ACDS 31ST Annual Meeting

MARCH 19, 2020

GRAND HYATT DENVER | DENVER, CO

Taking Dermatitis to New Heights

Advancing the field of dermatitis by sharing perspectives

Abstracts

Fisher Presentations (in order of presentation) — Colorado A Ballroom

General Session Presentations (in order of presentation) — Aspen Ballroom

Poster Presentations (in order of location): **Colorado B Ballroom**

********* FISHER PRESENTATIONS ********

Abstract Title: A Systematic Review of Photopatch Test Results from 2009-2019: Proposed Stratification of Photoallergens Based on Frequency and Clinical Relevance

Authors and Affiliations: Taehan Kim, Stanford University School of Medicine; Jennifer Chen, Stanford University; Golara Honari, Stanford University

Abstract

Objectives:
Photopatch testing (PPT) is the method of choice in evaluating patients with suspected photoallergic contact dermatitis. The frequency and relevance of positive reactions to specific photoallergens may vary depending on the population, geographic location, personal preferences, and exposures.
This study aims to systematically review and consolidate the literature on PPT results worldwide from 2009-2019. Specifically, we intend to stratify photoallergens based on the frequency and relevance of their positive PPT reactions.

Methods:
We conducted a comprehensive literature search on PubMed and Google Scholars and selected studies using the following criteria: written in the English language, sample size ≥30, ≥5 photoallergens tested. Case reports were excluded. We combined PPT results from these studies and calculated the weighted average frequency and relevance of positive PPT reactions for each photoallergen.

Results:
We identified 15 studies that met our inclusion criteria and obtained PPT results for 108 photoallergens. We then stratified these allergens into six tiers: tier 1 (frequency ≥ 1%, relevance ≥ 50%), 15 chemicals, including *p*-aminobenzoic acid, oxybenzone, and ketoprofen; tier 2 (frequency < 1%, relevance ≥ 50%), 19 chemicals; tier 3 (frequency ≥ 1%, relevance < 50%), 9 chemicals; tier 4 (frequency < 1%, relevance <50%), 7 chemicals; tier 5 (frequency > 0%, unknown relevance), 26 chemicals; tier 6 (no reported positive PPT reaction), 32 chemicals.

Conclusions:
This study demonstrates significant differences in the frequency and relevance of positive PPT reactions between commonly tested photoallergens. Stratification of photoallergens based on frequency and relevance can assist clinicians in selecting photoallergens and improve the efficacy of PPT.

Acknowledgements:
None

Abstract Title: Identifying Acrylates in Medical Adhesives

Authors and Affiliations: Idy Tam, Tufts University School of Medicine; JiaDe Yu, Massachusetts General Hospital

Abstract

Objectives:
Allergic contact dermatitis (ACD) to medical adhesives occurs in about 0.3-11% of patients often leading to wrongful assumption of an infection especially in the perioperative setting. However, the acrylates used in medical adhesives is unknown leading to recurrence of ACD. The goal of our pilot study is to identify the acrylates in medical adhesives.

Methods:
Sixteen medical adhesives available at the Massachusetts General Hospital were analyzed using ultrahigh-performance liquid chromatographic–mass spectrometry. Dormer-Chemotechnique's patch test allergens (colophony and acrylate series) were used as standard reagents. A match in isotopic patterns and retention time between those in medical adhesive samples and standards were used to identify acrylates in each medical adhesive.

Results:
Fifteen out of sixteen medical adhesive samples had at least one detectable acrylate; 12 adhesives contained only one acrylate, one adhesive contained two acrylates, and two adhesives contained four acrylates. Five acrylates were detected in the adhesive samples: triethyleneglycol dimethacrylate in 12 adhesives (68.8%), and dimethylaminoethyl methacrylate in four adhesives (25%), 1,6-hexandiol diacrylate in three adhesives (18.8%), and tetrahydrofurfuryl methacrylate and tetraethyleneglycol dimethacrylate in two adhesives (12.5%). Abietic acid were detected in five adhesives (31.3%). Seven of sixteen adhesives were listed as "hypoallergenic" by manufacturers, all of which contained acrylates. Adhesives from the same company did not contain the same acrylates.

Conclusions:
This is the first study to systematically characterize acrylates in medical adhesives. These results provide important information on potential allergens that may be present medical adhesives and extended patch testing can aid in diagnosis of ACD to medical adhesives.

Acknowledgements:
This research was supported by the ACDS Clinical Research Award.

Abstract Title: Analysis of a Convenience Sample of Slime Kits for Isothiazolinones Using a Novel Colorimetric Test

Authors and Affiliations: Keegan O'Hern, Dartmouth-Hitchcock Medical Center; Carsten Hamann, Mary Hitchcock Dartmouth-Hitchcock Medical Center; Kathryn Zug, Dartmouth-Hitchock Medical Center

Abstract

Objectives:
The popular children's toy, slime, has been recently shown to cause methylisothiazolinone (MI) allergic contact dermatitis. Slime is often sold as multi-component slime kits, containing a slime base as well as additives such as dyes and fragrances. In this study we aimed to directly test for isothiazolinones in commercially available slime products.

Methods:
Using a qualitative colorimetric isothiazolinone assay originally designed to test industrial water samples for the presence of MI and methylchloroisothiazolinone, we tested common components of slime– glue, borax, shampoo–as well as five best-selling multi-component slime kits for the presence of these isothiazolinones after dilution in distilled water.

Results:
5 slime kits (including 13 slimes, 2 slime-scent solutions, 1 borax solution, and 1 glue) as well as common home-recipe slime components (1 glue, 1 contact solution, 1 shampoo) were analyzed for the presence of isothiazolinones. 10/20 samples tested positive including 62% of the slimes (n=8/13), one slime-scent solution, and the shampoo. Only 10% (n=2/20) of the tested samples had ingredient lists. Only one of these, the shampoo, listed MI as an ingredient. A subset of positive and negative samples are being further tested by mass spectrometry.

Conclusions:
Isothiazolinones are commonly used in slime and its components. Every slime kit tested contained at least one component with isothiazolinones. Those with known MI allergy should be made aware to avoid slime products, and this experimental assay may prove useful for testing potential allergen-containing slimes in those with MI allergy.

Acknowledgements:

Abstract Title: Carba Mix Misses 40% of Reactions to Diphenylguanidine: Retrospective Analysis from the North American Contact Dermatitis Group

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Rachit Gupta, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
Rubber accelerators are well known causes of allergic contact dermatitis. Carba mix (CM; 3% pet) is a mixture of three rubber accelerators: 1,3-diphenylguanidine (DPG, 1%), zinc diethyldithiocarbamate (1%), and zinc dibutyldithiocarbamate (1%). Because DPG is a component of CM, DPG is often not tested separately. However, previous studies suggest that DPG allergy may be missed when only testing with CM. The purpose of this study was to determine the frequency of concomitant reactions to CM and DPG.

Methods:
A retrospective analysis of North American Contact Dermatitis Group (NACDG) data 2013-2016 was conducted. The study group consisted of patients with an allergic patch test code to either DPG (1% pet) or CM. Reactions coded as irritant or doubtful/macular erythema, but not interpreted as allergic, were excluded.

Results:
10,457 patients were patch-tested to both CM and DPG; 610 (5.8%) had allergic reactions to either CM and/or DPG [CM only (n = 292, 47.9%), DPG only (n = 190, 31.1%), both (n = 128, 21.0%)]. 39% of CM-allergic patients also reacted to DPG, and 59.7% of DPG-allergic patients reacted to CM. 71.6% of allergic reactions to CM and 75.5% of reactions to DPG were doubtful or mild.

Conclusions:
Testing for CM will miss approximately 40% of allergies to DPG. Both CM and DPG have a high frequency of doubtful and mild reactions.

Acknowledgements:

Abstract Title: Formaldehyde Release from Pre-dispersed Tattoo Inks: Analysis Using the Chromotropic Acid Method

Authors and Affiliations: Y. Linda Liou, University Hospitals Regional Hospitals; Lindsey Voller, Park Nicollet Contact Dermatitis Clinic; Walter Liszewski, Northwestern University; Marna Ericson, University of Minnesota Dermatology Department; Erin Warshaw, Minneapolis VA Medical Center

Abstract

Objectives:
To evaluate the presence of formaldehyde in pre-dispersed tattoo inks using the chromotropic acid method (CAM).

Methods:
Tattoo inks from 39 companies that manufacture and sell inks in the United States (U.S.) were evaluated. Inclusion criteria included availability to purchase online, either through U.S. online tattoo product wholesalers or individual websites. Tattoo brands were separated into 3 groups based on prevalence of use: common, uncommon, and rare. For all common brands, 8 colors—including primary colors, secondary colors, black, and white—were purchased. For all uncommon and rare brands, 5 colors—including primary colors, black, and white—were purchased. Each ink sample was tested with standard CAM procedures; concentration of formaldehyde released was quantified based on a standard titration using spectrophotometry.

Results:
A total of 127 tattoo inks were purchased and tested. Ninety-three (73%) tested positive for formaldehyde; 34 (27%) were negative. Formaldehyde release did not correlate with color or brand. At least one ink from all brands (except one) was positive for formaldehyde release.

Conclusions:
Approximately three-quarters of selected U.S. tattoo inks tested positive for formaldehyde release when evaluated with CAM. Patients and clinicians should be aware of pre-dispersed tattoo inks as a potential source of formaldehyde.

Acknowledgements:
This study is supported by an ACDS Clinical Research Award

Abstract Title: Scalp Allergic Contact Dermatitis: Retrospective Analysis of North American Contact Dermatitis Group Data, 1996 to 2016

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Sara Kullberg, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
While allergic contact dermatitis (ACD) to scalp products/contactants may affect the scalp, adjacent areas (forehead, eyelids, ears, neck) are frequently affected. The aim of this study was to evaluate data on patch-tested individuals with scalp dermatitis.

Methods:
A 20-year retrospective analysis of North American Contact Dermatitis Group (NACDG) data was conducted. This analysis focused on several groups: individuals with scalp involvement only (S), individuals with scalp plus face/neck/ear involvement (S+), and individuals with no scalp involvement (NS).

