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Title: Airway and systemic inflammation during Churg-Strauss syndrome natural course

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Body: Background: asthma is a key feature in Churg-Strauss syndrome (CSS) but the relationship between airway and systemic manifestations over the follow-up have been scarcely investigated. Aims: to compare in CSS patients asthma activity/severity and systemic disease activity/damage, sputum inflammatory markers with inflammatory disease biomarkers, asthma severity and airway inflammation. Methods: 35 patients with CSS were enrolled. All patients were assessed for lung function and bronchial hyperreactivity. Asthma severity and control were established according to GINA guidelines and by ACT questionnaire. We measured: sputum eosinophil percentage and exhaled nitric oxide, the Birmingham Vasculitis Activity Score (BVAS) and Vasculitis Damage Index (VDI), peripheral blood eosinophils count, and serum anti-neutrophil cytoplasmic autoantibody, eosinophil cationic protein, IgE, IL2-4-5. Results: despite the majority of the patients presented a complete systemic remission (BVAS:14±2 diagnosis vs 2.5±2 follow-up), 80% showed a moderate/severe chronic asthma with vasculitis damage (VDI: 0 at diagnosis vs 1.7±0.8 at follow-up). A significant correlation was detected between sputum eosinophil counts and ACT ($r=-0.64$, $p=0.014$) and sputum eosinophil counts and GINA control score ($p=0.008$). No statistical correlation was found between peripheral eosinophil count and asthma severity, and between sputum inflammatory markers and blood inflammatory mediators. Conclusion: chronic asthma negatively affects the natural history of CSS. Sputum inflammatory markers might represent a complementary tool in monitoring asthma component in CSS patients, as well as blood inflammatory disease biomarkers reflect CSS systemic activity.