

CASE REPORT

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Doi:

A Rare Case with Quail Egg Allergy without Allergic Reactions to Oral Food Challenge with Hen's Egg White

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ABSTRACT

Hen's egg, as one of the most common reasons for IgE-mediated food hypersensitivity, affects both children and adults. Taking precautionary measures is suggested for the consumption of other birds' eggs for patients with allergy to hen's egg. This paper describes a rare patient with quail egg allergy, which manifested no allergic reactions after oral food challenge with hen's egg white.

Keywords: Egg allergy; Oral food challenge; Quail egg allergy

INTRODUCTION

Hen's egg is considered one of the most important causes of food allergy in the pediatric population. About 0.5-2.5% of young children suffer from an egg allergy.¹ According to the oral food challenge-based meta-analysis by Nwaru et al, the prevalence of egg allergy was less than 1% in adults.² As a result, there are very rare cases with quail egg allergy. As reported in the literature, it has been suggested to take precautionary measures for using other bird's eggs, such as quail, in patients with hen's egg allergy because of clinical and immunological cross-reactivity between hen's egg and other eggs.³ Inconsistent with literature

review, this article introduced a scarce case with quail egg allergy that showed no allergic reactions after oral food challenge with hen's egg white.

CASE PRESENTATION

A 28-year-old woman (weight: 77 kg and height: 168 cm) was referred to Rasool-e-Akram Hospital. Her family has begun to breeding quails for eggs in a home underground since 18 months ago. Egg's packing was performed by her. She suffered from skin symptoms (such as urticaria) after skin exposure to the egg white and quail egg. Additionally, she experienced throat and tongue itching, stomachache, and vomiting following oral intake of hen's egg white and quail egg. The result of the skin prick test (SPT) to egg white was positive; while the oral food challenge (OFC) test for hen's egg white was negative. To verify the allergic sensitization to quail's egg, the prick to prick test to quail's egg

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white and the yolk was performed as well. Interestingly, the wheal/ flare for quail's egg white and the yolk was 20 mm/55 mm and 14 mm/40 mm, respectively.

Laboratory findings showed 7500/ μ L white blood cells and total IgE for 80.9 IU/mL. Results of SPT to other food allergens revealed positive sensitization to egg white, egg yolk, soy, and sesame allergens (Table 1). Moreover, the results of the RIDA qline Allergy test for hen egg (specific IgE to the egg white and egg yolk) were negative (RIDA qline Allergy, R-Biopharm,

Germany). However, we did not have RIDA kit for quail egg.

In Table 2, we listed the doses and the intervals of oral food challenge for hen's egg white and quail' egg white. According to guidelines, we considered the elimination of culprit and medications that could affect the oral food challenge. The patient showed no clinical symptoms after OFC for hen's egg white; while the patient presented rhinorrhea, itching, flushing, and erythema following OFC with quail egg white.

Table 1. Results of Skin prick test (SPT) to food allergens

Allergens	Wheal size (mm)	Flare Size (mm)
Egg White	9	30
Egg yolk	10	35
Milk	-	-
Soy	3	15
Fish	-	-
Sesame	5	15
Peanut	-	-
Wheat	-	-
Rice	-	-
Histamine	7	20

Table 2. The doses and intervals of oral food challenge (OFC) to hen's egg white and quail' egg white

Hen's egg white			Quail egg white		
Doses(cc)	Time (min)	Symptoms	Doses(cc)	Time (min)	Symptoms
0.3	0	-	0.1	0	-
1.2	15	-	0.4	15	-
3	30	-	1	30	-
4.5	45	-	1.5	45	-
6	60	-	2	60	rhinorrhea, itching, vomiting, flushing, erythema
7.5	75	-	2.5	75	
7.5	90	-	2.5	90	

DISCUSSION

This paper presented a rare case with quail' egg allergy, resulting from skin contact to quail's egg the result of which depicted no allergic reaction following OFC with hen's egg white. To the best of our knowledge, only two other studies,^{4,5} came up with this history in which there are differences. Our patient revealed allergic manifestations following skin exposure to quail egg, but the cases presented in the studies of Caro Contreras et al and Micozzi et al showed allergic reactions after oral intake of the quail

egg.^{4,5} On the other hand, Jones et al reported this case as an occupational allergy.⁶ They found two egg workers (a research scientist and a laboratory technician) with allergic symptoms and IgE sensitization to hen's egg and quail's egg.⁶

