

Association Between Peripheral Eosinophil Counts and Infant Lung Function

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Background and Hypothesis:

Some children with allergic asthma have peripheral eosinophilia early in life, suggesting that physiological changes in the lung begin during infancy. While this association has been established, studies have not examined if a link exists between eosinophilia and physiological airway measurements during the first year of life. It is hypothesized that systemic eosinophilia during the first year of life is associated with lower infant pulmonary function measurements.

Experimental Design or Project Methods:

A birth cohort study investigating the development of the upper airway microbiota over the first year of life was utilized for this study. Systemic absolute eosinophil counts were examined to determine if eosinophilia is associated with decreased infant pulmonary function test (iPFT) values. Blood and iPFT data were collected at 3 and 12 months.

Results:

28 participants had blood samples collected. 15 samples were taken at 3 months and 13 at one-year. 16 subjects were male, with a majority identifying as African American (14). The average

height and weight were 68.0 cm and 8.6 kg. The median absolute eosinophil count was $0.20 \times 10^3/\mu\text{L}$. Infant iPFT data included tidal volume, respiratory rate, expiration time, $t_{\text{PEF}}/t_{\text{E}}$, resistance, and compliance. No significant correlations were identified between eosinophil counts and iPFT data. This held true when all time points were combined and when examining each visit separately. The strongest correlation coefficient was -0.36 between absolute eosinophil count and FEV_{0.5}. The estimated number of samples needed to power a study examining the association between FEV_{0.5} and eosinophil counts is 80 samples.

Conclusion and Potential Impact:

Based on preliminary results, there are not enough samples to achieve significant correlations supporting the original hypothesis. The next step is to analyze more blood from current study participants. It is also planned to examine the association between the airway microbiome and eosinophilia to determine if early allergic markers in the blood may result from airway dysbiosis.