ORAL PRESENTATION

(8:40 AM)

QUANTIFYING THE VISIBLE APPEARANCE OF SUNSCREENS ON THE SKIN USING DIGITAL PHOTOGRAPHY AND COMPUTER IMAGE ANALYSIS: A PILOT STUDY

Vincent Richer[1], Pegah Kharazmi[1,2], Tim Lee[1,2], Sunil Kalia[1], Harvey Lui[1,3]

[1]Department of Dermatology and Skin Science, University of British Columbia and Photomedicine Institute, Vancouver Costal Health Research Institute [2]Cancer Control Research Program, BC Cancer Research Centre [3]Imaging Unit, Integrative Oncology Department, BC Cancer Research Centre

Background and Objective: The subjective visual appearance of sunscreens on the skin is one of many factors that influences if and how they are applied. Our objective was to objectively quantify the visibility of sunscreens on the skin. Methods: Four different sunscreens were applied at amounts of 0.5, 1.0, 1.5 and 2.0 mg/cm^2 to the backs (50 cm^2) of three subjects and the forehead (9 cm^2) of one subject. High-resolution standardized photographs were taken using a digital SLR camera, a diffuse light source and a standard color reference card. L*a*b* color values were extracted using Adobe Photoshop software from averaged areas with sunscreen and from control areas without sunscreen. Differences in visible color between the controls and the corresponding sunscreen application areas were represented by ΔE, which in turn was calculated from the Cartesian distance between the two locations within the 3-D L*a*b* color space. Results: By the above image analysis, all sunscreens applied on the back were visible at all applied quantities (ΔE range 1.0-24.7; p=0.0005, Wilcoxon signed rank test). Visibility of sunscreen as manifested by ΔE was dependent on the sunscreen product applied to the skin (p=0.0174, Friedman test). Stepwise linear regression identified product amount, SPF, composition (physical vs. chemical) and baseline b* as pertinent variables. Data from the experiment on the face was plotted and analyzed qualitatively only. Conclusion: Standardized photography and computer analysis is a potential method to objectively assess the visual appearance of sunscreens applied on the skin. Validation of this method is required.

Category: Early experiment with well defined objectives/hypothesis

(8:52 AM)

THE DART CLINIC: RESULTS OF A RETROSPECTIVE PATIENT SATISFACTION SURVEY

Michael Samycia[1], Collette McCourt[2], Kam Shojania[4], Sheila Au[1,3]

[1] Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada. [2] Department of Dermatology, Royal Victoria Hospital, Belfast Health and Social Care Trust, Belfast, N.I. [3] Division of Dermatology, Department of Medicine, St. Paul's Hospital and Providence Health Care. [4] Division of Rheumatology, St. Paul's Hospital and Providence Health Care and Department of Medicine, University of British Columbia, Vancouver, BC, Canada

Objectives: The Dermatology and Rheumatology Treatment Clinic is a novel multi-disciplinary clinic, where patients are concomitantly assessed by a rheumatologist and dermatologist. The purpose of this study is to determine if patients are finding the combined clinic beneficial to them and if they are satisfied with their care. The information that we gain will be used to correct any deficits identified. Method: We distributed 100 surveys to patients of the DART clinic. Participation in the survey was voluntary. Results: Thus far, we have collected 87 of the 100 surveys. Preliminary results show that 88% of our patients found it beneficial to see both a rheumatologist and dermatologist at a combined clinic (56% strongly agreed, and 32% agreed). 71% felt that they were given adequate information regarding medications and treatment (34% strongly agreed, and 47% agreed). 87% of patients felt they were given an enough amount of time for their consultation (41% strongly agreed, 46% agreed). 89% agreed that they had more knowledge about their condition after attending the DART clinic (34% strongly agreed, 55% agreed). Conclusions: Overall the preliminary results of our patient satisfaction survey are very positive. Patients enjoy seeing both a dermatologist and rheumatologist concomitantly. Even though our clinic is very busy, patients still feel that they are given an adequate amount of time for discussion and counseling.

