer Type		--
Basal Cell	107 (55%)	
Squamous Cell	88 (45%)	
Missing	1 (1%)	
Pre-Operative Size, cm		1.1 (0.6), [0.3 to 3.5]
0.9 cm or less	94 (48%)	
1.0 to 1.9 cm	85 (43%)	
2.0 cm or more	17 (9%)	
Change in Size, cm		0.5 (0.5), [0.0 to 2.7]
0.5 cm or less	94 (48%)	
0.5 to 0.9 cm	75 (38%)	
1.0 cm or more	27 (14%)	
Surgical Stages, number		--
One	104 (53%)	
Two	73 (37%)	
Three	17 (9%)	
Four	2 (1%)	

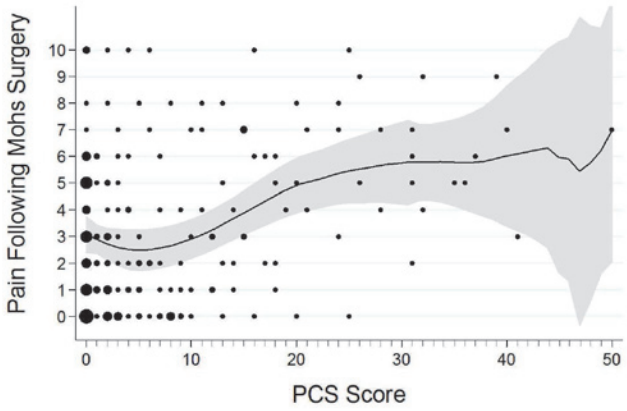

Figure 1: Scatter plot of pain over PCS scores, with points weighted for the frequency of underlying observations. A spline curve, predicting pain based on PCS scores, is overlaid with the 95% confidence interval of its predicted mean shaded.

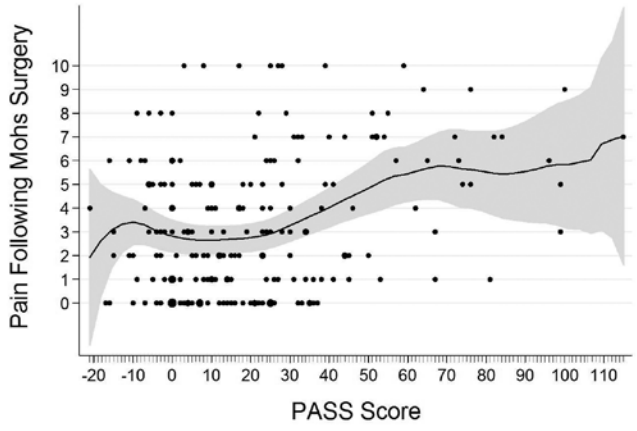

Figure 2: Scatter plot of pain over PASS scores, with points weighted for the frequency of underlying observations. A spline curve, predicting pain based on PCS scores, is overlaid with the 95% confidence interval of its predicted mean shaded.

048

Title: P63 as a Marker for Primary Cutaneous Carcinosarcoma and Treatment with Mohs Surgery

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Introduction: Primary cutaneous carcinosarcoma (PCC) is an extremely rare neoplasm characterized by both malignant epithelial and mesenchymal cells. The precise etiology of PCC is debated and methods to make a confident diagnosis have been an area of intensive study. The tumor suppressor gene product p63 has been indicated as a helpful genetic marker for confirming the diagnosis of PCC. In review of the literature, excision +/- radiotherapy has been the standard of care. This report presents the second reported case of PCC successfully treated with Mohs micrographic surgery (MMS), and discusses the suspected pathogenesis and histologic features of this rare neoplasm.

Design: A 91 year-old farmer with a previous history of multiple non-melanoma skin cancers presented with a 2.5 x 1.5 cm erythematous plaque with overlying scale crust on the left forearm of several months duration. A shave removal, followed by histological and immunohistochemical analysis, confirmed PCC. The lesion was removed via MMS followed by an additional 2 mm margin extraction for paraffin-embedding and immunoperoxidase stains to ensure negative margins.

