LETTER TO THE EDITOR

Oral quail egg homogenate in the treatment of allergic rhinitis: a first experience in clinical practice

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To the Editor,

Allergic rhinitis (AR) is a very common disease as it may affect up to 30% of the general population, including children, worldwide (1, 2). Type 2 inflammation, characterized by T helper 2 polarization, allergen-specific production, and eosinophilic mucosal infiltration, leads to AR. Inflammatory events cause the typical symptoms, including those nasal and ocular, as well as itching, sneezing, watery rhinorrhoea, lacrimation, and congestion.

Allergen-specific IgE production by B-lymphocytes is orchestrated by type-2 cytokines, including IL-4 and IL-13. After exposure to specific allergen, IgE activates mast cells to degranulate, triggering the release of the preformed mediators, including histamine, cytokines, pro-inflammatory agents, trypsin homolog proteases, that start the allergic inflammatory cascade (1). Moreover, also basophils are involved in type 2 inflammation, as they are a major source for IL-4 production (3). Tryptase, a trypsin homolog protease, is a signaling molecule that binds to the protease-activated receptor (PAR)-2 located on inflammatory cells (eosinophils, neutrophils, and macrophages) as well as neurons. Binding of tryptase to these receptors amplifies the inflammation, resulting in symptom worsening (4). Ovomucoids, derived from quail egg, are competitive inhibitors of trypsin. These specific glycoproteins bind to the trypsin-like serine proteases of the allergen and decrease their activity by blocking the enzyme active site so that the IgE are not able to enter the effector cells. By forming a physical barrier around the proteases, allergens will be less able to bring about an IgE-mediated response. Ovomucoids block the serine proteases from allergens, before the allergy chain reaction starts, and act as a protective barrier against exogenous allergens absorbed in the body (5). They also prevent tryptase binding with PAR-2, so it blocks the superoxide anion production by NADPH oxidase, associated with intra-cytoplasmic degranulation (major basic protein, eosinophil peroxidase, cytokines), resulting in less inflammation and local tissue degradation.

The history of quail eggs began in the early 1970s. A French general practitioner noticed that farmers who raised quails (*Coturnix coturnix*) presented fewer allergic symptoms than the general population in the same area. He prescribed raw quail eggs to his allergic patients, including both adults and children, and observed a reduction in their symptoms (6). This finding was subsequently investigated in several human clinical trials carried out by a larger group of physicians. In these studies, subjects suffering from outdoor and indoor allergens were given quail egg powder tablets or placebo. The results of these studies

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indicated that consumption of quail egg powder led to relief of subjects' symptoms with good tolerability of the administered product (7). A further randomized, double-blind, placebo-controlled study demonstrated that quail egg reduced symptoms and nasal inspiratory flow after allergen challenge (8). Based on this background, the current study investigated the effect of a quail egg treatment on patients with allergic rhinitis examined in real-world setting.

MATERIALS AND METHODS

Forty-five patients (21 males and 24 females, mean age 32.48 years, age range 18-60) suffering from allergic rhinitis and with moderate-severe nasal obstruction were enrolled in this study. The patients were examined at 3 otorhinolaryngological clinics located in Rome, Naples, and Bari. The inclusion criteria were: adult age, either gender, diagnosis of allergic rhinitis performed according to validated criteria (12), and nasal obstruction assessed by endoscopic evaluation. Exclusion criteria were: mechanical nasal obstruction, relevant septal deviation, non-allergic rhinitis, chronic diseases and concomitant treatments that could interfere with interpretations of results. All patients gave written informed consent to participate.

The patients were examined at baseline (T0) and at the end of the treatment (T1). Patients took 2 tablets twice a day. The tablet was a proprietary blend made of *C. coturnix* quail egg (Narivent compresse, DMG, Pomezia, Rome, Italy). Patients were instructed to slowly chew two tablets in the morning and in the evening for 30 consecutive days.

The parameters were sino-nasal outcome test (SNOT) score and nasal mucociliary transport time, both assessed at T0 and T1. SNOT-20 is a questionnaire containing 20 items with a 6-point scale. The sum of each item-score was calculated and expressed the SNOT score. At present, SNOT is the most commonly utilized and highest quality sinus-specific quality-of-life method available, as documented also by a meta-analysis (9). Nasal mucociliary transport time is calculated by placing attracting powder (vegetal charcoal powder) to the head of the inferior turbinate (10, 11); through direct pharyngoscopy it is then possible to detect the transit of the tracer from the posterior pharyngeal wall. The test requires quite some collaboration by the patient, who must keep a seated position without either blowing or sniffing. The charcoal powder is used as a tracer, as it is insoluble and clearly visible in a pink environment such as that of the nasopharyngeal area, and behaves as an inert material, adhering to the mucosa and is transported passively by the movement of mucus and cilia. Normally, the tracer is found in the pharynx after about 10–15 min. Adverse events were recorded in a diary card.

RESULTS

All patients completed the study. The mean SNOT score was 38.14 (min value 12 – max value 72) at T0. The most bothersome complaints were nasal obstruction in 40 patients, post-nasal drip in 22, discharge in 10, sneezing in 9, and hyposmia in 9. At T1, the mean SNOT score significantly ($p<0.05$) diminished to 26.14 (8-44) as shown in Fig. 1; 90% of patients reported a relevant symptom improvement, namely 43 patients perceived a relevant improvement of nasal obstruction, 32 of the need to blow the nose, 25 of rhinorrhea, 23 of sneezing, and 15 of hyposmia. The mean mucociliary transport time was 24 (19-40) min at T0 which significantly ($p<0.05$) decreased to 12 at T1 (Fig. 2). No clinically-relevant adverse events were reported.

