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Association between higher levels of pro-inflammatory cytokines (TNF, IL-6) and IL-5 in induced sputum and lower lung function among subjects with asthma

Emília M M de Andrade Belitardo, Paula Cristina Almeida, Eduardo Santos da Silva, Samara Sá Teles, Alana Alcântara Galvão, Luis Gustavo C, Álvaro A Cruz and Neuza M Alcântara-Neves

Federal University of Bahia (UFBA), Brazil

Aim: Asthma is a chronic and heterogeneous disease presenting various phenotypes. The aim of this study was to assess airway inflammation among subjects with asthma by counting cells and measuring cytokines in the sputum to search for associations with clinical features of the disease.

Methods: We studied 66 subjects, divided into three asthma subgroups [16 with severe asthma resistant to treatment (SAR), 22 with severe asthma controlled with treatment (SAC), 19 with mild to moderate asthma (MMA)] and a group with no asthma (NA) including 9 subjects. Total cellularity of the sputum samples was counted using a hemocytometer and differential cytology was observed in cytospin. Measurements of cytokines were performed by Luminex (Upstate/Millipore system "Flex kit"). Statistical analysis was performed using nonparametric tests.

Results: Sputum of SAR had higher percentage of neutrophils as compared with MMA (p=0.05) and higher percentage of eosinophils compared with NA (p=0.02). TNF was increased in SAR compared to NA, MMA and SAC (p=0.001). Subjects with asthma, and treated with high doses of inhaled corticosteroids presented higher levels of TNF (p=0.02), IL-6 (p=0.01) and IL-5 (p=0.03). Increased TNF production was associated with reduced lung function before and after bronchodilator as measured by FEV1% [p=0.00 for both), FEV1/FVC% (p=0.03 and p=0.02 respectively) and FEF25-75% (p=0.00 for both).

Conclusion: Increased inflammatory cytokines (TNF, IL-6 and IL-5) and number of inflammatory cells (neutrophils and eosinophils), were associated with SAR, and high levels of TNF were associated with worse lung function. Our findings support the concept these subjects may have an end phenotype of asthma related to airway inflammation that goes beyond the Th2 type response, and that it is indeed resistant to high doses inhaled corticosteroids, requiring a different approach to treatment.

Biography

Emília M M de Andrade Belitardo is a Physiotherapist, Specialist in Respiratory Physiotherapy by the Federal University of São Paulo and Master in Immunology by the Federal University of Bahia (UFBA). She is currently a PhD scholar of Immunology at UFBA, working in the Laboratory of Allergy and Acarology (LAA). Her research interests include Immuno-Epidemiology, Clinical Immunology, Immunomodulation and Immunogenetics. She collaborates with two major research projects: (i) An asthma cohort in children and adolescents of the city of Salvador - Bahia, SCAALA (Social Change in Asthma and Allergy in Latin America); and (ii) A case-control study developed in partnership with the Center of Excellence for Asthma (UFBA).

emilia_mandrade@hotmail.com

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