From the Editor: Food allergy is a frequent entity with important implications on quality of life of patients and their families. In this Clinical Allergy Tip, Dr. Ebisawa and Dr. Hayashi provide important information on how to manage patients with suspected egg allergy in avoiding unnecessary elimination diets and consequently improving their quality of life.

How to improve quality of life for children with hen’s egg allergy
By Motohiro Ebisawa, MD, PhD and Noriko Hayashi (Research Dietician)
Sagamihara National Hospital, Clinical Research Center for Allergy and Rheumatology

The allergenicity of heated egg is different from that of raw egg.

How to minimize handicap of egg allergy
Hen’s egg allergy is the most frequent among young children all over the world. In order to avoid complete elimination, it is important for hen’s egg allergic patients and guardians to introduce hen’s egg step by step, such as heated egg yolk with faint contamination of egg white followed by heated whole egg. In this way, hen’s egg allergic children and their parents can have better quality of life and enjoy food products with egg’s unique cooking characteristics.

The probability of hen’s egg allergy
The probability (possibility of the symptom induction) of positive oral food challenge predicted by egg white IgE antibodies measured by ImmunoCAP® in Japan has been reported. It is not necessarily mean that the symptoms of food allergy will still appear.

Antigenicity of the protein of hen’s egg
The main causative antigen of hen’s egg allergy is ovalbumin and ovomucoid. The antigenicity of ovalbumin (OVA) but not ovomucoid (OVM) weakens by heating. OVA is easy to be denatured by heating to a certain degree. Patients in whom ovomucoid IgE antibodies are low, even if the egg white IgE antibodies level is high, can often ingest heated egg. However, even if symptoms wouldn’t appear with heated-egg ingestion, they might appear with incomplete heated egg or raw egg ingestion.

In addition, the antigenic reduction of OVA is different from OVM by recipe (the temperature, the length of the heating time and food matrix). The allergenicity of OVA in food using egg’s thermo-coagulation characteristically decreases more remarkably than that of OVM, such as boiled egg and hamburger steak. Furthermore, the allergenicity of OVA in cake and biscuit,
which mixes egg with other ingredients such as wheat, seems to be clinically much weaker.

**Steps of oral egg challenges**

We have two steps of oral food challenges for the diagnosis of hen’s egg allergy at our hospital. At the first step, we use heated egg yolk with faint contamination of egg white (STEP 1) to any kind of suspected egg-allergy patients (from mild to severe). Then, we introduce heated whole egg as a second step (STEP 2).

<table>
<thead>
<tr>
<th>Amount of egg</th>
<th>Food</th>
<th>Production Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEP 1 1 heated-egg yolk with faint contamination of egg white <em>(one-10th to one-20th of egg white)</em></td>
<td>Pumpkin cake</td>
<td>heated with the microwave oven 1000 watts, 90 seconds</td>
</tr>
<tr>
<td>STEP 2 1/2 heated whole egg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

※ 1000 watts, 90 seconds

**Our oral egg challenge protocol**

[Diagram showing the steps of oral egg challenges and the resulting outcomes.]
**Oral food challenge of Hen’s egg STEP 1**

We conduct oral food challenge of hen’s egg STEP1 for almost all egg allergy patients without exception as patients and guardians agree. From our experience, as much as eighty percent of egg allergic patients could pass Step 1 challenge.

If they could ingest hen’s egg at STEP 1 level, they could start to try bread, baked confectionery, and meat substitute (such as ham or sausage) which include small amounts of heated white egg.

Challenging hen’s egg STEP 1 leads to the improvement of the quality of life of egg allergic patients.

**References**