Results:
48,753 patients were patch tested during the study period including 505 (1.0%) S and an additional 883 (1.8%) S+. As compared to NS (n=46,422), S and S+ were more likely to be >40 years old (82.4% and 75.7% vs. 66.4%) and female (87.5% and 84.6% vs. 65.7%), and less likely to have occupationally-related dermatitis (0% and 1.6% vs.14.0%) or have a history of atopic dermatitis (13.3% and 20.5% vs 22.2%, respectively). ACD was present in 45.9% S (n=232) and 66.8% S+ (n=590), respectively. The top allergens for SACD were p-phenylenediamine (29.3%), fragrance mix I (17.7%), nickel (13.8%), balsam of Peru (12.9%), and cinnamic aldehyde (9.1%). The top allergens for S+ACD, were p-phenylenediamine (44.6%), methylisothiazolinone (16.4%), fragrance mix I (12.4%), nickel (12.2%), and balsam of Peru (9.7%). Common allergen sources included: personal care products (not otherwise specified) (S:44.0%, S+36.1%), hair dyes (S:25.4%, S+:42.4%), and shampoos/conditioners (S:15.5%, S+:22.0%).

Conclusions:
Scalp ACD is rare and most commonly due to p-phenylenediamine. Hair products are a common source of allergens responsible for scalp ACD.

Acknowledgements:

Abstract Title: Contact Dermatitis Associated with Nail Care Products: Retrospective Analysis of North American Contact Dermatitis Group Data, 2001 – 2016

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Lindsey Voller, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
Ingredients in nail care products (NCPs) may lead to allergic and/or irritant contact dermatitis. This study sought to determine frequency of contact dermatitis associated with NCPs, characterize associated body sites, and describe causative allergens.

Methods:
A retrospective analysis was conducted of North American Contact Dermatitis Group (NACDG) data between 2001 – 2016. Patients with NCP sources specifically associated with any of the following were included: 1) positive patch test reaction to an NACDG screening allergen, 2) positive patch test reaction to a non-NACDG allergen, and 3) irritant contact dermatitis.

Results:
Of the 38,775 patients tested, 769 (2.0%) had: >1 allergic patch test reaction associated with an NCP (n=746, 97.0%), irritant contact dermatitis associated with an NCP (n=14, 1.8%), or both (n=9, 1.2%). Primary body sites included the face (43.0%) and hands (27.6%). The top five allergens were (meth)acrylates [2-hydroxyethyl methacrylate (2-HEMA), 273/482, 56.6%; methyl methacrylate (MMA), 210/755, 27.8%; ethyl acrylate (EA), 190/755, 25.2%; ethyl-2-cyanoacrylate, 12/175, 6.9%] and tosylamide (273/755, 36.2%). Frequency of allergy to 2-HEMA ($p=0.0069$) and EA ($p=0.0024$) significantly increased over the study period, while allergy secondary to tosylamide significantly decreased ($p<0.0001$). 17.1% of allergic reactions were to non-NACDG allergens.

Conclusions:
As long-lasting nail techniques become widespread, the prevalence of contact dermatitis to NCPs is expected to increase and should be suspected among patients with facial and/or hand dermatitis. Almost one-fifth of allergens would have been missed without additional screening allergens beyond the NACDG series, underscoring the need for testing to a broad array of allergens.

Acknowledgements:

Abstract Title: Patch Testing: The Patient Experience

Authors and Affiliations: Rebecca Kimyon, Park Nicollet Contact Dermatitis Clinic; Erin Warshaw, Minneapolis VA Medical Center; Sara Hylwa, Hennepin Healthcare and HealthPartners Institute; Anne Neeley, Park Nicollet Dermatology

Abstract

Objectives:
While anecdotally patients report itch/sleep disturbance/flaring dermatitis during patch testing, to date, data has been lacking on frequency of specific symptoms.

Methods:
Retrospective chart review of standard clinic questions regarding interim symptoms (pain, sleep disturbance, need for antipruritic/sleep medication, itch in test areas, itch outside of test areas, worsening of rash) assessed at 48 hour(48H) and final(F) patch test visits. Exploratory analyses evaluated association of symptoms with number of tested patches, location of patches, and number of positive reactions.

Results:
Over 15 months, 614 patients were patch-tested(71.4% female; average age 47.9). Average number of applied patches was 217; patch locations included: back(91.0%), arms(77.9%), legs(11.4%) and chest(6.4%). Total number of reactions included: none(13.0%), 1-5(31.5%), 6-10(23.4%), and >11(32.2%); 41.0%% had >1 ++/+++ reactions. Frequency of symptoms were: pain(48H:26.3%, F:15.4%), sleep disturbance(48H:55.6%, F:22.1%), need for antipruritic/sleep medication(48H:42.5%, F:40.9%), site itch(48H:77.4%, F:76.5%), itch elsewhere(48H:53.2%, F:53.7%), and worsening rash(48H:13.1%, F:27.8%). Significant associations included: number of applied patches and pain(48H&F); patch application on arm and pain(48H); patch application on chest and medication(48H&F); total number of reactions and pain(48H)/sleep(48H&F)/medication(48H&F)/site itch(48H&F)/worsening rash(F); and >1 ++/+++ reactions and pain(F)/medication(F)/site itch(48H/F)(all p values <0.05).

Conclusions:
The most common reported symptoms during patch testing were itch(at test sites and elsewhere), sleep disturbance, and need for medication. Number of positive patch test reactions, especially ++/+++ reactions, were significantly associated with symptoms.

Acknowledgements:

Abstract Title: Patch Testing is Increasingly being Performed by Non-Dermatologists: Retrospective Analysis of Medicare Part B Claims, 2010-2016

Authors and Affiliations: Adarsh Ravishankar, University of Minnesota Medical School; Rebecca Freese, Biostatistical Design and Analysis Center, University of Minnesota; Erin Warshaw, Minneapolis VA Medical Center; Noah Goldfarb, Department of Dermatology, University of Minnesota

Abstract

Objectives:
While other countries have characterized patch test utilization, to date, data from the U.S. has been lacking. The purpose of this study was to characterize the utilization of patch testing using Medicare Part B physician services data.

Methods:
Medicare Part B fee-for-service data from 2010-2016 was analyzed for patch test claims (procedure code 95044). Data collected included number of patches submitted/denied, amount paid, and provider type (physician vs. non-physician; dermatology vs allergy). Linear regression was performed for the change in submitted services compared to 2010 values. Pairwise comparisons of the change over time for each provider type were corrected with the Tukey method.

Results:
On average, 4.38 million patch claims per year were submitted and 4.04 million were accepted. From 2010 to 2016, net submitted services per 1000 Medicare Part B FFS enrollees grew by 33.7% and Medicare payments increased by 15.8%. The annual trend estimate for submitted services (compared to 2010 values) was 3.95 %/year (95% CI 0.93, 6.97) for physicians (all specialties) and 29.54 %/year (95% CI 26.52, 32.56) for non-physicians. For physicians only, the annual trend estimate for submitted services was 3.00 %/year (95% CI 0.71, 5.30) for dermatologists and 30.73 %/year (95% CI 28.43, 33.00) for allergists. Payment per patch (in 2016 USD) varied from a high of $6.53/patch (2011) to a low of $5.44/patch (2014).

Conclusions:
While patch testing overall increased in the U.S. Medicare population from 2010-2016, the increase was largely driven by non-physicians (nurse practitioners/physician assistants) and allergists.

Acknowledgements:

Abstract Title: A Mini-Epidemic of Suspected Contact Dermatitis to Delta Airlines® Uniforms: Clinical Pearls and Lessons Learned

Authors and Affiliations: Jamie Schlarbaum, University of Minnesota Medical School; Cory Dunnick, University of Colorado; Andrew Scheman; Anne Neeley, Park Nicollet Dermatology; Erin Warshaw, Minneapolis VA Medical Center; Sara Hylwa, Hennepin Healthcare and HealthPartners Institute

Abstract

Objectives:
In mid-2018, Delta Airlines® introduced new uniforms for flight attendants, gate agents, and maintenance personnel. Soon thereafter, workers reported skin irritation and rashes; social media and national news outlets amplified this information. Our aim is to describe the results of patch testing from Delta Airlines® employees from three contact dermatitis centers.

Methods:
13 Delta Airlines® flight and gate attendants with skin rashes presumed secondary to their uniforms were patch tested to a standard screening series (11 NACDG, 2 ACDS), and textile dye series, in addition to other allergen series and personal products. 12 individuals were tested to pieces of their uniforms and 11 individuals were tested to extracts from their uniforms (water, acetone, and isopropyl alcohol).

Results:
11 (85%) were female; age ranged from 25 to 62 years (average age: 43). All patients reported the development of a skin rash with new uniforms. 12 (92%) patients described involvement of their torso and 8 (62%) described involvement of the face/neck. Patch testing revealed 2 (15%) patients with a + reaction to 4-phenylenediamine (1% pet), 2 (15%) patients with a +/++ reaction to disperse blue dye mix 106/124 (1% pet.), and 3 (23%) with physical urticaria to uniform pieces. None had reactions consistent with allergic contact dermatitis to uniform pieces, uniform extracts, or to other traditional fabric-related allergens.

Conclusions:
No causative allergen was identified in the Delta Airlines® uniforms, but this 'mini-epidemic' provided an opportunity to optimize tools for evaluating uniform and textile allergy within our clinics.

Acknowledgements:

Abstract Title: Clogs: An Excellent (and Fashionable!) Option for Individuals with Allergic Contact Dermatitis to Shoes

Authors and Affiliations: Lindsey Voller, Park Nicollet Contact Dermatitis Clinic; Erin Warshaw, Minneapolis VA Medical Center

Abstract

Objectives:
Allergic contact dermatitis of the feet can be extremely difficult to manage. Limited, and often unappealing, shoe options are a significant barrier in compliance. The objective of this investigation was to determine the presence of common contact allergens in clogs.

Methods:
An online search was conducted to determine major clog brands. Information was obtained from the manufacturer's website and from discussion with company representatives. Specifically, the presence/type of rubber, adhesives, wood, leather, and dyes were investigated.

Results:
Information was obtained from 7 clog companies (4 Swedish and 3 U.S.). The majority used Alderwood and/or lime wood for the base. The clog sole (no skin contact) was made of rubber (n=4) or polyurethane (n=3). Five companies endorsed the use of vegetable tannins in their natural leather clogs; colored leather often consisted of chrome-tanned or an unknown dye composite mixture. Adhesives were typically used in gluing the wooden base to the rubber/polyurethane sole (no skin contact) and in small leather heel pad protectors (skin contact); specific adhesives were undisclosed or unknown. Custom-made clogs were available from 3 companies and cost ranged from $50–$350.

Conclusions:
Clogs represent an excellent shoe alternative for patients with rubber allergy. Vegetable-tanned leather is available for chromate-sensitive individuals and adhesives can be avoided by ordering clogs without a heel pad or removing the pad and sanding the wooden footbed. The wide variety and dressy styles, especially for women, make clogs an important addition to existing educational recommendations for patients with allergic contact dermatitis to shoes.

