
◎原 著

House dust mite allergy in patients with bronchial asthma. Serum IgE levels and IgE antibody values in relation to patient age.

Yoshiro Tanizaki, Hikaru Kitani, Takashi Mifune, Fumihiko Mitsunobu, Kazuhiro Kajimoto, Keisuke Sugimoto, Satoshi Yokota, Junichi Hiramatsu, Koji Ochi¹⁾, Hideo Harada¹⁾ Shinya Tada²⁾ and Ikuro Kimura²⁾

Division of Medicine, Misasa Medical, Branch, ¹⁾Department of Laboratory Medicine, ²⁾Second Department of Medicine, Okayama University Medical School

Abstract : Serum IgE levels and IgE antibody values in relation to patient age were examined in 50 patients with house dust mite (HDm) sensitive asthma, 1. IgE antibody values to HDm were highest in patients between the ages of 10 and 19, and the values generally low in those over the age of 40. 2. High IgE antibody values to HDm were accompanied by high serum IgE levels in patients between 10 and 19. IgE antibody values and serum IgE levels were in general low in patients over age 40. In patient under age 9, serum IgE levels were less than 500 IU/ml in 5 of the 10 subjects despite an increased value of IgE antibodies to HDm. These results suggest that an increased production of IgE antibodies to HDm is usually accompanied by an increased production of total IgE in younger subjects. However, an increase in production of IgE antibodies is not always related to an increase in production of total IgE in patients under age 9. The results also show that production of IgE antibodies to HDm and total IgE is in general low in older patients despite the hyperreactivity to HDm.

Key words : Serum IgE, IgE antibodies, house dust mite, bronchial asthma

Introduction

IgE-mediated allergy is one of the major reactions participating in the mechanism of onset of asthma (1,2). In IgE-mediated asthma, interaction between allergen and IgE antibodies on tissue mast cells induces initiation of allergic reaction : release of chemical media-

tors such as histamine and leukotrienes from mast cells causes pathophysiological changes in the airways of asthma patients (3). This type of asthma is assessed as atopic.

Atopic asthma patients have specific IgE antibodies to allergens. House dust mite (HDm), which induces the release of chemical mediators from mast cells and basophils (4-

7), is one of the most popular inhalant allergens, and the majority of asthma patients in children is sensitized by HDm (8).

In the present study, specific IgE antibody values to HDm were examined in asthma patients with HDm allergy in relation to serum IgE levels and age.

Subjects and Methods

The subjects of this study were 50 patients with atopic asthma (23 females and 27 males, mean age 25.8 years, range 4–72 years). All patients were sensitized by house dust mite (HDm) and showed a positive RAST score of 2+ or more to HDm. The mean serum IgE level was 907 IU/ml (range 56–2923 IU/ml). The subjects were divided into 5 groups according to age: 0–9, 10–19, 20–39, 40–59 and 60+ years.

Serum IgE level was measured by radioimmunosorbent test (RIST). IgE antibody value was evaluated by radioallergosorbent test (RAST). The results were expressed as PRU/ml and a score. A score of 2+ or more was regarded as positive.

Results

Table 1 shows characteristics of all patients with house dust mite (HDm) sensitive asthma. The mean serum IgE level was highest in asthma patients between the ages of 10 and 19. However, there were no significant differences among serum IgE levels in the five groups classified by age (Table 1).

The mean value of IgE antibodies to HDm was 29.5 PRU/ml in patients between the ages of 0 and 9, 52.4 PRU/ml in those between 10 and 19, 8.6 PRU/ml in those between 20 and 39, 5.3 PRU/ml in those between 40 and 59, and 3.1 PRU/ml in those over the age of 60. The IgE antibody value

Table 1. Characteristics of patients with HDm sensitive asthma

Age (years) Range	Mean	No of patients	Serum IgE Mean	IgE (IU/ml) Range
0-9	6.5	10	687	299-1190
10-19	19.1	18	1498	547-2933
20-39	29.4	9	561	56-1475
40-59	51.0	8	446	140-1020
60+	64.6	5	580	198-1049

HDm: house dust mite

was highest in patients between the ages of 10 and 19. In patients over the age of 20, the mean value of IgE antibodies was generally low, and tended to decrease as the age was high. However, there was no significant difference in mean values of IgE antibodies to HDm among the five age groups (Fig. 1).