Category: Early experiments with well defined objectives/hypotheses

(9:04 AM)

AUTOMATIC SEGMENTATION OF TUBULAR VASCULAR STRUCTURES IN DERMOSCOPY IMAGING: A FRAMEWORK BASED ON VASCULAR ERYTHEMA AND SHAPE

Pegah Kharazmi[1,2], Mohammed AlJasser[2], Harvey Lui[2,3], William V. Stoecker[4], Tim K. Lee[1,2,3]

[1]Department of Electrical and Computer Engineering, University of British Columbia, Vancouver, BC Canada; [2]Department of Dermatology and Skin Science, University of British Columbia and Vancouver Coastal Health Institute Vancouver, BC Canada; [3]Departments of Cancer Control Research and Integrative Oncology, BC Cancer Agency, Vancouver, BC Canada; [4]Department of Computer Science, Missouri University of Science and Technology, Rolla, MO USA

Background: The presence, patterns and clinical appearance of vascular structures in skin lesions are important factors in differentiating different skin lesions, especially non-melanocytic ones. Hence, detection and analysis of blood vessels can provide critical diagnostic information. Objective: To develop an automated computer algorithm for detecting tubular-shaped blood vessels within dermoscopic images. Methods: Our proposed method was composed of three parts. First, after preprocessing the images, under the supervision of a dermatologist, we determined three reference vectors for normal skin, pigmented skin and blood vessels from a number of candidate regions. Our training image set consisted a wide range of pigmented and non-pigmented skin lesions including basal cell carcinoma, seborrheic keratosis, malignant melanoma, and other miscellaneous lesions. We have extracted mean and standard deviation of chromatic values in Lab and HSV color space for the three categories. Based on Mahalanobis distance metric, we generated a mask image of potential vascular pixels by clustering the chromatic values of each pixel against the three reference vectors. Subsequently, we applied the Frangi measure to enhance tubular structures within the erythematous areas identified by the mask image. Finally, Otsu's thresholding method was used to segment the vascular structures. Results:

We have implemented the algorithm and tested it on 30 test dermoscopic images. A sensitivity of 87% and specificity of 72% have been achieved. **Conclusions:** We have successfully developed a framework for automatic segmentation of vascular structures from dermoscopy images. Our classification framework is adaptable, allowing for discrimination despite wide variations in our dataset features.

Category: Applied/Functional Experiments

(9:16 AM)
CLINICAL ACCURACY IN THE DIAGNOSIS OF MELANOMA BY DERMATOLOGISTS AND NON-DERMATOLOGISTS

Michal Martinka[1], Richard I. Crawford[2], Shannon Humphrey[3]

[1]Faculty of Medicine, [2]Department of Pathology and Laboratory Medicine, [3]Department of Dermatology and Skin Science, University of British Columbia

BACKGROUND: The incidence of melanoma is rising annually in Canada. Consequently more patients with pigmented lesions are presenting to dermatologists and non-dermatologists. Thus, physicians must be able to accurately discriminate between benign and malignant skin lesions. OBJECTIVE: This retrospective study is designed to augment our previous work on the clinical recognition of melanoma and further analyze the clinical accuracy of diagnosing melanoma in physicians of different specialties. METHODS: Pathology reports of biopsies submitted to Vancouver Coastal Health with a clinical or histopathological diagnosis of melanoma were reviewed (January - July 2013). The clinical diagnoses made by dermatologists, general practitioners and family physicians (GP/FP), and all other specialists were correlated with the final histopathological diagnosis. Our previously performed analysis started with the clinical diagnosis and referenced it back to the histologic diagnosis; in contrast, this study started with the histologic diagnosis and correlated it to the clinical diagnosis. RESULTS: 813 cases were included. The dermatologists, GP/FP's and all other specialists achieved sensitivities and specificities of 92% & 45%, 86% & 9% and 91% & 17% respectively. The positive predictive values and negative predictive values for dermatologists, GP/FP's and all other specialists was 60% & 86%, 29% & 61%, and 52% & 65% respectively. CONCLUSION: The results confirm our conclusions from our previous study and demonstrate that dermatologists have a significantly better diagnostic accuracy than the other groups. This further supports providing more training and education to non-dermatologists as it can have a meaningful impact on patient care.

Category: Early experiments with well defined objectives/hypotheses

(9:28 AM)
HISTOPATHOLOGIC FINDINGS IN DERMATOMYOSITIS OF THE SCALP

Leopoldo Santos, Magdalena Martinka, Jerry Shapiro, Jan Dutz

Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada.