Acknowledgements:

Abstract Title: Patch Test Results Under the Influence of Methotrexate

Authors and Affiliations: Carina Woodruff, UCSF; Nina Botto, UCSF

Abstract

Objectives:
Patch testing patients with severe dermatitis and/or concomitant conditions requiring immunosuppressive medications poses challenges to the clinician. Expert opinion suggests that methotrexate is the least suppressive agent, making it the first choice at our institution for disease suppression while patch testing. The validity of patch testing on methotrexate, however, remains poorly understood.

Methods:
We performed a retrospective chart review to identify patients patch tested at our tertiary care referral center from 2013 to 2019 while taking methotrexate. All patients were tested with a modified North American Contact Dermatitis Group (NACDG) standard series as well as additional series and personal products as deemed relevant by clinical history.

Results:
A total of 39 patients underwent patch testing while taking methotrexate. The median treatment dose was 17.5 mg. 77% (30/39) of patients had at least 1 positive reaction. 61% of patients had at least one weak (1+) reaction (24/39), 41% had at least one strong (2+) reaction (16/39), and 31% had at least one extreme (3+) reaction (12/39). A total of 75 weak reactions, 36 strong reactions, 16 extreme reactions and 1 irritant reaction were noted.

Conclusions:
We present data on the largest cohort to date of patients patch tested while taking methotrexate. Our results indicate that patients receiving varying doses are able to mount a full range of reactions, thus generally supporting expert consensus that has guided clinical practice. Although most patients exhibited weak reactions, cross-over studies are needed to elucidate the impact of methotrexate on the number and strength of reactions.

Acknowledgements:

Abstract Title: YouTube as a Source of Information on Contact Dermatitis

Authors and Affiliations: Brandon Adler, Keck School of Medicine, University of Southern California; Nicole Harter, University of Southern California/Children's Hospital Los Angeles; Vincent DeLeo, USC Dermatology

Abstract

Objectives:
Patients are increasingly turning to the Internet for health information. YouTube, the second most visited website worldwide, hosts a plethora of health-related video content of uncertain value from various sources. We sought to investigate the accuracy, quality, and popularity of the most viewed contact dermatitis videos on YouTube.

Methods:
Cross-sectional study of YouTube videos retrieved using the search term “contact dermatitis,” sorted by view count. Two dermatologists screened the first 60 results, excluding unrelated and non-English-language videos. Videos were categorized by source (healthcare or non-healthcare). Accuracy was assessed on a validated scale of 1-4; quality, using Global Quality Scale; and popularity, by total views, daily views, and engagement ratio ([comments+likes+dislikes]/views).

Results:
After screening, 39 videos were included, uploaded between 2009-2019. In contrast to healthcare sources, non-healthcare sources had lower accuracy (1.9 vs 3.7, $p<0.001$) and quality (1.8 vs 3.7, $p<0.001$) with a trend toward increased popularity by mean views (45,033 vs 33,538, $p=0.50$), views/day (35.9 vs 29.3, $p=0.58$), and engagement ratio (0.014 vs 0.009, $p=0.23$). Subgroup analysis of healthcare-source videos showed insignificantly higher accuracy and quality from dermatologists vs non-dermatologists.

Conclusions:
Accuracy and quality of contact dermatitis YouTube videos vary greatly by healthcare vs non-healthcare source. Compared to similar studies on other common dermatologic conditions, contact dermatitis content may be under-accessed on YouTube. Popularity metrics suggest viewer willingness to engage with videos from healthcare sources, highlighting an opportunity to improve patient education through accurate, high-quality, engaging video content.

Acknowledgements:

Abstract Title: Quantification of Formaldehyde in Textiles: Impact on Allergic Contact Dermatitis

Authors and Affiliations: Margo Reeder, UW School of Medicine & Public Health; Majid Sarmadi, University of Wisconsin School of Human Ecology

Abstract

Objectives:
Clothing may contain formaldehyde and provoke allergic contact dermatitis (ACD). The purpose of this study is to quantify the amount of formaldehyde in clothing. The second aim is to determine whether patients react to low levels of formaldehyde on patch testing.

Methods:
20 men's, 30 women's garments and 20 pillow cases from five different stores were tested for formaldehyde release using AATCC 112 test method. The following labels indicated that the article was finished with a textile resin: "wrinkle-free", "wrinkle resistant", "durable press", or "no iron." Formaldehyde allergic patients were patch tested to dilutions of formaldehyde ranging from 100 - 1000 ppm using both fabric swatches and Finn chambers.

Results:
Formaldehyde released from some of the materials tested in this research ranged from 3 to 900 ppm. Seven formaldehyde allergic patients were patch testing to formaldehyde dilutions. More strongly allergic (3+) patients reacted to lower levels of formaldehyde on patch testing. One patient reacted to 100 ppm.

Conclusions:
Formaldehyde allergic patients reacted to low levels of formaldehyde on patch testing. Further studies are needed to determine if a threshold exists to elicit ACD in formaldehyde allergic patients. Formaldehyde levels found in clothing is above industry standards and represents a hazard for allergic patients.

Acknowledgements:
This work was supported through a pilot award from the NIAMS funded UW Skin Disease Research Center (P30AR066524) and the UW-School of Human Ecology.

Abstract Title: Follow-up Study of the Workplace Prescription and the Implementation of Recommendations

Authors and Affiliations: Benjamin DeKoven, St Michael's Hospital; Diandra Budd, St Michael's Hospital; D. Holness, University of Toronto and St Michael's Hospital; Pilar Gomez, Saint Michael's Hospital; Irena Kudla, St. Michael's Hospital; Joel DeKoven, Uinversity of Toronto- Sunnybrook; Sandra Skotnicki-Grant, Bay Dermatology Center

Abstract

Objectives:
To evaluate the usefulness of a personalized, skin-specific tool called the Workplace Prescription (WP) in facilitating the return-to-work process for workers with OCD.

Methods:
Following ethics approval, 50 participants were recruited from the Occupational Health Clinic at St. Michael's Hospital in Toronto, Canada. At their final patch test visit, participants received two copies of the WP outlining the dermatologist's recommendations for return-to-work: one for their personal records and one for the employer. Participants completed a follow-up phone survey 6-8 weeks following the visit about their use of the WP, implementation of the recommendations at work, and their use of additional healthcare services. The survey was mailed to participants who could not be reached after three call attempts.

Results:
Mean age was 46 and 52% were male, 68% had ICD and 46% ACD. The majority were from healthcare or manufacturing. 60% reported time off work with a mean of 51 days. Most participants reported having reviewed the resource after leaving the clinic (N=45) and found it valuable (N=43). While only 74% acknowledged bringing a copy to the workplace, 76% stated most or all recommendations were implemented. Qualitative feedback indicated that although 12% of participants expressed concerns of employers dismissing the recommendations, the WP was well received or without issue, for 86% of workers.

Conclusions:
The WP was well utilized by participants, resulting in implementation of the workplace recommendations for the majority of workers.

Acknowledgements:
Funding provided by the Ontario Ministry of Labour

Abstract Title: Epidemiological Study of Patients With Contact Allergy To Ammonium Persulfate

Authors and Affiliations: Abdullah Alajaji, Brigham and Women's Hospital/Harvard Medical School; Pamela Scheinman, Brigham & Women's Hospital

Abstract

Objectives:
To identify the prevalence and clinical characteristics of patients with positive allergic reactions to ammonium persulfate among consecutive dermatitis patients who underwent patch testing in a single contact dermatitis clinic.

Methods:
A retrospective chart review of 2138 patients who underwent patch testing between July 1,2015 -November 1, 2019 was conducted. All patients were tested to a modified American Contact Dermatitis Core Series including ammonium persulfate. Initial readings were performed at 48 hours, final readings between 72 and 168 hours. Given irritant nature of ammonium persulfate, we included for analysis only patients with 2+ (papules + edema) or 3+ (extreme, spreading) reactions.

Results:
Among 2138 patients, 61 (2.85%) had 2+ or 3+ reactions to ammonium persulfate. 44 (72%) were female,17 (28%) were male. 46/61(75%) had atopy. 34/61 patients (56%) had 2+ reactions and 27(44%) had 3+ reactions. Clinical relevance was definite in 7/61(11%), probable in 6/61 (10%), unknown/possible in 48/61(79%). In patients with definite clinical relevance, 6/7 (86 %) had occupational ACD (4 hairdressers, 1 hair salon cleaner, 1 aquarium worker); 1/7 was bleaching her hair.

Conclusions:
Prevalence of 2+ or 3+ ammonium persulfate reactions in this single center study was higher than that reported by the North American Contact Dermatitis Group, 2015-2016,(0.75% vs 2.85% in our study). Ammonium persulfate is an important contact allergen for hairdressers and individuals bleaching their hair.

Acknowledgements:

Abstract Title: Sensitization Risk Assessment for the Occupational Exposure of Hairdressers to Hair Dyes Indicates an Increased Margin of Safety for ME-PPD Compared to PPD

Authors and Affiliations: Carsten Goebel, Coty-Wella Global Toxicology and Analytical; E. Gargano, Coty Global Toxicology and Analytical, Darmstadt, Germany; Brunhilde Bloemeke, Environmental Toxicology, Trier University, Trier, Germany; Anthony Gaspari, Thomas Jefferson University

Abstract

Objectives:
Introduction of a methoxymethyl side chain into the extreme sensitizer p-phenylenediamine (PPD) yielded 2-methoxymethyl-p-phenylenediamine (ME-PPD) with much lower sensitizing and excellent hair coloring properties. We previously showed that replacement of PPD by ME-PPD significantly reduced the sensitization risk for consumers. We now ask, if the use of ME-PPD will reduce the sensitization risk for hairdressers, since development of allergic contact dermatitis has been associated with occupational exposure to PPD.

Methods:
Occupational hand exposure of hairdressers (N=11) to ME-PPD was determined following routine hair color treatments in commercial salons in Germany as well as under maximized hand exposure conditions in an experimental set up (N=3). A hand rinse method followed by HPLC analysis was adapted for ME-PPD detection. Published hand exposure data for PPD were available. Daily hand exposure estimations were derived by assessment factors for wet work, uneven hand exposure and inter-individual variability for professionals. Quantitative risk assessment (QRA) was conducted to assess the risk for hairdressers to become sensitized to either ME-PPD or PPD containing hair dye products by comparing daily hand exposure with the sensitization threshold defined as the No Expected Sensitization Induction Levels (NESIL).

