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<td>Rabina Walsh, MD, Bree Zimmerman, MD, Erin Mathes, MD – University of California, San Francisco</td>
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<td>Kavita Darji, B.A. - Saint Louis University School of Medicine, Elaine Siegfried, M.D. – Saint Louis University School of Medicine, Cardinal Glennon Children's Hospital</td>
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<td>Barbara Miedzybrodzki, MD – University of Montreal, Jean-Francois Stalder, MD – Nantes University Hospital, Roxanne Gendron, M.Sc., Afshin Hatami, MD, Julie Powell, MD, Catherine C. McCuaig, MD, Danielle Marcoux, MD – University of Montreal</td>
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<td>How often are pediatric patients with clinically amyopathic dermatomyositis truly amyopathic?</td>
<td>Michelle L. Bayer, MD, Edward J. Oberle, MD, Yvonne E. Chiu, MD, Dominic O. Co, MD PhD – Medical College of Wisconsin</td>
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<td>Subcutaneous fat necrosis of the newborn: 20 - year retrospective study</td>
<td>Blanca Rosa Del Pozzo-Magana MD, Nhung T.C. Ho MD – The Hospital for Sick Children</td>
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<td>A Novel Pulsed-Dye Laser Protocol as an Adjuvant Intervention for Basal Cell Nevus Syndrome in Pediatric Patients</td>
<td>Tuyet Ann Nguyen, BS – Rady Children's Hospital San Diego, Antoanella Calame, MD – Compass Dermatopathology, Andrew C. Krakowski, MD – Rady Children's Hospital San Diego</td>
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<td>Neera Nathan, BA – Uniformed Services Univ of the Health Sciences, Rachna Patel, MSN, MPH, FNP-BC, Molly Crenshaw, BA – Natl Human Genome Research Institute, Cara Olsen, MS, DrPH – Uniformed Services Univ. of the Health Sciences, Marjone Lindhurst, PhD, Kim Keppler-Noreuil, MD, FAAP, FACMG, Leslie Biesseker, MD - Natl Human Genome Research Institute, Thomas Darling, MD, PhD – Uniformed Services Univ. of the Health Sciences</td>
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<td>EB SEQ: A New Comprehensive Next Generation Genetic Assay for the Diagnosis of Epidermolysis Bullosa</td>
<td>Anne W. Lucky, MD, Kejian Zhang, MD, Amber Begtup, PhD, Diane Kissell, MSHA, Neha Dagaonkar, MS, Ammar Husami, BS – Cincinnati Children's Hospital</td>
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<td>Gabriele Richard, MD, FACMG, Toni Lewis, MS, Sherri J. Bale, PhD, FACMG – GeneDx</td>
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<td>Lauren Becker MD, Kristen Hook MD, Ingrid Polcari MD, Raymond Arealux MD, Sheilaig Maguiness MD – University of Minnesota</td>
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<td>Carmen Liy-Wong, MD, Elena Pope, MD , Patricia C. Parkin, MD, Irene Lara-Corrales, MD – The Hospital for Sick Children</td>
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<td>Validation of the Instrument for Scoring Clinical Outcomes of Research for Epidermolysis Bullosa (iscorEB): Reliability and Construct validity</td>
<td>Elena Pope, MD, MSc, FRCPC – University of Toronto, Diane Fairclough, PhD – Children’s Hospital of Colorado, Irene Lara-Corrales, MD, MSc – University of Toronto, Anne Lucky, MD – Cincinnati Children’s Hospital, Jakub Tolar, MD, PhD – University of Minnesota, Anna Bruckner, MD – Children’s Hospital of Colorado</td>
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<td>Duri Yun, MD – The University of Chicago , Nanette Silverberg, MD – Mount Sinai Health System, Sarah L. Stein, MD – The University of Chicago Medicine</td>
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<td>Tanya Greywal, BA – University of California, San Diego / Rady Children's Hospital, Andrea Zaenglein, MD – Pennsylvania State University, Sheila Fallon Friedlander, MD – University of California, San Diego / Rady Children's Hospital</td>
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<td>Infantile Hemangiomas of the Lip: Patterns, Outcomes, and Implications</td>
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<td>Maria Kryatova, MS2, Jiawei Zhao, MS3, Vadim Villarroel, MD,Barbara Rainer, MD, Yasmine Kirkorian, MD, Anna Grossberg, MD, Katherine Puttgen, MD, Bernard Cohen, MD - Johns Hopkins Department of Dermatology</td>
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A Written Action Plan for Atopic Dermatitis: Implementation, Use, and Provider Perceptions

**Background:** Poor adherence to topical treatment regimens for childhood atopic dermatitis is common and complicated by fluctuations in disease activity and the need for multiple medications. Written action plans have potential for improving outcomes in pediatric atopic dermatitis, similar to their use in asthma. Further, written action plans have been shown to improve patient/parent understanding of treatment in atopic dermatitis. Despite this, these plans have not been universally implemented or integrated into electronic medical records. **Objective:** To assess the feasibility, frequency of use, and increase patient understanding and to improve outcomes.

**Methods:** As part of the UCSF pediatric dermatology practice from July 2014 through March 2015, an electronic EAP was made for use in patient instructions in the EPIC electronic medical record. The EAP was modeled after action plans created for pediatric asthma. Structures shorter instructions were created as an alternative if the provider felt the EAP was not appropriate. We monitored the use of the EAP and other written instructions for new patients with a primary diagnosis of atopic dermatitis seen in the UCSF pediatric dermatology practice from July 2014 through March 2015. A survey on the EAP was distributed to dermatology residents and pediatric dermatology faculty and fellows after the study period. Residents and fellows received a one-time financial incentive for 75% use. **Results:** EAP use increased over time (n=193, R^2=0.74, p=0.003), with use in 31% of patients encountering in month 1 compared to 77% use in month 9. Use of free-text instructions also decreased over time (R^2=0.72, p=0.004) from 54% in month 1 to 15% in month 9. Use of the EAP increased after the first three months and then reached a relative plateau in the 65-75% range. 19 surveys were completed (95% response). 100% of respondents “agreed” or “strongly agreed” that the EAP was easy to use and became easier to use with time. 94% (18/19) “agreed” or “strongly agreed” that their patients liked the EAP and that it helped improve understanding of the plan. 74% (14/19) “agreed” or “strongly agreed” that the EAP improved patient outcomes. **Conclusions:** Our results demonstrate an electronic EAP is feasible, gained acceptance over time and was felt by providers to increase patient understanding and to improve outcomes. The plateau at a high rate of use suggests providers feel the tool is not appropriate for all patients. Incentives and ease of use are important factors in successful implementation. Further work is needed to assess patient and parent perception and impact on objective disease outcomes.

**References**

## Title of Presentation

A retrospective review of Interferon-gamma for children with severe atopic dermatitis and recurrent eczema herpeticum

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## Author Information

Kavita Darji, B.A. – Saint Louis University School of Medicine  
Elaine Siegfried, M.D. – Saint Louis University School of Medicine, Cardinal Glennon Children’s Hospital

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<td>4431 Chouteau Ave Apt 1211 Saint Louis, MO 63110</td>
<td>951-897-0722</td>
<td><a href="mailto:kdarji@slu.edu">kdarji@slu.edu</a></td>
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## Case Summary

**Background:** Interferon gamma (IFN-γ) has been used treat severe atopic dermatitis (AD) with equivocal results. Eczema herpeticum is an uncommon, under recognized and often difficult to confirm complication of severe AD. Impaired IFN-γ protein production or IFN-γ receptor polymorphisms have been identified in patients with confirmed eczema herpeticum (ADEH+). Compared to those without evidence of prior HSV infection (ADEH-). This suggests a possible benefit from treatment with IFN-γ in a subset of ADEH+ patients. **Objective:** The purpose of this study was to retrospectively evaluate subsets of ADEH+ and ADEH- pediatric patients, including 10 treated with IFN-γ. **Methods:** Records of 30 children were reviewed: 11 ADEH+ and 19 ADEH-. All underwent extensive immunologic and microbiologic evaluation. Eight ADEH+ and 2 ADEH- patients were treated with subcutaneous IFN-γ at 50 mcg/M2/day. We compared demographic information, microbiologic and immune parameters, prior medications, dose and duration of IFN-γ administration, and response to treatment. **Results:** The 2 groups were of comparable age and AD severity. ADEH+ patients were characterized by higher mean total IgE (13,669 vs. 5,683); elevated HSV IgG (100% vs. 10%), higher incidence of insufficient TLR responses, more frequent history of molluscum contagiosum, and Group A Strep skin/pharyngeal colonization. Subcutaneous IFN-γ was well-tolerated by all 10 patients, with only 1 who experienced flu-like symptoms that resolved after the first week of treatment. The average duration of treatment was 11 mo (range 4.5-25). Five patients had initial control followed by relapse. Three had sustained control with interval flares (1 ADEH-). Two had no improvement (1 ADEH-). Treatment was complicated by poor adherence half the patients. Four of 6 with serial measurements had increased total IgE on IFN-γ, greatest in both ADEH- In all 10 patients the drug was discontinued for poor perceived efficacy. **Limitations:** retrospective design Conclusions: ADEH+ children have evidence of more impaired innate and adaptive immunity than those who are ADEH-. Treatment with IFN-γ did not result in dramatic improvement in either subset. Additional biomarkers (e.g. impaired IFN-γ protein production or receptor polymorphisms) may help predict better response to this treatment.

## References

Corticophoabia in a Canadian Pediatric Population with Atopic Dermatitis

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Background: Topical corticosteroids (TCS) are the cornerstone therapy of atopic dermatitis (AD). Fears about the specific actions, as well as local and systemic side effects of TCS, so-called corticophobia, have a significant impact on therapeutic adherence and can lead to treatment failure. The TOPICOP© (topical corticophobia) scale, developed by Stalder et al. in France, is the first validated tool to assess this phenomenon. Objective: To examine the various aspects and origins of corticophobia amongst parents of children and adolescents with AD in a Montreal pediatric dermatology population.

Methods: The TOPICOP© questionnaire was administered to patients and parents of patients, with AD waiting for their hospital outpatient dermatology appointment. The questionnaire comprises 12 questions exploring two distinct dimensions: “beliefs” and “worries”. Response choices consist of a 4-point Likert scale ranging from “never” to “always” and “totally disagree” to “totally agree”, with 0 to 3 points attributed per question. The maximum Topicop score is 36 (100%), expressed as percentage ± standard deviation. Data about patients’ level of education, geographical origins, as well as sources of information about TCS were collected. Results: 186 questionnaires were analyzed. Mean age of the children was 5.5 years old (range 3 months-18years). Sixty-two parents (35%) requested strong reassurance about the possible negative effects of TCS. Of this group, 40% were parents of infants, 30% of preschool aged children, while parents of school-aged children and teenagers represented 20% and 10% respectively. Parents of younger children have higher mean scores for each individual TOPICOP© item. The adolescents’ (12-18 years old) total mean scores are significantly lower compared to all other age groups. Regarding sources of information about TCS: 72.7% acquired information from a trusted professional (family physician or pharmacist), 10.2% from informal sources (family, friends, internet), and 13.6% from mixed sources, while 3.4% denied receiving any information. Patients acquiring information from mixed sources have a significantly higher “worries” dimension mean scores (63.2 vs 48 from a professional source). Conclusions: Our study indicates that physicians may underestimate parents’ concerns about the use of TCS. By determining the specific aspects and extent of corticophobia, clinicians will focus on individualized interventions for improving adherence to TCS treatment. Evidence-based education to front-line healthcare professionals about TCS is imperative in order to overcome TCS phobia in AD patients and their parents.

References
Title of Presentation | Poster Number
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Effect of atopic dermatitis on quality of life in adolescent children | 4

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Case Summary

Introduction and Aim of Study
Atopic dermatitis is a common condition affecting up to 20% of the paediatric population in Singapore. Due to its chronicity, it is often associated with significant psychosocial morbidity and can potentially affect the quality of life of sufferers. This study aims to investigate the association between the severity of AD and its impact on the quality of life in adolescents patients, as well as to identify specific psychosocial domains that were most affected by AD.

Materials and Methods
We performed a prospective study on a group of adolescent patients with varying severities of AD, aged between 11 and 16 years of age. These patients were on follow-up at the KKH Paediatric Dermatology clinic. The severity of eczema was ascertained using the Eczema Area and Severity Index (EASI) score. This was correlated with the Children’s Dermatology Life Quality Index (CDLQI) scores as reported by the patients. Biodata of the patients were also recorded. Statistical analysis was performed using the Analysis of one-way variance (ANOVA) and students’ t-test. Statistical significance was taken as P < 0.05.

Results/Conclusion
A total of 50 patients were enrolled, of which 31 were male and 19 were female, with a mean age of 13.4 years. Patients were divided into 3 groups of mild (21) eczema based on their EASI scores. Patients with mild and moderate eczema were noted to have significantly better quality of life as determined by lower CDLQI scores compared to severe eczema patients. With regards to specific psychosocial domains, AD had the greatest impact on disruption with i)leisure and physical activities, ii)itch and scratching, and iii)sleep interference, with a mean item score of 2.1 ±0.4 (p = 0.04), 1.8±0.2 (p= 0.07) and 1.7±0.2 (p=0.05) respectively. The psychosocial effects of eczema also varied according to age and gender.

References
Background: The most common complication among children with atopic dermatitis (AD) is infection with S. aureus, which colonizes these patients at twice the rate of the general population and is associated with worsening severity of disease.

