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An unusual case of occupational asthma in a part time magician. He has got an allergy surprise from his top hat!

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KEY WORDS

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Introduction

Exposure to rabbit (*Oryctolagus cuniculus*) constitutes a well recognized cause of occupational asthma for people in regular contact with this animal in occupational settings such as research laboratories, breeding, pet shops etc. (1,2). In recent years, rabbits became more popular as pets to have at home, like dogs and cats, in Italy and in other countries. Although in Italy there are no official data on the overall number of rabbits living in domestic environments, some indirect indexes suggest a significant increase in the rate of rabbit ownership, and commercial sources indicate an increasing business in rabbit breeding as well as in production of rabbit-related materials such as food, accessories etc. In these non occupational settings, the prevalence of allergic sensitization is poorly known; we have shown that in Naples

Summary statement

Rabbit constitutes a risk factor for occupational asthma in susceptible magicians.

Summary

*In this report we describe a case of respiratory allergy induced by an unusual occupational exposure to rabbit. The patient worked as a part-time magician in theatres and private parties and the most popular performance of his show was to pull out a white rabbit from a top hat. Unfortunately, a few minutes after the extraction of rabbit from top hat, the patient experienced the onset of upper and lower airway symptoms, and in some occasions he was forced to stop the show and to use short acting β_2 agonists and intramuscular steroids. The results of SPT and evaluation of serological specific IgE (ImmunoCAP and ImmunoCAP ISAC IgE) revealed allergic sensitization to rabbit (*Oryctolagus cuniculus*) dander as well as to *Parietaria* and dust mites. ImmunoCAP ISAC IgE excluded allergic sensitization to other cross-reacting animal allergens. Rabbit constitutes a reliable risk factor for allergic sensitization in individuals working as professional / part-time magicians or as animators in some recreational settings (resorts, parties, charity shows, etc).*

area (3,4) as well as in Italy (5) the values of prevalence ranges between 2.65-4.9% and 0.65-4.72% respectively.

In this report we describe a case of respiratory allergy induced by an unusual professional exposure to rabbit.

Case report

A 30-year-old man referred in our Allergy Centre for the onset of intermittent nasal and conjunctival symptoms; in addition he reported severe bronchial symptoms such as cough, wheezing and dyspnea in some particular circumstances.

Family history was positive for atopy (his father suffered from allergic urticaria). Although he was a teacher, he worked as a part-time magician in theatres and private parties. Among the children, the most popular performance of his show was to pull

out a white rabbit from a top hat. Unfortunately, a few minutes after the extraction of the rabbit from top hat, the patient experienced the onset of upper and lower airway symptoms and in some occasions he was forced to stop the show and to use short acting β_2 agonists and intramuscular steroids. It is important to note that rabbit was not living in patient's dwelling; the animal was taken just before the show (6). Patient denied any pet ownership or direct exposure to other mammals.

Skin-prick-test (SPT) was performed with commercial standardized allergenic extracts (ALK- Abello Group and Lofarma Laboratories, Milan, Italy). The panel included the following extracts: house dust mites, *Parietaria* species, grasses, cat and dog dander, olive, birch, *Alternaria alternata*, *Cladosporium herbarum* and mugwort, plus a positive (1% histamine hydrochloride) and negative (glycerinate solution) control. In addition, we used dander standardized extracts of other mammals (rabbit, mouse, rat, hamster, horse, guinea pig and cow). The SPT was carried out and interpreted according to international guidelines (7), the result was read after 10 min and expressed as the major diameter of the wheal and its orthogonal. A skin reaction of 3 mm or greater was considered positive.

A blood sample was taken for the measurement of total IgE and specific IgE to the same allergens of SPT panel by ImmunoCAP FEIA as well as by the micro-array technique ImmunoCAP ISAC (ThermoFisher Scientific, Immuno-Diagnostics, Milan, Italy). A standard spirometry was also carried out.

As monoclonal antibodies-based methods to measure the amount of rabbit allergen are not available in Italy, we cannot evaluate the degree of rabbit allergen contamination in patient's indoor environments.

The results of SPT revealed allergic sensitization to *Oryctolagus cuniculus* dander (the diameters of wheal were 10 x 12 mm), *Parietaria* (8 x 9 mm), *Dermatophagoides pteronyssinus* (9 x 10 mm), *D. farinae* (9 x 9 mm), positive control induced a wheal of 7 x 7 mm diameters.

ImmunoCAP total IgE antibodies were 179 kU/L. The values of ImmunoCAP specific IgE antibodies were the following: *Oryctolagus cuniculus* dander (e82) - 45.80 kUa/L, *Dermatophagoides pteronyssinus* - 3.24 kUa/L, *D. farinae* - 2.95 kUa/L, *Parietaria* - 12.35 kUa/L. The values of ImmunoCAP ISAC IgE were the following: rPar j 2 - 28 ISU-E, nDer f 1 - 0.8 ISU-E, rDerf 2 - 2.5 ISU-E, nDer p 1 - 2.7 ISU-E, rDer p 2 - 2.9 ISU-E. No IgE were found against animal cross-reacting allergens such as lipocalins (Can f 1, Can f 2, Equ c 1, Fel d 4, Mus m 1) and albumins (Bos d 6, Can f 3, Equ c 3, Fel d 2). When examining, spirometry revealed normal respiratory values.

The removal of rabbit, as well as an intensive cleaning of clothes / items used during the show and indoor environments where the patient rehearsed the show, resulted in a complete disappearance of all respiratory symptoms during performances.

Discussion

This is the first documented case-report of a severe respiratory allergy induced by occupational exposure to rabbit in a part-time magician. Previously, only a brief correspondence containing few sentences on this topic has been published (8). The high degree of cutaneous and serological sensitization to rabbit allergens as well as the lack of IgE antibodies against lipocalins and albumins indicates a selective allergy to rabbit induced by occupational exposure. In other words, the absence of any response to lipocalins or albumins likely exclude the possibility of a rabbit sensitization induced by cross-reaction mechanisms (9,10).

Some considerations can be drawn from our case:

1. Rabbit constitutes a reliable risk factor for allergic sensitization in individuals working as professional/part-time magicians or as animators in some recreational settings (resorts, parties, charity shows, etc.). This category of workers should avoid to use rabbits or other less common pets during their shows, if already sensitized to common pets (cats/dogs).
2. Allergists should query patients regarding direct/indirect contact with any furry animal in addition to exposure to common pets (cats/dogs). Since keeping "exotic animals" as pets is increasing in all developed countries (11), theoretically all animals living at home or in strict contact with humans may induce allergic sensitization.
3. Since it is likely that animal sensitized patients constitute an "allergic phenotype" (12), SPTs to furry animal allergens should be performed in all at high risk individuals already sensitized to cats and/or dogs before beginning an activity involving a strict contact with less common pets or furry animals, and in those who wish to own an "exotic" furry animal.

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