POSTER PRESENTATIONS

(Poster 1)
COSTS, OUTCOMES, AND WORK-RELATED FACTORS OF OCCUPATIONAL CONTACT DERMATITIS IN BRITISH COLUMBIA, CANADA (1990 - 2014)

Boluwaji Ogunyemi and Sunil Kalia

Department of Dermatology and Skin Science, University of British Columbia

Objectives: To describe trends in work-related factors, outcomes and economic impact of contact dermatitis among workers in British Columbia, Canada over a 25-year period.
Design: Retrospective analysis of accepted contact dermatitis worker's compensation claims from British Columbia (1990 - 2014).
Methods: Worker's Compensation Claims database was searched for cases of contact dermatitis. Accepted claims between 1990 to 2014, inclusively were analyzed. Demographics information ICD-9 diagnosis, occupational exposure, occupation, and monetary amount of claim were collected for each accepted claim. Total claim amount is broken down into amount awarded for disability, healthcare costs, and vocational rehabilitation.
Results: Of 4442 dermatology claims accepted, 3670 (82.6%) were for contact dermatitis. 49.2% of claimants were women, with a median age was 36.6 years. 3566 (97.2%) of claimants received short-term disability, 85 (2.3%) long-term disability, and 16 (0.4%) claimed healthcare costs without disability. Common industries include the service industry (1247 patients), health, medicine and nursing (504), fabricating and related careers (441), construction trades (325), and processing (261). With mean short-term disability of 24.51 days per claim, contact dermatitis resulted in 89, 878 working days of disability in British Columbia over the study period. With mean amount awarded of 7350.35 per claim, 27.0 million of the 30.6 million dollars awarded to dermatology claims over the study period were for occupational contact dermatitis.
Conclusions: Contact dermatitis is the most prevalent work-related dermatoses in BC. It is the major contributor to short term disability costs and days away from work among occupational dermatoses.

Category: Early experiments with well-defined objectives / hypotheses

---

(Poster 2)
MOLLUSCUM CONTAGIOSUM-LIKE PRESENTATIONS OF LANGERHANS CELL HISTIOCYTOSIS

Matthew Karpman, Mohammed Al Jasser, Joseph Lam

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

Langerhans cell histiocytosis (LCH) is a rare disorder characterized by clonal proliferation of Langerhans cells. The morphology of cutaneous lesions is highly variable and atypical

molluscum-like presentation of cutaneous LCH is rare. We present the features of this rare entity in an effort to increase awareness of this unusual presentation and review the literature on LCH presenting with molluscum-like lesions. All reported cases presented under two years of age with skin-only findings and scalp involvement. The average age of presentation in the LCH cases was 13 months and is younger than the age of presentation in children with MC. In contrast, MC usually presents in children between 5 and 10 years of age and rarely presents under 1 year of age due to protective maternal antibodies. Concurrent scalp and trunk involvement was observed in all LCH cases and neck, groin, and oral mucosa were reported in two cases. In MC, scalp involvement is relatively uncommon and intraoral involvement is rare having never been reported in prepubertal children. Notably, lymphadenopathy and hepatosplenomegaly were absent on reported presentations of molluscum-like LCH, but systemic involvement was subsequently found in half of the patients, highlighting the importance of recognition of this clinical presentation. LCH should be included in the differential diagnosis of MC especially in young children with scalp involvement, oral involvement, and in those under 1 year of age.

Category: Pilot/exploratory experiments

(Poster 3)
SYSTEMATIC REVIEW OF THE EFFICACY OF LASER AND LIGHT THERAPY FOR THE TREATMENT OF MELASMA

Lawrence Haiducu, Sunil Kalia

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

Background: Disorders of cutaneous hyperpigmentation are common and, because of their visibility, can cause significant psychosocial distress for affected patients, leading to low self-esteem and decreased productivity. As such, effective treatments are needed.
Objective: The aim of our study was to conduct a systematic review of the literature on the efficacy of laser and light therapies for melasma.
Methods: Original publications of randomized controlled clinical trials (RCTs) and controlled clinical trials were identified through searches in MEDLINE (Ovid) and the Cochrane Central Register of Controlled Trials (CENTRAL).
Results: We identified 23 relevant RCTs for melasma, which met our inclusion criteria, involving a total of 762 patients. In these studies, several laser and light therapies including Nd:YAG laser, Alexandrite laser, CO_2 laser, pulsed-dye laser, copper bromide laser and intense pulsed light were compared against each other and against many topical options for the treatment of melasma.
Conclusions: The use of combination CO_2 laser and Kligman's formula for melasma treatment was found to have superior efficacy and a good side effect profile in comparison to other laser modalities and topical options.

Category: Early experiments with well defined objectives/hypotheses

(Poster 4)

CORRECTIVE HYALURONIC ACID FILLERS AND NEUROTOXIN FOR FACIAL CUTANEOUS DEFECTS DUE TO AUTOIMMUNE CONNECTIVE TISSUE DISEASES: A CASE SERIES

Marisa G. Ponzo[1], Alastair Carruthers[1], Shannon Humphrey[1]

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada

Cutaneous defects resulting from autoimmune connective tissue disease (AI-CTD) can be stigmatizing and significantly impact quality of life, particularly when on the face. Autoimmune connective tissue diseases, such as scleroderma, morphea, and systemic lupus erythematosus can cause acquired facial lipoatrophy, post-inflammatory atrophic changes and sclerosis. Once disease activity has settled, patients are often left with skin atrophy and facial asymmetry. Corrective measures used for facial lipoatrophy include autologous fat transfer, skin flaps, bone grafts and synthetic inserts. Alternatively, soft tissue augmentation with injectable gel fillers such as hyaluronic acid (HA) offers a non-invasive method of correcting facial asymmetry. We describe a case series of four patients with facial hemiatrophy, lupus panniculitis, lupus erythematous, scleroderma, who achieved improvement in facial symmetry with primarily HA fillers. Using HA to correct cutaneous defects of AI-CTD allows for a cautious stage-by-stage correction. In our experience, it may provide a significant improvement in quality of life for patients stigmatized by these cutaneous defects.