While host factors are recognized as contributing to the pathogenesis of AD, the impact of bacterial factors on disease exacerbation has also been postulated. A recent study showed that S. aureus δ-toxin may be a mediator of disease. The genetic profile of S. aureus infecting children with AD has not been well characterized. Objectives: To characterize genetic adaptations that enhance its pathogenicity, and these adaptations happen frequently in endemic strains. These results may lead to targeted strategies for neutralizing or ameliorating MRSA-associated disease in atopic patients.

Methods: We performed a retrospective case-control analysis. Cases of MRSA were obtained from a culture bank of isolates collected from 114 pediatric AD patients at CUMC from December 2011 through March 2014. 15 of 114 patient cultures were positive for MRSA and selected as our cases. Controls were selected from archived MRSA strains from non-atopic pediatric patients with skin and soft tissue infection (SSTI) at CUMC between January 2011 and March 2014. Case-controls were matched on age, sex and body site. Whole genome sequencing was performed using the MiSeq Illumina platform. A phylogenetic tree of MRSA was reconstructed using RAXML. A CAMP-like test was performed to screen for agr and δ-toxin activity. qRT-PCR was performed to evaluate RNAIII expression, a surrogate of overall toxin production. Results: Phylogenetic analysis of strains showed that no particular lineage predominated in AD compared to SSTI. The CAMP-like screen demonstrated enhanced δ-hemolysis among MRSA in the atopic group compared to the control group; P=0.002. A matched set analysis of qRT-PCR data showed that case strains expressed two-fold greater RNAIII compared to controls; P=0.002. Adjusting for membership in the USA300 lineage also showed two fold greater RNAIII expression in cases compared to controls; P=0.003. Conclusions: Compared to MRSA isolates from the general pediatric population, isolates colonizing children with AD tend to have higher expression of RNAIII, suggesting up regulation of toxins and other virulence determinants. This suggests that MRSA from atopic patients has undergone genetic adaptations that enhance its pathogenicity, and these adaptations happen frequently in endemic strains. These results may lead to targeted strategies for neutralizing or ameliorating MRSA-associated disease in atopic patients.

References
The TREatment of severe Atopic dermatitis in children Taskforce (TREAT) U.S. and Canada Survey (a PeDRA Project)

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Case Summary

Background: While most patients with atopic dermatitis (AD) are adequately managed with topical treatments, some patients with severe AD require systemic immuno-modulatory medications, such as methotrexate, cyclosporine, and azathioprine. Yet, there is a paucity of evidence to direct physicians with the use of systemic therapies. Anecdotally, there is wide variation in treatment approaches amongst clinicians in the United States and Canada, but no survey has been conducted to confirm this impression.

Methods: The TReating ATopic Dermatitis US&amp;Canada Survey Team, a project of the Pediatric Dermatology Research Alliance (PeDRA), developed an on-line multiple-response survey to assess clinical practice and gather demographic information, details of systemic agent selection and identify factors impacting their use for refractory pediatric AD.

Results: In total, 133/290 members (45.9%) completed the survey and 115 (86.5%) utilized systemic treatments for severe pediatric AD. First-line drugs of choice were cyclosporine (45.2%), methotrexate (29.6%), and mycophenolate mofetil (13.0%). The most commonly used second line agents were methotrexate (31.3%) and mycophenolate mofetil (30.4%), while azathioprine was the most commonly cited third-line. Approximately half of the respondents did not use guidelines or protocols to direct the use of systemic treatment.

Conclusion: The survey shows great variation in prescribing practices among American and Canadian dermatologists utilizing systemic agents for pediatric AD. These results may inform the design of future controlled trials of systemic therapies in children.

References

Title of Presentation

How often are pediatric patients with clinically amyopathic dermatomyositis truly amyopathic?

Poster Number

7

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Case Summary

Background: Pediatric patients can present with cutaneous manifestations of dermatomyositis without overt weakness (clinically amyopathic juvenile dermatomyositis [JDM]), but it is unclear how commonly this occurs. Objective: The purpose of this study was to determine the frequency of clinically amyopathic JDM and the frequency in which a thorough laboratory and ancillary evaluation uncovers subclinical myositis. Methods: A retrospective chart review was performed of 46 patients diagnosed with JDM at Children’s Hospital of Wisconsin from January 2000 through April 2013. Data collected included: patient demographics, presenting symptoms and exam findings, full muscle enzyme panel (AST, ALT, LDH, CK, and aldolase), muscle biopsy, electromyography (EMG), and magnetic resonance imaging (MRI). Results: Of the 46 patients presenting with cutaneous findings consistent with JDM, 10 patients did not have clinical evidence of muscle involvement on history or examination (clinically amyopathic JDM). These patients tended to be younger, likely reflecting poor reliability of a clinical muscle exam in young children. Upon further evaluation, only 2/10 (4% of all JDM patients) were truly amyopathic. The remaining eight patients were classified as hypomyopathic. Six of the hypomyopathic patients had at least one abnormal muscle enzyme and two had an abnormal MRI demonstrating myositis. The sensitivity of CK alone in detecting muscle involvement was only 61% (27/44). If all five muscle enzymes were checked, the sensitivity of detecting at least one abnormal enzyme increased to 95% (42/44). Conclusion: These data suggest that the majority of pediatric patients presenting with cutaneous features of dermatomyositis without clinically apparent weakness have a subclinical myositis upon further evaluation. Truly amyopathic dermatomyositis is rare in children, and a thorough work-up is necessary to detect subclinical muscle disease. Further research is necessary to characterize the natural history of clinically amyopathic JDM and determine optimal management.

References

PeDRA-CARRA Collaborative Cutaneous Lupus Working Group

Title of Presentation | Poster Number
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PeDRA-CARRA Collaborative Cutaneous Lupus Working Group | 8

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Case Summary
A preliminary survey was conducted to determine priority areas for collaborative study of cutaneous lupus erythematosus (CLE). The survey was distributed to 400 pediatric rheumatologists in CARRA (The Childhood Arthritis and Rheumatology Research Alliance) and 100 pediatric dermatologists in PeDRA (Pediatric Dermatology Research Alliance (PeDRA). This is the first ever collaborative research effort between pediatric dermatology and rheumatology. Demographics: 90 rheumatologists (23%) and 60 dermatologists (60%) responded. The majority of respondents had practiced for >5 years (66% of rheumatologists, 62% of dermatologists). Results (Will be graphically represented based on the data collected) 1: Rheumatologists often collaborate with dermatologists to co-manage isolated CLE without systemic lupus erythematosus (SLE). 2: Dermatologists are more likely to collaborate with rheumatologists in treating CLE with underlying SLE than isolated CLE. 3: As a focus of research investigation, dermatologists and rheumatologists (76% of each group) were “most interested” in chronic cutaneous lupus erythematosus (CCLE) over acute cutaneous lupus erythematosus (ACLE). 4: Both sub-specialties were most interested in refractory cutaneous disease and isolated CLE with suspicious findings but not SLE. 5: There was good agreement in priority areas of investigation for clinical practice. Conclusions: This survey establishes cross-society interest in the collaborative study of pediatric cutaneous lupus. Most respondents favored the study of CCLE, of which discoid lupus (DLE) is most common. A collaborative project could seek to establish practice-based standards for the initial evaluation and screening of DLE patients and management of active and refractory skin disease. Delphi & nominal group technique would be used to establish consensus. Multi-center retrospective and prospective studies of pediatric DLE could follow to characterize the prevalence, natural history & outcomes, risk for progression to SLE, and management strategies for active & refractory skin disease. Summary of future goals:
• Delphi for the initial evaluation and monitoring of pediatric-onset DLE for progression to SLE, and treatment of active/refractory disease
• Secondary surveys of CARRA and PeDRA to assess current practice standards
• Publish CARRA/PeDRA consensus monitoring & treatment plan for DLE
• Perform multicenter retrospective cohort study to establish risk of progression for isolated DLE to SLE
• Establish multicenter prospective registry of DLE utilizing consensus monitoring plan as defined above

References
No references
Subcutaneous fat necrosis of the newborn: 20-year retrospective study

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Introduction: Subcutaneous fat necrosis of the newborn (SFN) is an rare, self-resolving panniculitis present in the first few weeks of life, characterized by indurated erythematous subcutaneous nodules and plaques over bony prominences. It affects full-term or postmature newborns, usually with maternal disorders and/or perinatal stress. Although its course is typically benign, SFN can be associated with several complications including hypercalcemia, nephrocalcinosis and nephrolithiasis. Methods: We review all cases with SFN from January 1993 to December 2013 at Sickkids Hospital in Toronto. Results: Thirty patients were included in this study, 16 were male. All children were born after 37 weeks. Median weight at birth was 3.8 kg. Sixteen mothers had a pre-existing condition such as Diabetes and Hypertension. History of complicated delivery was present in 28 patients. Hypoxic ischemic encephalopathy (HIE) was the most frequent (40%). All patients presented with subcutaneous nodules, 22 with erythema, 4 with edema, and 7 with pain. Clinical onset was around day 10 after birth. The most frequent location was the arms and shoulders 56.6%. Nineteen SFN cases developed hypercalcemia (17 mild and 2 moderate). Patients with more extensive involvement had higher levels of hypercalcemia. From all patients with HIE, 7 received therapeutic hypothermia of whom 6 developed hypercalcemia secondary to SFN. Four of these nineteen patients had recurrent or persistent hypercalcemia requiring active treatment. The main symptoms of hypercalcemia were irritability and/or jitteriness (52.6%). Nephrocalcinosis was present in 2 of 19 patients, one of whom also developed calcification of the gallbladder; their levels of iCa were 2.06mmol/L and 1.38mmol/L, with one having transient renal dysfunction. Of 10 patients with Platelets evaluated, 7 had thrombocytopenia. In one patient, blood triglycerides were analyzed and found elevated at 5.93mmol/L. As a challenge with the other retrospective studies on SFN including ours, blood work and abdominal U/S were not done in all patients, therefore the true risk for nephrocalcinosis, renal failure and hypertriglycerideremia could not be accurately evaluated. Conclusions: To our knowledge this is the largest series of patients with SFN reported in the literature. Although rare, SFN is a potential complication seen in newborns with history of complicated pregnancy and/or delivery. Hypercalcemia secondary to SFN is frequent but rarely severe. There is a need for a well-structured prospective study to set a guideline for investigations and to determine the true incidence of hypercalcemia and related complications in SFN.

References

Title of Presentation | Poster Number
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A Novel Pulsed-Dye Laser Protocol as an Adjuvant Intervention for Basal Cell Nevus Syndrome in Pediatric Patients | 10

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Case Summary
Background and Objective: Basal cell nevus syndrome (BCNS), also known as nevoid basal cell carcinoma syndrome or Gorlin-Goltz syndrome, is an autosomal dominant genodermatosis caused by a loss-of-function mutation in the tumor suppressor gene, patched (PTCH). 1, 2 It is clinically defined by the presence of odontogenic keratocysts, palmar and plantar dyserkrotic pitting, medulloblastomas, and basal cell carcinomas (BCC). 3, 4 Surgical excision remains the “gold standard” for BCCs; however, these procedures are often invasive, costly, and potentially disfiguring. 6 Several studies have demonstrated successful treatment of BCCs in adults using pulsed-dye laser (PDL). 7, 8 Given the necessity for multiple treatments over the lifetime of BCNS patients, we sought to determine whether tumor clearance could be achieved utilizing single treatment sessions with a novel stacked PDL protocol. Methods/Clinical Intervention: Two male patients, both 5 years of age, with a history of BCNS were identified. Their skin lesions consisted of hundreds of 1-2 mm smooth and pedunculated, flesh-to-brown colored papules scattered over the face, trunk, and extremities. Several biopsies prior to initiation of laser surgery confirmed the histopathological diagnosis of BCC. In an effort to curtail ongoing production of BCCs, both patients continued to use topical tretinoin, 5-fluorouracil, and imiquimod creams with minimal efficacy. Both patients were treated under general anesthesia using a 595 nm pulsed-dye laser with double-stacked pulses of pulse energy 9 J/cm(2), 10-mm spot size, 3-millisecond pulse length, with no dynamic cooling. All of the lesions were treated with a 4-mm margin of clinically normal skin. Several stereotypical lesions were then surgically excised for histopathological evaluation for evidence of residual BCC. Results: Both patients underwent a total of 6 single-treatment PDL sessions with approximately 1,318 BCCs treated. All laser-treated lesions clinically resolved without evidence of recurrence. Biopsies of stereotypical sites after treatment revealed only mild superficial perivascular lymphocytic inflammation with mild superficial dermal fibrosis and an unremarkable overlying epidermis without evidence of BCC. Conclusions: This study suggests that BCCs associated with BCNS can be treated using this novel stacked PDL protocol. This protocol may offer an alternative to surgical excision in special cases like BCNS where hundreds of BCCs over a lifetime may result in invasive, costly, and potentially disfiguring surgeries or for “breakthrough” BCCs that fail to respond to conventional topical medications alone.

