

Rabbit Anaphylaxis—An Interesting Case Report

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ABSTRACT

Rabbits are an unusual cause for allergic hypersensitivity; however, this domesticated animal must be considered in the differential diagnosis for symptoms ranging from rhinitis to anaphylaxis. We report an unusual case of allergic hypersensitivity to rabbits. This case involves a 6-year-old female who experienced anaphylaxis after oral ingestion of a rabbit that she had previously been sensitized to as a pet. This clinical scenario is an important one, as it alerts the clinician to the importance of recognizing rabbits as a potential source for allergens. Although it is extremely uncommon to have clinical manifestations from domesticated rabbits, it remains one of the possibilities for allergic disease, and a proper and thorough history should always be taken in an effort to shed light on the diagnosis. This case also demonstrates that aerosolized antigens crossreacting with antigen ingestion must always be included in the differential diagnosis of atopic disease.

INTRODUCTION

RABBITS ARE SMALL MAMMALS in the order of Lagomorpha of the family Leporidae. They are divided into 11 genera. They are often found throughout the world and in the continental United States, they are kept as domestic pets. There are only a handful of case reports documenting allergic hypersensitivity to these animals.^{1–3} Severe anaphylaxis to these pets is even more unusual. Most often, clinical symptoms range from allergic rhinitis, ocular allergy, and generalized pruritis to asthma.² Scientists have identified potential allergens from the fur, saliva, and urine. The saliva was found to be the most potent extract. The strongest allergen detected was 19 kDa glycoprotein, OryC1.^{1,4} This protein has been identified as a part of a larger family of proteins that function in binding lipophilic molecules. This family is known as the lipocalin family.^{4–6} Quantitative immunoelectrophoretic techniques have also discovered another major antigen, Ag R1, with respect to rabbit allergy.⁷ This antigen is predominantly found in the saliva. Pelt extracts have also been found to contain high quantities of this antigen. Ag R1 was also found in small amounts in rabbit urine; however, there is no detectable amount to be found in rabbit serum.⁷

MATERIALS AND METHODS

We report the following case of a patient who presents with anaphylaxis. The patient is a 6-year-old female who presented with a 3-year history of asthma and allergic rhinitis.

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She complained of worsening asthma and rhinitis symptoms inside her house and also upon exposure to outdoor pollen. She also revealed the family had a pet rabbit. Laboratory testing showed her total IgE was 865 kU/L, and RAST results were normal for tree, ragweed, and mold (<0.35 kIU/L). She also had positive results for *dermatophagoides farinae*, *dermatophagoides pteronyssinus*, cockroach, cat, dog, mouse, peanut, and rabbit epithelium (8.43 kIU/L, class IV). In addition to environmental control measures, the family was advised to eliminate the rabbit from the home, as this could be a potential allergic trigger for their daughter's symptoms.

RESULTS

Two days later, the patient presented to the emergency room with wheezing, cough, and angioedema of the hands and face. She was treated with albuterol, diphenhydramine, and oral steroids. The parents said they followed all of our instructions, and that they did not know why her anaphylaxis occurred. Further questioning revealed that the family ingested the pet rabbit for dinner on the night preceding the anaphylactic reaction. This was the first time the daughter ate rabbit or any other rodent with potential cross reactivity. There were no concomitant peanuts in her meal. Also of psychiatric significance, the patient was unaware that she had consumed her pet rabbit. The parents were under the impression that exposure solely to live rabbit would exacerbate their daughter's symptoms. They never expected an allergic reaction via consumption. They were advised not to feed their daughter rabbit again, and were given a prescription for self-injectable epinephrine. This demonstrates the complete identity, partial similarity, or cross reactivity between inhaled and food allergens. This has been noted previously with other foods, such as garlic and crustacean proteins.⁸ The two major points are that food allergic patients can develop an allergic reaction upon inhalation of the food (as seen with peanuts), and that respiratory sensitization to an allergen can lead to allergic symptoms upon its ingestion.