Category: Early experiments with well defined objectives/hypotheses

---

(Poster 5)

SKIN CONFIDENT: AN INTERVENTION TO INCREASE KNOWLEDGE AND SELF-ESTEEM IN ADOLESCENTS WITH ACNE

Angela Burleigh, Shannon Humphrey

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

Acne has an estimated prevalence of 85% in Canadian youth. Acne can have significant adverse effects on quality of life with 47% of high school students reporting low self-esteem and embarrassment directly attributable to their acne. Misinformation regarding acne pathogenesis, treatment options, and skin care practices compound this problem. This study aims to develop an effective educational intervention that can be delivered to high school students. We hypothesize that a short duration presentation can improve acne related quality of life measures. We have developed a 45 minute standardized educational slide presentation targeting adolescents. The content was developed from our clinical experience, data obtained from a formal review of the literature, and our own pilot presentations. The presentation content is comprised of skin care basics, a primer on acne, evidence based recommendations for skin care, and treatment of acne.

The effect of our intervention will be measured by administering a pre-intervention survey and a 4-week post-intervention survey. The survey utilizes the Acne-QoL questionnaire, a 19-item questionnaire divided into 4 domains: self-perception, social roles, emotional roles, and acne symptoms. In addition to this, information on skin care practices and self-reported disease severity ratings will be collected and included in the final analysis. The results from this study will determine if a short-duration presentation can improve acne related quality of life. A positive impact will determine if this initiative can proceed with implementation as a nationwide educational program. We have obtained UBC REB approval and are currently awaiting local school board approval.

Category: Pilot/exploratory experiments

(Poster 6)
BULLOUS PEMPHIGOID – A TEN-YEAR STUDY OF DISCORDANT RESULTS ON DIRECT IMMUNOFLUORESCENCE

Jessica G. Fudge, MD[1], Richard I. Crawford, MD FRCPC[1,2]

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

Background: Bullous pemphigoid (BP) is the most common subepidermal autoimmune disorder characterized by tense bullae. It is associated with circulating autoantibodies against BP antigen-1 and BP antigen-2. Diagnosis is based upon clinical, histopathologic and immunopathologic examination. Direct immunofluorescence (DIF) of perilesional skin highlights IgG and/or C3 in a linear pattern along the basement membrane.
Objectives: We hypothesize that repeat perilesional biopsies may be required for a definitive DIF diagnosis of BP, as initial DIF evaluation may represent a false-negative result.
Methods: A retrospective chart review was conducted on 1,143 specimens collected for evaluation for BP. Cases from two Vancouver Coastal Health Authority laboratories from 2006 to 2016 were reviewed. Results were interpreted as positive, negative, or indeterminate based on pathologic description and specimen quality.
Results: After meeting the inclusion criteria, 739 specimens were further evaluated. There were 290 cases of BP in the 10-year period. Eighteen patients had repeat biopsies. Of the 290 BP cases, 10 patients had an eventual positive diagnosis. Five DIF samples were lesional, therefore excluding these cases, 1.72% (CI: 1.49% to 1.95%) obtained a positive DIF on repeat biopsy
Conclusions: Although clinicians are likely to capture a true-positive DIF biopsy result, a small percentage may only become positive with repeat sampling. False-negative or indeterminate results may be due to specimen sampling from lesional skin or due to a subthreshold quantity of immune complexes in the skin. Repeat biopsy is warranted if BP is clinically suspected despite an initial negative DIF.

(Poster 7)
PRIVACY, CONFIDENTIALITY, AND REALITY

Neil Kitson[1] and John Pawlovich[2]

[1]UBC Dept. of Dermatology and Skin Science, Vancouver, Canada
[2]UBC Dept. of Family Practice, Prince George, Canada

We have established a pilot project for remote dermatology service using cell phones for voice, text and images. The goal is to establish access to service where in practice there is none. There is understandable concern about privacy breaches using such methods, and we use various means to reduce risk.

In this context we sought information about actual breaches of privacy in BC in which cell phones were involved. Preliminary data from Vancouver Coastal shows that of 203 investigations for potential breach of privacy conducted since 2011, 12 were found to have been actual breaches. Eleven of these were from loss of hardware or handsets. One was due to a dialling error and subsequent transmission to an incorrect number of an X-ray image with patient identifiers easily readable.

More breaches might occur than are reported. We are awaiting data from other health authorities. If these data are similar, then most breaches of privacy with cell phones might be due to physical loss together with lack of appropriate encryption, password protection, or regular and frequent deletion of images and clinical texts.

Given the common use of text messaging for clinical practice, privacy protection might better be achieved with appropriate education (as for hand washing) and provision of a secure clinical network (as we are doing in our pilot project), than by prohibition.

Category: pilot project

(Poster 8)
ANALYSIS OF GENERAL POPULATION INTEREST AND SEASONAL AND GEOGRAPHIC TRENDS IN SKIN CANCERS

Bez Toosi[1], Sunil Kalia[1]

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

Background: The incidence of skin cancer remains high and continues to rise. This study explores seasonal and geographic trends in general public's interest in melanoma and non-melanoma skin cancers. It utilizes internet search query data to test the hypothesis that skin cancer awareness varies by season and is on the rise in recent years.
Objective: To determine the seasonal and geographic effects on interest in skin cancers.
Methods: Internet search query data were obtained. Monthly normalized search volumes (NSV's) were determined for terms: melanoma, basal cell cancer, basal cell carcinoma, squamous cell carcinoma, squamous cell cancer, from January 2004 to 2015 for Canada, United

States and Australia. Using cosinor analysis, seasonal and geographic effects were tested for data from Canada and United States. Volume searches were used to analyze the trends in popularity of search terms.