References
Title of Presentation | Poster Number
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An Objective Method for Measuring Cerebriform Connective Tissue Nevus in Individuals with Proteus Syndrome | 11

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Case Summary
Background: Proteus syndrome is characterized by progressive, segmental overgrowth of the skin, subcutis, and other organs secondary to a mosaic activating mutation in AKT1.1,2 Because targeted treatment may now be developed, there is a need for clinical endpoints. The plantar cerebriform connective tissue nevus (CCTN) is the most specific and troublesome cutaneous manifestation of Proteus syndrome3-5; yet, there is no objective system for evaluating lesion change. Objective: To create a reliable quantitative tool to accurately measure the size of plantar CCTNs. Methods: Patients were recruited for studies of Proteus syndrome at the National Institutes of Health in Bethesda, Maryland between 1997 and 2014. A blinded database of photographs of the bilateral plantar feet obtained during serial patient visits was created by concealing the chronological order of photos. The entire plantar foot (excluding toes), CCTN size, and total abnormal area were measured using Imagej software. The relative sizes of the CCTN and total abnormal area were calculated by dividing each by the area of the plantar foot. CCTN was defined as a nevus with at least two gyri and three sulci. The total abnormal area was defined as the space occupied by CCTN and abnormal skin, which refers to Proteus syndrome related whitish papules that may coalesce into bumpy non-cerebriform plaques. Results: Twenty patients with two or more sequential images of the bilateral plantar feet were identified (median age 6.5 years [range 1.5-32]). Mean follow-up duration was 4.7 years (range 0.7-10.5) with a mean of 3.5 interval visits (range 2-7). All patients had abnormal skin on baseline examination. CCTNs were present in 3/5 (60%) patients ages five or less, 6/8 (80%) patients ages 5-10 and 7/7 (100%) patients older than 10. The relative CCTN and total abnormal area were measured on 152 images. Intraclass correlation between two reviewers was 0.918 for CCTN single measures and 0.709 for total abnormal area single measures (Cronbach’s alpha). Using a multiple linear regression model, the CCTN and total abnormal area were positively associated with age (p<.0001; p<.0001). The proportion of total abnormal area occupied by CCTN over time was also positively associated with age (p<.0001). Abnormal skin was inversely associated with age (p=.0358). Conclusion: This image measurement system was a reliable tool to assess the relative size of CCTNs over time. Growth patterns uncovered include that CCTN size increases with age and that abnormal skin may precede its formation. As existing areas of abnormal skin may be replaced by an expanding CCTN, they may help predict future CCTN involvement.

References
EB SEQ: A New Comprehensive Next Generation Genetic Assay for the Diagnosis of Epidermolysis Bullosa

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Case Summary
Introduction: Diagnosis of EB has required skin biopsies for electron microscopy and direct immunofluorescence followed by individual gene sequencing. We have developed a high-throughput sequencing assay called EBSEQ that allows simultaneous mutation detection of multiple genes. We present preliminary studies on the first 26 subjects to demonstrate that comprehensive sequencing is an acceptable clinical tool for rapid, comprehensive, and non-invasive genetic diagnosis.

Methods: 21 EB related genes were enriched by Agilent Haloplex target enrichment system with a fast sample processing time (6 hours) and low quantity of DNA (250 ng) as template. Upon enrichment of the target sequences using the Haloplex platform, next-generation sequencing was conducted using an Illumina MiSeq sequencer with paired-end 150 bp reads. Analysis of sequence data was completed with NextGene software (SoftGenetics, LLC) and the Molecular Genetics Laboratory custom bioinformatics pipeline that has been previously optimized and validated for analysis of other gene panels. Sanger sequencing primers for every gene on the EBSEQ panel have also been developed to confirm mutations identified by EBSEQ. Results: Our assay had a 75 to 98% clinical sensitivity and 99% analytical sensitivity to test base substitution and small deletions and duplications. We confirmed previously reported sequencing in 5 subjects. Mutations were identified in 26 probands using EBSEQ and we have confirmed mutations in 11 family members with targeted Sanger sequencing. Reports were generated in 3 to 6 weeks. In 2 patients we were able to detect significant mutations (KRT 14 and COL17A1) that had not been found with other commercial assays. We have diagnosed 7 cases of EBS, 4 of JEB, 6 of DDEB and 9 of RDEB. Diagnoses in some patients depended on skin biopsies for direct immunofluorescence and/or electron microscopy, parental studies and clinical correlation. Conclusions: EBSEQ is a new, comprehensive Next Generation Sequencing. EBSEQ is a fast, sensitive, reliable assay which is suitable for testing blood, tissue or saliva. Additional sequence variants of unknown clinical significance are often found and may be difficult to interpret. Final interpretation may still rely on clinical findings and identification of the level of cleavage and presence of cutaneous components as determined by electron microscopy and/or direct immunofluorescence immunomapping. Eventually, EBSEQ and other similar screening assays may become routine for rapid comprehensive diagnosis of EB and should help to establish genotype/phenotype clinical correlations.

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Multi-gene analysis (‘Exome-Slice’) is a very effective tool for diagnosing congenital ichthyoses, palmoplantar keratodermas and other

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Case Summary
The clinical diagnosis of congenital ichthyoses (CI), palmoplantar keratodermas (PPK), epidermolysis bullosa, ectodermal dysplasias and other genodermatoses can be challenging due to the large number of subtypes with overlapping features within each group. A molecular diagnosis is often complicated by genetic heterogeneity, for example >30 genes have been implicated in ichthyosis and related disorders. Our laboratory has developed a novel diagnostic approach for concurrent analysis of multiple disease genes. It is based on exome capture and next generation sequencing with targeted analysis of all relevant disease genes tailored to the specific clinical features of the proband (‘Exome-Slice’). We performed analysis of 38 genes associated with CI (CI Slice) or 88 genes associated with CI or other disorders of cornification (DOC Slice) on 55 probands referred for diagnostic testing. A total of 89 variants in 36 distinct disease genes were reported, including 68 pathogenic/likely pathogenic variants (PV) and 21 variants of uncertain significance. Sixty-nine percent (38/55) of cases had a positive result defined as a PV in an autosomal dominant or X-linked disorder, or two PV associated with an autosomal recessive disorder. Ten probands (18%) had one or more variants, which were not diagnostic but might possibly be related to the reported features, while results for the remaining 10% of cases were negative. Two probands were found to have two distinct skin disorders resulting in a more complex phenotype, while another two presented with attenuated features of their disease. Half of the positive cases had mutations in one of 7 genes causing (nonsyndromic) autosomal recessive CI. Most prevalent were mutations in TGM1 (lamellar ichthyosis) and ABCA12 (Harlequin ichthyosis) (n=5 each), followed by CYP4F22 and NIPAL4 (n=3 each), ALOXE3 (n=2), ALOX12B, and PNPLA1 (n=1 each). Rare syndromic forms of CI such as trichoiodystrophy, congenital disorder of glycosylation, and Sjögren-Larssen syndrome were diagnosed in 15% of probands. Thirty percent had genetic forms of PPK, 10% had X-linked ichthyosis, and the remainder had epidermolytic ichthyosis, ichthyosis vulgaris, erythrokeratodermia variabilis, or ectodermal dysplasia. In conclusion, exome-slice allows phenotype-driven targeted testing of multiple disease genes and has a high positive rate. It is an efficient way for diagnosing common and rare forms of CI and other genodermatoses, may identify co-occurrence of different disorders and broaden their phenotypic spectrum.

References
Pediatric ichthyosis with eyelid improvement following treatment with tazarac

Title of Presentation

Pediatric ichthyosis with eyelid improvement following treatment with tazarac

Poster Number

14

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Case Summary

Background: Lamellar ichthyosis (LI) is a well-described phenotypic subtype of autosomal recessive congenital ichthyosis (ARCI). The condition typically presents at birth with collodion membrane and leads to thick, plate-like scaling of skin throughout the body, alopecia and prominent ocular manifestations, such as bilateral cicatricial ectropion. Contracture leads to the inability to close the eyelids completely (lagophthalmos). These ocular complications can lead to chronic exposure keratitis and in some cases corneal ulceration and blindness. Treatment thus far has focused on surgical correction with skin or mucous membrane grafts and inverting sutures. However, severe phenotypes may have no acceptable donor sites. Surgical success in the literature has been assessed at 6 months or less. Retinoids modulate keratinocyte differentiation, therefore, a desirable treatment for various types of ichthyosis. Systemic retinoids are used in ichthyosis however they are associated with a number of side effects. Improvement of ectropion has been shown in a 77 year old female with ichthyosis and application of topical tazarotene 0.1% cream. Topical tazarotene 0.05% gel has been shown to improve scaling in pediatric and adult patients with ichthyosis in an open non-randomized trial compared to Urea cream. Methods: All LI patients at the University of Minnesota were included in the study, a total of 5 patients. Two patients were not included due to lack of follow up or concurrent exposure to systemic retinoids. The three patients included were diagnosed with LI by a pediatric dermatologist, and followed for multiple visits. Records were reviewed and data from pediatric dermatologist and pediatric ophthalmologist visits were obtained. Data was collected both before and after treatment of the upper and lower eyelid with tazarotene 0.1 or 0.05% cream daily. Results: All three patients included in the study demonstrated significant improvement in their ocular involvement. Resolution, or improvement of ectropion was seen at the first follow up visit (2 and 8 months). Two patients had lagophthalmos prior to treatment; both resolved at the 5 month follow up visit. Interestingly, one of these patients developed an aggressive corneal ulcer despite complete resolution of ectropion and despite frequent ophthalmic lubrication. The ulcer resolved with topical antibiotic and steroid eye drops. Conclusion: Topical tazarotene 0.5 or 0.1% cream is effective in the management of ectropion and lagophthalmos in the setting of LI. Further prospective studies would be useful to determine the duration and frequency of application required for maintenance treatment.

References

Title of Presentation: The relationship between Neurofibromatosis type 1, Juvenile Xanthogranuloma, and Malignancy

Poster Number: 15

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Case Summary

Background: Neurofibromatosis type 1 (NF1) is a common neurocutaneous syndrome that predisposes to benign and malignant tumors. The association of NF1, juvenile xanthogranulomas (JXG) and juvenile myelomonocytic leukemia (JMML) has been described in the literature, but it is unclear whether JXG alone constitute a risk factor for leukemia or/and other malignancies in children with NF1. Objective: Determine the frequency of association between the NF1, JXG and malignancy. Methods: We conducted a case-control study comparing children with NF1 and malignancy (cases) with sex and age matched children with NF1 without malignancy (controls), seen at The Hospital for Sick Children between February 1992 and February 2012. An odds ratio (95% confidence interval) was calculated for JXG in cases and controls.

Results: We found 739 patients with NF1 over a 20 year period, 14 of them also had a diagnosis of malignancy. We identified 29 controls matched by age and sex with our patients. Cases included 9 (64%) boys and 5 (36%) girls. Solid malignancies were found in 9/14 (64%) and hematologic malignancies in 5/14 (36%). Table 1 The mean age at diagnosis of JXG in cases was 4.4 +/- 3.7 and 1.5 +/- 1.7 years in the controls (p=0.14). JXG were multiple (2 or more) in 3/4 (75%) of the cases and in 6/6 (100%) of the controls. Mean follow up for the cases was 7.9 years (SD 4.9) and 7.2 (SD 2.7) for the controls. JXG were found in 3/5 (60%) patients with hematologic malignancies (1 Burkitt’s lymphoma, 2 JMML) and in 1/9 (11%) patients with solid malignancies (1 testicular rhabdomyosarcoma) (p=0.095). JXG were found in 4/14 (28.5%) cases and 6/29 (21%) controls. (OR1.5 95% CI 0.35-6.6, p= 0.56). Discussion: The purpose of the study was to evaluate the relationship between NF1, malignancy and JXG. Our study’s results did not support an association between JXG and malignancy in children with NF1. Despite its limitations, to our knowledge this is the first case-control study evaluating the relationship between NF1, JXG and malignancy providing reassurance for practitioners and patients alike. However, children with NF1 should always be carefully monitored for malignancy regardless of the presence or absence of JXG. Further larger cohort studies are needed to explore the predictors for malignancies including molecular data. Conclusions: JXG are common in children with NF1 but does not appear to be associated with an increased risk of malignancy.

References

Validation of the Instrument for Scoring Clinical Outcomes of Research for Epidermolysis Bullosa (iscorEB): Reliability and Construct validity

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Case Summary

Background:
iscorEB is an innovative disease severity tool, able to capture both clinical and patient-reported outcomes.

Objectives:
To test the reliability and content validity of iscorEB.

Methods:
Prospective cohort study conducted at 2 institutions: SickKids Hospital, Toronto, Canada and Denver Children’s Hospital, Denver, Colorado, USA. Six MDs performed two assessments separated by several hours (iscorEB clinician portion, Birmingham EB Score (BEBS) and scoring of disease severity). Patients/parents completed the patient iscorEB, Quality of Life in EB (QOLEB) questionnaire or Children’s Dermatology Life Quality Index (CDLQI) if 4-17 years of age. Intra-class correlation coefficient for inter- and intra-observer reliability and test-retest reliability were calculated. For construct validity iscorEB was compared to BEBS, QOLEB, CDLQI using Spearman’s correlation.

Results:
31 patients were enrolled, with a mean age of 19.46 (SD=13.43) years, 52% - RDEB, 16% - DDEB and 32%- EBS, with equal disease severity distribution. iscorEB differentiated between categories of disease severity (clinician: 2.84 vs. 10.17 vs 26.37, p<0.001; patient: 23.85 vs 33.78 vs 45.78, p<0.0001 for mild vs moderate vs severe disease). The inter-observer and intra-observer reliability was 0.96 and 0.91, respectively. The test retest reliability was 0.97. The construct validity measured by the Cronbach’s alpha coefficient was 0.89 and 0.84 for clinician and patient iscorEB, respectively, suggesting good internal consistency. iscorEB strongly correlated to BEBS (rho: 0.94, p<0.0001), EBQOL (rho: 0.91, p<0.0001) and CDLQI (rho:0.76, p=0.0009).

Conclusion:
iscorEB proved to be a reliable and valid instrument. We will study next its responsiveness to change and apply it to larger EB populations of various severities.

