Abstract

**Background:** The eosinophil cationic protein (ECP) is a small polypeptide that originates from activated eosinophil granulocytes. Serum ECP concentrations have also been linked to activity of allergic diseases.

**Objective:** The purpose of this study was to evaluate the clinical significance of serum ECP in allergic rhinitis (AR) and chronic rhinosinusitis (CRS), and to evaluate the relationship between allergic test and ECP levels.

**Methods:** A total of 1097 patients who tested serum ECP were included in this study. We divided them into the allergic group (AR, n=386), and non-allergic group (NAR, n=711). The non-allergic group was subdivided to CRS with polyp (n=169) and CRS without polyp (n=108) groups. We reviewed serum eosinophil count, total IgE, and allergic test; all measured parameters are expressed as means ± standard deviation. Among them, 39 patients had asthma. Allergic rhinitis (AR) is defined based on allergic symptoms with at least one panel of aeroallergens of Multiple Allergen Simultaneous Test (MAST).

**Result:** There were positive correlation between ECP levels and serum eosinophil counts (r=0.487, p=0.000). ECP levels and serum eosinophil counts were significantly increased in AR or CRS with polyp compared with without polyp groups (Table 2).

**Conclusion:** The role of ECP and serum eosinophils might be important in AR or CRS c poly. And there might be positive correlation between ECP levels and MAST result for AR.

## Results

**Average counts of serum eosinophil, total IgE and ECP in all subjects were 229.32 ± 240.65, 41.88 ± 136.04 and 43.58 ± 43.32 respectively.**

There were positive correlation between ECP levels and serum eosinophil counts (r=0.487, p=0.000) (Table 1, Fig 1).

**ECP levels (p=0.006) and serum eosinophil counts (p=0.003) were significantly increased in CRS with polyp than without polyp groups (Table 2).**

**ECP levels (p=0.015) and serum eosinophil counts (p=0.001) were significantly increased in AR than NAR groups (Table 3, Fig 3).**

In allergy group, there were positive correlation between ECP levels and scores of MAST for Dermatophagoides farina (Df) (r=0.171, p=0.001) (Table 4, Fig 4).

### Table 1. Correlation between ECP and asthma, serum eosinophil counts, and total IgE

<table>
<thead>
<tr>
<th></th>
<th>Asthma (n=36)</th>
<th>Eosinophil counts (10⁶/l)</th>
<th>Total IgE (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECP (µg/l)</td>
<td>49 ± 50.67</td>
<td>33.32 ± 42.701</td>
<td>0.006*</td>
</tr>
<tr>
<td>Eosinophil counts (10⁶/l)</td>
<td>264.87 ± 384.89</td>
<td>164.76 ± 159.78</td>
<td>0.003*</td>
</tr>
<tr>
<td>Total IgE (ng/mL)</td>
<td>38.95 ± 99.87</td>
<td>62.64 ± 195.23</td>
<td>0.247*</td>
</tr>
</tbody>
</table>

**Table 2. Correlation between CRS and serum ECP, eosinophil counts, and total IgE**

<table>
<thead>
<tr>
<th></th>
<th>AR</th>
<th>NAR</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECP (µg/l)</td>
<td>48.83 ± 45.08</td>
<td>14.86 ± 44.35</td>
<td>0.015*</td>
</tr>
<tr>
<td>Eosinophil counts (10⁶/l)</td>
<td>257.69 ± 210.75</td>
<td>209.75 ± 2250.61</td>
<td>0.001*</td>
</tr>
<tr>
<td>Total IgE (ng/mL)</td>
<td>38.22 ± 146.49</td>
<td>44.06 ± 129.29</td>
<td>0.514</td>
</tr>
</tbody>
</table>

**Table 3. Correlation between AR and serum ECP, eosinophil counts, and total IgE**

Discussion

The eosinophils contain granules filled with basic proteins. One of the proteins, ECP, is a basic, fibrosis promoting, cytotoxic ribonuclease and its functions. ECP often correlates with eosinophil numbers in circulation and might better discriminate eosinophil activation. ECP can potentially influence many types of cells and might contribute to the atopy development, for example, by inducing mast cell degranulation, promoting tissue remodeling or influencing ymphyocytes.

In our study, ECP had positive correlations with Eosinophil counts as other reports. And serum ECP and eosinophil counts were significantly increased in AR than NAR groups. And there were positive correlation between ECP levels and scores of MAST for Dermatophagoides farina (Df) in AR group.

CRS might present with (CRSwpNP) or without (CRSsNP) nasal polyps. In our study, ECP levels and serum eosinophil counts were significantly increased in CRS with polyp than without polyp groups. The mechanism of CRS c poly might be associated with ECP and eosinophils. Increased expression of the eosinophil chemokines; eotaxin-2 protein, eotaxin-1 and eotaxin-3 mRNA in NP might explain this eosinophil accumulation. The serum levels of ECP reflect not only the number of eosinophils, but more importantly their state of activation also. In addition, serum levels of ECP have been shown to correlate with the number of activated eosinophils present in the bronchial mucosa of asthmatics.

Conclusions

There were positive correlation between ECP levels and serum eosinophil counts.

**ECP levels and serum eosinophil counts were significantly increased in CRS with polyp than without polyp groups.**

**ECP levels and serum eosinophil counts were significantly increased in AR than NAR groups.**

**In AR group, there were positive correlation between ECP levels and scores of MAST for Dermatophagoides farina(Df).**

## Methods and Materials

A total of 1097 patients who tested serum ECP were included in this study. Among them, 39 patients had asthma. Allergic rhinitis (AR) is defined based on allergic symptoms with at least one panel of aeroallergens of Multiple Allergen Simultaneous Test (MAST). We reviewed serum eosinophil count, total IgE, and allergic test; MAST. All measured parameters are expressed as means ± standard deviation. Differences among groups were analyzed using the Kruskal–Wallis test. Various parameters were compared to ECP using the Mann-Whitney U test. Pearson’s correlation coefficient was used to analyze the relationship between variables and ECP in each data.

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## References