Results: Time series revealed peaks in Normalized Search Volumes (NSV) in summer months and troughs in fall months for United States, Canada and Australia. Cosinar analysis revealed statistically significant seasonal effects for all terms. Over the last year, there was a 20% increase in average monthly searches for all non-melanoma skin cancer terms.

Conclusion: Internet search queries revealed search queries to be highest for basal cell carcinoma and squamous cell carcinoma demonstrating strongest interest by the general public. Interest in skin cancers was found to be seasonal and highest in summer months. Further studies are needed to confirm these findings.

Early experiments with well defined objectives/hypotheses

(Poster 9)

DEVELOPMENT OF A MOBILE DERMATOLOGY APP: AN INTERACTIVE APPROACH TO LEARNING

Ardalan Akbari[1], Ali Majdzadeh[1]

[1]Faculty of Medicine, University of British Columbia, Vancouver, Canada

In medical undergraduate and postgraduate training across North America, there is a trend toward implementing mobile health apps as a teaching tool for medical students and residents. There is a growing body of research supporting the use of mobile apps among medical students to search about diagnostic and management options. A subset of these mobile apps are interactive, and users can input information or values to receive an output. Although there are many dermatology-related mobile apps available, only a small proportion are interactive and aid in diagnosing conditions. Our project development team consists of UBC medical students aiming to develop an interactive mobile app targeted to medical students, especially third and fourth year students undergoing clerkship training. In order to be more accessible to learners, our mobile app will be compatible with Android and iOS devices. Our project development is organized into two stages – content development and app coding. Content development comprises of organizing each cutaneous condition into the following subcategories: risk factors and epidemiology, common presentation, diagnosis/investigations, differential diagnoses, prevention/management, and red flags (pertinent information that should not be missed). App coding is the second stage and involves categorizing conditions based on clinical presentations. There is currently a prototype for the app platform, and students using the app will be able to include descriptors of lesions such as color, shape, and distribution pattern. This student-driven app can potentially be used in clinics and schools to aid students in classifying and describing skin lesions as well as generating differential diagnoses.

Category: Pilot/exploratory experiments

(Poster 10)
SUBCUTANEOUS IMMUNOTHERAPY FOR ATOPIC DERMATITIS - A REVIEW

Jessica Dunkley[1], Donald Stark[2]

[1] Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada
[2] Division of Allergy and Immunology, University of British Columbia, Vancouver, Canada

Background: Immunotherapy is an effective treatment option for allergic conditions including allergic rhinoconjunctivitis, allergic asthma and stinging insects. It involves administration of gradual increasing quantities of the allergen subcutaneously until an effective dose is achieved, inducing immunologic tolerance. Atopic dermatitis is commonly known as a multifactorial disease with onset in infancy or early childhood. The mainstay of treatment include emollients, topical corticosteroids and calcineurin inhibitors with systemic treatment for severe cases. The use of immunotherapy in atopic dermatitis has been studied in small observational trials in the past. **Objective**: A literature review was conducted to review the efficacy of subcutaneous immunotherapy in treatment of atopic dermatitis. **Methods**: In December 2016, a search of online journal databases; Medline (Ovid), PubMed, bibliography search, Google Scholar, clinicaltrials.gov and Cochrane Review was performed. MeSH terms included: immunotherapy, atopic dermatitis, eczema and dermatitis. Only English articles were selected. Outcome measures included a variety of measurement tools. **Results/Discussion**: 140 articles were identified and 20 were selected for review. Of the 20 selected, five were review articles. Results suggest immunotherapy may benefit patients with atopic dermatitis. However, considerable heterogeneity was identified between studies. The quality of the studies were low with small sample sizes, variability in treatment duration, follow-up and use of measurement tools. A well designed trial and methodology would need to be conducted to assess the efficacy of immunotherapy for atopic dermatitis.

Category: Pilot/exploratory experiments

(Poster 11)
POTENTIAL DRUG INTERACTIONS THAT DERMATOLOGISTS SHOULD BE AWARE OF IN SOLID ORGAN TRANSPLANT RECIPIENTS

Allison Gregory[1] MD MSc, Marianna Leung[2] PharmD BCPS BCPP CDE FCSHP, and Sheila Au[1,2] MD FRCPC

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

Introduction: Immunosuppressive medications have improved the lives of many by enabling solid organ transplantation (SOT). However, adverse events due to drug interactions remain a significant complication. As the SOT recipient (SOTR) population grows, dermatologists should

be aware of these interactions. This study reviewed the possible drug interactions between common dermatologic medications and immunosuppressive agents.

Methods: An unrestricted literature search of the MEDLINE database was performed using various combinations of key terms. Articles were reviewed for relevance by a dermatology resident and clinical pharmacist before the findings were synthesized.

Recent Findings: Inflammatory dermatoses are common in SOTRs. Tetracyclines are a relatively safe treatment option; however, caution should be exercised in renal transplant patients due to possible tetracycline-associated azotemia. Cutaneous infections are also common. In terms of anti-fungal therapies, azoles have a significant interaction with calcineurin inhibitors (CNI) and sirolimus that affect dosing while terbinafine can be used safely. Antiviral medications are prone to multiple pharmacodynamic interactions that can result in nephrotoxicity, neurotoxicity and neutropenia. Retinoids used in chemoprevention of cutaneous malignancies are relatively safe in transplant patients; however, dermatologists must be aware of a reported interaction between acitretin and sirolimus. While sedating antihistamines used to treat pruritus and urticaria have no reported interactions, a theoretical pharmacokinetic interaction between CNIs and high-dose non-sedating antihistamines should limit its use.