Summary: Our patient presented with a lesion suggestive of a malignant neoplasm, which was further analyzed via histochemical and immunohistochemical methods. Microscopic analysis revealed a well-differentiated squamous cell carcinoma and an atypical spindle cell proliferation suggestive of a sarcoma. Immunohistochemical analysis of the carcinomatous component was positive for p63 and the cytokeratins AE1/AE3, and negative for S100. Sarcomatous cells were strongly CD10 positive and only weakly positive for p63, with loss of cytokeratin staining. P63, thought to play a role in prevention of terminal differentiation of squamous cells, was expressed in the less differentiated carcinomatous epithelial cells while a loss of staining was seen with the more highly differentiated sarcomatous components. The cutaneous lesion was successfully removed via MMS with an additional extraction for paraffin-embedding and immunoperoxidase stains, as is common practice with other ill-defined sarcomas.

Conclusion: This case report demonstrates the usefulness of p63 as a genetic marker in establishing a diagnosis of PCC. Although the optimal treatment method for PCC is unclear, this report presents the second successfully treated case via MMS. The use of p63, and other cytokeratin markers such as AE1/AE3, has increased the sensitivity of defining the differentiation states of squamous epithelia. Histopathology and immunohistochemistry have provided a more confident diagnosis of PCC and, although surgical excision +/- radiotherapy is currently the recommended treatment, this case suggests MMS as a viable alternative for the successful treatment of PCC.

049

Title: The Management of Intravascular Invasion in Basal Cell Carcinomas

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Institutions: 1. Roger Williams Medical Center, Dermatology and Skin Surgery, Providence, RI, United States 2. Boston University School of Medicine, Boston, MA, United States 3. University of Wisconsin, School of Medicine, Madison, WI, United States 4. Skin Surgery Center, Seattle, WA, United States 5. University of Washington, Seattle, WA, United States

Introduction: Intravascular invasion (IVI) is a histological feature that worsens the prognosis of most carcinomas by increasing the risk of metastasis. However we do not know whether it worsens the prognosis in basal cell carcinomas (BCCs). The purpose of this study was to determine how to best manage BCCs exhibiting intravascular invasion.

Design: We first characterized the histological features of four cases of BCC exhibiting IVI. All histological features were confirmed by three academic dermatopathologists. Second, because of the rarity of this histology, we sent out two different anonymous surveys to ACMS members to determine both the prevalence and associated risks of IVI. Third, we sectioned through entire blocks of BCCs with high resolution cuts.

Summary: (1) The intravascular BCCs were characterized by tumor aggregates within vascular spaces that conformed to the vessel shape and were attached to the intima. No "tearing" or "tissue drag" artifacts were evident. (2) Because of the rarity of IVI BCC, we performed a retrospective survey to tap the cumulative experience of all ACMS members. Of 169 respondents, 31.4% reported having seen cases of intravascular BCCs in their practice. Of those respondents, the majority of respondents estimated the prevalence to be 1/10,000 cases of BCCs. They generally did not pursue a metastatic workup. However there was a wide range in the extent of metastatic workup. No adverse events were reported except for one death from metastasis. We were unable to obtain details despite a second survey designed to do so. The surveys suggested that cases of BCC with IVI might correlate with tumor size but do not correlate with other factors known to be associated with metastasis. (3) In response to a suggestion that IVI might be a common event detectable only by high resolution serial cuts, we performed serial cuts through eleven blocks of infiltrative or nodular

basal cell carcinomas but we found no evidence of IVI in our sections. Immunolabeling was used to highlight vascular spaces in some sections.
Conclusion: We describe the histological features of BCCs exhibiting IVI. Prevalence may be as high as 1 / 10,000 cases. In contrast to IVI in other carcinomas, IVI in BCCs appears not to increase the risk of metastasis. When IVI is encountered as an isolated event, conventional treatment usually suffices, along with appropriate close follow-up. However, we recommend a metastatic workup and appropriate adjunctive treatment in high risk patients.