References
A Standardized Clinical Assessment and Management Plan (SCAMP) for the Use of Atenolol to Treat Infantile Hemangiomas

Author Information

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Case Summary

The nonselective beta antagonist propranolol was serendipitously discovered as therapy for infantile hemangiomas (IH) in 2008, and has since become first-line and the first FDA-approved treatment for this condition. There is strong evidence attesting to its effectiveness. Oral propranolol is generally well-tolerated in infants, and severe adverse events are rare. However, potential effects such as sleep disturbance, bronchospasm and hypoglycemia have generated interest in the use of selective beta-1 antagonists such as atenolol. To date, two studies have demonstrated comparable efficacy between oral propranolol and oral atenolol, while suggesting that atenolol may have a favorable side effect profile. While propranolol has undoubtedly revolutionized the treatment of infantile hemangiomas, atenolol has potential as a preferable agent. Based on current guidelines for propranolol therapy and the pharmacokinetics of atenolol, our center’s multidisciplinary Vascular Anomalies Committee (a collaboration between pediatric dermatology, dermatologic surgery, plastic surgery, radiology, pediatric cardiology and pharmacy) has developed a standardized clinical assessment and management plan (SCAMP) for the use of atenolol to treat infantile hemangiomas. The SCAMP allows continuous revision of our treatment plan, while preserving uniformity of treatment so that we can develop best practices for management of children with infantile hemangiomas. 12 patients with infantile hemangiomas have been started on atenolol therapy according to the SCAMP, and there has been good response with no adverse effects to date. We hypothesize that atenolol may offer the following advantages: 1) Lower risk of sleep disturbances, long term cognitive effects and other CNS effects. In contrast to propranolol, atenolol is lipophobic and does not cross the blood-brain barrier. 2) No risk of bronchospasm. As atenolol does not act on pulmonary beta-2 receptors, it may be used safely in infants with predisposition to reactive airway problems. 3) No risk of hypoglycemia. Atenolol does not act on pancreatic beta-2 receptors. 4) Twice daily dosing. Given propranolol’s short half-life, it is optimally dosed three times daily. Atenolol is safely dosed 2 times daily in young children. This improves compliance and patient satisfaction. We anticipate that our multidisciplinary endeavor will provide evidence as to the safety and efficacy of atenolol as treatment for IH, as well as guidance regarding optimal patient selection, dosing regimen and monitoring.

References

Alopecia areata and hydroxychloroquine: A review of 8 cases

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Case Summary

Alopecia areata is a common cause of immune mediated non-scarring hair loss [1]. Treatment is often difficult because of the lack of effective therapeutic modalities. Recently a report was published of two adult patients with alopecia totalis successfully treated with hydroxychloroquine (HC) 200mg twice daily. Significant hair growth was achieved within 5 months of initiating treatment [2]. We report our experience using HC to treat 8 pediatric patients with alopecia areata at two institutions.

A retrospective review of all pediatric patients with alopecia areata treated with plaquenil at the University of Chicago Medicine and Mt. Sinai Health Systems since 2013 was undertaken. The patients ranged in age from 6 to 16 years old. There were 4 male patients and 4 female patients. Most of the patients were treated with HC 200mg by mouth twice daily with a treatment course ranging from 4-21 months. Six of the 8 patients had alopecia totalis or universalis at the initiation of therapy; 2 patients had less than 50% scalp involvement. Overall, 4 out of 8 patients (“responders”) achieved 50-80% scalp hair recovery while on therapy, three of whom had alopecia universalis. Two responders continue on therapy currently. One responder (the 6-year-old male with alopecia universalis) recovered 70% of his hair and has maintained 50% of his hair while off therapy. One responder had 80% regrowth on therapy, but her course was complicated by a severe infection with subsequent hair loss despite continued treatment with HC. One of the 8 treated patients progressed from partial scalp alopecia to near complete alopecia within 2 weeks of initiating HC; however after 4 months of continued therapy, he is experiencing regrowth of fine depigmented hairs. And finally, 3 out of 8 patients (“nonresponders”) had no evidence of regrowth after 4-6 months of HC therapy. Two of the three non responders have alopecia universalis or alopecia totalis of prolonged duration. Adverse effects of headache or abdominal symptoms were reported by 3 patients and led to treatment discontinuation in one patient. No ocular side effects were noted.

This case series suggests that hydroxychloroquine may be a reasonable alternative treatment option for alopecia areata for those patients refractory to other therapies. More data is necessary to determine which factors might predict response and underscores the need for combined efforts to design well-controlled clinical trials in the management of this disease [3].

References

### Title of Presentation

**AN2728 Topical Ointment, 2% in the Treatment of Children, Adolescents, and Adults with Atopic Dermatitis: Summary of the Phase 1b/2 Studies**

### Poster Number

19

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### Case Summary

**Background:** AN2728 topical ointment, 2% is a novel phosphodiesterase-4 inhibitor in development for treatment of atopic dermatitis (AD). This report summarizes findings from AN2728 phase 1b/2 AD studies.  

**Methods:** Study 1 was a phase 1b, open-label, maximal-use trial designed to assess systemic exposure, safety, and efficacy (Investigator’s Static Global Assessment [ISGA] and AD signs/symptoms) in children and adolescents. Study 2 was a phase 2a, randomized, double-blind, bilateral trial designed to evaluate AN2728 efficacy (Atopic Dermatitis Severity Index [ADSI]) and safety in adults with 2 comparable target AD lesions. Study 3 was a phase 2a, open-label trial designed to evaluate safety, systemic exposure, and efficacy (ISGA and AD signs/symptoms) in adolescents. Study 4 was a phase 2, multicenter, randomized, double-blind study of the efficacy (ADSI based on AD signs/symptoms) and safety of once- or twice-daily treatment with AN2728 topical ointment 0.5% or 2% in adolescents.  

**Results:** In study 1 (N=34), AN2728 was rapidly absorbed with limited systemic exposure; most treatment-emergent adverse events (TEAEs; 95%) were mild or moderate in intensity. Mean ISGA scores declined from baseline to day 29; improvement in pruritus severity was observed as early as day 5 (first assessment). In study 2 (N=25), 68% of patients experienced a greater decrease in ADSI score in AN2728-treated versus vehicle-treated lesions at day 28. Most TEAEs (90%) were mild. Limited AN2728 systemic exposure was demonstrated in study 3 (N=23); the most common TEAEs were application site pain and nasopharyngitis. Efficacy was demonstrated by reductions in mean ISGA and AD symptom severity scores. In study 4 (N=86), the greatest clinical improvements were observed with AN2728 topical ointment, 2% applied twice daily; 17 patients reported 20 TEAEs of mild (90%) or moderate (10%) severity.  

**Conclusion:** Preliminary data suggests that AN2728 topical ointment, 2% may be safe and effective in patients with AD.

### References

N/A


**Title of Presentation**  
Cantharidin on the Face? Yes, it is Safe! A Retrospective Case Series on the Treatment of Pediatric Facial Molluscum Contagiosum

**Poster Number**  
20

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**Case Summary**

**Objectives:**  
1. Characterize the incidence of adverse effects following treatment of pediatric facial molluscum contagiosum with cantharidin 0.7% solution, a non-FDA approved treatment.  
2. Measure parental satisfaction of cantharidin treatment for pediatric facial molluscum contagiosum.  
3. Characterize the reasons parents sought treatment for molluscum contagiosum.

Cantharidin, a blistering agent, is widely used for molluscum contagiosum (MC) skin infections despite lacking FDA approval. Its ease of application, safety, tolerability and effectiveness herald this as an excellent therapeutic agent. The use of cantharidin on the face, however, has often been unfoundedly discouraged due to product labeling and a lack of studies examining its use for facial lesions. This leaves practitioners with a practice gap. Therefore, we performed a retrospective chart review for children with facial MC treated with cantharidin at our tertiary care center between March 2013 and March 2014. Records were evaluated and parents/guardians were contacted for their post-cantharidin treatment experience. Of the 451 children identified, 94 cases met inclusion criteria. Reasons for seeking treatment included pruritus and spread of MC lesions. Of the 62 cases successfully contacted by telephone, post-treatment reported side effects were discoloration (18%), blistering greater than expected (10%) and pain (10%). Pruritus, scarring, irritation, bleeding, and spreading of lesions were uncommonly also cited. Satisfaction with treatment was rated an average of 8.7 out of 10.

In conclusion, our study specifically addresses the use of cantharidin for pediatric facial molluscum. The data demonstrate that cantharidin is a safe and effective first-line treatment for MC lesions on the face.

**References**

# Excimer laser treatment for hypopigmentation after lichen striatus: A retrospective case series of 12 patients

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## Case Summary

**Background:** Lichen striatus is a self-limited skin disease in children that is characterized by linearly distributed papules following Blaschko’s line. The dermatosis may disappear spontaneously, frequently leaving hypopigmentation.  
**Objective:** To evaluate the effectiveness of 308-nm excimer laser treatment for hypopigmentation after LS  
**Methods:** A retrospective review was performed on 12 patients with hypopigmentation after lichen striatus who underwent excimer laser treatment from May 2009 to December 2014. The degree and pattern of repigmentation were evaluated by two independent blinded dermatologists.  
**Results:** Eleven patients (91.7%) achieved complete repigmentation after a median treatment duration of 3.3 months (range 1.9–6.2), and all patients showed a diffuse pattern of repigmentation on their lesion. The median cumulative and maximal dosages were 7837.5 (2575–200,075) and 487.5 mJ/cm² (300–1725), respectively. The one patient with the longest disease duration of 26 months showed 85% repigmentation after a treatment duration of 41.9 months. Moreover, this patient showed diffuse and marginal repigmentation patterns simultaneously.  
**Conclusion:** Treatment with a 308-nm excimer laser was effective for repigmentation in hypopigmentation after LS. We suggest that early treatment with a 308-nm excimer laser should be introduced to prevent long-lasting hypopigmentation after lichen striatus.

## References

OBJECTIVE: Assess the safety of a pediatric-specific formulation of oral propranolol by evaluating data collected from a large cohort of patients in the French compassionate use program (CUP).

DESIGN: Infants treated with the new propranolol solution between April 2010 and July 2014 were included in the analysis. Demographic data and the characteristics of hemangioma were collected during treatment, and safety data were collected for the following two years.

SETTING: Institutional referral centers with ambulatory care.

PARTICIPANTS: Infants with proliferating infantile hemangioma requiring systemic therapy.

MAIN OUTCOME: Safety of specific formulation of propranolol use in the pediatric population.

RESULTS: 1661 patients were included in the CUP with demographic data available for 1645 patients. Of these, 75% were girls with a median age of 115 days. The severities of target hemangioma in these patients were 39.3% with severe ulceration, 72.4% with functional impairment and 15.8% with life-threatening hemangioma. The median propranolol dosage was 2 mg/kg/day with median treatment duration of 7.3 months. Propranolol was discontinued in 83.8% of patients due to resolution of the IH. We found 259 adverse drug reactions (ADRs) in 161 patients (9.7%), including 61 patients (3.7%) with serious adverse drug reactions (SADRs). The most frequent ADRs were bronchiolitis and bronchitis (25.9%), sleep disorders (15.1%), agitation (3.1%), decreased appetite (3.1%) and hypoglycemia (3.1%). The most frequent SADRs were bronchiolitis and bronchospasm (29.5% of all SADRs), hypoglycemia (6.6%) and bradycardia (4.9%).

CONCLUSIONS: In this large follow-up cohort, the use of a pediatric formulation of propranolol in infants with proliferating infantile hemangioma, including severely ulcerated, life-threatening and function-imparing hemangioma, was well tolerated. The SADRs mainly concerned respiratory, cardiovascular and metabolic disorders and we find that a proper pre-treatment evaluation and monitoring will minimize the cardiovascular and respiratory disorders during treatment. Furthermore, proper education of prescribers and caregivers must be maintained to prevent the potential risks of bronchial hyperreactivity reactions during bronchial infection and hypoglycemia in case of fasting.

References
Hidden risk in the use of topical corticosteroids for diaper dermatitis

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Case Summary
Background: It is known that prolonged use of systemic corticosteroids may cause Cushing’s syndrome (CS),1 however topical administration of high potency corticosteroids can also cause it. The latter often occurs in infants being treated with high potency topical corticosteroids (TC) for diaper dermatitis.2

Objective: To describe the characteristics of infants with iatrogenic Cushing’s syndrome (ICS) after treatment of diaper dermatitis with TC. Patients and methods: Case series in which all patients diagnosed, from January 2010 to December 2014 at the National Institute of Pediatrics, with ICS after treatment of diaper dermatitis with TC were included. Descriptive statistical analysis was performed. Results: Seventeen out of 66 patients with diaper dermatitis developed ICS due to the application of high potency TC. There were 9 males and 8 females. Most patients (8/17) had been prescribed a combined product with betamethasone dipropionate, clotrimazole and gentamicin sulfate. The mean age of onset of TC’s application was 3.9 months (range 2 to 8 months), and the mean age at the time of ICS diagnosis was 10.8 months (range 5 to 18 months). Dermatologic findings were skin atrophy in the diaper area and hypertrichosis (figs. 1 and 2). The most frequent complications observed were growth retardation and weight gain in all 17 patients. There were no major complications such as cardiovascular disorders or sepsis. In all cases, TC were withdrawn and replacement therapy with oral corticosteroids was prescribed in reduce doses initially 40mgm2day for 6 weeks. Analysis: Application of TC in the diaper area where there is a thin skin under occlusion may increase drug absorption by 100 times.3,4 If the skin barrier in this area is altered by inflammation, such as in diaper dermatitis, percutaneous absorption can be further increased and associated with the development of ICS. When diagnosed, TC should be discontinued and replacement therapy with physiological doses of oral corticosteroids - doubled in case of infection, trauma or surgery - for 6 to 9 months should be administered5 since the recovery of HPA suppression has been calculated in 3.49±2.92 months.6 Conclusions: In our country high potency TC are frequently prescribed for the treatment of diaper dermatitis. This practice may be associated with ICS and secondary adrenal failure. To avoid adverse effects of TC, all physicians must know their side effects, and educate the population to prevent their overuse and application without medical prescription, especially in diaper dermatitis.

