

Influence of lifestyle factors and stress on the radioallergosorbent test scores: two case reports

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It is well known that lifestyle factors and stress can influence the immune system, but it is less clear whether they have any effect on radioallergosorbent test (RAST) scores. The RAST scores were measured over time in 2 allergy patients, being assessed monthly for a period exceeding 10 years in one of them. The potential influence of lifestyle factors and stress on RAST scores was investigated in these 2 patients. The results showed that RAST scores were more strongly affected by lifestyle factors than by environmental levels of allergens.

Both patients gave permission for publication of the information in this report.

Case 1: The patient was a 68-year-old man with hay fever who was positive for 41 out of 58 RAST items. From 1995 to 2005, testing was performed at monthly intervals to observe changes of the RAST scores.

Two months after a major theft, which was important enough to be reported on television, the RAST scores of this patient became maximal. The profile of cedar pollen scores over 3 years is shown in Figure 1, revealing a marked increase after the theft. All 41 items with high RAST scores prior to the theft showed increases that ranged from 19.18-fold to 3.16-fold (mean: 13.72-fold). There was a 19.18-fold increase of the RAST score for strawberry (from 0.50 to 9.59), while the scores for celery, purple squid, potato, and banana increased from 0.63 to 11.00, 0.37 to 6.45, 0.72 to 12.50, and 0.59 to 10.20, respectively. There was also a 2.22-fold increase in immunoglobulin E (IgE) from 494.0 to 1089.0.

In addition, there was a more than 10-fold increase in the RAST scores for *Anthoxanthum odoratum* (sweet vernal grass), ragweed, Japanese cypress, cedar, wheat, corn, rice, sesame, buckwheat, pea, peanut, soy, almond, tomato, carrot, orange, coconut, garlic, apple, bamboo shoot, sweet potato, parsley, melon, malt, mango, banana, pear, peach, grapefruit, spinach, and pumpkin, while there was a more than 3-fold increase in the scores for octopus, crab, squid, shrimp, and house dust. Among

20 items with normal RAST scores prior to the theft, the score increased for 10 items (sardine, horse mackerel, flounder, mackerel, kiwi fruit, α -lactalbumin, lamb, moldy cheese, cocoa, and dog dander). Subsequently, some of the RAST scores decreased over time.

In general, this patient's RAST scores showed monthly variations and annual changes were also observed when scores were compared for the same month of different years. However, > 10-fold changes of the RAST scores for more than 50 items were only observed after the major theft.

Case 2: The patient was a 55-year-old woman with hay fever who received advice to improve her lifestyle without taking anti-allergy medication. From 2004, RAST scores for cedar, Japanese cypress, and ragweed were measured in March for three years consecutively and changes of the RAST scores were compared with