Background: Cutaneous features of dermatomyositis (DM) often begin and continue to involve the scalp. While there are clinical descriptions of scalp dermatomyositis, there are no published descriptions of the histopathology of this disorder affecting the scalp. Objective: To describe the histopathologic features of dermatomyositis of the scalp. Methodology: Scalp biopsies of two patients with typical cutaneous features of dermatomyositis were examined and compared to scalp biopsies of patients with cutaneous forms of lupus erythematosus (LE). Horizontal and transverse sections stained with hematoxylin and eosin and transverse sections stained with PAS and mucin stains were examined. Results: DM histopathology showed the following features within the epidermis; follicular plugging and mild vacuolar interface changes. Within the dermis, superficial and deep perivascular and peri-adnexial lymphocytic infiltrates that extended to the subcutis in one case. Both cases showed basement membrane thickening on PAS stain and increased mucin. The control case (LE) showed within epidermis; mild atrophy, subtle vacuolar interface change and follicular plugging. Within the dermis, dense superficial and deep perivascular, perifollicular and perieccrine lymphocytic infiltrates which extended to the superficial subcutis. However, basement membrane thickening and increased mucin were absent features. Conclusion: The dermatopathological features of scalp dermatomyositis include superficial and deep perivascular lymphocytic infiltrates, the presence of lichenoid interface changes, colloid bodies, a thickened basement membrane and mucin deposition. Clinicians and dermatopathologists should be aware that scalp dermatomyositis may mimic cutaneous lupus erythematosus of the scalp and that a pathological distinction between these two entities affecting the scalp may not be possible.

Category: Early experiments with well-defined objectives/hypotheses

(9:40 AM)
THE PREVALENCE OF NIGHT SWEATING IN PRIMARY HYPERHIDROSIS
Rayeheh Bahar, Sunil Kalia, Mingwan Su, and Youwen Zhou

Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada.

In hyperhidrosis (HH), sweating occurs without any underlying trigger such as warm temperature or exercise. It is believed that night sweating is rare in this medical condition, and its presence raises concern for underlying medical or psychological conditions. However, the prevalence of night sweating in HH and non-HH patients has not been systematically investigated. Our objective of the current study is to clarify the significance of night sweating. This is a prospective study that assesses consecutive patients presenting to the dermatology outpatient clinics. After patients fill out the questionnaires, they are grouped into 2; the HH patients and non-HH patients. Then the prevalence of night sweating in these groups and its relationship with anxiety and depression is evaluated. In total 300 individuals including 174 females and 126 males with average age of 47 years and average of BMI of 23.9 were recruited. The prevalence of night sweating in HH and non-HH groups was 84% and 20.7% respectively. Further, among HH sufferers, presence of night sweating is associated with higher scores of anxiety and depression compared with those without night sweating. Night sweating is a common symptom in the general population, and even more common in patients with primary HH. Therefore, night sweating should not be used as an exclusion criterion for the diagnosis of

primary HH. Further, among HH patients, anxiety and depression are associated with night sweating. The exact underlying link between anxiety, HH and night sweating warrants further investigations in the future.

Category: Early experiments with well defined objectives/hypotheses

(11:20 AM)
ULTRAVIOLET LIGHT-MEDIATED INDUCTION OF SYSTEMIC LUPUS ERYTHEMATOSUS

Misha Zarbafian[1], Mehran Ghoreishi[2,3], Jan P. Dutz[2,3]

[1]University of British Columbia, Vancouver Fraser Medical Program. [2]Child and Family Research Institute, Vancouver, British Columbia. [3]University of British Columbia, Department of Dermatology and Skin Science

Background: Non-obese diabetic (NOD) mice repeatedly exposed to ultraviolet (UV) light and Toll-like receptor-7 (TLR7) agonist cream (imiquimod) develop lupus-like disease, suggesting a possible cutaneous trigger for systemic lupus erythematosus (SLE). T-follicular helper (TFH) cells support B cell maturation in germinal centers, leading to auto-antibody production. High-mobility group protein B1 (HMGB1) facilitates auto-antibody production in SLE, both locally and systemically. Purpose: To characterize TFH cells and activated B cells in skin-draining lymph nodes of NOD mice treated with UV and imiquimod. Methods: NOD and Balb/C mice received weekly UVB radiation and 25 μg of topical imiquimod. Skin-draining lymph nodes were analyzed by flow cytometry after four treatments to determine the activation status and number of TFH cells and B cells. Extra-nuclear expression of HMGB1 was evaluated in skin samples from strains after four treatments. Results: There was expansion of both TFH and B cells, as well as increased expression of B cell activation marker CD40 in skin-draining lymph nodes of NOD mice following combined UV and imiquimod therapy, in contrast to Balb/C mice. Extra-nuclear expression of HMGB1 was greater in NOD mice, whereas expression in Balb/C mice was largely limited to the nucleus. Conclusions: Skin-draining lymph node TFH cell expansion is an early event after UV and TLR7-agonist therapy, and occurs in lupus-prone animals. HMGB1 redistribution in the skin also occurs in lupus-prone strains. Quantification of circulating TFH cells and local HMGB1 expression may serve as markers for predicting SLE onset in genetically predisposed individuals.