Conclusion: There are many systemic dermatologic treatments that can be used safely in SOTRs. However, modifications to treatment selection as well as appropriate patient monitoring should be used to minimize complications of drug-drug interactions.

Category: Pilot/exploratory experiments

(Poster 12)

AUTOMATED ANALYSIS OF MORPHOLOGY AND ARCHITECTURAL PATTERNS OF LESIONAL VASCULAR STRUCTURES: A DERMOSCOPIC DIAGNOSTIC CLUE

Pegah Kharazmi[1,2,3], Sunil Kalia[2], Harvey Lui[2,3], Z. Jane Wang[1], Tim K. Lee[1,2,3]

[1]Biomedical Engineering Program, University of British Columbia, Vancouver, Canada
[2]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada
[3]Departments of Cancer Control Research and Integrative Oncology, BC Cancer Agency, Vancouver, Canada

Background: The morphological patterns of vascular structures in skin lesions have high diagnostic significance especially in non-melanocytic lesions. Different morphologies are associated with different skin conditions, some with a high specificity for certain disorders. Therefore, recognition of distinctive vascular structures provides critical information leading to more accurate diagnosis. **Objective:** We aim to develop an automated framework for categorizing dermoscopic blood vessels based on their morphology and clinical appearance into four classes of dotted, arborizing, linear and polymorphous. **Methods:** Our proposed method is composed of two parts. Firstly we introduce a systematic approach for segmenting lesional vessels. Next, based on the preselected and validated vessels, we define and extract a set of geometrical, structural and spatial features according to the vessels' width, length, density, symmetry, degree of branching, distribution and orientation. The extracted feature set is then fed

into a classification scheme to classify the vascular morphology of the lesion into one of the categories of dotted, arborizing, linear and polymorphous. **Results:** The method is implemented on a set of 200 labeled dermoscopy images from different resources. A weighted average sensitivity of 89% and specificity of 80% are achieved in a five-fold cross-validation. **Conclusion/Limitation:** The machine-based learning method can recognize four common vessel morphology and architectural patterns. As more data becomes available, we plan to extend the technique to include more vessel types. The presented technique could potentially contribute to the quality of care as a clinical decision support system and serve as an educational tool.

Category: Early experiments with well-defined objectives/hypotheses

---

(Poster 13)
PSORIASIS FOLLOWING PD-1 INHIBITOR THERAPY: FEATURES AND TREATMENT

Pamela O'Connor[1] and Jan Dutz[1,2]

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

Background: Patients with stage IV melanoma have a one-year survival rate less than 25%. Advances in therapies that harness anti-tumor immunity by inhibiting immune checkpoints such as programmed cell death 1 (PD-1) have revolutionized the treatment of metastatic melanoma. The cutaneous toxicities of these drugs can cause substantial morbidity resulting in cessation of treatment. The safest and most effective treatments for the cutaneous side effects of immune checkpoint inhibitors are not known. **Aim:** To review clinician experience and published data on the features and management of psoriasis in patients on PD-1 inhibitor therapy. **Methods:** Case review and structured literature review. **Outcomes:** We present two cases of palmoplantar and small plaque psoriasis occurring during treatment with the PD-1 inhibitor pembrolizumab for metastatic melanoma. In one case the patient responded to pembrolizumab but failed topical treatment of psoriasis resulting in temporary discontinuation of the immunotherapy. Successful treatment with methotrexate allowed reintroduction of pembrolizumab. The patient subsequently had progression of her metastatic disease. Review of published literature revealed that PD-1 inhibitor related psoriasis can present with multiple morphologies with an increased frequency of palmoplantar pustulosis and small plaque types. In patients with preexisting plaque type psoriasis a transition to small plaque morphology after PD-1 inhibition is common. The most frequently reported treatments are topical corticosteroids and acitretin, with varied outcomes. Systemic immunosuppressants including methotrexate and TNFα inhibitors have been used to treat other PD-1 inhibitor toxicities (colitis, arthritis); we propose these treatments may be an option for PD-1 inhibitor-induced psoriasis.

Category: Early experiments with well-defined objectives/hypotheses

(Poster 14)

PLASMA MATRIX METALLOPROTEASE EXPRESSION IN ALOPECIA AREATA AND ANDROGENETIC ALOPECIA PATIENTS

Hiromi Endo, Gigi Leung, Eddy Wang, Kevin McElwee

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

Matrix metalloproteases (MMPs) are capable of degrading extracellular matrix proteins in skin and hair follicles. They are also known to regulate remodeling processes in cardiovascular disease. Several studies indicate that cardiovascular disease and arterial stiffness is more prevalent in young males with androgenetic alopecia (AGA). Limited research also suggests a potential association of alopecia areata (AA) with heart disease. In this study, we investigated the presence of MMPs in the plasma of 79 AA patients and 66 AGA patients compared to 36 people with no hair loss (NHL). We used a fluorescent collagen break-down assay to quantify the net functional activity of plasma MMPs and inhibitors. Interestingly, the plasma levels of active MMPs in AA patients' plasma were significantly lower on average than both NHL and AGA patients. AGA patients showed slightly lower levels of active MMPs on average compared to NHL subjects. Within the AGA group, there was a tendency towards higher MMP activity in less severe, shorter duration and younger age patients. When focusing on patients with AGA aged under 40 with Norwood-Hamilton type-I hair loss, compared to the NHL group aged under 40, the plasma levels of active MMPs on average were statistically significantly higher than NHL subjects. The low level of MMP activity in AA patient plasma may be consistent with a lack of MMP secretion by dormant or non-functional, disease affected follicles. The highest levels of MMP activity in type-I AGA patients under 40 could be consistent with increased risk for subclinical heart tissue remodeling.