050

Title: SCC In Situ with Invasive Component Noted on Mohs Histology: A 5-year, Single Institution Retrospective Review

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Institutions: 1. Siriraj Hospital, Faculty of Medicine, Bangkoknoi, Bangkok, Thailand 2. University of California San Diego, Department of Dermatology, San Diego, CA, United States 3. University of California San Diego, San Diego, CA, United States 4. University of California San Diego Medical School, San Diego, CA, United States 5. Sutter Medical Group of the Redwoods, Dermatology, Santa Rosa, CA, United States

Introduction: Squamous cell carcinoma in situ (SCCIS) has a 3% to 5% risk of progression to invasive squamous cell carcinoma (SCC). However, lesions with SCCIS on pre-operative biopsy report have frequently shown to have dermal invasion on histology during Mohs micrographic surgery (MMS). Understanding the clinical behavior of tumors with diagnosis of SCCIS on the initial biopsy pathology report is important since treatment recommendations may differ for those lesions with higher propensity for dermal invasion. The purpose of this study is to determine the number of SCCIS cases with dermal invasion detected during MMS and the extension of the invasive component.
Design: Medical records of MMS cases with pre-operative diagnosis of SCCIS presenting between March 2007 and February 2012 were retrospectively reviewed. Both Mohs operative notes and histology slides were reviewed to study the number of SCCIS cases with invasive component and the extent of their invasion. Data from SCCIS with and without invasive component cases were compared.
Summary: From the 4,037 MMS cases, 566 cases had pre-operative diagnosis of SCCIS, and 92 of these cases (16.3%) were found to have dermal invasion. The mean number of stages required to treat SCCIS with dermal invasion and without invasion cases were 2.74 and 2.20, respectively ($p < 0.001$). Mean of the widest final surgical margin in SCCIS with dermal invasion cases was 13.15mm and in SCCIS without invasion cases was 9.12mm ($p < 0.001$). Timing from skin biopsy to MMS was not different between SCCIS with and without invasion cases, 42.82 and 47.98 days, respectively. Interestingly, from those 566 SCCIS cases, 203 cases (35.9%) had a diagnosis of SCCIS followed by a note describing that invasive component could not be excluded because the base of the specimen was transected, and 363 cases (64.1%) had a definitive diagnosis of SCCIS. Fifty-two cases (25.6%) in transected specimen group showed dermal invasion, whereas, only 40 cases (11%) in the non-transected group showed dermal invasion.
Conclusion: SCCIS with dermal invasion found during MMS is not uncommon, especially in lesions where the skin biopsy report showed a transected base specimen. SCCIS with dermal invasion were more aggressive than the SCCIS without invasion, as demonstrated by number of MMS stage and final surgical margins required. This information is important for physicians when recommending treatment options for SCCIS management.

051

Title: Neuroendocrine Tumor of the Skin Arising in the Background of Imatinib Mesylate Therapy

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Introduction: Receptor tyrosine kinases are important in tumor carcinogenesis. Tumors demonstrating KIT mutations, including gastrointestinal stromal tumors (GISTs) and cutaneous neuroendocrine carcinoma (Merkel cell carcinoma, MCCs) have been the targets of highly selective small molecule receptor tyrosine kinase inhibitors such as imatinib mesylate. Though this medication has shown efficacy in the treatment of GISTs, phase II trials of imatinib mesylate in the treatment of MCCs were haulted due to rapid disease progression. The difference in clinical efficacy has been attributed to the type of mutations observed in GISTs and MCCs: GISTs demonstrate gain-of-function mutations in KIT that can be suppressed by imatinib mesylate while MCCs fail to demonstrate activating mutations in KIT and, thus, are minimally affected by imatinib mesylate. We present here a 77-year-old woman with a history of GIST of the stomach who developed a cutaneous neuroendocrine tumor on the upper lip eleven months after starting imatinib mesylate therapy. This is the first reported case of a de-novo cutaneous neuroendocrine carcinoma arising during imatinib mesylate therapy.
Summary: Heterogenous mutations in KIT contribute to the pathogenesis of GISTs and MCCs. Activating mutations of KIT are associated with successful tumor treatment in both GISTs and MCCs. This patient's GIST decreased in size while undergoing imatinib mesylate therapy as a result of the patient's known gain-of-function mutation in KIT. Based on MCC growth in the presence of imatinib mesylate therapy, it can be inferred that the patient's MCC behaved like other cutaneous neuroendocrine tumors described without an activating KIT mutation.
Conclusion: This is the first reported case of a de-novo cutaneous neuroendocrine carcinoma arising during imatinib mesylate therapy. Though heterogenous mutations in KIT contribute to the pathogenesis of GISTs and MCCs, it is unclear what role, if any, imatinib mesylate played in the development of this patient's MCC.

