760 Biologic Therapy Does Not Increase Incidence Of COVID-19

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RATIONALE: Biologics are used to target various inflammatory pathways in atopic diseases such as asthma, atopic dermatitis (AD), and chronic idiopathic urticaria (CIU). These therapies are also known to suppress the immune system making this topic increasingly relevant during the COVID-19 pandemic. We hypothesized an increased incidence of COVID-19 in patients treated with biologics compared with controls.

METHODS: A sample of 389 patients was sourced from 5 clinics across the GAAAI network between March 1, 2020 and February 28, 2022. Patients were divided into two groups: 1) patients on biologic (n = 188, omalizumab, dupilumab, benralizumab, and mepolizumab) and 2) randomly selected non-biologic subcutaneous immunotherapy patients (n = 201). The data was imported into RStudio and Chi-squared analysis was performed to calculate p-values for differences in COVID-19 incidence.

RESULTS: The incidence of COVID-19 in all biologic patients is not significantly different compared with the control group (p-value = 0.053). The hypothesis of equivalent incidence of COVID-19 in patients treated with omalizumab compared with the control group is rejected (p-value <0.05); however, it is accepted for the other biologics. Secondary analysis indicates that biologics may affect the incidence of COVID-19 in asthma patients (p-value <0.05), but spare patients with CIU, AD, and nasal polyposis.

CONCLUSIONS: Biologic patients do not appear to have an increased incidence of COVID-19 compared with controls. Sub-analysis of specific biologics convey differences in incidence of COVID-19 indicating a possible increased risk in the omalizumab treated patients. On balance, this study contributes to the growing literature of COVID-19 risk associated with biologics.

761 Association of Early-life Daycare Exposure and Allergy Sensitization in Puerto Rico: PRIMERO Birth Cohort Findings

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RATIONALE: The impact of early-life daycare attendance on the development of asthma and allergic diseases has been the subject of multiple studies, yielding mixed findings. If early-life daycare attendance influences aeroallergen sensitization, daycare attendance could significantly influence later childhood health.

METHODS: We collected demographic and clinical measures from the consented mothers and their children born at >36 weeks gestation, weighing >2.25 kg, in the PRIMERO (Puerto Rican Infant Metagenomic and Epidemiologic Study of Respiratory Outcomes) cohort at Hospital Interamericano de Medicina Avanzada-San Pablo, Puerto Rico. Children were actively surveilled for their first two years of life, with blood samples for total IgE and perennial allergen-specific IgE testing collected during the year-2 visit. We used regression analyses to explore the association of daycare attendance with total IgE levels and perennial aeroallergen sensitization.

RESULTS: Daycare attendance status and total and perennial allergen-specific IgE measurements were available for 435 children, of which 96 (22.1%) attended daycare. Total IgE levels were, on average, 142 UI/ml lower among children who attended daycare compared to those who did not (P = 0.03; P = 0.04 after adjustment for confounders). Children in daycare had 0.57 times the odds (95% CI: 0.35 - 0.91) of perennial aeroallergen sensitization compared to those who were not in daycare (after adjustment: 0.57, 95% CI: 0.33 - 0.97).

CONCLUSIONS: Early-life daycare attendance was protective against perennial aeroallergen sensitization and children attending daycare had clinically significant lower total IgE levels, suggesting that daycare attendance could lower the risk of asthma and allergic diseases.

762 Characterization of microbial components present in bioconcept metalworking fluid that may contribute to the development of severe lung pathology

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RATIONALE: Workers at a manufacturing facility using bioconcept metalworking fluid (MWF) engineered to selectively grow the biocontrol organism *Pseudomonas pseudoalcaligenes* developed a severe lung disease described as bronchiolitis, alveolar ductitis, and emphysema (BADE). Analysis of lung biopsies from affected workers indicated the lung microbiome was similar to that observed in used MWF. We hypothesized that this shift in the lung microbiome may contribute to the development of BADE.

METHODS: *Pseudomonas* species within used bioconcept MWF from the facility were isolated by viable culture. Bacterial 16S rRNA sequencing was conducted to ensure isolation of a single organism and to compare to *P. pseudoalcaligenes* strains (ATCC#17443 and ATCC#49536). Further characterization included quantification of microbial metabolites produced by the *Pseudomonas* isolates by liquid chromatography-tandem mass spectrometry.

RESULTS: Bacterial diversity within used MWF samples showed *Pseudomonas sp*. comprised 53.85% (Range: 0.07%-99.87%) of the total bacterial sequences. Two isolates were cultured and sequenced along with two *P. pseudoalcaligenes* strains. The 16S sequences of the isolates and ATCC strains clustered separately but were 96.6% similar, both matching deposited sequences for *Pseudomonas sp*. Microbial metabolites identified in all four *Pseudomonas* cultures included maculosin (11.2-15.4 μg/mL), cyclo(L-Pro-L-Val) (2.06-3.07 μg/mL), and brevianamide F (61.5-106 ng/mL), all of which are diketopiperazines.

CONCLUSIONS: Diketopiperazines derived from microbes have known antimicrobial properties, many of which have been shown to modulate microbiome environments. High concentrations of diketopiperazines produced by *Pseudomonas sp*. may contribute to microbiome dysbiosis within the lungs of affected workers, which in turn may contribute to unique lung pathologies not seen in previous MWF exposures.