Category: Early experiments with well-defined objectives/hypotheses

---

(Poster 15)

NOVEL STANDING CONE FLAP IN FACIAL RECONSTRUCTION: A CASE SERIES

Julie Jefferson, Iren Kossintseva

Division of Micrographic Surgery and Cutaneous Oncology, Department of Dermatology, University of British Columbia, Vancouver, Canada

During non-graft reconstruction of Mohs surgical defects (with flaps or linear closures) standing cones of redundant tissue typically arise. These standing cones are resected and either discarded or sometimes used as a Burrow's full thickness skin graft during closure. We present a series of cases detailing a novel flap technique whereby a standing cone is only partially resected and then rotated to repair a primary defect. This technique can uniquely cover surprisingly sizeable defects in cosmetically challenging locations. As such, it offers a simplified approach to an otherwise large or even multi-stage flap repair. By minimizing the amount of mobilized tissue

needed to close the primary defect, the standing cone flap can reduce the amount of post-operative pain and scarring, as well as minimize the risk of bleeding and free margin distortion.

Category: Pilot/exploratory experiments

(Poster 16)

INCREASED EXPRESSION OF STRESS HORMONE CRH RECEPTOR ON CIRCULATING MONOCYTES OF ALOPECIA AREATA PATIENTS

Hongwei Guo[1], Lixin Xu[2], Eddy Hsi Chun Wang[1], Kevin McElwee[1]

1. Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada
2. Flow Core Facility, Children and Family Research Institute, Vancouver, Canada

Stress is believed to play a key role in alopecia areata (AA). Corticotropin-releasing hormone (CRH), the proximal regulator of the stress axis, has been recognized as an immunomodulatory factor in peripheral tissues and human peripheral blood mononuclear cells (PBMCs). We used multicolor flow cytometry to identify receptor CRHR1 expression on PBMC subsets in AA patients (n=54) and controls (n=65). Then we performed *in vitro* CRH treatment on PBMCs to assess the response of the cells. CRHR1 expression on monocytes was enhanced in AA compared with controls (3.17% versus 1.44%, $p=0.001$). High CRHR1 expression was significantly related to chronic AA (disease duration >1year; $p=0.001$, $\chi2$ test), and large lesion area (AA >25%; $p=0.0275$, $\chi2$ test). High CRHR1 expression was correlated to a low CD3/CD14 ratio (R=-0.97, $p=0.011$) and markedly independently correlated with AA incidence (R=0.282, $p=0.022$). *In vitro* CRH treatment of control PBMCs slightly promoted innate immune response related gene upregulation, but downregulated pathological inflammatory response genes. PBMCs from AA patients were largely insensitive to CRH treatment. However CRH significantly increased Lymphotoxin beta (LTB) gene expression in PBMCs of AA whereas there was no change in control PBMCs. Notably, Toll like receptor-3 (TLR3) gene expression was decreased in AA PBMCs, but increased in control PBMCs. Our data suggest that in CRH sensitive subjects, CRH could play a role in immune protection by upregulating the innate immune response and palliating pathological inflammatory responses; but in CRH insensitive AA subjects, CRH may influence autoimmunity by promoting monocyte migration and LTB production.

Category: Early experiments with well-defined objectives/hypotheses

(Poster 17)
TELEDERMATOLOGY FOR RURAL AND REMOTE BRITISH COLUMBIA

Michael Copley[1], Danny Guo[1], Nam Phan[2], Kendall Ho[3], John Pawlovich[2] and Neil Kitson[1]

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada
[2]Department of Family Medicine, University of British Columbia, Vancouver, Canada
[3]Department of Emergency Medicine, University of British Columbia, Vancouver, Canada

In British Columbia, access to specialist dermatology care is extremely limited, particularly in rural and remote areas. Teledermatology, as defined as the delivery of dermatology care at distance through telecommunication technologies, may offer a solution. Until several years ago, real-time videoconferencing was the major modality available for teledermatology. More recently, however, another method called store-and-forward (e.g. BC Consult Derm) has been gaining in popularity. When such methods are not available, alternate methods are undoubtedly being accessed including text-messaging, telephone, e-mail and unsecured video conferencing; however, the patterns of practice in this regard remain largely unknown. The aim of our study is therefore to better understand the access patterns, experiences and satisfaction with teledermatology services from the point-of-view of physicians practicing in rural and remote areas of BC. To accomplish this aim we plan to distribute a 14 question survey to primary care physicians and specialists working in rural areas, as defined those areas included in the Rural Practice Subsidiary Agreement (RSA). This survey will be distributed in electronic format through UBC's FluidSurveys and will pertain to a related study on clinical texting practices, but will also contain questions about basic demographics (age, years in practice), access to traditional dermatology consultation services, experience(s) with teldermatology services and satisfaction such experiences. By better understanding the needs and experiences of physicians working in underserved areas of the province, future initiatives and technologies aimed at improving access to specialist dermatology care can be optimally designed to meet these needs.