052

Title: Full-thickness Skin Grafts Secured with 2-octylcyanoacrylate and Adhesive Strips: A Case Series

Authors: Jennifer S. Ranario, MD, MBA[1]; Ikue Shimizu, MD[1]
Institution: 1. Texas Tech University Health Sciences Center, Lubbock, TX, United States

Introduction: Advantages of cyanoacrylate tissue adhesives in skin closures include shorter closure times, elimination of the need for suture removal and decreased risk of suture marks. When compared to

wounds closed with standard methods (sutures, staples, adhesive tape), a systematic review and meta-analysis of randomized controlled studies showed no difference in rates of infection or cosmetic outcomes with wounds closed with tissue glue (2-octylcyanoacrylate and n-butyl-2-cyanoacrylate). There was an increased rate of wound dehiscence with all tissue adhesives, but the difference was not significant when only 2-octylcyanoacrylate was compared with standard methods. Due to the possibility of wound dehiscence, tissue adhesives are best used in areas of low tension. Full thickness skin grafts are typically cut and trimmed to be placed without tension and therefore may be appropriate for being secured with cyanoacrylates. We describe a series of Mohs micrographic surgery defects closed with full thickness skin grafts, all of which were secured with 2-octylcyanoacrylate.

Design: After each tumor was cleared with Mohs micrographic surgery, good hemostasis was obtained, and the graft was trimmed to match exactly the defect, allowing rapid fixation of the graft with 2-octylcyanoacrylate. One or two central basting sutures were placed as needed for concave areas. Adhesive strips were used for an extra layer of protection and security, and then a pressure dressing was applied for 48 hours.

Conclusion: We have found securing full thickness skin grafts with 2-octylcyanoacrylate decreases closure time but more importantly, simplifies wound care for patients. It eliminates the need for bolster dressings, daily dressing changes, and aggressive use of ointment, all of which can be a source of complaint.

053

Title: Increased Utilization of Second-intent Healing in Mohs Micrographic Surgery

Authors: H. William Higgins, II, MD, MBE[1]; Kachiu C. Lee, MD, MPH[1]; Patrick Mulvaney, MD[1]; Antonio P. Cruz, MD[1]; Raymond G. Dufresne, Jr., MD[1]

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Introduction: To evaluate utilization of secondary intention healing (SIH) in Mohs surgery cases in 2001 vs. 2011.

Design: We conducted a retrospective study on patients treated with Mohs surgery at one academic facility in 2001 compared to 2011. Data on the following were analyzed: patient demographics (gender, age), tumor type/subtype, anatomic site of the tumor, primary versus recurrent tumors, initial area, layers, final defect size, and repair method. Analysis was completed using the $\chi 2$ test, with $p \leq 0.05$ considered significant.

Summary: We analyzed 1067 cases from 2001 and compared them with 1746 cases in 2011. Use of SIH increased from 7% of cases in 2001 to 13% of cases in 2011 ($p<.001$). Males were also more likely than females to receive SIH for both years ($p<.01$). Lesions on the ears ($p<.001$), scalp ($p<.001$), and extremities ($p<.001$) were more likely to head under secondary intention compared to other locations on the body.

Conclusion: The increase in SIH over the past decade harkens back to the earlier pioneers in Mohs surgery, including Dr. Frederic Mohs himself. Previous studies suggest that cosmetic acceptability and functional outcome of SIH are favorable in select head and neck areas, including concave areas of the face such as the temple, auricle, and medial canthus. Use of SIH in less traditional areas has also been reported on the forehead, lips, and lower eyelid. Overall, SIH allows for decreased operative time and a less invasive procedure (as no further tissue is removed). However, because these wounds require a longer time to heal and increased care during the post-operative period, studies into cost-effectiveness are necessary. The increased utilization of SIH in 2011 also suggests both our surgeons' and patients' increasing comfort with use of this repair technique.