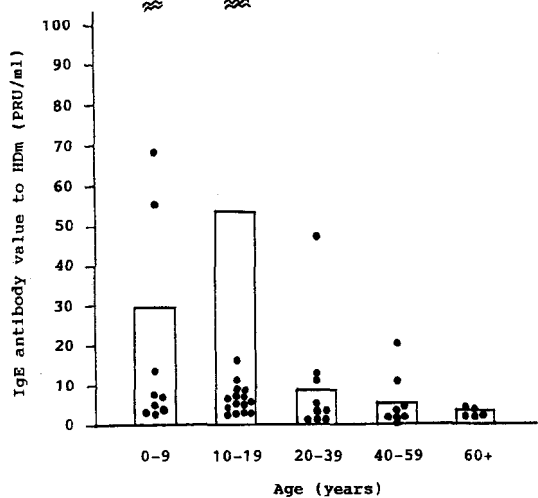


Fig. 1. IgE antibody values to house dust mite (HDm) in each age group. Vertical columns represent the mean in each group.

Serum IgE levels in each group were shown in Fig. 2. The serum IgE levels of HDm sensitive asthmatics were in general high, and

the level in all patients between the ages of 10 and 19 was higher than 500 IU/ml. In contrast, the levels of serum IgE in patients over the age of 20 ranged widely, and the low serum IgE level of less than 200 IU/ml was observed 7 of the 22 (33.8%) patients (Fig. 2).

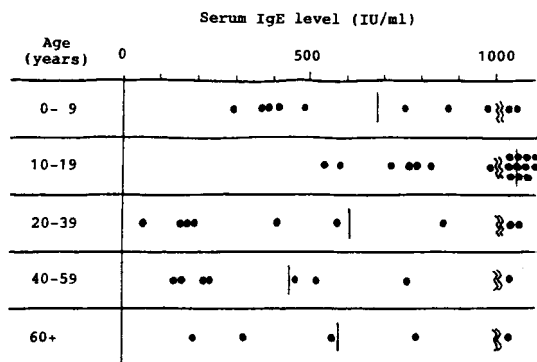


Fig. 2. Serum IgE levels in each age group. The level of serum IgE widely ranged in patients over the age of 20.

Correlation between IgE antibody value to HDm and patient age was examined in relation to serum IgE levels. Serum IgE levels and IgE antibody values to HDm were generally high in younger patients and low in older patients. Thus, the number of patients showing a high serum IgE level of more than 1000 IU/ml and a high IgE antibody value of more than 3.0 PRU/ml was greater in patients under the age of 19 than in those over age 40 (Fig. 3).

Table 2 shows serum IgE levels and IgE antibody values in patients with a high IgE antibody value of more than 20 PRU/ml. Two of the 8 (25.0%) patients showed a high serum IgE level of more than 1000 IU/ml. In contrast, the level of serum IgE was less than 500 IU/ml in 2 patients. Serum IgE levels of

the other 4 patients were between 500 and 1000 IU/ml (Table 2).

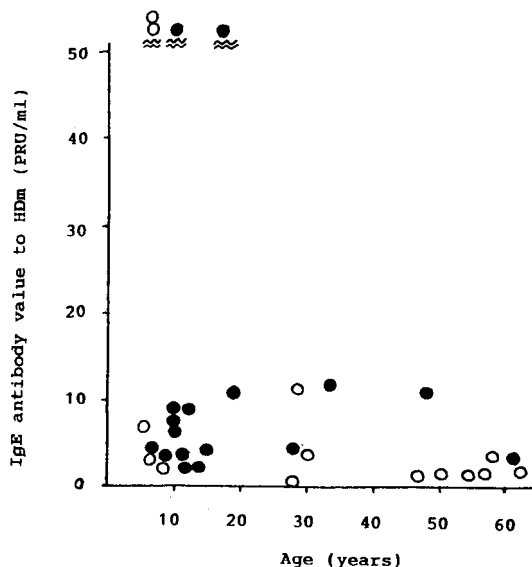


Fig. 3. Correlation between IgE antibody value to house dust mite (HDm) and patient age in relation to serum IgE levels: serum IgE of more than 1000 IU/ml (●) and less than 500 IU/ml (○).