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

(Poster 18)
CD200 AND ITS RECEPTOR MAY PLAY A ROLE IN BASAL CELL CARCINOMA IMMUNE PROTECTION

Wendi (Victor) Gao[1], Lisa Xu[2], Gigi Leung[1], Hiromi Endo[1], David Zloty[1], Kevin McElwee[1]

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

Basal Cell Carcinomas (BCCs) are abnormal, uncontrolled growths that arise from the skin's basal cells, which lay in the deepest layer of the epidermis and in the hair follicle bulge. BCC is the most frequently occurring form of all cancers, with more than 4 million new cases diagnosed

in the USA every year. Inflammation inducing drugs, such as imiquimod, can be used to treat BCCs. This suggests the epithelial growths may exhibit functional immune privilege protection similar to other more aggressive forms of cancer. However, little is known about the nature of immune privilege signaling in BCCs. Here, we investigated expression patterns of immune privilege related genes and proteins in BCCs and comparative controls using quantitative real time PCR, western blotting, and flow cytometry. Results indicated upregulation of multiple genes with most consistent expression of CD200 and CD200R. By flow cytometry, CD200 was expressed by BCC cells and normal epithelial cells, while CD200R was primarily identified on CD45+ immune cells. Notably, fewer CD45+ cells were found in BCC tissues as compared to peripheral control tissue from the same patient. This study is ongoing. As CD200 is reported to work by suppressing the activity of CD8 cells, an *in vitro* co-culture experiment of CD200+ BCC cells mixed with peripheral blood mononuclear cells (PBMCs) will be designed to find out whether the CD200 and CD200R interaction plays a role in the functional BCC immune protection response. By understanding immune privilege in BCCs, new or improved inflammation promoting drug treatments may be developed.

Category: Early experiments with well-defined objectives/hypotheses

---

(Poster 19)
SUM-12 AS A PRO-METASTATIC FACTOR IN MELANOMA

Xue Zhang[1], Mingwan Su[1,2], Yabin Cheng[1], Laura Graziano[1], Gang Wang[3], Yu Lei[1], Magdalena Martinka[3], Youwen Zhou[1,2].

[1]Molecular Medicine Lab, Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada.
[2]Vancouver Coastal Health Research Institute, Vancouver, Canada.
[3]Department of Pathology and Laboratory Medicine, University of British Columbia, Vancouver, Canada.

Melanoma is a malignancy originating from melanocytes; if detected early, melanoma has a high 5-year survival rate of between 90 and 99%, but this rate drops dramatically to approximately 16% once it has begun to metastasize. On the one hand, using high-throughput methods screening for expression changes in melanoma tissues, we have identified SUM-12 (coded name) as one of the most significantly up-regulated genes in melanoma biopsies compared with normal nevi and skin tissues. On the other hand, other members from SUM-12 protein family have been found to facilitate tumour metastasis through microenvironment restructuring and extracellular matrix remodeling. Both indicate that SUM-12 may play an important role in melanoma. The objectives of my research are to investigate SUM-12 expression profile, clinical significance, and bio-functions in melanoma. It is hypothesized that SUM-12 expression is up-regulated in melanoma and is correlated with more vigorous tumour initiation and metastasis. To test the hypothesis, we have performed real-time PCR and Western blot, which detected a significantly higher expression of SUM-12 both on mRNA and protein level. In addition, functional studies on melanoma cell lines have identified that SUM-12 could promote proliferation, migration and invasion *in vitro*. Moreover, a tissue microarray with 713 biopsies

will be conducted to assess the correlation between SUM-12 expression levels and patient outcomes. This study will unravel SUM-12 expression patterns and functional effects in melanoma progression. With confirmed functional impacts on melanoma cell lines, this protein will be potentially a useful prognostic biomarker and a therapeutic target for melanoma therapies.

Category: Early experiments with well defined objectives/hypotheses

---

(Poster 20)

THE PREVALENCE OF ANXIETY AND DEPRESSION IN PATIENTS WITH HYPERHIDROSIS

Lingling Li[1], Youwen Zhou[2]

1 Department of Dermatology, Dongzhimen Hospital affiliated to Beijing University of Chinese Medicine.
2 Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada.

We examined 4540 consecutive dermatology outpatients from Vancouver, British Columbia, Canada, and Shanghai, China, using Patient Health Questionnaire-9 and Generalized Anxiety Disorder-7scales for anxiety and depression assessments. Multivariable logistic regression analysis showed a significant association between hyperhidrosis (HH) and the prevalence of anxiety and depression in a HH severity- dependent manner. Both anxiety and depression are much more common in patients with HH compares with patients without HH, and that positive associated with all HH subtypes, especially generalized or facial HH. Assessment and management of anxiety and depression should be an essential component in the management of patients with HH. Base on this research, further studies are needed to investigate if HH and depression or anxiety share the same pathogenic pathway. Night sweating is one of HH subtype which is characterized by sweating only during the night, the prevalence and pathogen have seldom reported yet, however, we initially discovered night sweating patients may also have palmar or plantar hyperhidrosis (PPH) in early-onset or anxiety and depression, in next step we should focus on analysis the relationship between HH and night sweating, and the prevalence of anxiety and depression in night sweating.

Category: Early experiments with well defined objectives/hypotheses

---

(Poster 21)

A FUNCTIONAL STUDY OF THE TRANSCRIPTION FACTOR SUM-6 (SPECIFICALLY UPREGULATED IN MELANOMA GENE 6) IN METASTATIC MELANOMA

Laura Graziano[1], Youwen Zhou[1]

[1]Department of Dermatology and Skin Science, University of British Columbia, Vancouver, Canada. [2]Vancouver Coastal Health Research Institute, Vancouver, Canada.

SUM-6 is a human homeobox gene that encodes for a transcription factor protein, which plays a key role in normal embryogenesis. Our interests first turned to this gene when a DNA microarray found it to be upregulated in metastatic melanoma samples in comparison to normal skin and normal nevi. Overexpression of both the gene and nuclear protein has been shown to occur in a variety of cancers such as breast, colorectal, and pancreatic, and has been demonstrated to promote tumorigenesis. We first measured its mRNA expression in melanoma cell lines and patient samples via qPCR. It was found that SUM-6 expression was higher in metastatic melanoma samples and cell lines than in normal nevi, normal skin and immortalized melanocytes. The purpose of the current study was to evaluate the function of SUM-6 in metastatic melanoma cells *in vitro*. Stable knockdown of SUM-6 was achieved via transfection of plasmid shRNA into malignant melanoma cell lines (A375 and RPMI-7951). Functional studies were then performed on these cells which included a viability assay, BrdU assay, Western Blot of apoptosis proteins, migration assay, invasion assay, and colony formation assay. All results demonstrated that SUM-6 allowed for enhanced proliferation and metastatic abilities (properties which were diminished in SUM-6 knockdown cells). These findings suggest that SUM-6 may play a significant role in the progression and metastasis of melanoma. Therefore SUM-6 has the potential to become a drug target pending further experiments. *In vivo* mouse model studies have been planned and will be executed in the near future.