References
### Title of Presentation

**Inhibition of Angiofibromas in a Tuberous Sclerosis Patient Using Topical Timolol**

### Poster Number

24

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### Case Summary

**Background and Objective:** Angiofibromas are the most recognized cutaneous manifestations of tuberous sclerosis complex, and may be associated with disfigurement, bleeding, pruritus, erythema, and significant psychosocial consequences. Cryotherapy, electrocoagulation, radiofrequency ablation, dermabrasion, laser treatment, and podophyllotoxin have all demonstrated some success in the treatment of facial angiofibromas. However, complications such as pain, postinflammatory hyperpigmentation, and scarring have reduced their utility. Most notably, recurrences have been reported in up to 80% of cases necessitating frequent, serial treatments. Rapamycin (sirolimus) has received recent attention for its role in helping regulate the formation of angiofibromas, but limited availability and potentially prohibitive financial cost are drawbacks to its use. Consequently, the “ideal” treatment for angiofibromas remains elusive.

**Methods/Clinical Intervention:** A 26-year-old woman with a history of TSC presented for management of multiple refractory facial angiofibromas. Physical exam revealed hundreds of near-confluent, 1-2 mm, pinkish-red, fibrous papules with an erythematous base on the patient’s nose and bilateral cheeks. The patient had previously been treated with pulse dye laser (595nm) two years prior to presentation, but her angiofibromas recurred within two to three months of her treatment. The family denied using any other oral or topical therapies in the last 15 years.

The patient was treated under general anesthesia using a 595-nm pulsed dye laser with a 10 mm spot size, fluence of 9 J/cm² and 1.5 ms pulse width, followed by a macro-fractionated 10,600-nm CO₂ laser at the following settings: 125 mJ/3.5W/0.1 second repeat delay/Size 5/Density 5-6. Sterile water was rubbed vigorously over the surface using a cotton tip applicator to remove the lesions down to the superficial papillary dermis. Topical timolol 0.5% gel was applied twice a day to the patient’s right cheek only, starting two weeks prior to her scheduled laser surgery and then re-starting on postoperative Day #5.

**Results:** Four months later, the patient had markedly reduced erythema and reduced number and size of angiofibromas on the timolol-treated right cheek as compared to her untreated nose and left cheek, which served as internal controls.

**Conclusions:** β-blockers may prove useful as an adjuvant to rapamycin and more traditional destructive procedures for the treatment of facial angiofibromas. Because of their histological similarities, β-blockers may serve as a novel treatment of subungal fibromas, pearly penile papules, and fibrous papules of the nose as well.

### References


**Title of Presentation**

Interim Analysis of a Double-Blind, Placebo-Controlled Study of Topical Cantharidin for the Treatment of Molluscum Contagiosum.

**Poster Number**

25

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**Case Summary**

Molluscum contagiosum (MC) is an infectious skin condition caused by a DNA poxvirus. Clinically, it presents as smooth umbilicated papules and commonly affects children. Lesions are usually self-limited, but some may persist for months and even years. Patients can experience irritation, dermatitis, scarring or depigmentation from manipulation, as well as new lesions from autoinoculation. Furthermore, lesions are contagious and the virus can be transmitted to close contacts, prompting patients and their parents to seek treatment. Currently available therapies, such as curettage and cryotherapy, are poorly tolerated, and there remains a need for a treatment that is non-traumatic, safe and effective. Cantharidin, a vesicant derived from the blister beetle, has been used by dermatologists to treat MC for decades, but it is no longer universally available in the US, as it lacks FDA approval. As a result, the medication has to be specially compounded and has become exceedingly difficult to obtain. In addition, concerns regarding the safety and efficacy of the medication still remain.

We conducted a double-blind, placebo-controlled study to evaluate the safety and efficacy of topical cantharidin 0.7% for treatment of MC. Fifty-two participants, ages 2 to 17 years, were enrolled into a two-phase clinical trial. In phase 1, participants were randomly assigned to receive: (a) cantharidin 0.7% topical, (b) cantharidin 0.7% topical with occlusion, (c) placebo, or (d) placebo with occlusion. Treatments were applied in the office at weeks 0 and 3. Lesion count and adverse effects were assessed every 3 weeks. In phase 2, all participants with active lesions were treated with open-label topical cantharidin 0.7% without occlusion every 3 weeks until all MC resolved. Total lesion count was measured at each visit. Forty-five participants completed phase 1 of the study. Compared to placebo, there was a significant decrease in lesion count in participants treated with cantharidin, irrespective of occlusion, at weeks 6 (p < 0.0001). In phase 2, all participants received open-label cantharidin and the data was analyzed with an intention-to-treat model where those participants who were lost to follow-up were considered non-responders. The median time to clearance was 9 weeks and 87.8% of the participants treated with cantharidin had complete resolution. The remaining 12.2% were lost to follow-up. Blister formation at treatment sites was common and expected in participants treated with cantharidin (87%). There were no reported adverse reactions. These results demonstrate that cantharidin is an effective and safe treatment for MC when applied as an in-office treatment.

**References**

## Title of Presentation

Pharmacokinetics Data in Infants with Infantile Hemangioma and Healthy Adults after Administration of a New Oral Solution of Propranolol

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## Case Summary

**Background:** Propranolol has been used for many years in adults and children for cardiovascular indications but pharmacokinetics information is limited in children, especially in infants. Pierre Fabre has developed a pediatric oral solution intended to be administered to infants for the treatment of proliferative Infantile Hemangiomas (IH) requiring systemic therapy. Objective: Compare the pharmacokinetics data of propranolol after administration of the new propranolol oral solution in infants treated for proliferating IH and in healthy adults.

**Methods:** Study in infants: 19 infants were included by age into group I (from 50 to 89 days) and group II (from 113 to 152 days). Within each age group, infants were treated for 12 weeks at 3 mg/kg/day given twice daily after a 2-week titration period (1 and 2 mg/kg/day given twice daily on Week 1 and Week 2, respectively). 2 micro-blood samples (250 µL) during the 2-week titration and 6 micro-blood samples on one occasion at steady-state after 4 weeks and 12 weeks of treatment for groups I and II, respectively, were collected. Study in adults: 12 healthy young male subjects received in 2 periods 2 single oral administrations of 80 mg either the new propranolol hydrochloride oral solution or propranolol hydrochloride tablet, separated by a wash-out of 3 days. 16 blood samples were collected from T0 to T24h post-dose. Propranolol plasma concentrations were quantified using validated liquid chromatography-tandem mass spectrometry methods. Results: In infants, mean Cmax of 78.5 and 79.2 ng/mL were observed in Group I (n=8) and Group II (n=11), respectively, with a corresponding median Tmax of 2 h post-dose in both groups. Mean AUCt were 541 and 430 h*ng/mL and weight-adjusted oral plasma clearances were 2.71 and 3.27 L/h/kg, in Group I and Group II, respectively. In adults, mean Cmax of 48.0 ng/mL with a median Tmax of 1.33 h post-dose were observed after single administration of 80 mg of propranolol as an oral solution. Mean AUC was 311 h*ng/mL. The weight-adjusted oral plasma clearance was 3.6 L/h/kg. Conclusion: The weight-adjusted oral plasma clearances of propranolol determined in infants were similar whatever the age group, and were in the same range as those observed in the study in adults or those reported in the literature. These results suggest that the oral clearance for propranolol is weight-related and age independent and confirm that the dose in mg/kg should be used without dose adaptation by range of age.

## References

None
Platelet-rich plasma for alopecia areata in children: a pilot study

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Case Summary

BACKGROUND:
Alopecia areata (AA) is a common auto-inflammatory disease, with severe psychosocial implications associated with the degree of compromise. Different therapeutic alternatives have been used, none of them ensuring complete hair regrowth or decreasing relapse risk after their use (1). Platelet-rich plasma (PRP) has attracted attention in dermatology since 2008, for its ability to promote wound healing, tissue regeneration and increase hair density after hair transplantation (2). Activated PRP increased the proliferation of DP cells and stimulated extracellular signal-regulated kinase (ERK) and Akt signaling. Fibroblast growth factor 7 (FGF-7) and beta-catenin, which are potent stimuli for hair growth, were upregulated in DP cells. The injection of mice with activated PRP induced faster telogen-to-anagen transition than was seen on control mice (3).

Late in 2013, a randomized clinical trial to evaluate the effects of PRP on AA in adults was published. The authors found more rapid hair regrowth and less relapse risk in patients with AA total and universalis treated with PRP compared with those treated with intralesional steroids (4). After these promising conclusions we decided to initiate our pilot study in children.

MATERIALS AND METHODS:
A total of three treatments were given for each patient, with an interval of one month from each other. At each visit we extracted 10ml of blood using a commercial tube kit for PRP. Immediately after, the tube was centrifuged for 5 minutes at 2400 rpm. Upon application of EMLA into the affected areas, the resulting 4 ml of PRP were injected using mesotherapy. In two cases sedation was necessary. All patients continued with the systemic therapy previously started. Macrophotographs were taken at baseline, at each visit and at 3 months follow-up. 2 independent evaluators rated the results using SALT score.

RESULTS:
8 consecutive patients were enrolled (2 with AA universalis). Significant improvements were seen in 2 patients, with more than 30% of scalp hair regrowth, curiously in the occipital area and eyebrows. Some improvement was seen in 4 patients with less than 30% scalp hair regrowth. The 2 no-response patients have AA universalis, low levels of vitamin D (25-HO) and one of them hypothyroidism. None of the patients had complete hair regrowth. No severe side effects were present.

CONCLUSION:
Our pilot study supports the previously published evidence that PRP might have a beneficial role in hair growth. It can be considered another safe treatment modality for AA that may be worth trying. Because this is not a controlled study we cannot assure that the response was due to a placebo effect.

References

REFERENCES:
Successful use of cyclosporine in the treatment of Stevens-Johnson Syndrome in three pediatric patients

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Case Summary

Stevens-Johnson Syndrome (SJS) and Toxic Epidermal Necrolysis (TEN) are medical emergencies that are characterized by severe blistering, skin necrosis, and subsequent physiologic instability and increased risk of sepsis. Mainstays of treatment for SJS/TEN include removal of the offending agent, supportive care, and appropriate wound care. Treatment of SJS/TEN with immunosuppressive agents such as corticosteroids and intravenous immunoglobulin (IVlg) is controversial, and even less is known about the treatment of SJS/TEN in children. Recently, however, several retrospective studies and case reports have highlighted the success of using cyclosporine (CSA) in the treatment of SJS/TEN in adults. Similarly, one case report exists highlighting the successful treatment of TEN with CSA in a child. In this case series, we describe three pediatric patients treated successfully with cyclosporine and provide evidence for CSA use in children with SJS/TEN. We describe an 8-year-old girl with SJS secondary to presumed Mycoplasma pneumoniae infection, a 5-year-old boy with SJS likely secondary to acetaminophen, and a 17-month-old boy with SJS/TEN overlap likely secondary to phenytoin. The average time in delay to admission was 3.3 days (range 0-8) and delay in diagnosis to treatment was 2.3 days (range 0-6). The average response or arrest time to cyclosporine was 3.2 days (range 1.5-4) and average time to remission or reepithelialization was 12 days (range 10-15). The average length of stay in the hospital was 11.7 days (range 4-19). All three children achieved remission and returned to their baseline health. Our results corroborate the results of other studies and cases reporting that cyclosporine use in SJS/TEN is associated with dramatically arrested disease progression, increased reepithelialization rates, and reduced mortality rates. The potential success of cyclosporin A as a treatment for SJS/TEN has also been reported in two small studies and several case reports in adults and one case report in a child who was also treated with several other agents. This report of three children treated successfully with CSA provides evidence that CSA is an efficacious treatment for SJS/TEN in pediatric patients. Moreover, concerns over use of an immunosuppressive agent impeding wound healing and other adverse effects of CSA were not observed in this case series. More trials are needed to evaluate the safety and efficacy of CSA use in children, however, these cases provide further support for previous observations that CSA used in the treatment of SJS/TEN produces consistently favorable outcomes in both adults and children.

References

A Survey of Bullying in Pediatric Dermatology Patients

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Case Summary
Background/Significance: Although most would agree that visible differences increase a child’s risk of being bullied in school, few studies have explored the risk factors and effects of pediatric skin conditions and bullying in detail. It is known that being bullied in turn increases one’s risk of social anxiety, depression, and suicidality, and that bullies themselves are often experiencing mental health problems. Due to the limited number of pediatric mental health professionals and the potential social stigma associated with receiving mental health services, dermatologists can play an important role in supporting their pediatric patients with psychosocial comorbidities. To this aim, we developed, administered, and analyzed a survey exploring risk factors, prevalence and emotional impact of bullying among all-comers to our single tertiary pediatric dermatology clinic. We hypothesized that the use of a simple survey can help us identify and assist pediatric dermatology patients in greatest need of support. Methods: Our observational, cross-sectional study utilized a short survey we developed based on the clinical experience of the investigators as well as a literature review of factors contributing to stigmatization in children with skin conditions. Our survey will include 150 patients aged 8-19 attending the pediatric dermatology clinic at Boston Children’s Hospital. Results/Discussion: Preliminary results show a notable prevalence of bullying in this specific population. 22% report being bullied by at least a few children, 6% at least weekly. 10% reported wanting to stay home from school because of bullying. Acne (32%), atopic dermatitis (25%), and alopecia areata (13%) are the most common conditions associated with being bullied amongst patients surveyed. 49% of patients have listed the face as one of the areas affected by their skin condition. 16% of all patients wish they had more help to deal with being bullied and only 13% report being asked by a nurse or doctor about bullying before. Bullying may be the primary reason for seeking dermatologic care. Informally, our study revealed that parents and dermatologists alike are often unaware that a child has been bullied, and having discussions about bullying strengthens the therapeutic relationship. These findings highlight the need for greater awareness of and comprehensive support services for bullying in the pediatric dermatology population.

