Candida-specific IgG4 antibodies and bronchial asthma

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Abstract: Serum levels of Candida-specific IgG4 antibodies were examined in 66 patients with bronchial asthma, relating to patient age and asthma severity.

1. The levels of Candida-specific IgG4 antibodies were the highest in patients with 60+ years of age, compared to the levels in cases with 0-39 and 40-59 years of age.
2. In cases with 40-59 years of age, the levels of Candida-specific IgG4 were significantly higher in cases with long-term steroid therapy (severe intractable asthma) than in cases without steroid regimen.

The results suggest that increased levels of Candida-specific IgG4 were observed in relation to patient age and asthma severity.

Key words: Candida, Specific IgG4, Bronchial asthma, Aging, Asthma severity

Introduction

Candida albicans is one of the most important allergens in bronchial asthma. Candida as an allergen can induce histamine release from basophilic leucocytes through IgE receptors1,2, but the release of histamine induced by Candida is somewhat different from the release by house dust-mite and anti-IgE3,4, suggesting participation of IgG antibodies in Candida-induced reaction2,5.

The role of IgG4 antibodies, which are capable of sensitising human skin for 2-4 hours only5 and described as IgG short-term sensitising (IgG S-TS) by Parish7, is still controversial. It has been suggested that IgG4 as well as IgE may participate in immediate allergic reactions. However, any results about participation of IgG4 in allergen-triggered histamine release and anti-IgG4-induced release of histamine have not been shown8,9. On the other hand, it has been reported that IgG4 could act as a blocking antibody in natural allergen exposures and hyposensitization treatment10,11. A question as to whether IgG4 is a sensitising or a blocking antibody, or both still remain.

In this report serum levels of Candida-specific IgG4 antibodies were measured in patients with bronchial asthma, and relationship of the levels to patient age and asthma
severity was discussed.

Subjects and Methods

Subjects were 66 patients with bronchial asthma, 35 females and 31 males, including 15 cases with steroid-dependent intractable asthma. The subjects were divided into three age groups; 0 to 39 (group A), 40 to 59 (group B), 60+ years of age (group C).

Serum levels of specific IgG4 against Candida albicans were estimated by a ELISA method.

Results

1. Relationship to patient age.

A significant difference was not present in serum levels of Candida-specific IgG4 between cases of group A and B. The levels of Candida-specific IgG4 were significantly higher in cases of group C than in cases of group B (p<0.05) (Table 1).

Table 1. Serum levels of Candida-specific IgG4 antibodies in relation to patient age

<table>
<thead>
<tr>
<th>Patient age, years</th>
<th>No of cases</th>
<th>Serum levels of specific IgG4 (U/ml)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-39</td>
<td>12</td>
<td>14.5 ± 13.7</td>
<td>2.5-48.0</td>
</tr>
<tr>
<td>40-59</td>
<td>21</td>
<td>13.2 ± 15.6</td>
<td>2.5-62.0</td>
</tr>
<tr>
<td>60+</td>
<td>33</td>
<td>25.9 ± 24.2</td>
<td>2.5-80.0</td>
</tr>
</tbody>
</table>

2. Relationship to asthma severity.

Serum levels of Candida-specific IgG4 were 11.9±14.3U/ml (Mean±SD) in cases without steroid regimen, and 21.0±2.0U/ml in cases with long-term steroid therapy (ST cases) (severe intractable asthma) of group A. The levels were higher in ST cases, although the difference was not significant. Compared to the levels of Candida-specific IgG4 (7.2±5.2U/ml) in cases without steroid regimen, the levels were significantly higher (32.5±21.1U/ml) in ST cases of group B (p<0.001). No significant difference was present in Candida-specific IgG4 between cases without steroid regimen (24.5±23.4 U/ml) and ST cases (29.4±26.0U/ml) of group C (Fig. 1).

Fig. 1. Serum levels of Candida-specific IgG4 antibodies in relation to asthma severity. (■) : cases without steroid regimen, (□) : cases with long-term steroid therapy

Discussion

It has been thought that IgG4 participates in immediate allergic reactions. At first, it has been noticed that IgG4 as well as IgE acts on allergic reactions as a sensitising antibody, as previously reported by Parish. IgE, however, can induce histamine release from basophils, but not IgG4. After then IgG4 has been demonstrated to act as a blocking antibody in natural allergen exposures and hyposensitization treatment.

In this report an increase in Candida-
Candida-specific IgG4 was observed in relation to patient age and asthma severity. Our previous studies showed that serum levels of Candida-specific IgG in patients with bronchial asthma increased with aging. The levels of Candida-specific IgG4 correlate to a certain extent with aging. The levels were higher in cases with 60+ years of age, compared to cases with 0–39 and 40–59. The results suggest that higher levels of specific IgG4 do not lead to participation of Candida in the onset mechanisms of bronchial asthma in elderly.

On the other hand, it is possible to speculate that higher levels of Candida-specific IgG4 in patients with severe intractable asthma correlate with participation of the allergen-mediated reactions in the onset mechanisms when patient age is between 40 and 59 years. In cases with 0–39 years of age, higher levels of specific IgG4 were observed in severe intractable cases. But no significant difference was found because the number of these cases was too small, only two cases.

The results obtained here suggest that specific IgG4 acts as a sensitising antibody when Candida is an allergen.

References
カジダ特異的IgG4抗体と気管支喘息

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66例の気管支喘息症例を対象に、血清カジダ特異的IgG4抗体を測定し、その血中レベルと年齢および喘息の重症度との関連について検討を加えた。

1. 血清カジダ特異的IgG4値は、0〜39才、40〜59才の年齢層にくらべ、60才以上の年齢層において高く、年齢によりその値が変動することが示唆された。

2. 40〜59才の年齢層では、血清カジダ特異的IgG4は、ステロイド非使用例にくらべ、ステロイド依存性重症難治性喘息症例で有意の高値を示し、この年齢層では、カジダ特異的IgG4抗体がその発症病態に関連している可能性が示唆された。

以上、カジダ特異的IgG4抗体の上昇は、高年齢層の症例（69才以上）では全般的に、また40〜59才の年齢層で重症型喘息症例において観察されることが明らかにされた。

キーワード：カジダ，特異的IgG4，気管支喘息，加齢，喘息重症度