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Longitudinal Characterization of Atopic Dermatitis Phenotypes in The Children's Respiratory and Environmental Workgroup (CREW) Birth Cohort Consortium

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443 Are we following the best evidence-based guidelines for the management of Chronic Urticaria?

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RATIONALE: We performed a retrospective chart review at our adult allergy and immunology clinic to evaluate the quality of care of patients with chronic urticaria.

METHODS: This study was reviewed by the Rutgers IRB Newark Campus and was determined to be a non-human subject study Pro2022000829. Using the International EAACI/GA^{2}LEN/EuroGuiDerm/APAAACI guidelines, eleven recommendations were selected to evaluate the care of patients with chronic urticaria. Then a retrospective chart review was performed at our inner-city academic allergy and immunology clinic. Fifty-patient charts were randomly selected from patients who received care between 01/01/2021 to 12/31/2021 for chronic urticaria. All patients had a diagnosis of chronic urticaria (≥ 6 weeks) and were between the age of 18-80 years old. It was determined whether or not eleven recommendations from the guidelines were followed during the visit.

RESULTS: The results revealed that 100% of the patients were prescribed 2nd generation H_1-antihistamines for relief, 88% were assessed for associated angioedema, 68% were assessed regarding the characteristics of their rash, 66% were assessed regarding other physical triggers of urticaria, 64% were assessed regarding the duration of individual hives, 52% were assessed for dermatographia, 40% were assessed for post-hive pigmentation, bruising or scarring and systemic symptoms such as joint pain, fatigue or weight loss, and 18% were assessed regarding worsening of hives with NSAIDs.

CONCLUSIONS: This quality assurance study highlights the strengths and the weaknesses of an adult Allergy and Immunology clinic at an inner-city academic center.

444 Effect of Staphylococcus aureus on the Keratinocytes in Atopic Dermatitis

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RATIONALE: Atopic dermatitis (AD) is associated with *Staphylococcus aureus* skin colonization. *S. aureus* strains secrete proteins, virulence factors and enterotoxins that may affect immune function and skin integrity. We sought to investigate how specific *Staphylococcal species and strains a*ffect epithelial barrier function.

METHODS: Skin swabs from 20 AD patients and healthy controls were collected. Bacterial species were isolated and bacterial toxin gene expression and production were measured using RIDASCREEN set assay. Human keratinocytes cells were cultured with bacterial supernatants. Transepithelial electrical resistance (TEER) and MTT assays were performed to investigate the effect of staphylococcus toxins on epithelial barrier function and viability.

RESULTS: Twenty-four *staphylococcus* strains were identified from patients with AD and food allergies, three of which were unique *S. aureus* strains. Bacterial supernatant from two of the *S. aureus* strains (LK1493 and 1505) decreased the viability of human keratinocytes to 64% ($p \leq 0.001$) and 65% ($p \leq 0.001$) respectively. Three of the *S. capitis* strains decreased the mean viability of the cells to 25 ($p \leq 0.0005$), 38 ($p \leq 0.001$), and 51% ($p \leq 0.005$) for strains LK1436, LK1532, and LK1519, respectively. The TEER results showed that two *S. aureus* strains (LK1422 and LK1493) decreased the epithelial barrier integrity by decreasing the TEER measurements by 40% ($p \leq 0.05$) and 60% ($p \leq 0.01$) respectively.

CONCLUSIONS: Staphylococcus strains isolated from AD patients with food allergies decreased cell viability of human keratinocytes, most strongly from *S.capitis*. and *S.aureus strains*. *S.aureus* has the strongest effect on decreasing the epithelial barrier integrity, suggesting that Staphyloccocal strains have a differential effect on the skin viability and integrity

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RATIONALE: Previously identified longitudinal patterns of atopic dermatitis (AD) may lack generalizability and precision due to small sample size and limited time points. We identify and describe longitudinal AD phenotypes in a large consortium study.

METHODS: Data from 11 birth cohorts across the United States from the CREW (Children's Respiratory and Environmental Workgroup) consortium were harmonized to determine physician diagnosis of AD in each year of life from 0-7 years of age (N=7,900). AD phenotypes were identified using Longitudinal Latent Class Analysis, and relationships with demographic variables were determined using multinomial logistic regression with a 3-step procedure to account for uncertainty in class membership.

RESULTS: We identified 5 classes of AD expression, selected based on model fit, interpretability, and clinical utility: Persistent AD (15.4%), Early AD with Potential Reoccurrence (2.7%), Late-Onset AD (7.0%), Transient Early AD (3.0%), and Minimal/No AD (72.0%). Males had significantly higher odds of Persistent AD (OR [95% CI]=1.47 [1.22, 1.75]) and Early AD with Potential Reoccurrence (OR [95% CI]=1.89 [1.19, 2.94]). Relative to White children, Black children had higher odds of Persistent AD (OR [95% CI]=2.50 [2.05, 3.05]), Early AD with Potential Reoccurrence (OR [95% CI]=3.07 [1.94, 4.85]), and Transient Early AD (OR [95% CI]=4.12 [2.62, 6.48]).

CONCLUSIONS: Five AD phenotypes exist in a diverse national sample of children. Black children and males are at increased risk of early and persistent AD. These findings illustrate potential risk factors to target AD prevention.

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