The notable point in this patient was the lack of adverse reactions to egg white during OFC, despite a positive history of allergic reactions to hen's egg white. It was speculated that this might be due to the application of unintentional medications at the time of OFC or before that. Another possibility is induced tolerance during gradual increasing doses of egg white

for OFC and development of short time oral tolerance, as well as the development of delayed reactions.⁷ So, for better determination of hens egg allergy, it is better to do another OFC with fewer steps or use single maximum doses of egg white. Additionally, for clear determination of major epitope, component resolved diagnosis is the method of choice that wasn't available in this study. It worth mentioning that all aforementioned issues had been well monitored in our patient. The findings of Feeney et al study demonstrated the differences between properties of quail egg and other birds' eggs, especially in quail's egg white proteins.⁸ The results obtained by the previous study suggested that homogenate of quail egg could diminish especially food allergic responses.⁹ Moreover, the immunomodulatory and anti-allergic functions of quail' egg have been already patented (patent number: US2015/0057232A1).¹⁰ Despite the aforementioned issues, a few cases of allergy to quail eggs have been found in the literature.⁴⁻⁶

According to the published studies, cross-reactivity has been identified among molecules of egg whites in different birds. Also, the phylogenic distance among species of birds has the potential to affect the diversity of cross-reactivity.⁴ The presence of genuine and non-cross reacting proteins in quail's egg could be the reason for allergy to quail's egg without allergic reaction to hen's egg white.⁴ According to the study of Micozzi et al Ovalbumin of quail's egg was the main allergenic protein in five patients with this history.⁵ Our case is on a limited diet for the bird's egg and carries Epinephrine auto-injector, and we are to consider doing component resolved diagnosis and obtain the results in further studies.

This patient was a rare case with allergic reactions due to skin exposure to quail'egg which manifested no adverse reaction after OFC with hen's egg white. The allergic reactions to genuine allergenic molecules of quail eggs could be the cause of the absence of allergic reactions to hen's egg white. Nevertheless, the carefulness in the consumption of other birds' eggs in patients with IgE-mediated hypersensitivity, seems necessary.

This study had two limitations; the first one was the unavailable facility for detection of specific IgE against quail egg and the second one was missed follow up of the patient because the patient lived in a township far from Tehran.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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REFERENCES

1. Caubet JC, Wang J. Current understanding of egg allergy. *Pediatr Clin North Am.* 2011;58(2):427-43, xi.
2. Nwaru BI, Hickstein L, Panesar SS, Roberts G, Muraro A, Sheikh A. Prevalence of common food allergies in Europe: a systematic review and meta-analysis. *Allergy.* 2014;69(8):992-1007.
3. Tan JW, Joshi P. Egg allergy: an update. *J Paediatr Child Health.* 2014;50(1):11-5.
4. Caro Contreras FJ, Giner Munoz MT, Martin Mateos MA, Plaza Martin AM, et al. Allergy to quail's egg without allergy to chicken's egg. case report. *Allergol Immunopathol (Madr).* 2008;36(4):234-7.
5. Micozzi S, Bartolome B, Sanchis-Merino ME, Alfaya T, Aldunate T, Diaz M, et al. Hypersensitivity to Quail Egg Proteins: What About Hen Egg? *J Investig Allergol Clin Immunol.* 2016;26(5):316-8.
6. Jones M, Skidmore A, Glozier N, Welch J, Hunter AS, Cullinan P. Occupational egg allergy in an embryological research facility. *Occup Med (Lond).* 2013;63(5):348-53.
7. Niggemann B. When is an oral food challenge positive? *Allergy.* 2010;65(1):2-6.
8. Feeney RE, Means GE, Bigler JC. Inhibition of human trypsin, plasmin, and thrombin by naturally occurring inhibitors of proteolytic enzymes. *J Biol Chem.* 1969;244(8):1957-60.
9. Lianto P, Han S, Li X, Ogutu FO, Zhang Y, Fan Z, et al. Quail egg homogenate alleviates food allergy induced eosinophilic esophagitis like disease through modulating PAR-2 transduction pathway in peanut sensitized mice. *Sci Rep.* 2018;8(1):1049.
10. Melsens P, Waterloo BE, Jean L, Saint-Junien FR. Anti-inflammatory composition for modulating the cell response of neutrophils and eosinophils. United States Patent, US2015/0057232 A1. 2015.