Identification of Chronic Rhinosinusitis Phenotypes

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ABSTRACT

The pathogenesis of chronic rhinosinusitis is still unclear. A variety of factors are thought to be involved in the pathogenesis of chronic rhinosinusitis (CRS). However, the phenotypes of CRS and their relationship with the pathogenesis of CRS have not been elucidated. The present study aimed to identify the phenotypes of chronic paranasal sinusitis patients by means of a cluster analysis.

METHODS

We conducted a retrospective analysis of prospectively collected data from April 2007 to March 2008 in a multicenter study involving 5 hospitals. A total of 503 patients were enrolled in this study, but 104 (20.7%) were excluded due to missing data. The data were thus analyzed for 399 patients. For the cluster analysis, 20 factors were selected that are thought to be associated with the pathophysiology of CRS. Those factors were the mean age of the patients, the CT and polyp scores, the subjective symptom scores, mucosal eosinophil count, peripheral eosinophil count, peripheral basophil count, the RAST scores for house dust mite, Japanese cedarpollen, Alternaria and Aspergillus, specific IgE to each of the tested antigens, sex, smoking status, and allergy. Cluster analysis was performed by Ward's agglomerative (bottom-up) hierarchical clustering method. The distance between individuals was calculated using the Euclidean distance. Each cluster was analyzed by ANOVA. Differences were considered statistically significant when the P value was <0.05. The statistical package was SPSS ver 11.0 (Chicago, IL).

RESULTS

Cluster 1, with low values for total IgE, the peripheral eosinophil count and the mucosal eosinophil count, was the dominant cluster (n=191). Cluster 2, with extremely high tissue eosinophil counts, but mild blood eosinophil increase, was the second largest cluster (n=69). Cluster 3, with slightly increased blood and tissue eosinophil counts, was the third largest cluster (n=118). Cluster 4, with an elevated peripheral eosinophil count, was the fourth largest cluster (n=54). Cluster 5, with extremely high peripheral eosinophil counts and mucosal eosinophil count, was the fifth largest cluster (n=69). Cluster 6, with extremely high peripheral eosinophil counts and mucosal eosinophil count, was the sixth largest cluster (n=35).

CONCLUSIONS

Cluster analysis of the phenotypes of CRS distinguished six clusters. They consisted of Cluster 1, NECRS without NP; Cluster 2, high peripheral eosinophil counts; Cluster 3, slightly increased peripheral eosinophil counts; Cluster 4, high peripheral eosinophil counts; Cluster 5, extremely high peripheral eosinophil counts and mucosal eosinophil count; and Cluster 6, extremely high peripheral eosinophil counts and mucosal eosinophil count. This study satisfied the diagnostic criteria for CRS set forth in the European Position Paper on Rhinosinusitis and Nasal Polyps. Patients who had been administered an antibacterial agent or a steroid for more than 1 month were excluded from the analysis. Patients were also excluded if they were <15 years of age or had a history of allergy, like diverticulosis, in which case the results obtained were not comparable.

REFERENCES