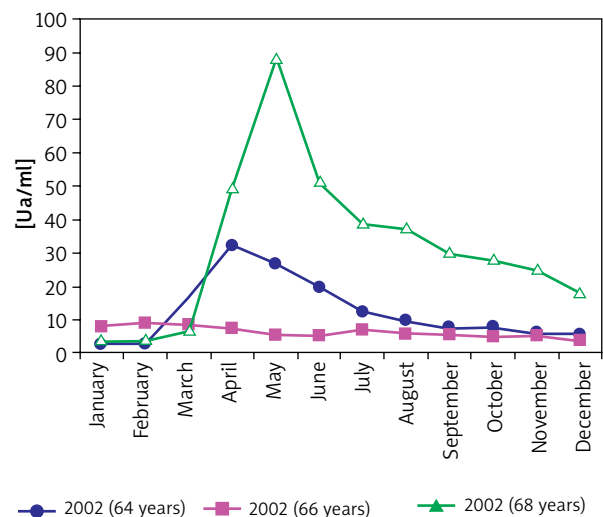


Figure 1. Monthly changes of cedar pollen RAST scores in case 1

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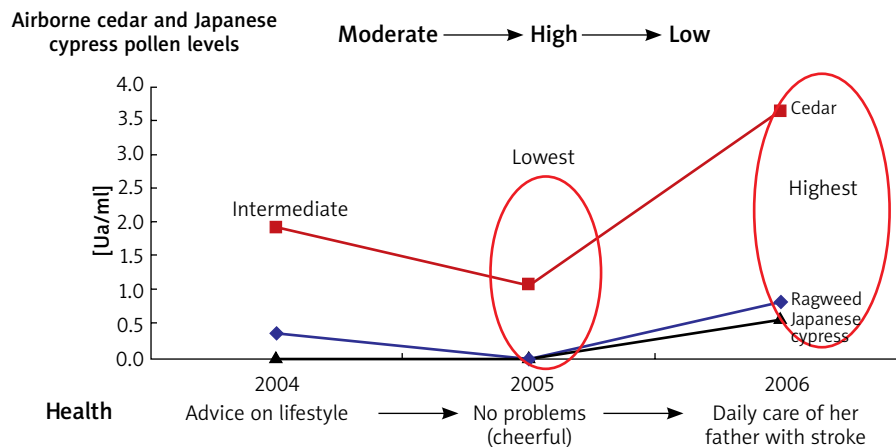


Figure 2. Summary of RAST score changes in case 2

the changes of her lifestyle. The cedar pollen RAST score was 1.93 in the first year. Then she was advised to make certain lifestyle changes, which included eating dinner earlier (5:30 pm rather than 8:00–9:00 pm), changing her bedtime from 1:00 am to 10:00 pm, and increasing her sleeping time from 5 h to about 7 h. The next year, her cedar pollen RAST score decreased to 1.07, although airborne levels of cedar pollen were very high. RAST scores for ragweed and Japanese cypress were previously positive, but these became negative. Furthermore, her hay fever symptoms were mild that year. However, her father had cerebral infarction the following year and became bedridden, and she became involved in his daily care (toileting, assisting with meals three times a day, and cleaning every day with no time off). She was unable to relax while eating meals and unable to get enough sleep, becoming physically and mentally exhausted. Although airborne cedar pollen levels were very low that year, her RAST score increased from 1.07 to the highest level recorded (3.70), while tests for Japanese cypress and ragweed changed from negative to positive (from less than 0.34 to 0.58 and less than 0.34 to 0.48, respectively). In addition, her hay fever symptoms were the most severe in recent years (Figure 2).

In case 1, changes of monthly RAST scores were observed over many years and an increase of more than 10-fold in the scores for several items only occurred after a major theft (important enough to be televised), which suggests that the sudden dramatic increase in RAST data was attributable to stress. The changes of the patient's RAST scores were not limited to pollens, which are influenced by the season, and RAST scores for all items (including foods) increased simultaneously, with many items that had not been elevated before, becoming positive. These findings provide evidence that exposure to stress can exacerbate allergy, based on quantitative assessment of 51 RAST items, and demonstrate that stress has a marked influence on allergic reactions.

In case 2, variation of RAST scores and allergy symptoms were closely related to lifestyle changes, suggesting that whether allergic symptoms develop or not depends more on host factors than on the levels of environmental allergens (pollen).

It has been suggested that contact with animals (feces, etc.) can increase regulatory T cells and might reduce susceptibility to allergic reactions. However, it might be possible that the lifestyle associated with rearing animals reduces stress (e.g., early rising and going to bed early) and increases regulatory T cells, thereby reducing susceptibility to allergic reactions [1, 2].

Taken together with the two cases reported here, such findings suggest that reducing stress and leading a healthy lifestyle could contribute to suppression of allergic symptoms. Although our sample size is too small to permit definitive conclusions, the presented data strongly suggest that RAST scores were more strongly affected by lifestyle factors, which merits further research.

Conflict of interest

The authors report no conflict of interest.

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