Results:
Under typical working conditions in commercial salons and under experimentally maximized conditions hand exposure to ME-PPD was 240-fold and 40-fold below the sensitization threshold, respectively, whereas PPD hand exposure was only 2.7-fold below.

Conclusions:
For ME-PPD, the large margin of safety for the occupational hand exposure of hairdressers indicates a very low likelihood of sensitization, while for PPD the margin of safety is very small.

Acknowledgements:

Abstract Title: Formaldehyde Released From the Leather Component of Many Contemporary Work Gloves can Trigger Hand Dermatitis in Formaldehyde Allergic Patients

Authors and Affiliations: John Elliott, University of Alberta; Rylee Oosterhuis, University of Alberta; Kunimasa Suzuki, University of Alberta, Alberta Diabetes Institute, Alberta, Canada

Abstract

Objectives:
A 49 year old male heavy duty mechanic previously shown by us to be allergic to formaldehyde but not allergic to chromates contacted our clinic because of acute onset of severe vesicular hand dermatitis. He had run out of his usual thicker occlusive vinyl gloves, and 1 week prior had switched to wearing leather/fabric 'fitter' work gloves instead. Our objective was to determine if the patient's new gloves were releasing formaldehyde in sufficient quantities to trigger his hand dermatitis, and to test a range of similar gloves to see if they also released formaldehyde.

Methods:
The patient provided us with the remainder of the package (i.e. four pairs) of the suspect gloves. We separated the leather and fabric portions and used the acetylacetone method to measure formaldehyde release from each component of the gloves. We used the same approach to test a number of similar gloves.

Results:
The leather component of the gloves provided by the patient released an average of 200 ppm formaldehyde(n=8) and the fabric part released an average of 144 ppm(n=8). The literature suggests these amounts would be sufficient to trigger dermatitis in sensitized individuals. Testing a number of similar fitter and gardening gloves showed formaldehyde release from leather parts ranging from 146 to 1694 ppm and formaldehyde release from fabric parts ranging from 125 to 2859 ppm.

Conclusions:
In some cases, occupational hand dermatitis in formaldehyde allergic patients is due to formaldehyde released from the leather component of the patient's work gloves.

Acknowledgements:

Abstract Title: Duration of Contact Dermatitis Prior to Patch Test Appointment is Associated with Distance to Clinic and County Poverty Rate

Authors and Affiliations: Larissa Rodriguez-Homs, Duke University School of Medicine; Beiyu Liu, Duke University School of Medicine; Cynthia Green, Duke University Medical Center, Department of Biostatistics and Bioinformatics; Olamiji Sofela, Duke University Medical Center, Analytics Center of Excellence; Amber Atwater, Duke University Dermatology

Abstract

Objectives:
To examine the effect of travel distance and other socioeconomic factors on duration of dermatitis prior to presentation at the Duke Contact Dermatitis and Patch Testing Center.

Methods:
This is a retrospective study of patients who underwent patch testing from 3/1/2012 to 8/1/2018. Associations between duration of dermatitis, distance to clinic, and socioeconomic factors (age, race/ethnicity, payor group, county poverty rate, and rural-urban status) were examined.

Results:
1131 patients were included. The median duration of dermatitis was 14 months (Q1 = 7 months; Q3 = 36 months) and the median distance to clinic was 18 miles (Q1 = 7 miles; Q3 = 45.9 miles). For a 50-mile increase in the distance from the patient's ZIP code to the clinic, the median duration of dermatitis increased by 17.9% ($p < 0.001$). For every 5% increase in the county poverty rate, the median duration of dermatitis increased by 16.3% ($p = 0.032$). Trends were noted for a longer duration of dermatitis based on insurance payor, rural-urban status and race.

Conclusions:
Distance to patch test provider and county poverty status are important measures of access for patients with dermatitis.

Acknowledgements:
Leila Ledbetter, Duke University Medical Center Librarian

Abstract Title: Allergic Contact Dermatitis to Aluminum-Based Chambers During Routine Patch Testing

Authors and Affiliations: Jordan Ward, Duke University; Rabina Walsh, Duke University; Jane Bellet, Duke University; Amber Atwater, Duke University Dermatology

Abstract

Objectives:
We report a case of an 8-year-old girl with positive patch test reaction to aluminum-based patch test chambers and subsequent confirmation of aluminum allergy.

Methods:
Patch testing was performed with the North American Contact Dermatitis Society screening series and supplemental allergens, with aluminum-based patch test chambers, in standard fashion. Patch test reactions were designated as 3+ (very strong), 2+ (strong), 1+ (mild), +/- (weak/doubtful) and – (negative). Repeat patch testing was completed with aluminum patch test chambers and plastic patch test chambers, as well as additional allergens, as indicated.

Results:
Diffuse weak positive (1+) reactions were noted at every aluminum chamber site, with exception of corticosteroids. Testing was repeated with petrolatum in an aluminum chamber (+/-), petrolatum in a plastic chamber (-), and an aluminum chamber without added allergen (+/-). Additional testing in plastic chambers revealed aluminum chloride hexahydrate 2% petrolatum (1+), aluminum 100% (1+) and aluminum hydroxide 10% petrolatum (-). Once aluminum allergy was established, repeat patch testing was completed with plastic wells. Results revealed doubtful (+/-) and weak (1+) reactions to multiple fragrance allergens and nickel.

Conclusions:
Pediatric patients may be at higher risk for aluminum allergy; the use of plastic wells should be considered. When testing for aluminum allergy, aluminum chloride hexahydrate 10% petrolatum is recommended; aluminum chloride hexahydrate 2% petrolatum is the best commercially available option. Aluminum allergy can resolve or improve over time and is not a contraindication to aluminum-based immunizations.

Acknowledgements:
Financial relationships: Dr. Atwater received a Pfizer grant.

Abstract Title: The Value of Patch Testing in Adverse Cutaneous Drug Reactions

Authors and Affiliations: Megan Lim, The Ottawa Hospital; Melanie Pratt, The Ottawa Hospital , University of Ottawa

Abstract

Objectives:
The objectives of this presentation are to showcase the utility of patch testing in select drug-related delayed-type hypersensitivity drug reactions. We will review our institutional protocol for compounding various medicaments for patch testing. Here, we present several cases where patch testing was useful to confirm a culprit medication implicated in acute generalized exanthematous pustulosis (AGEP), fixed-drug eruption (FDE), systemic allergic contact dermatitis and symmetric drug-related intertriginous flexural erythema (SDRIFE).

Methods:
Patients were patch tested to The North American Contact Dermatitis Group (NACDG) standard series and to select medications mixed by our inpatient pharmacy diluted to 30% in petrolatum using IQ chambers and Scanpor tape. Patches were read at 72 and 120 hours.

Results:
Patch testing revealed contact dermatitis at patch test sites or the patient experienced a localized recall reaction, thereby confirming the offending medication in clinically important drug reactions.

Conclusions:
Patch testing is emerging as a valuable tool for evaluating drug allergy when there are multiple possible culprit medications. It is helpful when positive, but does not exclude a hypersensitivity reaction when negative. It is considered extremely safe.

Acknowledgements:

Abstract Title: Contact Allergens in Beard Care Products

Authors and Affiliations: Walter Liszewski, Northwestern University

Abstract

Objectives:
Objectives: beards have become increasingly popular in the United States. Numerous companies manufacture products to style and moisturize beards. These leave-on products come in several forms: oils, balms, and lotions. The purpose of this study was to identify the frequency and variety of contact allergens found in beard moisturizers.

Methods:
Methods: 59 beard moisturizers (31 oils, 20 balms, and 8 lotions) were analyzed for the presence of allergens in the North American or ACDS standard series.

Results:
Results: across all products, 20 allergens were present. All 59 products contained one or more fragrance, and at least one-quarter of all oils and lotions contained linalool and/or limonene. Preservatives and emulsifiers were found primarily in lotions, and the most common were phenoxyethanol (62.5%) and cetylstearyl alcohol (87.5%), respectively. Tocopherol was a common additive in oils (51.6%), balms (70.0%), and lotions (62.5%). Propolis (70.0%) and lanolin (45.0%) were common ingredients in balms; notably, lanolin was not present in any of the oils or lotions. Two sunscreens—benzyl salicylate and benzophenone-3—were found in one oil but no other products. Among all products, the most common disclaimers were animal cruelty-free (40.7%), paraben-free (37.3%), sulfate-free (28.8%), and gluten-free (15.3%).

Conclusions:
Conclusion: patch testing physicians should be aware that many common allergens are present in beard care products, and the types of allergens vary between oils, balms, and lotions.

Acknowledgements:

Abstract Title: Clinical Patterns of Hair Dye Dermatitis and P-Phenylenediamine Contact Sensitivity in Indian Population

Authors and Affiliations: Mrinal Gupta, Treatwell Skin Centre, Jammu, India

Abstract

Objectives:
To study the clinical patterns and PPD contact sensitivity in patients with hair-dye dermatitis.

Methods:
Two hundred (M: F 117:83) consecutive patients aged between 18 and 74 years suspected
to have contact allergy from hair dye were studied by patch testing with Indian Standard Series including p-phenylenediamine (PPD, 1.0% pet).

Results:
One hundred forty four (M: F 80:64) patients showed positive patch tests from PPD. Twenty eight of these patients also showed positive patch test reaction from fragrance mix, thiuram mix, paraben mix, or colophony. One hundred and seven (74%) patients affected were aged older than 40 years. Thirty two (22%) patients had a history of atopy. The duration of dermatitis varied from <1 month to >1 year with exacerbation following hair coloring. Seventy-nine patients had dermatitis of scalp and/or scalp margins and 53 patients had face and neck dermatitis. Hand eczema. Periorbital dermatitis, chronic actinic dermatitis, and erythema multiforme-like lesions were seen in 28, 16, 6, and 2 patients, respectively.

Conclusions:
Hair dyes and PPD constitute a significant cause of contact dermatitis with variable manifestations. There is an urgent need
for creating consumer awareness regarding hair-dyes contact sensitivity and the significance of performing sensitivity testing prior to actual use.

Acknowledgements:
None

Abstract Title: Patch Testing with Nickel Sulfate 2.5% vs 5%, and Palladium Chloride vs Sodium Tetrachloropalladate: The McGill Experience

Authors and Affiliations: Catherine Besner Morin, McGill Dermatology; Denis Sasseville, Montreal General Hospital

Abstract

Objectives:
The prevalence of sensitization to palladium ranges from 7% to 9% when patch testing with palladium chloride, but testing with sodium tetrachloropalladate is reported to increase the detection rate by up to 50%. Objectives: To determine which palladium salt is the optimal patch testing allergen. To compare patch testing results of two concentrations of nickel sulfate. To report the proportion of concomitant allergy to nickel and palladium.