References
Acne fulminans is the most severe and debilitating form of acne. It typically manifests as an explosive worsening and ulceration of skin lesions, and can be associated with fever, bone pain, and other systemic symptoms. It has also been associated with severe multiorgan syndromes such as SAPHO (Synovitis, Acne, Pustulosis, Hyperostosis, Osteitis) and PAPA (Pyogenic arthritis, Pseudogout, Acne). Fortunately, classic acne fulminans is a relatively rare disease, but its variants appear to be increasing in incidence. “Pseudo-acne fulminans” or “acne fulminans sine fulminans” is most often seen following treatment with isotretinoin for significant cystic/inflammatory acne. Ironically, isotretinoin is both a common cause of “pseudo-acne fulminans,” as well as the best long-term treatment for all forms of acne fulminans.

There is a paucity of evidence-based information and no clear guidelines concerning the pathogenesis, treatment, and prevention of acne fulminans and its variants. Therefore, a group of recognized thought leaders was convened to review both evidence-based and empiric information relating to acne fulminans and its variants. The goal was to develop a consensus understanding regarding the pathogenesis, prevention, treatment, and future directions for investigation of acne fulminans and its variants. Prior to the conference, an extensive review of the literature was conducted and a Dropbox was created, which included all articles of relevance to acne fulminans and its variants. The chairs identified nine priority topics, and each participant was assigned a specific topic to present to the group. Appropriate clinical case presentations and consensus survey questions were utilized to create recommendations based on both the literature and the expert consensus. These guidelines offer a more complete understanding of acne fulminans, providing approaches for both the treatment and the prevention of acne fulminans and its variants.

References

Dermatology-related Outpatient Visits by Children in the United States 2006-2010: Implications for Pediatric Education

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Case Summary

Previous estimates indicate that 10% of outpatient pediatric visits address a dermatologic concern (1-2). While pediatricians often treat dermatologic conditions, because it is not their specialty, they see proportionately few cases of individual dermatologic conditions (3), which has implications for quality of care. Deficiencies in dermatology education for pediatric trainees has been documented (4-5). We sought to identify the most common pediatric dermatology diagnoses seen in outpatient settings to identify high yield educational topics for healthcare providers. We analyzed the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Care Survey (NHAMCS) databases from 2006-2010 for visits including patients aged 0-18 years. The NAMCS and NHAMCS surveys are conducted annually by the CDC, and provide a national probability sample of ambulatory visits across the United States. We categorized visits as dermatology-related by the presence of one of the 25 most common pediatric dermatology conditions identified in prior studies (6) and our clinical experience. Visits were compared using the discharge diagnosis (ICD-9 CM) codes. Overall 23.2 million (9.35% of) outpatient pediatric visits included one of the dermatology diagnoses examined in our study. Six diagnoses accounted for approximately 70% of pediatric visits for a dermatologic complaint, and included contact dermatitis, acne, skin and soft tissue infections, dermatitis NOS, viral warts, and atopic dermatitis. Contact dermatitis was the most common pediatric dermatology diagnosis seen in both hospital-based and private outpatient clinics, but skin and soft tissue infection was the most common in the emergency department. Pediatricians and family practitioners saw similar percentages of diagnoses with contact dermatitis being the most common. Approximately 60% of pediatric visits to a dermatologist were for the diagnoses of acne or viral warts. Our study showed that dermatologic conditions are often addressed in the outpatient pediatric setting. Creating an educational curriculum based on these identified common dermatologic diagnoses has the potential to be efficient and improve the quality of care for many pediatric patients (7). Furthermore, dermatology is among the top three subspecialties to provide routine follow up care to pediatric patients (8). If primary care providers could comfortably diagnose and treat common pediatric skin conditions, this could potentially allow more patients with complex or urgent conditions to be seen by a pediatric dermatologist, thereby helping to alleviate the workforce shortage of our subspecialty.

References

### Title of Presentation
Diet control is a risk factor for severe acne in young female adolescents in Taiwan

### Poster Number
32

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### Case Summary
**Background**
Acne is the most common skin disease in adolescence. Diet has been noted as one of the common risk factors for severity of acne. The association of diet control and severity of acne in young female adolescents will be shown in this national-wide survey in Taiwan.

**Material & Methods**
Our study recruited young female adolescents (aged 12-15 years) during September 2010-March 2011. Questionnaires and physical examinations were performed by well-trained investigators (non-dermatologists). The individual numbers of comedonal and inflammatory acne were recorded by locations (forehead, cheeks, nose/chin). A questionnaire about “components of daily diet”, “diet control”, and “change of body weight” was taken by each subject, under the instruction of the investigator. Survey Data Analysis (SUDDAN), Pearson’s chi-square test and Fisher’s exact test were used for statistical analysis. A p value less than 0.05 was defined as statistically significant.

**Results**
451 girls with valid questionnaires were recruited for analysis. The prevalence of facial acne was 90.3%. Diet control and subsequent weight loss had statistically significant association with severity of acne in young female adolescent in Taiwan.

### References

## Title of Presentation

**Pediatric Dermatology Training for Board Certified General Pediatricians:**

2014 SPD Workforce Committee Survey Results

| Poster Number | 33 |

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## Case Summary

There is a current shortage of board-certified pediatric dermatologists and demand for pediatric dermatology expertise remains high, as does interest in pediatric dermatology training among pediatric residents. In response to this critical issue, there has been ongoing discussion within the SPD regarding the appropriateness and feasibility of supporting an alternate training pathway in pediatric dermatology for board-eligible and board-certified pediatricians. A "Special Certificate" training program as envisioned could be jointly sponsored through the American Board of Pediatrics (ABP) and the American Board of Dermatology (ABD) and presumably supervised by pediatric dermatology fellowship training program directors; ACGME accreditation would require additional effort to create a curriculum and competency standards.

In 2011, pediatric dermatology fellowship directors and the SPD Executive Committee were surveyed regarding their support for such a program. Responses were mixed and a consensus was not established. The SPD Workforce Committee generated a follow-up survey in 2014 regarding this issue and the broader issue of how to increase the competence of care provided to children with dermatologic issues.

The survey was sent out to 509 members; 256 emails were opened and 98 members responded, including 33 pediatric fellowship directors representing 31 training programs. The majority of respondents were opposed to a formalized pathway to train pediatricians in pediatric dermatology, and very few training programs had the resources to provide such training. The responses suggested that the minority who favored a training program were pediatricians or had pediatric training.

Many who favored an alternate certification pathway were personally ineligible for certification. Specific comments reflected conflicting opinion, with the majority related to limited faculty and resources to provide training and the belief that dermatology residency training is essential to providing specialized care in pediatric dermatology. Requirement for ACGME accreditation for an alternate certification pathway for pediatricians, which would most likely be required by the ABP, was identified as a significant roadblock for training programs. The majority of respondents did support initiatives aimed at providing more education for pediatricians as well as initiatives to encourage medical students and dermatology residents to pursue training in pediatric dermatology. The SPD Executive Committee has not recommended additional action on this issue at this time.

## References

Title of Presentation

Planned PeDRA Procedural Dermatology Studies, Procedural Sub-Committee, Pediatric Dermatology Research Alliance (PeDRA)

Poster Number

34

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Case Summary

Introduction: Currently, research in procedural dermatology is mainly limited to adult patients. Research specifically involving pediatric patients is highly lacking. There remains a significant need for large, prospective studies to gather data on the use of procedures in this uniquely vulnerable population. The Pediatric Dermatology Research Alliance (PeDRA) sub-committee on procedural dermatology seeks to engage pediatric dermatologists in this endeavor.

Potential Procedural Sub-Committee Studies:

1) Port Wine Stain and Laser "Best Practices" Survey and Consensus Statement
   A survey will be distributed to elucidate the practices and beliefs of pediatric dermatologists who treat port wine stains with laser. The survey will address: timing of treatment, frequency of treatment, pain management, and treatment parameters. The data will be compared to a survey that will be performed in parallel with the cosmetic dermatology community, and a consensus statement will be developed.

2) Laser-Assisted Wound Healing and Scar Mitigation in Epidermolysis Bullosa Patients
   A multi-center study will be conducted to determine the role, if any, of lasers in the healing of epidermolysis bullosa wounds. We seek to determine if early intervention can help heal chronic wounds, mitigate scarring, alter the development of squamous cell carcinoma, and alleviate pruritus and pain in the affected areas.

3) Prospective Procedural Adverse Events Study
   The incidence of adverse events from pediatric dermatology procedures has not been well defined. This prospective, multi-practice study aims to enumerate these complications. Information on adverse events related to procedures such as cantharadin application, Candida antigen injection, cryotherapy, punch biopsy, shave biopsy, excision, laser surgery, phototherapy, and patch testing will be collected and aggregated over a 1-year period.

4) Survey of Practices/Beliefs and Consensus Statement on Isotretinoin and Wound Healing
   A survey will be distributed to pediatric dermatologists to delineate “perceived” versus “evidence-based” notions of how isotretinoin affects wound healing. Doing so is crucial in adolescents who have used isotretinoin and now seek treatment for acne scars. The results of this survey will be compared to a parallel survey from the cosmetic dermatology community, and a consensus statement will be developed.

Conclusion: Herein we present these pediatric procedural studies to gather interest and to call for participation from other pediatric dermatologists. If you are interested in participating please email the procedural sub-committee chairperson, Andrew C. Krakowski, MD, at akrakowski@gmail.com.

References

1 Pediatric Dermatology Research Alliance (PeDRA) URL http://pedraresearch.org/ [accessed on May 15 2015]


**Title of Presentation**

Excipients in Oral Antihistamines Can Perpetuate Allergic Contact Dermatitis

**Poster Number**

35

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**Case Summary**

Propylene glycol is a well-documented causative agent of allergic contact dermatitis (ACD). In the pediatric population, the clinically relevant prevalence of ACD due to propylene glycol is difficult to determine but this agent has been shown to be one of the top 15 contact allergens in children (1). Due to propylene glycol’s versatile chemical properties and low toxicity, it is a common component of topical and oral medications, personal care products, and foods. Ingestion of medications and foods containing propylene glycol has been reported to cause systemic dermatitis in patients with a cutaneous sensitivity to the allergen (2,3). Systemic dermatitis also has been reported to occur following intravenous injection of medication with propylene glycol in its base (4). We describe two adolescents with sensitivity to propylene glycol confirmed by patch testing in whom complete improvement of dermatitis seemed to depend on cessation of oral antihistamines containing propylene glycol. We report these cases to alert providers to the potential for worsening of ACD due to systemic exposure to propylene glycol in patients with a cutaneous sensitivity to the allergen. As propylene glycol is an excipient in most formulations of children’s oral antihistamines as well as in many foods, topical corticosteroid preparations, and personal care products, providers can utilize this discussion as a guide when creating treatment plans for patients with propylene glycol sensitivities.

**References**

Title of Presentation: Leukocytoclastic Vasculitis in Children- clinical features, physical examination and direct immunofluorescence characteristics of 70 biopsy-proven cases

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Case Summary:
Background: Leukocytoclastic vasculitis (LCV) comprises a range of conditions characterized by histologic evidence of inflammation of blood vessels in the dermis or subcutaneous tissue (1,2). While the most common cause of LCV in children is believed to be Henoch-Schonlein Purpura (HSP) (3-5), and although fairly well studied in adults (4), the demographic features, clinical appearance and etiologies of leukocytoclastic vasculitis are poorly characterized in the pediatric age group.

Methods: Retrospective review of pediatric patients with evidence of LCV on cutaneous biopsy specimens seen at our institution between 1993-2013.

Results: Of the 70 pediatric patients identified, average age was 12.5 years and 59% female. Extracutaneous symptoms were reported by 80% of patients; most commonly reported were arthritis (53%), abdominal pain (44%), and hematuria (9%). Prevalence of extracutaneous symptoms and physical exam characteristics remained similar even when cases of HSP were excluded from the study group. Etiologies of LCV were determined to be HSP in 33 (47%) cases, systemic inflammatory conditions (urticarial vasculitis, polyarteritis nodosa, PLEVA, etc.) in 11 (16%) cases and systemic autoimmune disease (systemic lupus erythematosus, SLE-like conditions, pernio, etc.) in 10 (14%) cases. Direct immunofluorescence was positive most commonly for fibrinogen (95%), followed by IgM (73%), C3 (62%) and IgA (60%). When cases of HSP were excluded the positivity of IgA on DIF decreased (28%) while other immune deposits remained similar.

Conclusion: This study found HSP to be the most common cause of LCV, although at a lower rate than in previous older reports, followed by systemic inflammatory conditions and systemic autoimmune diseases. These findings highlight that other etiologies for LCV may be more common in children than previously believed. Rates of cutaneous findings, extracutaneous symptoms and DIF findings were similar when HSP cases were excluded from the study group, demonstrating the importance of maintaining a broad differential when evaluating children with cutaneous vasculitis.