Category: (3) Applied/functional experiments (animal models of disease and in vivo studies, etc)

(11:32 AM)
REAL-TIME RAMAN SPECTROSCOPY FOR IN VIVO SKIN CANCER DIAGNOSIS: AN UPDATE

Jianhua Zhao,[1,2] Haishan Zeng,[1,2] David I. McLean,[1] Sunil Kalia[1] and Harvey Lui[1,2]

[1]Photomedicine Institute, Department of Dermatology and Skin Science, University of British Columbia and Vancouver Coastal Health Research Institute, Vancouver, Canada. [2]Imaging Unit - Integrative Oncology Department, British Columbia Cancer Agency Research Center, Vancouver, Canada

Background: Our previous large-scale clinical study established that real-time Raman spectroscopy can distinguish malignant from benign skin lesions with good diagnostic accuracy. The objective of this study is to further validate our previous findings with a separate dataset of patient lesions. *Methods:* An integrated real-time Raman spectroscopic system was used to acquire skin Raman spectrum. Multi-variant statistical data analysis with partial least squares (PLS) was used for lesion classification. Based on clinical interest, the analyses were focused on discriminating skin cancers and precancers that require treatment (including melanoma, squamous cell carcinoma, basal cell carcinoma and actinic keratosis) from benign skin lesions that may clinically mimic skin cancers (including atypical nevus, blue nevus, compound nevus, intradermal nevus, junctional nevus, seborrheic keratosis). *Results:* With the previous set of skin Raman spectra (n=518) as a training dataset and the new cohort of skin Raman spectra (n=127) as a test dataset, the area under the receiver operating characteristic (ROC) curve (AUC) was 0.889 (95%CI: 0.834-0.944; PLS), comparable to the performance of the training dataset where the ROC AUC was 0.896 (95%CI: 0.846-0.946; PLS) based on leave-one-out cross validation (LOOCV). The results were also comparable to the performance of the two cohorts of skin Raman spectra consolidated and analyzed together (ROC AUC: 0.894; 95%CI: 0.870-0.918; PLS with LOOCV). The consolidated dataset that incorporates all results to date showed an overall narrower confidence interval. *Conclusions:* Independent skin Raman measurement confirms our previous findings, and validates that real-time Raman spectroscopy can distinguish malignant from benign skin lesions with good diagnostic accuracy.

Category: Applied/functional experiments (animal models of disease and in vivo studies, etc)

(11:44 AM)

COMPLETE EAR RECONSTRUCTION WITH TWO INTERPOLATION FLAPS AND ANTI-HELIX CARTILAGE GRAFT

Irèn Kossintseva, MD, FRCPC, FAAD

Department of Dermatology & Skin Science, UBC

Purpose: Complete de-novo ear reconstruction is a challenge necessitating both a framework that imitates the shape and projection of the contralateral ear, as well as the soft tissue covering with adequate blood supply. The traditional method of utilizing rib cartilage framework placed beneath temporoparietal-fascia (TPF) flap and skin bears inherent limitations: first, safely harvesting rib cartilage under local anesthesia in Mohs surgical suites; second, problems with the learning curve of the TPF flap; third, using scalp for coverage. The author describes an elegant and safe alternative for complete external ear reconstruction by using two interpolation flaps and anti-helix cartilage graft. Design: Patient presenting with a near-complete loss of external ear post-Mohs Micrographic Surgery, underwent a novel reconstruction of the entire ear using two interpolation flaps and anti-helix cartilage graft. Complete construction and finessing of the ear

contours required three stages, plus minute adjustments along the way. Conclusion: This novel method of complete ear reconstruction using pre-auricular cheek interpolation flap for the anterior portion of the ear and post-auricular neck for the posterior portion of the ear, while suspending the superior curve of the helix from an anti-helix cartilage graft strut, allows a Mohs surgeon to successfully and safely construct an ear under local anesthesia. This design creates both the concave and the convex contours of the ear, as well as the arched shape of the helical root. Previously un-described roll-over scalp flap is an effective way of gaining helical height or focally increasing ear size. Linear concavities are created using epidermis-to-dermis sutures.