Methods:
Methods: Patients were consecutively patch tested with palladium chloride 2% pet, sodium tetrachloropalladate 3% pet, and nickel sulfate 2.5% and 5% pet. Palladium chloride, sodium tetrachloropalladate and nickel sulfate 5% were applied on IQ chambers. Materials were supplied by Chemotechnique. Nickel sulfate 2.5% was tested in the NACDG series on Finn Chambers. Readings were performed at 48 and 96 hours.

Results:
Results: Thirty-three (16.4%) of 210 patients were positive to nickel 2.5% and 31 (15.4%) to the 5% concentration. Twenty-two (11%) reacted to sodium tetrachloropalladate versus 16 (8%) to palladium chloride. Fifteen (66%) patients with a positive test to sodium tetrachloropalladate, were sensitized to nickel, while 3 patients reacted to palladium alone.

Conclusions:
Conclusion: In our small sample, testing with nickel sulfate 5% was not superior to 2.5%. In agreement with existing literature, sodium tetrachloropalladate seems a better allergen to detect palladium allergy.

Acknowledgements:

Abstract Title: Axillary Contact Dermatitis to Topical Clindamycin

Authors and Affiliations: Lindsey Voller, Park Nicollet Contact Dermatitis Clinic; Sara Kullberg, Park Nicollet Contact Dermatitis Clinic; Erin Warshaw, Minneapolis VA Medical Center

Abstract

Objectives:
A 63-year-old female presented with a one-year history of intermittent dermatitis consisting of pruritic, red papules and plaques involving the bilateral axillary vaults, anterior/posterior axillary folds and lateral trunk. Symptoms were worse with sweating. She had been prescribed clindamycin phosphate 1% lotion for use as deodorant and had discontinued all other deodorants and antiperspirants. She had no known systemic drug allergies.

Methods:
Patch testing was performed with the North American Contact Dermatitis Group screening series, several supplemental series, purified clindamycin (10% pet), and home products, including clindamycin phosphate 1% lotion (as is).

Results:
Patch test results on day 5 showed 1+ reactions to purified clindamycin and clindamycin phosphate lotion. A separate, repeat patch of the purified clindamycin was also positive. Other potentially relevant positives included methylisothiazolinone, methylisothiazolinone/methylchloroisothiazolinone, tixocortol-21-pivalate, and various fragrances. Pertinent true negative reactions included aluminum chloride hexahydrate (2% pet), Drysol, and the inactive ingredients in clindamycin phosphate lotion (cetostearyl alcohol, stearyl alcohol, and sodium lauroyl sarcosinate).

Conclusions:
While patch testing has been used to diagnose systemic drug reactions to clindamycin, allergic contact dermatitis from primary topical application is rare. The first case was described in 1978 due to an alcohol-based clindamycin hydrochloride 1% solution prescribed for facial acne. Since then, nine other cases have been reported, only one of which involved the axillae. We present a case of clinically relevant allergic contact dermatitis to clindamycin, a relatively rare sensitizer.

Acknowledgements:

Abstract Title: Effectiveness of Support Groups for Patients with Contact Dermatitis

Authors and Affiliations: Lindsey Voller, Park Nicollet Contact Dermatitis Clinic; Sara Kullberg, Park Nicollet Contact Dermatitis Clinic; Yujie Liou, University Hospitals Regional Hospitals; Sara Hylwa, Hennepin Healthcare and HealthPartners Institute

Abstract

Objectives:
Contact dermatitis can be difficult to manage and overwhelming for patients, often requiring significant lifestyle changes. This study sought to investigate whether a contact dermatitis support group could help patients find community and learn from others who share similar experiences.

Methods:
Hour-long support group meetings were advertised during final patch test readings and held on a monthly basis for approximately 1 year. Sessions were facilitated by a social worker and faculty dermatologist. A 30 question, cross-sectional survey was offered to attendees to assess perception of their condition and overall usefulness of the group.

Results:
Between 2-5 patients attended each group session; 6 participants completed the survey. Most participants were female (83.3%) and Caucasian (66.7%), with an average age of 56.7 years. Half had attended the meetings 1-2 times previously, while half had attended 4-5 times. All participants believed their contact dermatitis affected their ability to socialize with friends and family, and 5/6 (83.3%) reported that it was important or somewhat important to socialize with others affected by contact dermatitis. Three group members had met with other attendees outside of the monthly sessions. The majority (83.3%) reported that support group had a positive effect on their understanding of contact dermatitis and would recommend the group to others.

Conclusions:
Support groups may be a helpful adjunct for patients learning to cope with the challenges associated with contact dermatitis. While preliminary feedback from group members is promising, further investigation is warranted to determine whether these groups are effective on a larger scale.

Acknowledgements:

Abstract Title: Allergic Contact Dermatitis to Pure Indigo Powder Hair Dye

Authors and Affiliations: Lindsey Voller, Park Nicollet Contact Dermatitis Clinic; Kunimasa Suzuki, University of Alberta, Alberta Diabetes Institute, Alberta, Canada; John Elliott, University of Alberta; Anne Neeley, Park Nicollet Dermatology

Abstract

Objectives:
A 50-year-old woman presented with a 10-month history of intermittent dermatitis involving the posterior neck and earlobes. Symptoms first began after dyeing her hair using 100% natural indigo powder added to natural henna. She had previously been using natural henna for many years without complication. This study sought to determine whether contact allergy to pure indigo powder contributed to her ongoing dermatitis.

Methods:
Patch testing was performed with the 2019 – 2020 North American Contact Dermatitis Group screening series along with several supplemental series, including hairstyling and textile dye panels, as well as her personal products, including pure henna and indigo powders.

Results:
Patch test results on day 8 revealed strong or very strong (2+ or 3+) reactions to para-phenylenediamine (PPD), para-toluenediamine sulfate, disperse orange 3, 3- aminophenol, 4-aminophenol, 4-aminoazobenzene, and 100% indigo powder. She had no reaction to pure henna powder. Thin-layer chromatography was performed on a sample of the indigo powder to rule out the presence of undisclosed PPD. Given the patient's desire to continue dyeing her hair, she was advised to use 100% natural henna or mineral-based dye. Three months later, she reported that her active dermatitis had resolved, although she continued to endorse residual hyperpigmentation of the posterior neck.

Conclusions:
We present this case to raise awareness of clinically relevant contact allergy to pure indigo powder and to reiterate the importance of patch testing to personal products. To the authors' knowledge, only one prior case of allergic contact dermatitis to indigo powder has been reported.1

1. Swan BC, Tam MM, Higgins CL, Nixon RL. Allergic contact dermatitis to substitute hair dyes in a patient allergic to para-phenylenediamine: Pure henna, black tea and indigo powder. Australas J Dermatol. 2016. doi:10.1111/ajd.12454

Acknowledgements:

Abstract Title: First Report of Allergic Contact Dermatitis to Loteprednol Etabonate Gel

Authors and Affiliations: Estefania Cruzval-O'Reilly, University of North Carolina at Chapel Hill; Aida Lugo-Somolinos, UNC Dermatology

Abstract

Objectives:
Loteprednol etabonate 0.5% gel (Lotemax®) is a corticosteroid used for the treatment of post-operative pain and inflammation following ocular surgery. It is structurally similar to other corticosteroids. However, it has a labile ester in lieu of a ketone group at carbon 20.
To the best of our knowledge, true contact dermatitis to loteprednol etabonate has not been reported in the literature. We hereby report the first case of allergic contact dermatitis (ACD) to loteprednol etabonate gel confirmed by patch testing.

Methods:
A 59- year-old woman with a history of eye irritation was referred to dermatology for evaluation of suspected ACD. Following pterygium surgery in 2000 and 2018, she developed eye swelling, redness, tearing and induration. She denied any itching or pain.

Results:
After a thorough review of the post- surgical notes, a custom patch tray was created based on the overlapping medications and personal care products used following both pterygium surgeries. At the 96-hour reading, the patient developed a reaction to loteprednol etabonate, a product she had used in various formulations (drops, gel, and ointment) during the post-operative course of both surgeries. She also had a positive reaction to Cortizone 10 cream and tixocortol-21-pivalate 1% petroleum. No reaction was noted for benzalkonium chloride, an excipient commonly found in ophthalmic medications. Based on the patient's history and patch test results, she was diagnosed with ACD to loteprednol etabonate.

Conclusions:
Ophthalmologists and dermatologists should consider the diagnosis of contact dermatitis to loteprednol etabonate in patients presenting with periorbital dermatitis following its use.

Acknowledgements:

Abstract Title: Photopatch Tests Results : Series of 37 Brazilian Patients

Authors and Affiliations: Maria Antonieta Scherrer, Maria Scherrer; Vanessa Rocha, UFMG

Abstract

Objectives:
Our aim is to study the main photoallergens in selected patients.

Methods:
Photodermatosis suspected patients who had undergone patchtesting to the Brazilian Standard Tray (BST) were photopatchtesting following its appropriated protocol. Since no patient presented a minimum erythematous dose lower than 10J/ cm2 of UVA, this dose was used.

Results:
Among 1,712 patch tested patients between 2007-2019, we selected 37 (2.2%), 19 men (51.4%) and 18 women (48.6%), aged 30-80 years, 22 (59.4%) of phototypes II and III, 7 (19%) IV and V and 8 (21.6%) VI. Seventy-four positive reactions were observed, 54 on the irradiated side and 20 on non-irradiated side leading to diagnoses of photoallergic contact dermatitis (PACD) in 23 (62%) patients, and allergic contact dermatitis (ACD) in 12 (32%) .The photoallergic reactions detected were with chlorpromazine (n = 9 , 24%), Balsam Peru (n = 6, 16%), perfume mix (n=5, 13.5%), promethazine, chlorhexedine and potassium dichromate (n = 4, 11%), oxybenzone and BHT (n = 3, 8%), Paraphenylenediamine and Compositae mix (n = 2, 5.4%), Sesquiterpene Lactona mix, Thiourea and Butylmethoxybenzoylactone (n = 1, 2.7%). Six patients (16%) had negative tests on both tested sides.

Conclusions:
Chlorpromazine was the most frequent photoallergic allergen. It is a phenothiazine-derived antipsychotic whose analogues such as dihydrochlorothiazide and promethazine are widely used in the country as a diuretic and antipruritic drug. Differences in the pattern of photopositivity vary according to the population and geographical area studied.