Category: Applied/functional experiments

(Poster 22)
ACELLULAR DERMAL MATRIX MODULATES PHENOTYPE OF ADIPOSE-DERIVED STEM CELLS AS A TREATMENT FOR CHRONIC WOUNDS

Victoria McCann, Ali Farrokhi, Jasmine ZiJin Cheng, Aziz Ghahary, and Reza Jalili

Professional Firefighters' Burn & Wound Healing Research Group, Division of Plastic Surgery, Department of Surgery, International Collaboration on Repair Discoveries (ICORD), University of British Columbia

Acellular dermal matrix (ADM) is a promising biomaterial for coverage of chronic wounds. Further recellularization of ADM with adipose-derived stem cells (ASCs) significantly increases the healing capacity of this biomaterial based wound coverage. The aim of our study was to develop an ASC-populated ADM and assess its characteristics in vitro with the ultimate goal of promotion of wound healing. In this study, we introduced a novel method of de-cellularizing mouse skin and used this as an ADM scaffold to seed with human ASCs. We compared this 3D model to 2D ASC cultured at different time points. Combinations of positive (CD146, CD44, CD90, and CD73) and negative (CD31, CD34, CD45) markers were used as stem cell markers. Morphology and myofibroblast differentiation capacity of ASCs were also evaluated. Our results showed a significant reduction in expression of CD73 and CD44 in ASCs cultured on the 3D ADM compared to cells grown in 2D culture. We found that ASCs cultured under regular 2D

conditions mainly shifted towards a myofibroblastic phenotype with increased myofibroblast marker α-smooth muscle actin (α-SMA), and ECM protein type I collagen. In contrast, ASCs cultured on ADM showed a more balanced differentiation pattern with maintenance of some stem cell markers such as CD146. Taken together, these findings show that ASC differentiation into myofibroblasts can be regulated by the 3D ADM. This ASC-ADM combination has good potential as a therapeutic approach to reduce fibrosis while maintaining the benefit of natural extracellular matrix wound coverage and the healing capacity of stem cells.

Study Category: 2) Early Experiments with well-defined objectives/hypothesis.

(Poster 23)
PERI-PROCEDURAL ANXIOLYTIC AGENTS IN DERMATOLOGIC SURGERY: QUANTITATIVE EXPERIENCE AND SYSTEMATIC LITERATURE REVIEW OF THE EFFECTIVE DIFFERENCES

Danny Guo[1] and Irèn Kossintseva[1]

[1]Department of Dermatology and Skin Science, University of British Columbia

Background: Procedural dermatology, including Mohs micrographic surgery (MMS), hair transplantation (HT), and cosmetic surgery can induce significant patient anxiety. While pre-procedural anxiolysis has been documented in other fields, there is only one study published for its usage in procedural dermatology and MMS. Herein, we perform a systematic literature review and discuss our center's experience with pre-procedural anxiolytics (PPA) in MMS and HT.
Methods: A systematic review of PPA medications and modalities in clinical trials over the last 10 years was conducted using PubMed. These results were compared to University of British Columbia's Dermatologic Surgery Centre's documented experience with benzodiazepines in the last 2 years.
Results: Our literature search identified 21 studies on PPA using: lorazepam, alprazolam, midazolam, gabapentin, pregabalin, propranolol, parecoxib, melatonin, and zopiclone. Anxiety scores were measured with Visual Analog Scale, Numeric Rating Scale, or State-Trait Anxiety Inventory. Our centre's experience shows that peri-operative benzodiazepines are received by 12.1% of MMS patients (lorazepam 0.5-3mg SL) and 100% of HT patients (diazepam 5-40mg PO ± lorazepam 1-3mg SL). PPA reduced anxiety by an average of 52.2% versus 16.0% in control groups.
Conclusions: PPA medications can produce significant relief for patients undergoing both outpatient and inpatient procedures. Little has been published on the use of anxiolytics in MMS or HT. Thus, we summarize the available data from a variety of interventional and surgical fields, compare and quantitate the effectiveness of the various agents, and together with our own experience, propose a need to create guidelines for pre-procedural anxiolysis.

Category: Pilot/exploratory experiments

(Poster 24)

A PROSPECTIVE COHORT STUDY OF PATIENTS WITH CUTANEOUS DERMATOMYOSITIS

Ayida Al Khalili[1] Jan P Dutz[1]

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

Background: Dermatomyositis (DM) is an autoimmune disease that affects mainly skin and muscle. Skin disease can vary from mild to severe. The pathogenesis of DM involves activation of the adaptive and innate immune system, in particular interferon alpha/beta. A type I interferon gene signature is a potential biomarker for disease activity in DM. In addition, serum levels of interferon beta correlate with both interferon gene signature and disease activity. Treatment of cutaneous disease refractory to conventional therapy is a challenge. IVIG has been used in such cases with good response, but is costly. More recently, tofacitinib, an oral JAK 1-3 inhibitor, has been used with promising response. A better understanding of dose response and outcomes with these therapies is needed. *Aim:* The aim of the study is to assess clinical response following therapy with IVIG or tofacitinib in refractory cutaneous DM by measuring interferon alpha/beta gene signature and serum interferon beta level. *Methods:* A prospective cohort study of patients with cutaneous DM who are treated with IVIG or tofacitinib. Patients will be seen at 3-month intervals and formally assessed with a cutaneous activity score (CDASI), a health questionnaire (DLQI) and biomarkers including interferon gene signature, serum interferon beta levels, and CXCL10. A preliminary cohort of 5 patients will be followed for 6 months. *Anticipated outcome:* Serial clinical and biomarker measurements will be followed. Analysis will determine if these markers can be used in future studies of efficacy of therapy with IVIG or tofacitinib.