055

Title: Dynamic Infrared Imaging: A Non-invasive Approach for the Detection of Skin Cancer

Authors: Erica G. Lau, DO[1]; Sebastian Godoy, MS[2,3]; David Ramirez, PhD[3]; Greg von Winckel, MD[2,3]; Pradeep Sen, PhD[3]; Sanchita Krishna, PhD[3]; Sanjay Krishna, PhD[2,3]; R. Steven Padilla, MD[1]

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Introduction: Thermal infrared imaging provides a quantitative estimate of spatial and temporal temperatures of an object. Malignant cells, by definition, have increased metabolic activity. We propose melanoma and non-melanoma skin cancers have a temporal recovery time to warming that differs from normal skin. This technology may allow for a non-invasive approach for the early detection of skin cancer.

Design: Patients were selected by dermatology residents and attending physicians from a University dermatology clinic with lesions suspicious for skin cancer. The lesion and surrounding skin were cooled to 10°C using compressed air. As the area was allowed to warm up, images were captured at the rate of 60 points per second for a total of 3 minutes using an Advanced Longwave Infrared-imaging and Analysis System (ALIAS). A software called SKIviz was used to plot the temperature profile during warming from which a spatial map of the dynamic differential temperature (DDT) of the lesion and surrounding skin was created. Biopsies of the lesion were performed for definitive diagnosis.

Summary: The DDT curve for both normal skin (surrounding skin) and lesional skin were plotted. Malignancy was determined by a clear visual difference between lesional and non-lesional skin (Figure 1). Sixteen lesions were evaluated as a part of our pilot study. A L2-norm metric was developed as a parameter to assess whether the lesion was malignant or benign. Table 1 summarizes the results of the pilot study. A sensitivity of 90% and a specificity of 75% was obtained in this small sample set.

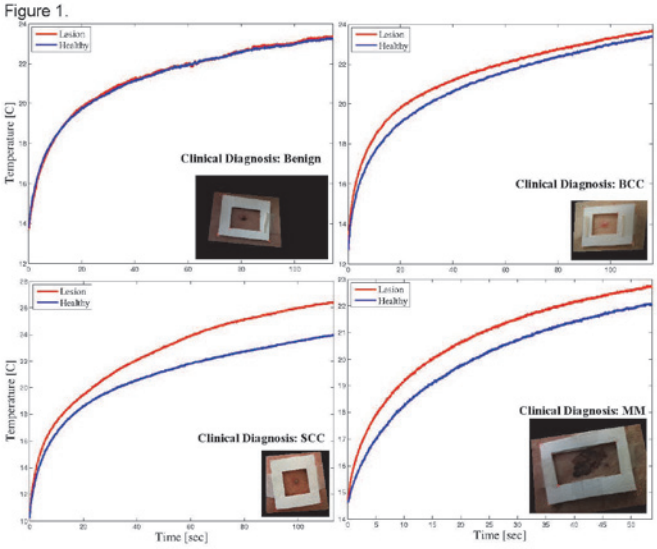
Conclusion: Initial data shows dynamic infrared imaging is a promising non-invasive approach for the early detection of skin cancer.

Table 1.

Patient Number	Ground Truth: Clinical	Value of L2 Norm from DTC	DISC Diagnosis (Threshold=0.2)	Correlation
1	Melanoma	1.11	Malignant	TP
2	Benign	0.16	Benign	TN
3	BCC	0.24	Malignant	TP
4	BCC	0.84	Malignant	TP
5	Melanoma	0.28	Malignant	TP
6	Benign	0.03	Benign	TN
7	Benign	0.36	Malignant	FN
8	BCC	0.63	Malignant	TN
9	SCC	1.11	Malignant	TP
10	BCC	0.2	Inconclusive	Ignored
11	BCC	0.31	Malignant	TP
12	SCC	1.09	Malignant	TP
13	Inconclusive	0.2	Inconclusive	Ignored
14	BCC	0.41	Malignant	TP
15	Benign	2.17	Malignant	FP
16	BCC	0.37	Malignant	TP

TP=True Positive; TN=True Negative; FP=False Positive; FN=False Negative

Figure 1.