Acknowledgements:

Abstract Title: North American Prospective Pediatric Allergic Contact Dermatitis Registry

Authors and Affiliations: Idy Tam, Tufts University School of Medicine; Hope Gole, University of Missouri; Kari Martin, University of Missouri - Columbia; JiaDe Yu, Massachusetts General Hospital

Abstract

Objectives:
The true incidence of allergic contact dermatitis (ACD) in children is unknown and published studies of children with ACD are limited. In 2018, Massachusetts General Hospital (MGH) initiated a multicenter, prospective pediatric ACD registry in efforts to gather data on the incidence and prevalence of ACD and identify evolving trends of allergen sensitization in US children. Hereby, we report updates of the registry.

Methods:
This is a multicenter prospective analysis of patch test results of children 18 years or younger from February 2018 to December 2019.

Results:
Nine academic medical centers have agreed to participate in this study. Five out of nine sites have received institutional review board approval. Two sites have initiated data collection. The registry thus far, includes 102 pediatric patients (mean age±SD: 9.8±5.0 years; males: 42.2% and females: 57.8%). Seventy patients (68.6%) had a history of atopic dermatitis. Average number of patch test allergens tested per patient was 98.1±39.2 allergens (mean allergens±SD). Eighty-one percent of patients had one or more positive patch test reactions. The most common allergens were nickel (17.6%), cobalt (16.7%), methylisothiazolinone (MI) (13.7%), and methylchloroisothiazolinone (MCI)/MI (12.7%), hydroperoxides of linalool (11.8%).

Conclusions:
This is the first national prospective database of pediatric ACD in the United States. Prior databases have been limited by its retrospective nature and heterogeneity of provider qualifications. By selecting leading academic centers and expert contact dermatologists to participate, we seek to create the most comprehensive and accurate collection of pediatric ACD cases which can improve our understanding of this condition in children.

Acknowledgements:

Abstract Title: Sodium Disulfite/Bisulfite Allergy Manifesting from Dish Soap

Authors and Affiliations: Sara Kullberg, Park Nicollet Contact Dermatitis Clinic; Sara Hylwa, Hennepin Healthcare and HealthPartners Institute

Abstract

Objectives:
A 62-year-old woman presented with a 5-year history of intermittent pruritic vesiculopustular dermatitis of the bilateral hands. Previous treatments included multiple topical steroid ointments with cloth gloves overnight, coal tar, flurandrenolide tape, Bactine cleansing spray, Neosporin, and various moisturizing creams. Notably, she had been working as a caregiver, and reported a preference for washing dishes with PalmOlive Ultra SoftTouch Almond Milk and Blueberry Scent liquid dish soap.

Methods:
Patch testing was performed to the North American Contact Dermatitis Group standard screening series, several supplemental series, and a few of her own home products.

Results:
Final patch test reading on day 7 showed a very strong (+++) reaction to sodium disulfite/bisulfite, 1% in pet (Fig. 1). Other potentially relevant positives included gold sodium thiosulfate, balsam of peru, formaldehyde, and cetrimonium chloride. Sodium bisulfite was declared in her specific PalmOlive SoftTouch dish soap, and in her Clairol Professional LiquiColor Gray Busters hair dye. Given the exclusive distribution of dermatitis to the hands, her inconsistency with wearing gloves washing dishes, and subsequent positive repeat open application testing, her dish soap appeared to be significantly contributing to her dermatitis.

Conclusions:
New sources of sulfite allergy continue to emerge worldwide throughout the literature, as patients have experienced reactions, with or without systemic symptoms, to rectal enemas, catheter systems, and intravitreal injections. To the authors' knowledge, allergic contact dermatitis of the hands due to sulfite allergy from liquid dish soap has never been previously reported.

Acknowledgements:

Abstract Title: Methylisothiazolinone in Children's Nail Polish

Authors and Affiliations: Sara Kullberg, Park Nicollet Contact Dermatitis Clinic; Rachit Gupta, Park Nicollet Contact Dermatitis Clinic; Erin Warshaw, Minneapolis VA Medical Center

Abstract

Objectives:
Isothiazolinone preservatives including methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) and methylisothiazolinone (MI) are well known sensitizers responsible for a worldwide epidemic of allergic contact dermatitis. Some commonly recognized sources of isothiazolinones include homemade slime, wet wipes, and personal care products.

Methods:
We recently patch tested a mother with hand dermatitis. Final results showed a mild (+) reaction to MI.

Results:
Upon examination of our patient's (and her family's) products, we found several potentially relevant sources of MI including Townley Girl Disney Frozen Non-Toxic Nail Polish, which she applied to her 7-year-old daughter's nails. While MI has been well documented in pediatric skin care products, especially hair products, to our knowledge, it has not been reported as an ingredient in nail polish. A Google and Amazon search for children's nail polishes found that JoJo Siwa 7-pack nail polish set and Pure Anada Princess Polish also contain MI.

Conclusions:
Nail polishes marketed for children are often "water-based" and tout the claim of "non-toxic". However, water-based products require preservatives such as MI in order to prevent bacterial growth. We report this case to raise awareness of a new source of isothiazolinones for children and their family members.

Acknowledgements:

Abstract Title: Allergic Contact Dermatitis to IBOA in the Glucose Sensor FreeStyle Libre® in a Tertiary Care Portuguese Hospital

Authors and Affiliations: Catarina Queiros, Hospital de Santa Maria, Centro Hospitalar e Universitário de Lisboa Norte; Maria Inês Alexandre, Department of Endocrinology, Hospital de Santa Maria; Pedro Miguel Garrido, Department of Dermatology, Hospital de Santa Maria; Teresa Correia, Department of Dermatology, Hospital de Santa Maria; Paulo Filipe, Department of Dermatology, Hospital de Santa Maria

Abstract

Objectives:
Background: In the past few years, the glucose sensor FreeStyle Libre® has been associated with several cases of allergic contact dermatitis (ACD). The allergen responsible for most of these cases is isobornyl acrylate (IBOA; CAS 5888-33-5), a substance present within the sensor that migrates through the adhesive, thereby reaching the skin.
Objectives: To describe and characterize a population with contact dermatitis caused by glucose sensors in a Tertiary Care Portuguese Hospital, and to assess the prevalence of IBOA sensitization.

Methods:
Methods: Overall, 10 patients with cutaneous reaction to the glucose sensor FreeStyle Libre® were patch tested with the Portuguese baseline series, acrylates, plastic & glues series (provided from Chemotechnique), and with IBOA, purchased from Sigma-Aldrich and diluted 0.1% in pet.

Results:
Results: Eight patients reacted positively to IBOA, thereby confirming sensitization to this allergen. Three of these patients also reacted to some allergens of the Portuguese baseline series, all of them with past relevance. Two patients turned out to be negative in all patch tests.

Conclusions:
Conclusion: Allergic contact dermatitis caused by glucose sensors is an increasingly recognized problem, IBOA being the most common culprit allergen. In our series, we found a sensitization prevalence of 80% to this allergen, which is concordant with previous studies. Two of our patients did not react to IBOA, which can be explained by an irritant contact dermatitis instead of allergic contact dermatitis or to sensitization to a different allergen, such as N-N dimethylacrylamide, which we were not able to test.

Acknowledgements:
Acknowledgment: The authors would like to thank Dr. Vasco Ribeiro for the collaboration in the acquisition and preparation of allergen IBOA.

Abstract Title: "Will moisturizer help my skin?" A Review of Dermatitis Guidelines and Literature

Authors and Affiliations: Margaret Hammond, University Hospitals Cleveland Medical Center; Susan Nedorost, Case Western University Hospitals

Abstract

Objectives:
Inundated by skin care product marketing, patients with and without dermatitis often ask their dermatologists about the benefit of moisturizer. We review recent literature to assist with answering that question.

Methods:
We searched PubMed for relevant Cochrane reviews and current guidelines using combinations of the terms "emollient", "moisturizer", "dermatitis", "guidelines" as well as recent literature and our own pilot study data on the skin microbiome.

Results:
Consensus guidelines from six international societies were reviewed, all of which advocated for moisturizer use as a cornerstone of atopic dermatitis management. Moisturizers improve barrier function quickly and have anti-inflammatory effects but also have potential for causing contact allergy. In neonates, moisturizers may delay wet to dry cycles and thus delay irritant dermatitis. However, once dermatitis occurs, it may be desirable in neonates to avoid application of moisturizers containing components present in food that may trigger systemic contact dermatitis, such as oat. Moisturizers may also affect the cutaneous microbiome. Occlusive preparations may promote an environment for growth of mixed species biofilms which are shown to promote Th2 skewing by increasing thymic stromal lymphopoietin.

Conclusions:
Although recent consensus guidelines propose use of moisturizers in patients living with dermatitis, we do not know enough about the influence of various moisturizers on sensitization potential and the microbiome to offer broad advice including to healthy patients. Further interventional studies are needed to allow a more personalized approach in the future.

Acknowledgements:

Abstract Title: Relevant Contact Allergy to Benzisothiazolinone found in a Personal Care Product

Authors and Affiliations: Rachit Gupta, Park Nicollet Contact Dermatitis Clinic; Sara Kullberg, Park Nicollet Contact Dermatitis Clinic; Erin Warshaw, Minneapolis VA Medical Center

Abstract

Objectives:
Products designed for use on human skin (personal care products, PCPs) are regulated differently from industrial products. Historically, 1,2-Benzisothiazolin-3-one (BIT), a biocide and fungicide, has been used in products not designed for use directly on human skin (e.g. paints, varnishes, household cleaners). This vignette illustrates a novel source of clinically relevant allergic contact dermatitis to BIT in a PCP.

Methods:
A 35-year-old female presented with a 3-month history of bilateral hand dermatitis. The rash began in the interdigital web spaces and spread to both palms. Patch testing was completed to the North American Contact Dermatitis Group screening series and several additional series.

Results:
Patch testing demonstrated strong (++) reactions to nickel (2.5% and 5% pet) and BIT (0.1% pet), as well as a doubtful (+/-) reaction to bronopol (0.5% pet). BIT was listed as an ingredient in her Puracy Natural Foaming Lavender Vanilla Hand Soap, as well as in an all-purpose surface cleaner and two laundry products.

Conclusions:
While intermittent hand exposure to BIT in her household cleaners was possibly relevant, daily exposure to BIT in her hand soap was likely the major source of contact to BIT. To our knowledge, allergic contact dermatitis of the hands from BIT in a PCP has not been reported. This case underscores the importance of investigating patient products for identified allergens, even when not anticipated. As the isothiazolinone epidemic spreads, clinicians should be aware of BIT in PCPs.