Category: Applied/functional experiments

(11:56 AM)
CUTANEOUS PORPHYRINS EXHIBIT ANTI-STOKES FLUORESCENCE THAT IS DETECTABLE IN SEBUM

Yunxian Tian[1, 2, 3], Jianhua Zhao[1, 2], Zhenguo Wu[1, 2], Mohammed Al Jasser[1], Harvey Lui[1, 2], David I. McLean[1], Haishan Zeng [1, 2, 3]

[1] Photomedicine Institute - Department of Dermatology and Skin Science, University of British Columbia & Vancouver Coastal Health Research Institute, Vancouver, Canada. [2] Imaging Unit - Integrative Oncology Department, British Columbia Cancer Agency Research Centre, Vancouver, Canada. [3] Department of Physics and Astronomy, University of British Columbia, Vancouver, Canada

Porphyrins produced by *Propionibacterium acnes* represent the principal fluorophore associated with acne, and appear as orange-red luminescence under the Wood's lamp. Assessment of acne based on Wood's lamp (UV) or visible (VIS) light illumination is limited by photon penetration depth and has limited sensitivity for earlier stage lesions. Anti-Stokes fluorescence as a new technology could be generated by lower cost, continuous-wave laser source. Different from two-photon fluorescence realized by ultra short pulse, femtosecond laser, anti-Stokes fluorescence allows us to focus at specific molecules since most other molecules failed to fulfill the excitation conditions. We applied this technology to a complex biological system - facial sebum. Anti-Stokes fluorescence under NIR CW excitation is more sensitive and specific for porphyrins than UV- or visible light-excited regular (Stokes) fluorescence and fs laser-excited multi-photon fluorescence. This approach also has higher image contrast compared to NIR fs laser-based multi-photon fluorescence imaging. The anti-Stokes fluorescence of porphyrins within sebum could potentially be applied to detecting and targeting acne lesions for treatment via fluorescence image guidance.

Category: pilot/exploratory experiments

(12:08 PM)
***IN VIVO* HIGH RESOLUTION VIDEO MICROSCOPY OF HUMAN SKIN IN THE VERTICAL PLANE**

Zhenguo Wu[1, 2, 4], Yunxian Tian[1, 2, 3], Jianhua Zhao[1, 2], Harvey Lui[1, 2], David I. McLean[2],

Haishan Zeng [1, 2, 3, 4].
[1] Imaging Unit – Integrative Oncology Department, BC Cancer Agency Research Centre, Vancouver, BC, Canada. [2] Photomedicine Institute, Department of Dermatology and Skin Science, University of British Columbia and Vancouver Coastal Health Research Institute, Vancouver, BC, Canada. [3] Department of Physics and Astronomy, University of British Columbia, Vancouver, BC, Canada. [4] Interdisciplinary Oncology Program, Faculty of Medicine, University of British Columbia, Vancouver, BC, Canada

Reflectance confocal microscopy (RCM) and multiphoton microscopy (MPM) are non-invasive methods of acquiring morphological images of the skin *in vivo*. Most research in this area focuses on instruments that are configured for two-dimensional imaging in a horizontal plane parallel to the skin surface. In contrast, conventional histopathologic evaluation of the skin is based on vertical tissue sections that show microscopic features and their interrelationships according to their depth within the skin. The ability to similarly depict the skin in the vertical plane during *in vivo* microscopic imaging poses several significant challenges with respect to imaging speed, resolution and extractable information. We developed a laser scanning multimodal microscopy system which combines RCM and MPM, and has the ability to achieve high resolution vertical "optical sectioning" of *in vivo* human skin at video rates. RCM and MPM images can be obtained simultaneously thereby providing complementary morphological information. To validate the performance of this system vertical section RCM and MPM microscopic images of normal human skin *in vivo* were obtained at video rates of 15 frames per second. Using our system it is possible to discern the following structures: all layers of the epidermis including the stratum lucidum, the dermal-epidermal junction, and the papillary dermis. Blood flow is also visible as evidenced by blood cell movement within vessels. The effective imaging depth is about 200 micrometers. This system provides a means of interrogating human skin noninvasively at an orientation analogous to conventional histologic sectioning.