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Title: Partial Success of Intralesional Methotrexate in Treatment of Reactive Squamous Cell Carcinoma after Mohs Surgery

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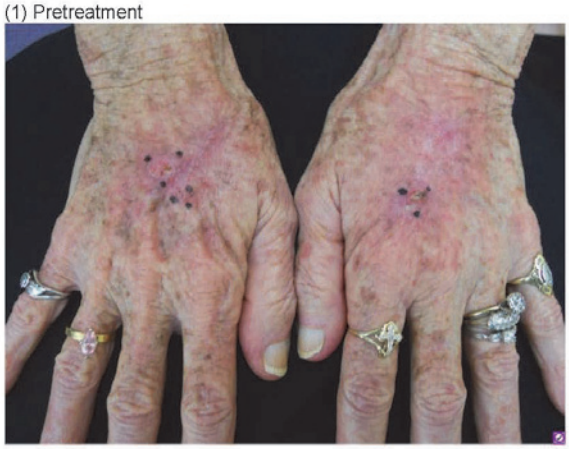
Introduction: Reactive squamous cell carcinoma, often of the keratoacanthoma (KA) type, may appear acutely at sites of previous skin injury or scar (1), sometimes after removal of primary cutaneous malignancies with histopathologically confirmed clear margins. Reactive KAs usually develop within three months post-operatively (2), but may develop within days. Treatment of reactive KAs is difficult as lesions tend to recur post-operatively. We describe treatment of multiple reactive KAs on the dorsum of the hands, which recurred after multiple surgical interventions, with intralesional methotrexate (MTX).

Design: Case report of treatment of multiple reactive KAs on the dorsum of the hands, which recurred after multiple surgical interventions, with intralesional methotrexate (MTX).

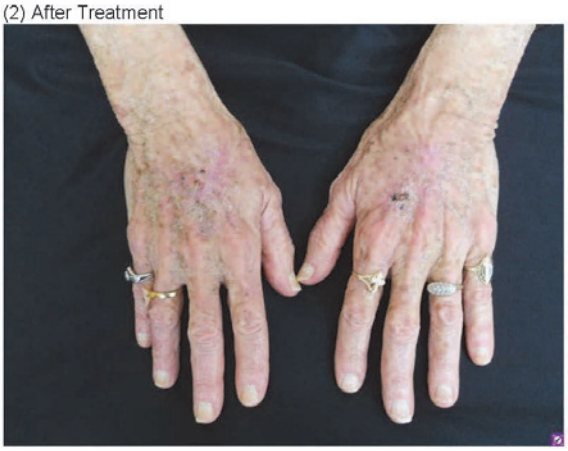
Summary: An 82-year-old woman was referred for Mohs micrographic surgery (MMS) of a potentially recurrent squamous cell carcinoma of the left hand that was excised with clear margins nearly a year prior. A 20x10 mm tumor in the central scar re-excised with MMS and closed primarily. After failing multiple surgical interventions the lesions were treated with intralesional MTX, 0.2ml of a 25mg/ml solution for a total of 5mg, after local anesthesia. Unfortunately, after apparent clearance of disease and 5 months after the first injection, a new lesion was confirmed as SCC on the left hand within the original scar. Due to concerns for the role of suture reactivity in the etiology in reactive SCC, this has been treated by MMS (with clear margins) and left to heal by second intention without signs of recurrence after the short term follow-up of 1 month.

Conclusion: Treatment of reactive KAs with intralesional MTX has been reported in two cases. In the first, no response was noted; the second patient responded to a combination of MTX, intralesional 5-FU, and acitretin (3). An established dosing protocol has not been established, but a dose of 5-10mg per lesion appears reasonable. Appropriate laboratory monitoring is recommended, particularly in patients with renal impairment. The etiology and treatment of reactive squamous cell carcinoma warrants additional study.

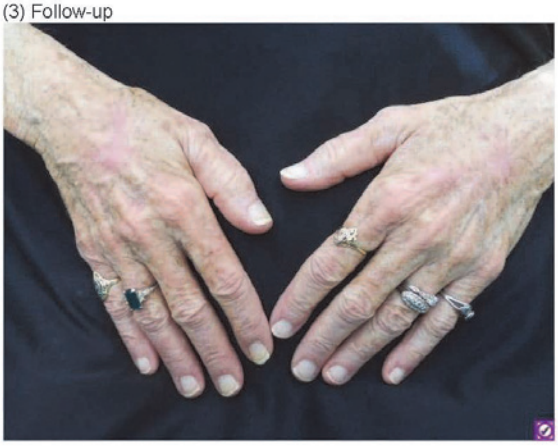
(1) Pretreatment



(2) After Treatment



(3) Follow-up



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