Acknowledgements:

Abstract Title: Positive Patch Test Reactions to Carba Mix and Thiuram Mix: An Analysis of Co-Reactivity from the North American Contact Dermatitis Group

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Rachit Gupta, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
Because thiurams and dithiocarbamates have significant structural similarity, cross-reactivity is expected. This purpose of this study was to characterize carba mix (CM) and thiuram mix (TM) co-reactivity as well as characterize demographics and allergen sources in a large North American population.

Methods:
1994-2016 North American Contact Dermatitis Group data was analyzed. All patients with a final reaction coded as "allergic" to either CM or TM were included. Irritant or doubtful/macular erythema reactions not interpreted as "allergic" were excluded.

Results:
49754 patients were tested to both CM and TM. 3437 (6.9%) had allergic reactions to CM and/or TM: CM only (n = 1403, 40.8%), TM only (n = 1068, 31.0%) or both (n = 966, 28.1%). 47.5% of TM-positive patients were positive to CM and 40.8% of CM-positive patients were positive to TM. Males, occupationally-related dermatitis, and hand dermatitis were significantly more common in the CM/TM positive group as compared to the CM/TM negative group. Over 80% of CM/TM allergic reactions were clinically relevant. Gloves were the most common source; clothing and footwear were also frequent. The proportion of glove-related dermatitis was significantly lower in patients allergic to CM alone (24%) as compared to patients allergic to both CM and TM (63%) or to TM alone (41%).

Conclusions:
CM and TM remain important, clinically relevant allergens. Significant cross-reactivity between CM and TM was demonstrated, consistent with previously-proposed redox pair mechanism.

Acknowledgements:

Abstract Title: Brief Review of Allergic Contact Dermatitis Masquerading as Malignancies

Authors and Affiliations: Neil Vigil, The University of Arizona College of Medicine - Phoenix; Dathan Hamann, Contact Dermatitis Institute

Abstract

Objectives:
Allergic contact dermatitis (ACD) is a commonly presenting type IV hypersensitivity reaction that requires timely and accurate diagnosis for treatment and removal of offending agents. Rarely, ACD may be misidentified as a malignant disease process. Misidentification of ACD can lead to delay in treatment, prolongation of symptoms, and exposure to unnecessary diagnostic and therapeutic modalities. Additionally, patients may experience negative psychological effects from being misdiagnosed with cancer. We present a brief review of literature identifying cases of ACD initially presenting as malignancies.

Methods:
An online literature review was conducted through Pubmed and OVID databases utilizing appropriate keywords including Contact Dermatitis, mimicking, masquerading, and malignancy.

Results:
9 cases of ACD initially suspicious for malignancy were identified. The most commonly suspected malignancy was Cutaneous T-Cell Lymphoma representing 5 of the cases with 4 of those concerning for mycosis fungoides (MF). Two cases presented as BCC in in the distribution of glasses. One case initially thought to be Paget's disease of the breast. Lastly, one case masquerading as carcinoid syndrome. 8 of 9 cases reported using patch testing in confirming their final diagnosis of ACD.

Conclusions:
Review of these cases show that while rare, ACD may initially masquerade as more serious malignancy. In nearly all cases, thorough history and patch testing guided the clinician to the correct diagnosis. Physicians should keep a broad differential including ACD given the appropriate context.

Acknowledgements:

Abstract Title: Eyelid Dermatitis: Retrospective Analysis of North American Contact Dermatitis Group Data, 1994 – 2016

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Lindsey Voller, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
Allergic and irritant contact dermatitis (ACD/ICD) affecting the eyelids is common. This study aimed to provide information on the prevalence of eyelid dermatitis and primary causative allergens and irritants.

Methods:
A retrospective analysis was conducted of North American Contact Dermatitis Group (NACDG) data between 1994 – 2016. Patients with eyelids as the only body site of involvement were included and further characterized by: 1) currently relevant NACDG allergens, 2) non-NACDG allergens, and 3) relevant irritants.

Results:
Of the 50,795 patients patch tested during the study period, 2,332 (4.6%) had exclusively eyelid dermatitis. Most patients were female (88.4%), Caucasian (90.3%), >40 years old (70.6%), and non-atopic (56.4%). Primary diagnoses included ACD (43.4%), ICD (17.0%), and atopic dermatitis (13.1%). Of the 1,390 with ACD/ICD, 1,018 had currently relevant NACDG allergens (73.2%), 127 had non-NACDG allergens only (9.1%), and 245 had relevant irritants only (17.6%). The top five NACDG allergens were nickel sulfate (15.3%), methylisothiazolinone (13.7%), fragrance mix I (13.6%), gold sodium thiosulfate (12.8%), and Balsam of Peru (9.8%). The most common relevant irritant sources were cosmetics (64.0%) and eye care products (8.3%).

Conclusions:
ACD of the eyelids was commonly caused by metals and fragrances; methylisothiazolinone has emerged as an important allergen. Irritants were important in one-fifth of referred patients. Atopic dermatitis was also a common diagnosis. Patch testing remains an important tool in the evaluation of patients with eyelid dermatitis.

Acknowledgements:

Abstract Title: A Case of Symmetrical Drug-related Intertriginous and Flexural Exanthema (SDRIFE) to Prednisolone

Authors and Affiliations: Tricia Chong, National Skin Centre, Singapore; Yee Kiat Heng, National Skin Centre,Singapore

Abstract

Objectives:
Hausserman defined SDRIFE as an eruption of symmetrical erythema over intertriginous/ flexural skin, following exposure to a systemically administered drug. Prednisolone, often prescribed as anti-inflammatory medication, is a rare cause of SDRIFE. We aim to highlight this entity.

Methods:
We describe a case report of SDRIFE to prednisolone.

Results:
A 52-year old Chinese female presented with three episodes of pruritic rashes affecting intertriginous skin. These rashes only occurred when she had concurrent tonsillitis and would resolve within two weeks. Review of her drug history revealed the onset of rashes consistently coincided with commencement of a prednisolone course (prescribed for tonsillitis) approximately 24 hours prior. On examination, erythematous patches were noted over her bilateral groin folds and inframammary areas.

Patch test (PT) to tixocortol pivalate was +++. PTs to prednisolone in 30% petrolatum, budesonide, triamcinolone acetonide, clobetasol propionate, hydrocortisone-17- butyrate and dexamethasone- 21- phosphate disodium salt were negative. Graded oral provocation test (OPT) to prednisolone (15mg in total) reproduced intertriginous rashes within 2 hours, confirming a diagnosis of SDRIFE to prednisolone.
As dexamethasone PT was negative, graded OPT to dexamethasone (4mg in total) was undertaken. No immediate or delayed reaction was noted. Our patient was advised to use dexamethasone as an alternative to prednisolone, if necessary.

Conclusions:
This case highlights that, although uncommon, prednisolone can cause SDRIFE. Dermatologists should be aware of this possibility as prednisolone is frequently prescribed. PTs can aid diagnosis and guide the selection of alternative steroids which the patient may tolerate.

Acknowledgements:

Abstract Title: Patch Testing Reactions in 316 Patients Tested from 2007 to 2019 at a University Hospital Setting of Northeast Mexico

Authors and Affiliations: Luis Cruz Gómez, Servicio de Dermatología, Hospital Universitario ''Dr. José E. González''.; Jorge Ocampo Candiani, Servicio de Dermatología, Hospital Universitario ''Dr. José E. González''.; Minerva Gómez Flores, Servicio de Dermatología, Hospital Universitario ''Dr. José E. González''.; Maira Herz Ruelas, Servicio de Dermatología, Hospital Universitario ''Dr. José E. González''.

Abstract

Objectives:
Information regarding contact allergens detected by patch testing in Mexico and Latin America is scarce. Our objective is to identify the prevalence of positive reactions of each allergen using the European and North American standard and cosmetic series on patients in Northeast Mexico and to correlate these results with demographic variables.

Methods:
This is an observational, retrospective, longitudinal and unicenter study. Medical records of patients who underwent patch testing at the Dermatology Department of the University Hospital “Dr. José Eleuterio González”, U.A.N.L., Mexico, between 2007 and 2019 were retrospectively reviewed.

Results:
A total of 316 patients were patch tested. There were 233 patients (73.3%) who had at least 1 positive reaction, [177 female (75.9%) and 56 male (24.1%)]. The 5 most common allergens were: nickel (28.7%), followed by methylchloroisothiazolinone / methylisothiazolinone (24.0%), methyldibromo glutaronitrile / phenoxyethanol (12%), potassium dichromate (10%), and, fragrance mix 8% (9.4%). Female showed a positive reaction to nickel in 31.6%, methylchloroisothiazolinone / methylisothiazolinone 27.1%, methyldibromo glutaronitrile / phenoxyethanol 11.2%, phenylmercuric acetate 9.0% and fragrance mix 8%. In male, the most common allergens were: potassium dichromate with 23.2%, nickel 19.6%, iodopropynyl butylcarbamate and cobalt with 16.0%, methylchloroisothiazolinone / methylisothiazolinone and methyldibromo glutaronitrile / phenoxyethanol with 14.2% each one. Overall the most common affected area were the hands (45.0%).

Conclusions:
These results are in accordance to the most prevalent allergens documented in other countries, such as nickel and methylisothiazolinone. The main limitation of this study is its retrospective design.

Acknowledgements:
None.

Abstract Title: Preliminary Report from Patch Testing Database

Authors and Affiliations: Sydney Sullivan, University of California, Davis; Peggy Wu, University of California - Davis

Abstract

Objectives:
To create a database of patients seen for patch testing at the University of California, Davis, with the purpose of characterizing clinical presentation and phenotype, histologic findings, and outcomes of patch testing.

Methods:
This retrospective and prospective database has been approved by the Institutional Review Board. De-identified information is recorded in a REDCap™ database and analyzed with Excel and STATA®.

Results:
Of seventy-nine participants, 61% were of Caucasian, 19.5% Asian, 3.9% African American, and 2.9% Hispanic descent. 80.8% of patients had a biopsy prior to patch testing with the majority of those reports mentioning spongiosis, eosinophils, or contact dermatitis. 47 (79.7%) of patients reported pruritis as their primary symptom and erythema was the second most common complaint. 38.3% of patients had been diagnosed with atopic dermatitis prior to patch testing. At the final patch test reading, 76% of patients were diagnosed with allergic contact dermatitis (ACD). 2-3 months following patch testing, 10/16 patients correctly recalled their allergen testing results. Atopic dermatitis, truncal presentation, biopsy results mentioning contact dermatitis, spongiosis, or eosinophils were not significantly associated with a final diagnosis of ACD post patch testing. Hand findings at presentation trended towards a significant association with ACD diagnosis, $p = 0.08$, while facial presentation was significantly associated with ACD, $p < 0.0001$.