Category: Applied/functional experiments

(12:20 PM)
ACCURACY OF SKIN CANCER DIAGNOSIS IN POST-TRANSPLANT PATIENTS

Baldwin, Sarah[1] and Au, Sheila[2]

[1]Medical student, University of British Columbia Faculty of Medicine. Vancouver, Canada.
[2]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada and Division of Dermatology, Department of Medicine, St. Paul's Hospital and Providence Health Care, Vancouver, Canada.

Background: Transplant recipients are at increased risk of non-melanoma skin cancer (NMSC). Accurate identification of skin lesions ensures that cutaneous malignancies are diagnosed early and treated. Submitting appropriate lesions for biopsy decreases unnecessary sampling of benign lesions. Diagnostic accuracy rates in skin cancer screening clinics for post-transplant patients range between 40% and 54%. Methods: A 12-month chart review identified 128 post-transplant patients who underwent diagnostic skin biopsy for suspected skin cancer in a new post-transplant screening clinic (SCREEN Clinic) at our hospital. For each biopsy, we compared the attending dermatologist's primary written clinical diagnosis with the final histologic diagnosis. The

diagnosis was considered to be accurate if the primary diagnosis matched the final diagnosis. A number of relationships were interrogated in the examination and diagnosis of 182 skin lesions. These included overall diagnostic accuracy (51%), accuracy in the diagnosis of squamous cell carcinoma (50%), and accuracy in the diagnosis of basal cell carcinoma (47%). Overall diagnostic accuracy increased to 72% when the differential diagnosis was taken into account. In the 89 cases of misdiagnosis, the majority were actinic keratoses (37%), NMSC incorrectly diagnosed with regard to subtype (35%), or benign lesions mistaken for NMSC (21%). Conclusion: Overall low clinical accuracy of skin cancer diagnosis has been previously documented in this population. Reasons for our similar findings may include a tendency to biopsy subtle lesions in a high-risk population, and altered clinical morphology in transplant patients in which squamous cell carcinoma, basal cell carcinoma, actinic keratoses and benign papillomas look very similar.

Category: Pilot/Exploratory experiment

(1:20 PM)
TOPICAL ADJUVANT APPLICATION AT THE TIME OF SUBCUTANEOUS VACCINATION PROMOTES RESIDENT MEMORY CELL GERNERATION

Jacqueline Lai, Patrick Hopkins, Nicole Leung, Mitsuhiro Komba and Jan Dutz

Department of Dermatology and Skin Science, University of British Columbia, Vancouver, BC, Canada, V5Z 4H4

The skin contains resident immune cells that contribute to protection from infections. T cells residing in non-lymphoid tissues are termed tissue-resident memory T cells (Trm). $CD8^+$ Trm recruited to the skin upon infection retain in the epidermis and play an important role in immune memory. The integrin CD103 is necessary for the optimal formation of $CD8^+$ Trm. Epicutaneous CpG oligodeoxynucleotide (ODN) adjuvant administration improves immune responses to the subcutaneously injected model antigen ovalbumin (OVA). Here, we investigated how epicutaneous CpG ODN administration alters the formation of $CD8^+$ Trm. Flow cytometric analysis of cells isolated from the epidermis and the blood was performed. Both subcutaneous and epicutaneous CpG ODN administration with subcutaneous OVA led to the recruitment of antigen-specific $CD8^+$ cells to the skin. However, the percentage of antigen-specific cells within the $CD8^+$ population was significantly higher and sustained when CpG ODN was administered epicutaneously. Similar observation was found in the blood. Total epidermal $CD8^+$ cells gradually increased CD103 expression after immunization, but antigen-specific cells express even higher levels of CD103 than non-specific cells. Importantly, epicutaneously adjuvanted mice show enhanced survival when challenged intradermally with a melanoma expressing OVA at a site distal from the immunization site. This suggests that global immunity in the tissues can be achieved, and that epicutaneous CpG ODN administration have the potential to improve current formulations of subcutaneous vaccines.

