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Letter to the Editor

A successful case of egg allergy tolerance achieved at a local clinic

Dear Editor,

Food allergy (FA) is reportedly on the rise among children,¹ as are cases requiring an oral food challenge test (OFC) or dietary management. Toit *et al.* reported that the consumption of peanut in infancy decreased the prevalence of peanut allergy at 5 years of age.² Natsume *et al.* reported that consumption of cooked egg from 6 months of age succeeded in decreasing the prevalence of egg allergy.³ Herein we discuss dietary acclimation, a practical form of dietary management, which achieved early, successful, and safe tolerance in a case of egg allergy diagnosed by OFC at a rural clinic located on the Nijijima Islands off the east coast of Japan.

The Nijijima Islands, located 160 km south of Tokyo, can be accessed daily by sea or air. Because essential food items are transported there from the main island, the dietary habits of the inhabitants are similar to those of the mainland. Some 3000 people live in Nijijima village, with 12.9% being younger than 18 years old. There is only one clinic in the village staffed by three doctors and nine nurses.

Some patients experience spontaneous remission of FA. Others do not, with the result that they avoid, or develop an aversion to, a range of suspected food items.⁴ Recent reports claimed that early tolerance was achieved through oral immunotherapy (OIT) or dietary management from an early age.^{5,6} However, children in rural or remote areas with poor access to medical care are forced to cope by eliminating suspected allergens from their diet due to lack of sufficient experience with FA among local physicians. In short, the growing demand for the new types of FA treatment such as those outlined above has outpaced the supply of physicians trained to administer them.

The treatment here discussed was designed in compliance with the Declaration of Helsinki and the Ethical Guidelines for Medical and Health Research Involving Human Subjects of the Ministry of Health, Labour and Welfare of Japan. We obtained written informed consent from the patient's parents as well as approval from the Ethics Committee of Tokyo National Health Insurance Clinic in Nijijima (Nijijima-2014-001). The nurses employed at Nijijima clinic were carefully instructed in the treatment protocol and given a treatment manual to enhance safety. The definition of symptoms occurring during the OFC and dietary acclimation therapy was based on the 2014 Japanese anaphylaxis guidelines.⁷ The OFC was conducted according to FA guidelines.^{8,9} A positive OFC result was defined as the appearance of grade 2 symptoms or grade 1 symptoms lasting ≥ 30 min. Grade 1 symptoms improving ≤ 30 min were classified as indeterminate and reassessed at home.

An 11-month-old boy with no previous medical or family history of allergy presented at our clinic with positive results for serum specific IgE antibody to egg. The serum specific IgE antibody to egg white (EW) was 14.1 kU/L, and the ovomucoid (OVM) was 8.6 kU/L at 7 months. Dietary egg was completely eliminated following the test results. Dietary acclimation was begun using a small amount of egg yolk and gradually increasing the quantity to $\frac{1}{2}$ yolk. At 15 months of age, OFC was done to determine whether he had FA or not. For the OFC, 10 g of hard-boiled EW was divided into three unequal doses, and fed to the patient at 30-min intervals. Egg allergy was diagnosed after grade 1 skin symptoms occurred and persisted more than 30 min after ingestion of 6 g EW.

Pursuant to the parents' wishes, dietary acclimation was begun (Fig. 1). The target amount was set at 20 g of hard-boiled EW, somewhat more than the usual 15 g included in the school meals. Two grams of EW were added to his diet as an initial dose because the patient was able to tolerate 3 g EW. The parents were instructed to feed their child this amount once a day. After the patient ingested the amount 5–10 times without presenting any symptoms, the dosage was increased by 0.5–1.0 g. Although grade 1 airway or grade 1 skin symptoms occurred several times during the dietary acclimation regimen, no anaphylaxis was observed. The target amount was achieved five months later and was maintained until the next OFC. The 2nd OFC was conducted two weeks after eliminating egg from the patient's diet. The patient's 2-

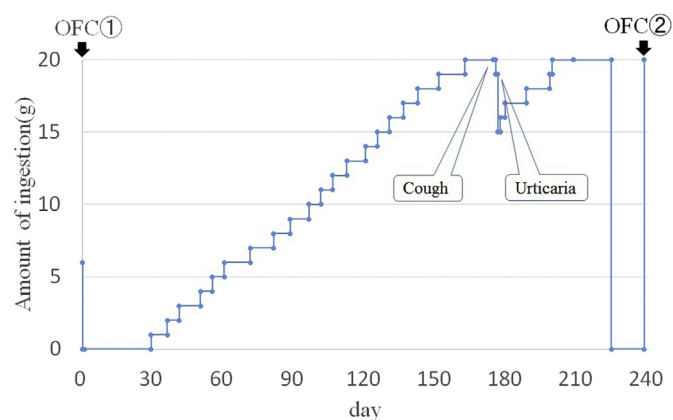


Fig. 1. Dietary instruction. Relationship between treatment duration and the amount of egg white (EW) ingested. Target amount was set at 20 g EW. Two grams EW was given as the starting dose. When the amount could be eaten without any symptoms 5–10 times, the quantity was increased by 0.5–1 g. The target amount was achieved about 5 months later. No anaphylaxis was observed. The 2nd OFC was conducted 2 weeks after eliminating egg from the patient's diet. EW, egg white; OFC, oral food challenge test.