Conclusions:
This preliminary analysis of a diverse patch test population support and extend data from other cross-sectional studies. We hope to expand this database to better describe and quantify the effects of patch testing.

Acknowledgements:
Angelina Samchuk and Phillip Richards

Abstract Title: Allergic Contact Dermatitis to Chlorhexidine: Retrospective Analysis of North American Contact Dermatitis Group Data, 2015 to 2016

Authors and Affiliations: Erin Warshaw, Minneapolis VA Medical Center; Sara Kullberg, Park Nicollet Contact Dermatitis Clinic

Abstract

Objectives:
Chlorhexidine is a topical antiseptic used in medical preparations as well as some personal care products. This retrospective review aimed to further characterize contact allergy to chlorhexidine.

Methods:
Study design was a 2-year retrospective multicenter cross-sectional analysis of North American Contact Dermatitis Group (NACDG) data. This analysis focused on individuals with a positive (allergic) patch-test reaction to chlorhexidine digluconate (1% aqueous).

Results:
0.8% of patients (46/5500) had an allergic patch test reaction to chlorhexidine. 45.7% of allergic reactions were coded as currently relevant to their dermatitis. Mild (+) reactions were most common (n=25; 54.3%), followed by strong (++) reactions (n=9; 19.6%) and very strong (+++) reactions (n=4; 8.7%); 8 borderline (+/-) reactions (17.4%) were coded as allergic. The top 3 most common body sites in the chlorhexidine-allergic patients were scattered/generalized (37.0%), hand (30.4%), and face (21.7%). 15.2% of reactions were occupationally related including the following jobs: nursing, dental assistants, funeral directors, mechanics, and machinists. Skin disinfectants (n=11; 23.9%), personal care products (n=3; 6.5%), and shampoos (n=3; 6.5%) were the most frequently associated sources of chlorhexidine.

Conclusions:
Frequency of positive chlorhexidine reactions was <1.0% and the most common clinical presentations were scattered/generalized, hand, or facial dermatitis. Nearly half of all chlorhexidine-allergic patients had current clinical relevance. While most clinicians are aware of chlorhexidine in disinfectant hand soaps and surgical scrubs, hair care products may be under recognized.

Acknowledgements:

Abstract Title: Dermatitis in a Unique Cccupational Cohort

Authors and Affiliations: Eseosa Asemota, Harvard School of Public Health; Irina Mordukhovich, Harvard School of Public Health, Boston, MA; Steven Staffa, Harvard School of Public Health, Boston, MA; Eileen McNeely, Harvard School of Public Health, Boston, MA

Abstract

Objectives:
Thousands of flight attendants at several major airlines reported dermatologic symptoms following the introduction of new uniforms. Earlier, we confirmed an increased rate of dermatologic symptoms among Alaska Airlines crew, and now seek to replicate this finding among American Airlines crew. This survey-based prospective longitudinal study investigated skin symptoms in a unique occupational cohort.

Methods:
We conducted a time series analysis of self-reported dermatologic symptoms in cabin crew at American Airlines, who were part of the Harvard Flight Attendant Health Survey. This study did query about uniforms, and dermatologic questions were part of the comprehensive survey questions. The comparative standardized prevalence of dermatological symptoms at different study waves were evaluated via Multivariable Generalized Estimating Equations (GEE) regression modeling, with inverse probability weighting (IPW).

Results:
When comparing 2017-2018 (uniforms were introduced in 2016) versus 2014-2015, there was an increased prevalence (per 100) of the following: irritant dermatitis (16 versus 8.9; adjusted odds ratio from GEE (aOR)=2.18; 95% confidence interval (CI) 1.19-3.99; P=0.012), seeking care for rash/hives (27.8 versus 11.9; aOR=2.81; 95% CI 1.7-4.64; P<0.001), and multiple chemical sensitivity (11.42 versus 5.7; aOR=3.09; 95% CI 1.49-6.4; P=0.002).

Conclusions:
These findings suggest a correlation between airline uniforms and observed dermatologic symptoms. Airlines, textile manufacturers, national agencies, and private labs have conducted separate laboratory tests and healthhazard reviews on the textiles. While several concerning compounds were detected, none of these have been found to be at potentially hazardous levels. However, flight attendants are exposed to a unique occupational environment, which includes various air contaminants, changes in pressure, oxygenation and humidity, that could potentially mediate these dermatologic effects, and a NIOSH Health Hazard Evaluation suggested that combined chemicals in the uniform could be of causal concern.
The study suggests that in order to enhance the practice of complex medical dermatology and occupational dermatology, skin exposure to chemicals in textiles may need to be studied using models evaluating environmental factors such as ultraviolet radiation and ozone chemistry, concentrations, dispersions with sweat and friction, and chemical interactions

Acknowledgements:

Abstract Title: Work-Related Skin Symptoms and Exposure to Cleaning Agents Among Healthcare Workers

Authors and Affiliations: D. Holness, University of Toronto and St Michael's Hospital; Ameth Garrido, University of Toronto; Joshua Lipszyc, University of Toronto; Gary Liss, University of Toronto; Ron House, University of Toronto; Susan Tarlo, University of Toronto

Abstract

Objectives:
Health care workers are exposed to a variety of cleaning agents and disinfectants as part of their job requirement, which increase the likelihood of developing contact dermatitis. The objective of this study was to investigate associations between cleaning agents and work-related skin symptoms in health care workers.

Methods:
Following ethics approval, participants for this cross-sectional study were recruited from four hospitals. The questionnaire was adapted from the Nordic Occupational Skin Questionnaire and the Hand Dermatitis Screening Tool. Participants were assigned to either exposed or non-exposed groups based on their occupation and responses to the questionnaire.

Results:
The response rate was 39.9% (n= 307) consisting of 80.6% females. The exposed group had 230 participants consisting primarily of nurses and cleaners; 77 were non-exposed controls. Five to nine years was the median amount of time a participant had been at their current job. Exposed workers had a higher lifetime rash prevalence (p-value= 0.004, OR= 2.43 (95% CI= 1.35, 4.39)) and work-related rash prevalence (p-value= 0.002, OR= 3.78 (1.85, 7.75)). Of the 30.3% of participants who indicated a work-related rash, 89.2% were from the exposed group. Cleaning agents associated with work-related rashes were bleach (p-value < 0.001, OR= 6.25 (2.37, 16.49), quaternary ammonium compounds (p-value= 0.0008, OR= 4.70 (1.88, 11.77)), and isopropanol (p-value= 0.04, OR= 3.35 (1.12, 9.98). Peroxide (p-value= 0.07) showed a non-significant trend to association.

Conclusions:
The increased probability of cleaners developing work-related skin symptoms suggests that better preventive measures are needed.

Acknowledgements:
Funding from the Ontario Ministry of Labour

Abstract Title: Acrylates in Nail Salons in Toronto, Canada

Authors and Affiliations: D. Holness, University of Toronto and St Michael's Hospital; Sheila Kalenge, Occupational Cancer Research Centre; Linh Nguyen, Department of Physical and Environmental Sciences, University of Toronto; Tracy Kirkham, University of Toronto; Victoria Arrandale, University of Toronto

Abstract

Objectives:
There has been significant growth in the nail salon industry. There is concern about chemical exposures and their potential health effects. The objective was to assess acrylate exposures of nail technicians in Toronto, Canada.

Methods:
Both surface and air sampling were conducted. Nail technicians' dominant hand (n=4) or both hands (n=4) were wiped with a pre-moistened wipe after providing nail services (e.g., acrylic nails, shellac polishes). Positive control samples were collected from workers who deliberately contacted the products (n=3). Positive control samples (n=18) were also collected by applying a drop of nail product onto a surface and wiping the contaminated area. Air samples were collected by personal passive full shift sampling. All samples were analyzed using GC/MS.

Results:
No acrylates were detected in any hand or surface wipes. Among positive controls samples using nail products, methyl methacrylate was detected in 28% of the samples, ethyl methacrylate 33%, 2-hydroxyethyl acrylate 39%, 2-hydroxyethyl methacrylate 50% and, 2-hydroxypropyl methacrylate 28%. For the positive control hand wipes, only 2-hydroxyethyl methacrylate (66%) and 2-hydroxypropyl methacrylate were detected (66%). Methyl methacrylate was detected in acrylic, dipping powder and '5-free formula' nail products. Methyl methacrylate was detected in 63% of the air samples and ethyl methacrylate in 36%.

Conclusions:
Despite confirmation that nail products contained acrylates and finding acrylates in air samples, there was no detectable acrylate skin exposure or surface contamination. Workers were observed to employ safe work practices with the acrylate-containing products.

Acknowledgements:
Funding from the Ontario Ministry of Labour

Abstract Title: Workplace Exposures and Skin Symptoms in Nail Technicians in Toronto,Canada

Authors and Affiliations: D. Holness, University of Toronto and St Michael's Hospital; Sadaf Sanaat, Occupational Cancer Research Centre; Victoria Arrandale, University of Toronto

Abstract

Objectives:
In recent years the nail salon industry has grown rapidly. In Toronto, Ontario there are currently over 1450 licensed nail salons. Salons are largely small businesses, often employing immigrant women. The objectives of this study was to determine work practices and skin symptoms in nail technicians in Toronto, Canada.

Methods:
Following ethics approval, nail technicians were recruited from nail salons in Toronto, Ontario. Workplace health and safety practices as well as skin and respiratory symptoms were evaluated using an anonymous questionnaire. Symptoms reported to be worse at work or improved away from work were considered work-related.

Results:
In total 155 nail technicians participated. Almost all (95%) were female and 24% were older than 40 years of age. Over 20% of nail technicians had worked in the salon for more than 5 years. 96% reported using gloves while providing services to clients, however, only 32% reported using gloves for over 6 hours a shift. Virtually all technicians provided regular manicures and pedicures, 87% shellac, 66% gels, 52% nail hardener, 34% acrylics and 25% solar gels. Only 5% reported a current rash, two thirds (67%) of which was work-related. Nearly 10% of technicians reported previously having a rash with 73% being work-related.

Conclusions:
The results indicate that nail technicians are experiencing skin symptoms that may be work-related. With an industry growing so quickly, it is important to implement appropriate prevention practices in order to improve and protect the health and safety of nail salons technicians.

Acknowledgements:
Funding from the Ontario Ministry of Labour