



Bird-egg syndrome: a variant of secondary food allergies

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Background

Bird-egg-syndrome is a rare variant of secondary food allergies: sensitization is mostly caused by the inhalation of feathers and excrement from pet birds. Due to a cross-reaction between bird feathers or feces and allergens from egg yolk and poultry [1], a secondary food allergy to egg yolk and possibly to raw poultry [2] develops due to the partially heat-labile Gal d 5 [3–5].

Case study

Patient history

A 24-year old male patient presented for a diagnostic workup of suspected hen's egg allergy with results of negative specific immunoglobulin E (sIgE) against hen's egg. He reported symptoms including itching in the throat, intraoral swelling and dyspnea 15 min after the consumption of eggs or products containing traces of egg. There was no history of emergency

anti-allergic treatment and the patient described strict avoidance of all foods containing egg since his 21st birthday. The symptoms first occurred at the age of 15 years; prior to that, the regular consumption of eggs and egg products had produced no complications. During the diagnostic workup, the patient reported allergic asthma at the age of 12 after coming into brief contact with a domestic budgerigar.

Diagnostic workup

Serological diagnosis:

- Total IgE 16.20 kU/l
- Tryptase 6.39 µg/l
- sIgE ImmunoCAP: budgerigar feathers (0.11 kU/l); chicken feathers (0.21 kU/l); chicken meat (0.03 kU/l); egg white (0.02 kU/l); ovalbumin (0.00 kU/l); ovomucin (0.00 kU/l); conalbumin (0.00 kU/l); egg yolk (0.06 kU/l)
- ImmunoCap ISAC: no detectable sIgE (<0.3 ISU-E) against Gal d 1, -2-, 3, -5

Cutaneous diagnosis (skin prick test):

- Positive foods (≥3 mm, largest wheal diameter): egg yolk (commercial and raw native); Knorr's French fries sauce; total egg (native)
- Negative foods (<3 mm, largest wheal diameter): egg white (raw native and commercial/cooked native); egg yolk (cooked native); chicken meat and turkey meat (native)

Case discussion

Clearly assignable anaphylactic reactions are a contraindication to oral provocation testing [4]. Due to negative serological findings, low total IgE and the reported symptoms, exposure testing was performed for

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Table 1 Simple-blinded placebo-controlled exposure testing

1st Test: egg white	Allergen: hen's egg white (cooked 15 min at 100 °C) → total administered: 33.8 g; placebo: Sinlac → total administered: 310.2 g Average ratio of allergen:placebo → 0.08:1									
–	<i>Applied to the lip</i>					<i>Chewing, spitting out, rinsing of mouth</i>				
Allergen (g)	1					0.39				
Clinical symptoms	– (Subjectively symptom-free)					–				
All applications were titrated										
<i>Ingestion</i>	1 st Dose	2 nd Dose	3 rd Dose	4 th Dose	5 th Dose	6 th Dose	7 th Dose	8 th Dose	9 th Dose	10 th Dose
Allergen (g)	None	0.005	0.009	0.030	0.180	None	0.80	2.80	9	21
Placebo (g)	5.97	0.04	0.10	0.55	3.3	5.4	14.8	40	80	160
Symptoms	–	–	–	–	–	–	–	–	–	–
2nd test: egg yolk	Allergen: hen's egg yolk (cooked 15 min at 100 °C) → total administered: 1.01 g; placebo: Sinlac → total administered: 26.2 g Average ratio of allergen:placebo → 0.03:1									
–	<i>Applied to the lip</i>					<i>Chewing, spitting out, rinsing of mouth</i>				
Allergen (g)	0.3					0.1				
Clinical symptoms	–					–				
All applications were titrated										
<i>Ingestion</i>	1 st Dose	2 nd Dose	3 rd Dose	4 th Dose	5 th Dose	6 th Dose	7 th Dose	Vital parameters remained stable. Symptoms resolved after intravenous administration of dimetindene. Results: Clinical findings confirm a suspected allergy to hen's egg yolk (also to cooked egg). Thus, the 24-year-old male belongs to the rare group of patients (<20%) with IgE antibodies against heat-resistant epitopes		
Allergen (g)	None	0.00188	0.008	0.010	0.09	None	0.90			
Placebo (g)	1.8	0.2	0.5	1.2	2	4.5	16			
Symptoms	–	–	–	–	–	Itching on the left forearm → not objectively identifiable	Intraoral vesiculae; perioral erythema; generalized urticaria → Exposure test discontinued			

egg components, which showed negative cutaneous prick test results [6].

Single-blind placebo-controlled exposure testing (see Table 1)

- Day 1: egg white, negative
- Day 2: egg yolk, anaphylaxis grade I after 0.10999 g total egg yolk

Conclusion

Exposure testing revealed the rare egg yolk allergy caused by bird-egg syndrome. While the skin prick test showed results corresponding to the patient's statements in the medical history, the sIgE measurements showed negative results, possibly due to low total IgE.

As a result, the patient was advised to avoid products containing egg or (production-related) traces of egg. Moreover, an emergency kit was issued.

Conflict of interest S. Trame, Stefani Röseler, D. Kluwig, Cathleen Schreiter, J. Staub, G. Wurpts, H.F. Merk and J.M. Baron declare that they have no competing interests.

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