Table 2. Characteristics of asthma patients with a high value in RAST to HDm (more than 20 PRU/ml)

Case	Age (years)	Sex	Serum IgE (IU/ml)	Value in RAST to HDm (PRU/ml)	Score
1	10	M	1463	424	6+
2	15	M	707	259	6+
3	14	M	2466	170	6+
4	6	M	754	130	6+
5	5	M	498	69	5+
6	5	M	299	55	5+
7	30	M	587	46	4+
8	45	F	515	20	3+

HDm: house dust mite

Discussion

Bronchial asthma is divided into two types, atopic and nonatopic, based on the presence or absence of IgE-mediated allergic reaction (9), although asthma is almost always caused by IgE-mediated allergy (10, 11). In atopic asthma, high serum IgE levels and IgE antibody to inhalant allergen are usually found. House dust mite (HDm) allergy is one of the most popular reactions causing bronchial asthma.

In the present study, serum IgE levels and IgE antibody values to HDm were examined in patients with HDm sensitive asthma. The mean value of IgE antibodies to HDm was high in patients under the age of 19 and considerably low in those over the age of 40. Six of the 28 (21.4%) patients under the age of 19 had a IgE antibody value of more than 20 PRU/ml, while none of them over age 40 had such a high value. These results suggest that younger patients with asthma are sensitized by HDm more intensively than older patients.

Regarding correlations between IgE antibody values and serum IgE levels, all patients between the ages of 10 and 19 had a high serum IgE level of more than 500 IU/ml, and mean IgE antibody values of them was high. The results show that high IgE antibody values accompanied by high serum IgE levels are found in patients between 10 and 19. In contrast, in patients over the age of 20, IgE antibody values to HDm were generally low, and serum IgE levels were also low (less than 200 IU/ml) in some patients despite having hyperreactivity to HDm. In patients between 0 and 9, the IgE antibody value to HDm was considerably high, but the serum IgE level was not so high (less than 500 IU/ml) in 5

of the 10 (50.0%) patients. These results suggest that an increased production of total IgE is related to an increased production of IgE antibodies to HDm in younger patients between the ages of 10 and 19, but not in older patients over the age of 40. The results also demonstrate that an increased production of IgE antibody to HDm is not always accompanied by an increased production of total IgE in patients between 0 and 9.

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気管支喘息におけるハウスダストアレルギ-。血清IgE値とIgE抗体価と年齢との関連

谷崎勝朗, 貴谷 光, 御船尚志, 光延文裕, 梶本和宏, 杉本啓介, 横田 聡, 平松順一, 越智浩二¹⁾, 原田英雄¹⁾, 多田慎也²⁾, 木村郁郎²⁾

岡山大学医学部附属病院三朝分院内科, ¹⁾医学部臨床検査医学, ²⁾医学部第2内科

ハウスダストが原因抗原であるアトピー型気管支喘息50例を対象に, 血清IgE値とIgE抗体価を年齢との関連のもとに検討した。

1. IgE抗体価は10-19才の年齢層の症例において最も高く, 一方40才以上の症例では全般的に低い傾向が見られた。
2. 10-19才の年齢層の症例では, IgE抗体価の高値と同時に血清IgE値も高い値を示したが,

40才以上の症例では, IgE抗体価および血清IgE値いずれも10-19才の症例に比べ全般的に低い値を示した。9才以下の症例では, IgE抗体価の高値にもかかわらず, 血清IgE値は比較的 low, 500IU/ml以下を示した症例が10例中5例に観察された。

これらの結果は, 若年症例では, IgE抗体の産生亢進と総IgEの産生亢進が同時に見られることが多いが, 9才以下ではIgE抗体産生亢進に総IgE産生亢進が必ずしもともなわない場合があることを示している。また, 40才以上の症例では, ハウスダストに対する過敏性は有しているものの, IgE抗体価および血清IgEは全般的に低い値を示す傾向が示唆された。

キーワード : 血清IgE, IgE抗体, ダニ, 気管支喘息