Category: Pilot/exploratory experiments.

(Poster 25)

ANTIMICROBIAL ACTIVITY OF SILVER NANOPARTICLES DELIVERED BY POLYASPARTIC ACID NANOFIBER MATERIAL AND ITS EFFECTS ON CELL VIABILITY OF HUMAN ADIPOSE STEM CELLS

Mary Fossey[1], Frank Ko[2], Lynn Wan[2], Aziz Ghahary[1], and Reza Jalili[1].

[1]Burn and Wound Healing Research Group, Division of Plastic Surgery, Department of Surgery, International Collaboration on Repair Discoveries (ICORD), University of British Columbia, Vancouver, Canada
[2]Department of Materials Engineering, Faculty of Applied Science, University of British Columbia, Vancouver, Canada

For efficient chronic wound healing, a high-water absorbency biomaterial, antimicrobial activity and human adipose stem cells (hASCs) have been known to help facilitate and accelerate the

intricate process. This study focuses on polyaspartic acid nanofiber material (NFM), which was loaded with silver nanoparticles (AgNp) for its strong bactericidal effects**.** The aim of this pilot study is to optimally increase the antimicrobial activity of biomaterials by finding an adequate concentration of AgNp that could prevent contamination while maintaining low cytotoxicity effects on host cells. The ultimate goal is to test this material directly on a skin substitute. The antimicrobial activity and cytotoxicity of the NFM was tested with three different concentrations of silver 0.5%, 1.0% and 1.5% on *Escherichia coli* and on hASCs. Bacterial contamination was quantified by measuring absorbency using spectrophotometry. While the cell viability of hASCs were monitored with MTT assays and live-dead staining. All concentrations of AgNp-NFM resulted in a significant decrease in bacterial contamination with no significant difference between concentrations. The cell viability tests showed that 0.5% AgNp-NFM seem to be the best treatments in terms of cell viability as 1.0% and 1.5% AgNp-NFM resulted in decreased cell viability. In terms of morphology, as the concentration of silver increased, more hASCs were seen to lose a healthy morphology and succumb to its cytotoxicity. Overall, the treatment with the best outcome was seen to be the concentration of 0.5% silver as it successfully inhibited bacterial infection without significantly harming the hASCs.

(Poster 26)

DISTINCTION BETWEEN BULLOUS PEMPHIGOID AND EPIDERMOLYSIS BULLOSA ACQUISITA WITHOUT THE USE OF DIRECT IMMUNOFLUORESCENCE

Kerry Gardner[1] and Richard I. Crawford[1,2].

Departments of [1]Dermatology and Skin Science and [2]Pathology and Laboratory Medicine, University of British Columbia, Vancouver, Canada.

Introduction: It has been postulated that periodic acid-Schiff (PAS) staining of basement membrane (BM) can predict direct immunofluorescence (DIF) patterns seen in epidermolysis bullosa acquisita (EBA) and bullous pemphigoid (BP). It has also been suggested that the type of inflammatory infiltrate or presence of fraying of basal keratinocytes may differentiate these two conditions. In this study, we aimed to confirm these observations. **Methods**: We reviewed 13 cases of DIF-confirmed EBA, and 19 cases of DIF-confirmed BP, all with a subepidermal blister in the routinely processed specimen. The gold standard for diagnosis of EBA versus BP was taken to be identification of immune deposits on the dermal side ("floor" for EBA) or the epidermal side ("roof" for BP) of the salt-split DIF specimen. Our tests to distinguish EBA from BP on the routinely processed biopsy included: PAS BM on the blister roof; neutrophilic infiltrate; lack of eosinophilic infiltrate; and absence of keratinocyte fraying. **Results**: Sensitivity (Sn) and specificity (Sp) for each test was as follows: PAS staining of roof (Sn 25%, Sp 95%), neutrophilic infiltrate (Sn 54%, Sp 74%), lack of eosinophilic infiltrate (Sn 92%, Sp 68%), and absence of keratinocyte fraying (Sn 62%, Sp 58%). **Discussion**: Features in the routinely processed biopsy were unable to reliably distinguish between EBA and BP. Direct immunofluorescence on salt-split skin remains the standard for identification.

Category: (2) Early experiments with well defined objectives/hypotheses

(Poster 27)
BIOLOGIC USE IN HIV PATIENTS: A PROSPECTIVE DATA REGISTRY

<u>Michael Samycia</u>[1], Aaron Wong[1]

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

Background: Psoriasis affects 1.3-5% of HIV patients. HIV-associated psoriasis is often more severe and prone to frequent exacerbations. Treating psoriasis in HIV Patients is challenging due to possible complications from immunosuppressive medications such as biologics. Anti-TNF-alpha agents are well tolerated in HIV patients. Recently, a number of new biologic agents and small molecules have been approved for conditions such as psoriasis and eczema. Many of these agents are currently being used 'off-label' in HIV patients.
Objective: Our goal is to create a prospective database of HIV patients on biologic therapy for dermatologic conditions.
Patients and Methods: HIV-positive patients from the Immunodeficiency Clinic at St. Paul's hospital who are currently on biologic treatment will be included in this study. Data including patient demographics, CD4+ count, viral load, concomitant infections and biologic use will be collected
Conclusions: We hope to use this data to further characterize biologic use in HIV-patients.

Category: Pilot/exploratory experiments