References:
**Title of Presentation**
Linear lichen planus reveals keratinocytic determinants of inflammatory disorders

**Poster Number**
37

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**Case Summary**

Linear lichen planus (LLP) is a rare form of lichen planus in which the characteristic lesions present along lines of Blaschko, most commonly on the extremities. It represents approximately 2% of total LP cases, with only 2-3% of that subset seen in patients under 20 years of age[1]. Lines of Blaschko arise via dorsoventral migration of mutant ectodermal keratinocyte precursors during embryonic development [2, 3]. We present here a 17-year-old Female referred for evaluation of an eruption on her right leg that first appeared 2 years prior. Initially the eruption began as red to purple pruritic spots that cleared with significant post inflammatory hyperpigmentation but recurred in the same distribution. Examination revealed a cluster of approximately a dozen 2-4 mm planar, pink-violaceous papules on the right medial lower thigh surrounded by reticulated hyperpigmentation which extended from the medial ankle to the proximal medial thigh in a Blaschko-linear distribution. A biopsy showed patchy lichenoid lymphocytic infiltrate with vacuolar alteration and occasional necrotic keratinocytes. Numerous melanophages were seen in papillary dermis, along with mild epidermal acanthosis. There was incremental improvement with application of triamcinolone cream. LLP and other dermatoses that manifest along LOB; including psoriasis, lichen striatus ILVEN, and acquired blaschkoid dermatitis; are easily identifiable, as they tightly adhere to this distribution pattern. The tropism of these disorders to lines of Blaschko supports a keratinocytic determinant for these disorders in which mutant keratinocytes, in the setting of a specific environmental trigger, manifest localized inflammatory disease. We have previously employed paired whole exome sequencing (WES) of normal and affected tissue to identify the genetic basis of linear cutaneous disorders including nevus sebaceus and syringocystadenoma papilliferum (REFS). We propose to employ this approach in linear inflammatory disorders, including lichen planus, ILVEN, “Blaschkitis,” and psoriasis to identify keratinocytic genetic determinants of these inflammatory disorders. This may permit development of new therapeutic modalities for these disorders, many of which can present with broader cutaneous involvement refractory to therapy.

**References**

**Title of Presentation**

**Pediatric Psoriasis CSI: Comorbidity Screening Initiative**

**Poster Number**

38

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**Case Summary**

Psoriasis is a complex inflammatory skin condition that has been associated with several serious medical comorbidities in adults, including hypertension, dyslipidemia, type 2 diabetes mellitus, overweight/obesity, psoriatic arthritis, non-alcoholic fatty liver disease, depression, anxiety, and decreased quality of life. Several research groups have investigated the assessment and risk of these comorbidities in adults with psoriasis, but there is little guidance for screening pediatric patients. Thus, we assembled a panel of multi-disciplinary experts to develop evidence-based screening recommendations and address this gap in management of affected children. The panel reviewed the available literature on these comorbidities and used the patient-centered Strength of Recommendation Taxonomy (SORT) method to grade the quality of evidence. Because of the paucity of pediatric studies published on these topics, the strength of these recommendations is SORT level C (based on consensus, usual practice, opinion, disease-oriented evidence or case series), consistent with expert consensus recommendations. The majority of the recommendations coincide with those endorsed by the American Academy of Pediatrics for the general pediatric patient since there is currently insufficient evidence to justify more intensive screening protocols for the pediatric psoriasis patient. Educating families and patients early about improving lifestyle choices and providing a supportive environment facilitated by open communication between primary providers and specialists may help reduce the risk of developing these comorbidities in pediatric psoriasis patients. A written document summarizing the available evidence, screening recommendations, and research gaps is forthcoming.

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**References**


The term pyoderma gangrenosum (PG) was first coined at Mayo Clinic in 1930 to describe an uncommon ulcerating skin disorder. PG is rare in childhood, and the features of PG have not been well characterized in the pediatric population. We conducted a retrospective review of patients aged 17 years and younger, who were diagnosed with pyoderma gangrenosum and evaluated at Mayo Clinic from 1976 to 2012. Thirteen patients with unequivocal pyoderma gangrenosum were included in the study. A slight female predominance was noted (8 girls, 62%). The mean age of diagnosis was 15.6 years (range 5-17 years). All patients had ulcerative lesions (Figures 1 and 2), and several also had pustular lesions (n = 8, 62%; Figure 3). Pathergy was clearly present in 62% of patients. Two patients had fevers of unknown origin that resolved with treatment of their PG.

In contrast to adults, who are most likely to develop PG on the lower extremities, PG in children is more evenly distributed on the body. PG lesions were most commonly found on the trunk and lower extremities (both in 77% of patients), but also the upper extremities and head/neck. Biopsy was performed in most patients, revealing nonspecific inflammation in most cases, with predominantly neutrophilic inflammation in about one third of cases.

In contrast to a previous review of pyoderma gangrenosum in childhood, 9 of 13 patients (69%) had an underlying associated disorder including Crohn’s disease (n =7, 54% of patients), juvenile idiopathic arthritis (n = 1, 8%), and PAPA syndrome (n = 1, 8%). No other associated disorders were identified including HIV, immunodeficiencies, or leukemia. In general, the course of the pyoderma gangrenosum did not clearly mirror the course of the underlying disease, though this was difficult to quantify. Nearly all patients were treated for pyoderma gangrenosum, with 12 of 13 (92%) receiving topical/local therapies and 11 of 13 (85%) undergoing systemic treatment. Local therapies included antiseptic dressings, tacrolimus ointment, topical corticosteroids, and intralesional corticosteroid injections. Systemic treatment most commonly included oral corticosteroids (73% of patients receiving systemic treatment), as well as sulfasalazine/sulfa drugs (55%), followed by dapsone, mycophenolate mofetil, azathioprine/6-mercaptopurine, anti-TNF agents, and cyclosporine. The course of disease and response to treatment was variable amongst patients, with some patients experiencing complete clearance in as little as three months, and other patients experiencing a relapsing and remitting course.

References
Psoriasis and psoriasiform eruptions in pediatric patients with inflammatory bowel disease being treated with anti-TNF-alpha agents

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Case Summary

Background. Anti-tumor necrosis factor alpha (TNF-α) medications are used to treat a variety of autoimmune and inflammatory conditions including psoriasis. Paradoxically, numerous reports have documented new-onset or flaring of psoriasis in patients being treated for conditions other than psoriasis, particularly in adults with inflammatory bowel disease (IBD). Thus far, not much is known regarding similar cases in the pediatric population.

Methods. A retrospective chart review was performed on patients aged 0-18 seen at the Mayo Clinic between 2003 and 2014 with IBD who developed new-onset or a recurrence of psoriasis or a psoriasiform eruption while on anti-TNF-α medications. Charts meeting criteria underwent manual review and clinical data was gathered.

Results. Thirteen children developed psoriasis while on anti-TNF therapy for IBD. Infliximab (77%) and adalimumab (23%) were responsible for initial development of psoriasis in these patients. Onset of psoriasis or psoriasiform skin lesions varied from first treatment to four years into treatment, with a mean onset of 20.2 months. Lesions had the highest predilection for the scalp, followed by the umbilicus and extremities. Plaque psoriasis was most commonly seen (85%), followed by palmoplantar pustular psoriasis (15%). Topical corticosteroids were utilized in all cases. Eight patients (62%) had to discontinue their initial anti-TNF treatment due to their skin eruption, 7 of whom were switched to a different anti-TNF agent and 1 to ustekinumab. Six of those (75%) experienced recurrent lesions. Two of these patients had to discontinue all biologic therapy due to recurrence or persistence of psoriasiform skin reactions. Ultimately, 85% of all patients were able to continue biologic therapy, with 69% able to continue anti-TNF therapy with skin-directed therapy, with or without change in medication.

Conclusion. Anti-TNF-α-induced psoriasis in children being treated for IBD is a rarely reported adverse reaction in the pediatric population. There may be a class effect among infliximab, adalimumab, & certolizumab. Plaque-type psoriasis affecting the scalp is the most common presentation and treatment using a conventional approach for psoriasis should first be attempted and may often be successful. In recalcitrant cases, cessation of therapy may be necessary, and newer biologics may serve as a reliable treatment option for the IBD in the future.

References

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### Case Summary

Aims: Psoriasis carries with it a significant burden of disease. There is growing knowledge in the adult literature regarding medical and psychiatric comorbidities, as well as its significant impact on those affected and their loved ones. Emerging data indicate the impact that psoriasis has on affected children, but little is known about how it affects a child’s parents. In our effort to better understand this and ultimately develop better treatment and support strategies, we explored how a child’s psoriasis may impact his or her parents.

Methods: We conducted semi-structured, qualitative interviews with 23 parents of children with psoriasis (88% response rate) seeking care at a large academic medical center. All subjects had a child diagnosed with psoriasis, with varying severity of disease. Two trained interviewers conducted the interviews which were audiotaped and transcribed. We used framework analysis to identify and code themes independently. Codes were harmonized via discussion and consensus.

Results: Twenty-one women (mothers of affected children) and 2 men (fathers of affected children) were interviewed (age range of child: 18 months-17 years). Types of psoriasis in the children ranged from plaque (82%), inverse (9%), guttate (4%), and generalized pustular (4%).

Four broad themes emerged from the interviews including negative effects on (1) physical health – child’s psoriasis affecting parent’s sleep, contributing to stress and depression, and inability to focus on personal health issues; (2) emotional health – concern over child’s current health and well-being, worry about child’s condition and future healthcare implications, and sadness and frustration resulting from their child’s psoriasis; (3) social and family function – the time, cost, and burden of treatment and care for their child, relationship challenges with the child, other family members (including spousal conflict) and friends, and feeling the need to raise awareness about the condition; and (4) personal function – how caring for a child with psoriasis affects career, how the parent limits their activities or accommodates to compensate for the affected child, and how these functions become a normal part of the family routine.

Conclusions: Childhood psoriasis carries a significant burden for the parents of affected children. Multiple domains, including physical and emotional health, social and family function, and personal function are significantly affected. Ultimately, treatment and support approaches that consider the effect of the child’s skin disease on both the child and the family should be developed to better support patients.

### References

**Title of Presentation**  
*Congenital melanocytic nevi and the experience of itch: results of a patient-based survey*

**Poster Number**  
42

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**Case Summary**

**Background:** Evaluation of congenital melanocytic nevi (CMN) is a common reason to visit a pediatric dermatologist. Anecdotally, patients, the CMN community, and dermatologists familiar with this population have noted the complaint of pruritus in patients with larger-sized CMN. In some cases, this can be a significant issue that impacts quality of life and may constitute an important and under-recognized medical problem. There is a paucity of information reported regarding the pruritus prevalence, pathogenesis and treatments for this population.  

**Methods:** The purpose of this study was to describe the pruritus experienced by patients with CMN, with focus on large/giant CMN. A 56 question online survey was utilized to collect data and all age groups on all continents were included. Responses were based on patient or caregiver self-report. Although the survey was advertised primarily to patients with large/giant CMN, patients with smaller sized CMN were not excluded. The questionnaire was designed by the authors based on review of published itch scales in the literature, recent revised classification of CMN and the Dermatology Life Quality Index (1, 2).

**Results:** Data analysis was completed on 183 respondents. The majority of persons with CMN were females residing in North America with giant CMN (G1, G2 total 46%), with greater than 50 (47%) satellites. Sixty-four percent of respondents reported itching, with 16% having experienced itching in the past, 9% with current itching, and 39% with itching currently and in the past. Pruritic areas tended to be hairy, bumpy, and appear thick/wrinkled. Common locations for itching included CMN areas over the back, buttocks, and legs. Atopic dermatitis was reported in 29% of participants. Itching onset was noted as early as 2 months of age and as late as 20 years of age. The most frequent treatments were moisturizers and prescription topical steroid preparations. When asked how well treatments tried helped improve the itch, most subjects reported they “did not help” or “helped a little”. Surgical removal of pruritic areas was pursued in 35% of subjects. Itch severity score positively correlated with dermatology life quality index.

**Summary/limitations:** Itching is likely a significant problem for patients with CMN, in particular those with large/giant CMN. This was a patient-based survey and responses were not physician verified.

**References**

Title of Presentation
Nonmelanoma Skin Cancer in Children: A Retrospective Chart Review

Poster Number
43

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Case Summary
Background & Objective
Pediatric nonmelanoma skin cancer (NMSC) is rare and has traditionally been associated with heritable predisposing conditions. Clinical characteristics, outcomes, and other risk factors have not been well described. The goal of this study was to characterize clinical features, potential risk factors, and gaps in care associated with pediatric NMSC.

Methods
A retrospective chart review was performed of all patients with histopathologic diagnoses of squamous cell carcinoma (SCC) and basal cell carcinoma (BCC) at Boston Children’s Hospital between 1993 and 2014.

Results
28 patients and 185 occurrences of NMSC were identified. There were 7 patients with SCC, 19 with BCC, and 2 with both BCC and SCC. 50% (14/28) of patients with NMSC had a heritable predisposing condition, while 46% (13/28) had one or more acquired risk factors. 4 patients (1 SCC, 3 BCC) had no identifiable risk factors.

Acquired risk factors included prolonged immunosuppression (6), radiation therapy (8), chemotherapy (7), and voriconazole use (4). Of these patients, 69% (9/13) had two or more risk factors. Of those with a single risk factor, 3 received prolonged immunosuppression, and one received radiation therapy. There were no patients with chemotherapy or prolonged voriconazole exposure alone as risk factors. Prolonged immunosuppression was significantly associated with occurrence of SCC. 84.6% (11/13) were of white race, and all were of Fitzpatrick skin phototype I or II (if documented).

78% (7/9) of patients with SCC had subsequent diagnoses of SCC, keratoacanthoma (KA), and/or actinic keratosis (AK). 38% (8/21) of patients with BCC went on to have additional BCCs. 62% (8/13) of patients with one or more acquired risk factors had subsequent cancerous or precancerous skin lesions.

Mean time to diagnosis of NMSC was 948 days; 36% of patients were initially misdiagnosed. The majority of patients underwent surgical excision; only one had recurrent disease. There were no NMSC associated deaths.