Category: early experiments with well defined objectives/hypothesis

(1:32 PM)
SKIN CANCER IN CHRONIC LYMPHOCYTIC LEUKEMIA: A CLINIC-BASED POPULATION STUDY

Jessica Fudge[1], Mohammad Pannu, Sara Beiggi [3], James Johnston[4, 5], Marni Wiseman[5, 6]

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada. [2]Faculty of Medicine, University of Manitoba, Winnipeg, Canada. [3]Department of Health Science Research, Mayo Clinic, Rochester, United States of America. [4]Manitoba Institute of Cell Biology, CancerCare Manitoba, Winnipeg, Canada. [5]Department of Hematology and Medical Oncology, CancerCare Manitoba, Winnipeg, Canada. [6]Department of Dermatology, University of Manitoba, Winnipeg, Canada

Background: Chronic lymphocytic leukemia (CLL) is the second most common leukemia in adults and non-melanoma skin cancer comprises 40% second malignancies. The authors describe skin cancers in CLL patients in a dermatology-hematology clinic and identify trends in single vs. multiple skin cancers, pre- and post-CLL diagnosis. Methods: This is a retrospective cohort study of patients with CLL between 2002-2012. Basal cell carcinoma (BCC), squamous cell carcinoma (SCC), Merkel cell carcinoma (MCC), Bowen's disease (BD) and melanoma were investigated. Time between first (and subsequent) skin cancer diagnoses to CLL diagnosis was measured. Rai stage and prognostic CLL markers were recorded. Results: 594 patients were identified (median age 73, range 38 – 89). 133 patients had a total 368 skin cancers; 35% diagnosed pre-CLL, 65% post-CLL. BCCs (56%) were most common followed by SCCs (25%), BDs (13%), melanomas (5%) and MCCs (1%). Of patients with skin cancer, 53% had a single skin cancer diagnosis and 47% had >1. Rai stage at first skin cancer showed a bimodal incidence peak at stage I (18%) and IV (13%). Follow-up ranged from 0.01 – 11 years (median 4.63). Fifty-three percent of patients that received chemotherapy had more skin cancers compared to patients that did not, with the exception of MCC. Conclusions: A higher incidence of skin cancers were diagnosed post-CLL regardless of previous history. This demonstrates the importance for routine skin surveillance in CLL patients. Patients that received chemotherapy developed more skin cancers than those that did not. Correlation with CLL prognostic markers is currently being analyzed.

Category: Early experiments with well defined objectives/hypotheses

(1:44 PM)
A PROTOCOL FOR THE EARLY DETECTION AND MANAGEMENT OF CALCIPHYLAXIS: A JOINT NEPHROLOGY AND DERMATOLOGY INITIATIVE

[1]Marisa Ponzo, [2]Wynnie Lau, [2]Mercedeh Kiaii, [2]Myriam Farah, [3]Sheila Au

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, British Columbia, Canada. [2]Department of Medicine, Division of Nephrology, St Paul's Hospital, University of British Columbia, Vancouver, British Columbia, Canada. [3]Department of Dermatology and Skin Science, University of British Columbia, Vancouver BC and Division of Dermatology, Department of Medicine, St. Paul's Hospital, Vancouver, British Columbia,

Canada

Background: Calciphylaxis is a rare, fatal complication of end-stage renal disease (ESRD) characterized by calcification of subcutaneous arterioles, vascular thrombosis, skin necrosis and death within 3 months. The literature demonstrates that early intensive hemodialysis and sodium thiosulfate therapy can positively affect outcome. Our goal was to generate a joint Dermatology-Nephrology protocol to facilitate the early diagnosis and management of high-risk patients. Methods: We performed a single-institution retrospective chart review of 16 patients, from 2008 to 2014, treated with a multi-interventional strategy. Gathering the expertise from the Nephrology and Dermatology services, we developed a novel protocol for the early detection and management of calciphylaxis. Results: Most patients were middle-aged females of white ethnicity. The most prevalent risk factors for calciphylaxis were ESRD (94%), diabetes (75%), and obesity (44%). Metabolic derangements commonly associated with calciphylaxis were rarely present, such as hypercalcemia, hyperphosphatemia and hyperparathyroidism. All patients reported pain as their presenting symptom. Patient outcomes improved over time. Most patients diagnosed from 2011 to 2014 recovered from their calciphylaxis, with three patients surviving to renal transplantation. Our protocol includes early assessment for risk factors, regular inquiry into tender new skin nodules and palpation of all body panni. Once suspected, we advocate for urgent full-thickness skin biopsy to confirm the diagnosis and prompt institution of therapy which includes intensified hemodialysis, sodium thiosulfate and oxygen therapy. Conclusions: Calciphylaxis is a challenging condition at the interface of Nephrology and Dermatology. We have seen better outcomes with the initiation of aggressive measures targeting the pathophysiologic mechanisms contributing to disease.