DISCUSSION

Allergic rhinitis is a very common disorder, characterized by bothersome symptoms, mainly concerning nasal obstruction, that negatively affect the quality of life of patients (1). The present study showed that quail egg significantly improved nasal symptoms and quality of life of these patients. Moreover, quail egg also significantly improved the mucociliary transport time. This parameter provides information about the clearance capacity of nasal mucosa to remove pathological secretions, mediators, allergen, and pollutants from the nasal surface. It is affected by inflammatory and infectious diseases, and a reduced mucus clearance worsens symptoms.

The current study is the first demonstration that a one-month course of quail egg was able to significantly improve nasal complaints, quality of life, and nasal mucociliary transport time in patients with allergic rhinitis. These outcomes were consistent with a previous study that used the allergen nasal

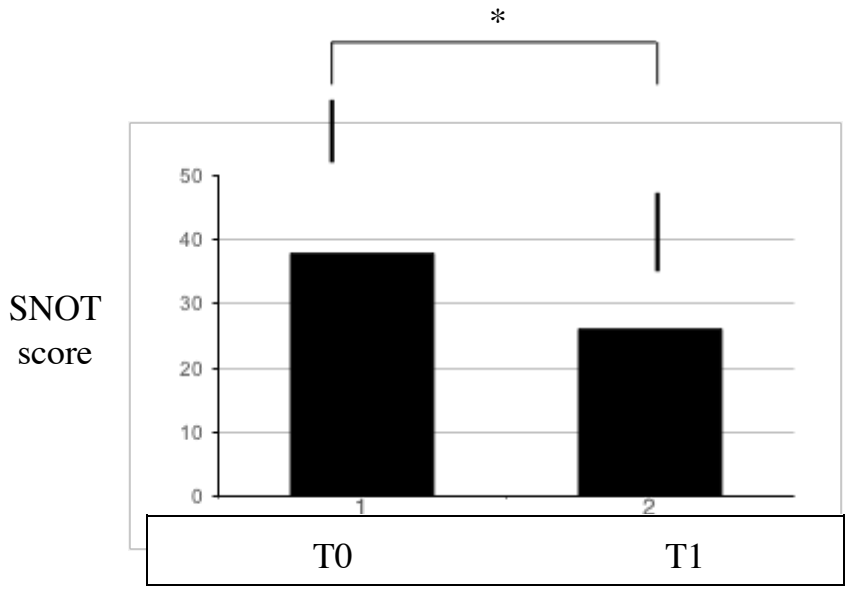

Fig. 1. *SNOT score in patients with allergic rhinitis evaluated at baseline (T0) and after one-month course (T1) with quail egg. * = p<.05.*

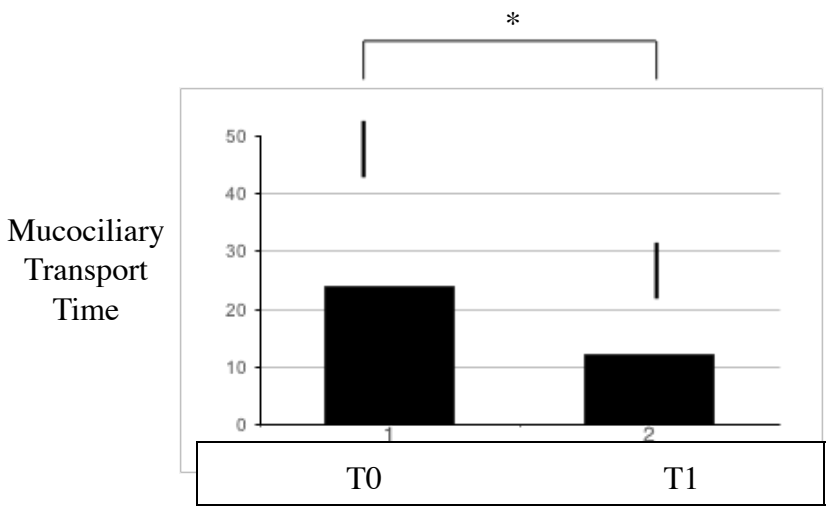

Fig. 2. *Nasal mucociliary transport time (minutes) in patients with allergic rhinitis evaluated at baseline (T0) and after one-month course (T1) with quail egg. * = p<.05*

challenge model (12). Of course, nasal challenge is an experimental method to investigate the allergic reaction, but does not completely mirror the natural exposure to allergens. Therefore, the present study has a greater clinical relevance. Moreover, it was conducted in a real-world setting, such as an out-patients clinic. As a result, the present findings could be reproduced in clinical practice.

On the other hand, this study has some limitations, including the open design, the lack of a control group and the calculation of the sample size, no biomarker was assessed, and nasal airflow was not measured. To respond to these unmet needs, further studies should be conducted using more rigorous methodology. On the other hand, the study was conducted in a real-life setting, so the outcomes could mirror what happens in clinical practice.

In conclusion, the current study demonstrated for the first time that a one-month course with quail egg could improve symptoms, quality of life, and nasal mucociliary transport time in patients with allergic rhinitis.

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