Discussion/Conclusions
Our study suggests that NMSC is a rare yet recurrent problem in children, particularly in those with identifiable risk factors. Although pediatric NMSC is traditionally associated with heritable predisposing conditions, our study showed that 46% of cases are associated with acquired risk factors, including prolonged immunosuppression, radiation therapy, chemotherapy, and voriconazole use. Physicians should be aware of both heritable and acquired risk factors that may predispose a child to skin cancer; this way, appropriate counseling and monitoring as well as early recognition and treatment can be provided.

References
Pediatric Atypical Melanocytic Neoplasms: A Retrospective Case Series with Focus on Diagnostic Challenges, Molecular Analysis, and Surgical

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Case Summary
Atypical melanocytic neoplasms (AMNs) can be diagnostically challenging, with debate concerning diagnostic criteria, use of ancillary testing, and optimum treatment. We describe our institutional experience with AMNs in the pediatric age group, focusing on diagnostic shifts in pathologic interpretation from community, consultant, and institutional consensus and changes in diagnosis based on definitive surgical treatment and long-term follow-up.

Methods: A single-institution retrospective analysis of patients up to 26 years of age, referred between 1998-2014 for diagnosis and treatment of melanocytic neoplasms which could not be definitively diagnosed as benign or malignant by the initial pathologist. All diagnoses were numerically coded based on suspicion for malignancy: 1-benign; 2-atypical, favor benign; 3-indeterminate for malignancy; 4-atypical, favor malignant; 5-malignant; and alphabetically coded by melanocyte phenotype (e.g. S=spitzoid, B=blue nevus-like).

Results: 100 patients were evaluated. The median age was 17. 81 lesions were reviewed by an additional expert consultant; all were reviewed by a board-certified dermatopathologist at our institution. Expert review resulted in a change in diagnostic category compared to initial diagnosis in 69% of patients. Of these, 66% were upcoded and 34% were downcoded as more or less suspicious for malignancy respectively, and 51% had a change in phenotypic category. Institutional review resulted in a change in diagnostic category in 83% of patients compared to initial review and in 65% of patients compared to expert consultant review. Molecular analysis was used in 6 lesions. Negative FISH and CGH resulted in downcoding of 3 lesions. Abnormal FISH or presence of BRAFv600e mutation resulted in upcoding of diagnosis in 3 lesions. 43 patients underwent sentinel lymph node biopsy (SLNB), and 33% of these were positive. The re-excision and/or SLNB findings resulted in a change of diagnosis in 14% of these patients. At a median follow-up of 55 weeks, one patient was alive with disease, two were dead of disease, one was dead of unknown causes, and 97 had no evidence of disease.

Conclusions: This large series of challenging melanocytic neoplasms in the childhood, adolescent, and young adult population demonstrates the variability of diagnoses among pathologists, both community and experts. Molecular analysis can support the diagnostic process, and surgical results may provide valuable information about the biology of lesions. Overall, these lesions have good prognosis, although rare fatal cases show the need for further research in this area.

References
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Congenital Brain Anomalies in PHACE Syndrome  |  45

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Case Summary
Introduction: PHACE Syndrome is a congenital disorder characterized by large infantile hemangiomas of the face, scalp, and neck associated with developmental abnormalities of the brain, heart, blood vessels, eyes, and chest wall. Studies have been done to better characterize the observed anomalies in the heart and blood vessels. In their study of PHACE patients with cerebral arteriopathy, Hess et al (2010) reported that 41% had associated structural brain anomalies1. However, to date there has not been a more detailed analysis of the types of structural brain anomalies that occur in this disorder. The goal of this study was to better characterize structural brain anomalies and assess for associations between brain anomalies and clinical outcome.

Methods: Inclusion criteria for the study included enrollment in the International PHACE Syndrome Clinical Registry and Genetic Repository and the availability of cross-section brain images in the CHW system. IRB approval was obtained and a literature review was performed to identify all brain anomalies previously reported in PHACE syndrome and was used to create a data intake form. Initial review of MRI images was performed at Children's Hospital of Wisconsin.

Results: MRI images from 32 patients were available for review. Structural brain anomalies were identified in 19/32 cases. 9 had posterior fossa anomalies: 6 with cerebellar hypoplasia, 2 with cerebellar hypoplasia and brainstem anomalies and 1 with brainstem anomalies. Of the 8 with cerebellar hypoplasia 4 occurred on the left side, 2 on the right, and 2 bilaterally with the right side affected more than the left. 3 patients had Dandy Walker malformations. 6 patients had abnormalities in the pituitary, 3 had Rathke cleft cysts, 2 had partially empty sella, and one was missing the posterior pituitary and pituitary stalk. 2 patients had hypoplasia of the optic chiasm. Malformations of cortical development and agenesis of the corpus callosum were each seen once. An additional anomaly found on brain imaging was 11 patients had dural ectasia of the trigeminal cistern.

Conclusion: The most common structural brain anomalies were in the posterior fossa and pituitary. Posterior fossa anomalies were the most common observation, ranging from the most severe form being Dandy Walker to mild cerebellar hypoplasia including the hemisphere and the vermis. In every case of cerebellar anomaly the affected side was the same as the hemangioma and major arterial anomalies. While the posterior fossa is a common location for brain anomalies in PHACE Syndrome, other areas such as the pituitary and Meckel’s cave must also be examined, as 15/32 cases had abnormalities.

References
Background: Klippel-Trenaunay syndrome (KTS) is a rare, complex vascular anomaly characterized by the triad of capillary malformation (port-wine stain), venous malformation +/- lymphatic malformation, and limb overgrowth. Reported skin-related complications of KTS include eczema, ulceration, verrucous changes, vascular ectasias (blebs), bleeding, thrombophlebitis, and infection. The rarity of the syndrome as well as past inconsistency in classification of vascular anomalies has made large studies of the prevalence of these complications difficult.

Objective: To determine the spectrum and prevalence of skin-related complications occurring in patients with KTS.

Methods: A retrospective review of 130 patients with possible KTS evaluated between 2008 and 2012, was performed to identify (1) all patients with the presence capillary malformation, venous +/- lymphatic malformation, and limb overgrowth fulfilling strict KTS diagnostic criteria as approved by the International Society for the Study of Vascular Anomalies (ISSVA) General Assembly in April 2014 and (2) presence or absence of cutaneous complications including eczema, ulceration, cellulitis, superficial thrombophlebitis, and capillary malformation complication (thickening, bleeding, blebs).

Results: Overall, KTS criteria were met in 60 of 130 (46%) patients. The mean age at most recent follow up was 25.6 years (median 22; range 0-74). Of those patients with KTS, cutaneous complications were present in 57% (34/60) with 30% (18/60) experiencing multiple complications. Patients with one or more cutaneous complication were more likely to have a lymphatic malformation (11/34; 32%) than those without complication (1/26; 4%), p=0.006.

The prevalence of cutaneous complications is as follows: 16/60 (27%) with a capillary malformation complication, 15/60 (25%) with superficial thrombophlebitis, 12/60 (20%) with cellulitis, 8/60 (13%) with ulceration and 3/60 (5%) with eczema. Of those with capillary malformation complication, the most prominent findings included bleb formation (13/16; 81%), bleeding (11/16; 69%), and thickening (3/16; 19%). Of those with cellulitis, 75% (9/12) had recurrent cellulitis with 5 patients requiring hospitalization.

Conclusions: This is the largest study to date analyzing the prevalence of cutaneous complications in KTS. Skin-related complications are common, affecting 3 out every 5 patients fulfilling criteria for the diagnosis of KTS. Awareness of these possible complications is important for primary care physicians and dermatologists as there may be significant associated morbidity and mortality, and early diagnosis and appropriate management is vital.

References
Evaluation of maternal infertility as a risk factor for PHACE syndrome

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Case Summary

Introduction: PHACE syndrome is characterized by Posterior fossa anomalies, Hemangioma, Arterial anomalies, Coarctation of the aorta, Eye anomalies, and sternal defects. The etiology of PHACE syndrome is unknown and likely multifactorial and complex. A genetic etiology has been proposed given the syndromic phenotype; however, there are no published reports of heritability in families of children with PHACE. Preliminary X-inactivation studies have not demonstrated significant skewing in affected female patients or their mothers (1). Whole exome sequencing and copy number variation analysis have yet to identify a common pathogenic variant (2). To further delineate the pathogenesis of PHACE, we sought to determine if there is an increased prevalence of infertility and assisted reproductive technologies (ART) in the mothers of children with PHACE. It is known that the incidence of imprinting disorders is increased in individuals conceived through the use of ART. Imprinting disorders occur when either the paternal or maternal normal allele is epigenetically silenced (imprinted) and a mutated allele from the other parent is expressed. Previous studies indicate that ART themselves are not the cause of imprinting disorders, but rather the genetic background of subfertile parents (3). It has been proposed that ART may bypass a natural selection mechanism to allow for an imprinting disorder to occur (4). Design: A survey to evaluate the rates of miscarriage, infertility, and ART use was made available to 114 families enrolled in the PHACE syndrome International Clinical Registry and Genetic Repository. Results: A total of 63 responses were gathered from December 14th, 2014 to February 4th, 2015. Twenty-five of 62 survey respondents (40.3%) and 62/218 mothers in the entire registry (28.4%) reported a known or suspected history of miscarriage; this difference likely represents an ascertainment bias. Although higher, the latter rate is not significantly different from the national miscarriage rate of 15-20% in the United States (5). Sixteen percent of mothers of PHACE children report a history of infertility compared to a national infertility rate of 12% (6). According to the National Survey on Family Growth, 11.9% of women in the United States received infertility services (7). This is comparable to the 14.8% (9/61) in the PHACE registry who reported receiving fertility therapy for the pregnancy related to the child with PHACE. Conclusion: Though more mothers in the PHACE registry had miscarriages and infertility, no statistically significant differences were found when comparing to national data. Rates of ART use did not differ substantially in the two groups.

References

BACKGROUND/OBJECTIVES: Infantile hemangiomas (IH) of the lip are potentially problematic due to their high visibility and risk for disfigurement and ulceration. This study examined sizes, patterns, and locations of lip hemangiomas, their prognostic value, and their implications in hemangioma pathogenesis.

METHODS: The records of 106 patients seen for lip hemangiomas from 2006-2013 at Nationwide Children's Hospital were reviewed. Localized hemangiomas were mapped to a location on the lip based on their focus. Size, location, and morphology were assessed in regards to outcome. Poor outcomes were considered to be marked anatomic deformity or scarring, functional complications, ulceration, vital compromise, and PHACES syndrome.

RESULTS: 92% of segmental lip hemangiomas were associated with poor outcomes as opposed to 32% of localized hemangiomas (p < 0.001). Localized lip hemangiomas originated from six distinct locations. Localized lip hemangiomas with poor outcomes were, on average about 2.36 cm² larger (95% CI: 1.47-3.25 cm²) than those that resolve well (p < 0.001), 52% of upper lip hemangiomas had poor outcomes, compared to 6% of lower lip hemangiomas (p = 0.0015). 61% of localized hemangiomas involving the vermilion border had poor outcomes, compared to only 25% of those that did not (p = 0.014).

CONCLUSIONS: Localized lip hemangiomas have a nonrandom pattern that seems to respect known models of facial development. Segmental morphology is associated with poor outcomes. In localized lip hemangiomas, the upper lip is associated with more problematic outcomes than the lower lip. Large size and involvement of the vermilion border are also valuable prognostic indicators associated with poor outcomes.

References

Nasal Infantile Hemangiomas: Characteristics, Complications and Outcomes

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Case Summary

Background:
Fifty percent of infantile hemangiomas (IH) – the most common benign infantile tumor – arise on the head and neck. While nasal IH pose unique complications such as airway compromise, potential for cartilage destruction, and later psychosocial stress if the resolution is incomplete or prolonged, these lesions are understudied. We aim to characterize nasal IH by type and depth, and determine which characteristics are associated with complications and are predictive of outcome, specifically with respect to presence of IH or residual skin changes at the start of kindergarten.

Methods:
We performed a retrospective chart review of all patients seen by Pediatric Dermatology at Johns Hopkins between 2001 and 2014 for nasal IH (N=89). A telephone interview with the parents was also conducted in June and July 2014. All statistical analyses were performed using SPSS software (Version 22.0. Armonk, NY: IBM Corp.). Categorical variables were compared using Chi-Square and Fisher’s Exact tests as appropriate. For all analyses, P<0.05 was accepted as significant.

Results:
The telephone survey had a 71% response rate. Most IH were focal lesions (87%), of mixed depth (58%), located on the nasal tip (58%). Most patients had at least one treatment type (80%). Of the patients who were treated, 62% received propranolol, 30% received oral steroids, 34% received pulsed dye laser, and 27% had surgery (some patients had multiple treatment types). Thirty-nine percent of patients had complications, the most common of which was airway compromise/nasal compression (69%). Other complications included ulceration (31%), visual obstruction (14%), and infection (3%). By the start of kindergarten, IH had regressed in 70%, but 78% of these children still had residual skin changes (telangiectasia, fibrofatty mass, or scarring). Segmental and indeterminate IH were more likely to have complications (P=0.014) and received more treatment types (P =0.025) than focal lesions. Mixed IH were more likely to ulcerate than deep or superficial lesions (P =0.011). Mixed and deep IH received more treatment types than superficial IH (P =0.022). Of those IH that regressed by kindergarten, mixed and superficial left more residual skin changes than deep (P =0.040).

Conclusions:
Nasal IH of segmental and indeterminate type and IH of mixed depth have the most complicated clinical course; these lesions should be identified as high risk and monitored and treated accordingly. Most nasal IH regress by kindergarten and parents may be reassured appropriately. However, many IH leave residual skin changes and early referral to pediatric dermatology for evaluation may be important for the best outcome.

References