Category: Early experiments with well defined objectives/hypotheses

(1:56 PM)
AUTOMATED HAIR MORPHOMETRICS USING A SMARTPHONE

Ali Majdzadeh[1], Thomas Chu[1,4], Leopoldo Santos[1,4], Mohammed AlJasser[1], Hengameh Mirzaalian Dastjerdi[2], Jerry Shapiro[1,4], Ghassan Hamarneh[2], Harvey Lui[1,4], Tim K. Lee[1,2,3,4]

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, BC Canada. [2]School of Computing Science, Simon Fraser University, Burnaby, BC Canada. [3]Cancer Control Research Program, BC Cancer Agency, Vancouver, BC Canada. [4]Vancouver Coastal Health Research Institute, Vancouver, BC Canada

Hair loss is a common dermatological problem for which progression and response to treatment are difficult to assess and monitor quantitatively. Manual hair counting facilitated by commercial USB-camera hair magnifiers (such as the “Folliscope”) can be employed as a reliable method to quantify hair, but this is typically time-consuming. Other optical devices exist that are capable of automatically counting hair and measuring hair caliber, but they are either too invasive, entail dyeing and/or trimming of the hair, or require too much time. We have developed a wireless and portable system which employs a smartphone (iPhone 4 with the “Canfield DermScope” dermatoscope lens adaptor) and custom algorithm to automatically count hair and measure hair caliber in an expeditious and operator-friendly manner. In this study, we determine the accuracy of the automated hair measurement algorithm through comparison with Folliscope-facilitated

measurement. The average hair density and caliber were determined at 15 cm above the glabella for 36 volunteers using the Folliscope. Dermatoscopy images were subsequently acquired from the same locations using the iPhone dermatoscope and wirelessly transmitted to a laptop where they were digitally processed and the densities and calibers of hair were automatically calculated. Our preliminary results indicate that, on average, our algorithm yields values for hair density and caliber that are within 10.4% and 13.3% greater than those acquired by the Folliscope, respectively. Our system has proven to be rapid and might be useful for clinical and research applications in hair density and caliber monitoring.

Category: Applied/functional experiments

(2:08PM)

A PILOT STUDY ON EFFICACY AND SAFETY OF VARIOUS CONCENTRATIONS OF INTRALESIONAL TRIAMCINOLONE ACETONIDE IN ALOPECIA AREATA

Thomas W. Chu MD[12], Mohammed AlJasser MD FRCPC[3], Kevin McElwee PhD[1], Jerry Shapiro MD FRCPC[12]

[1]Department of Dermatology and Skin Sciences, University of British Columbia, Vancouver, British Columbia, Canada. [2]Department of Dermatology, Far Eastern Memorial Hospital, New Taipei, Taiwan. [3]Division of Dermatology, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Saudi Arabia. [4]Department of Dermatology, New York University Langone Medical Center, New York, New York, USA

Background: Alopecia areata (AA) is characterized by nonscarring inflammatory hair loss. Intralesional (IL) injection of triamcinolone acetonide (TA) at concentrations of 2.5 to 10 mg/ml remains the preferred first-line therapy in adults with patchy hair loss or less than 50% scalp involvement. Objective: To compare efficacy in terms of hair density (HD) and hair caliber (HC), as well as side effect profile of 2.5, 5, and 10 mg/ml IL-TA for AA. Methods: For each subject (N=4), a 3 x 3 cm patch of AA was marked into quadrants. Each quadrant was randomly assigned one of 2.5, 5, or 10 mg/ml TA, or normal saline. Each quadrant received the same TA concentration for six IL injections at 6-week intervals. The patches were photographed, and HD and HC were measured from each quadrant. Results were normalized and analyzed for significance. Results: Significant increase of HD ($P < 0.025$) and HC ($P < 0.04$) was observed for all treatments compared to saline. However, the 5 and 10 mg/ml TA concentrations did not yield greater HD or HC compared to 2.5 mg/ml. Four of five reports of atrophy resulted from 10 mg/ml TA and one occurred at the 2.5 mg/ml concentration. Conclusion: IL-TA injection of 2.5 mg/ml or more is more effective than placebo. However, as response is not dose dependent, higher concentrations may not be of any advantage. Higher incidence of atrophy occurs at the highest TA concentration. We propose 2.5 mg/ml as the most appropriate concentration for the treatment of limited AA.

Category: Pilot/exploratory experiments (for study design, hypotheses creation, etc)