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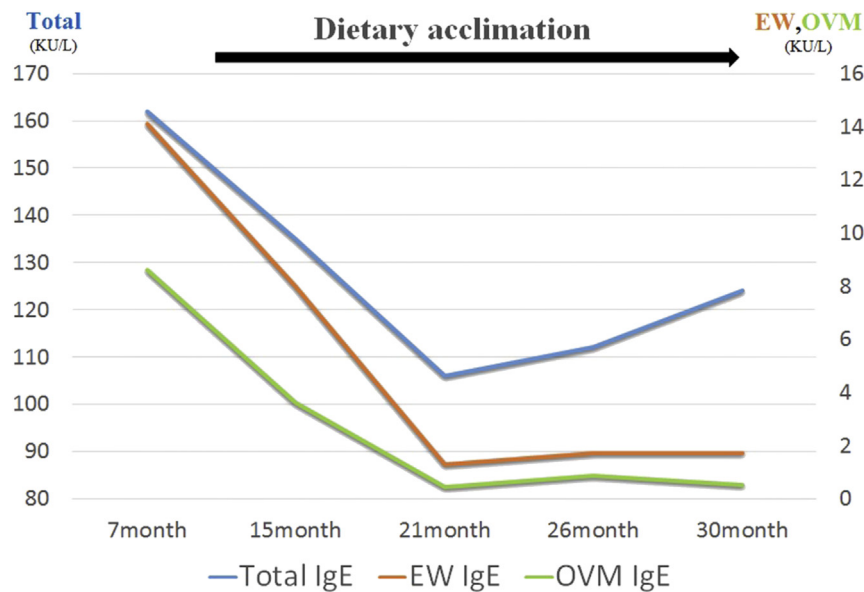


Fig. 2. Change of IgE level. Change in serum total IgE antibody, specific IgE antibody to egg white, and ovomucoid. Each significantly decreased after start of dietary acclimation. EW, egg white; OVM, ovomucoid.

weeks-sustained unresponsiveness was confirmed by a negative OFC result using 20 g of hard-boiled EW. The laboratory findings showed that serum total IgE antibody and specific IgE antibody for EW and OVM had significantly decreased after starting dietary acclimation (Fig. 2). After the second OFC, boiled or heated egg as an ingredient in meals was given to the patient. Later, foods containing half boiled egg such as mayonnaise or egg soup in quantities of about 20 g were repeatedly given at home without producing any FA symptoms, confirming that tolerance to egg had been achieved.

While OIT is currently recommended at specialized treatment centers, patients lacking access to such resources, especially in rural areas, have no recourse but to eliminate suspected allergens from their diet, with the result that various dietary items are sometimes unnecessarily avoided.

Although we strongly recommend dietary acclimation for low-risk patients, the criteria for identifying such patients are needed to ensure safety. Until official criteria are established, a history of anaphylaxis, the appearance of symptoms in response to a very small amount of the allergen, reaction to a particular allergen such as peanut, a high level of serum specific IgE antibody, uncontrolled bronchial asthma, atopic dermatitis, and a past history of cardiac or respiratory disease may be considered risk factors.¹⁰ OFC and dietary acclimation are recommended to patients in resource poor areas if they have a history of any of the above conditions. Administering the suspected allergen in several doses at sufficient intake intervals and preparing treatment manuals and drugs in case symptoms do appear are important. Low-risk children are advised to undergo the OFC at a general clinic, while children at high risk of developing severe symptoms should undergo the OFC at a specialized treatment center.

Most important for the success of this treatment is the ability of the medical care system to provide the appropriate treatments. For example, a manual on the OFC, daily dietary guidelines, and treatment procedures when symptoms appear is needed. An important adjunct to this would be an efficient means of consulting well-trained allergy specialists in emergencies.

The improvement observed in this case may have resulted from the natural remission of FA. However, given the safety and practicality of the procedure for low-risk patients, our method is of

practical use even in resource-poor treatment settings. Further efforts, such as stratification of patients at risk, are needed to promote correct FA treatment.

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Conflict of interest

The authors have no conflict of interest to declare.

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