DISCUSSION

Household pets are an important etiology in determining the allergic reservoir that triggers patient symptoms. Most often, families tend to keep canines and felines as household pets; however, people are now keeping various other mammals and rodents as domestic household pets. One such example includes rabbits, which are small mammals in the order of *Lagomorpha* of the family *Leporidae*. Even with the increasing prevalence of rabbits as pets, severe allergic reactions are rare.²

Other commercial uses for rabbit include: using the pelt to make fur coats and toys, harvesting the fur to make clothing, and using the meat for edible purposes. Rabbit breeding is also very popular, as over 600,000 rabbits are used annually in research. Facilities that employ the use of these rabbits for research purposes include medical schools, hospitals, pharmaceutical companies, veterinary schools, as well as major research universities.⁹

Common symptoms for rabbit allergy include rhinitis, conjunctivitis, and wheezing in asthmatics. This is certainly more common in patients who face the hazards of occupational allergy (veterinary doctors, researchers, lab technicians). A study published in 1996 revealed that in a survey of 1,200 people exposed to laboratory animals on a daily basis, nearly 15% of the workers suffered with rhinitis, conjunctivitis, asthma, cough, or urticaria upon exposure to the animals being handled. Roughly 37% of responders admitted that rabbit were the causative animal.¹⁰ Out of all of these patients, there was one patient who developed an anaphylactic reaction after accidentally puncturing his skin with a rabbit tissue contaminated needle. His serum IgE to rabbit was also elevated.¹¹

If a rabbit allergy is suspected, the first course of action is minimizing exposure and direct contact. Ideally, the owner should remove the rabbit from the household. Unlike the family in this report, many owners have formed emotional attachments to their animals and are unwilling to part with their pets. If this is the case, it is recommended to participate in aggressive handwashing techniques, restrict the animal's territory, keep the animal outside of the bedroom, and clean the surrounding environment frequently. Some

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experts suggest the use of air filtration units to minimize the amount of allergenic material in the air. If these measures fail, then the use of topical and oral antihistamines has been the mainstay of therapy. For some allergens, it is possible to employ immunotherapy for treatment; however, at this time there is no standardized extract for the antigens OryC1 or AgR1.

Another important concept that needs to be addressed is the issue of cross reactivity of the antigen via respiratory and oral ingestion. There have been many case reports of cross reactivity documented in the literature. There may be partial similarity or cross reactivity between inhaled allergens and food allergens. One such example includes garlic and crustacean proteins.⁸ There has also been a major study on the fish parasite, *Anisakis*, causing allergic airway hyperreactivity and dermatitis. This study demonstrated that a risk for allergic reaction to this parasite does exist in patients who are occupationally exposed (seafood processing workers) where skin and inhalation exposure exists.¹² Cytokines of the T_H2 subset such as IL-4, IL-5, IL-9, and IL-13 have also been shown to be causally related to airway hyperresponsiveness.¹³

Another area of interest that has received a lot of media attention has been the area of peanut sensitivity via inhalation. A study by Sicherer et al.¹⁴ set out to investigate the clinical manifestations of peanut allergy on airplanes. It is common for most major airlines to serve peanuts as in-flight snacks, and it has been found that peanut allergen is detectable in the ventilation system of the planes studied.¹⁵ Most of the clinical characteristics of peanut allergies on the plane involved cutaneous and oral exposure; however, roughly 40% of the patients studied developed allergies after respiratory sensitization. Such symptoms could include rhinorrhea, sneezing, cough, or hives. In addition, there have been several case reports regarding acute allergic reactions to airborne food antigens via cooking or occupational exposure. These antigens include string beans, lentils, meats, and seafood.^{16–21} Last, there have been case reports documenting dust mite contamination in the flour of beignets as another source of inhalant allergens. This has also been shown to cause anaphylaxis after human consumption.^{22–23}

The last major batch of cross reactive antigens exists in the realm of seafood. There have been interesting case reports describing workers who were exposed to aerosolized scallop particles having an increased risk of occupational asthma.²⁴ There have also been documented aerosolized shellfish allergen exposures leading to worsening asthma. This study aimed to look at crab allergen concentrations in air samples and the development of respiratory symptoms among the workers who were exposed to that particulate matter. Cough was present in 28% and wheeze in 4% of workers.²⁵ It illustrates the important point that aerosolized antigens must always be considered in atopic individuals.

CONCLUSION

This case report serves to alert the clinician to the importance of recognizing the rabbit as a potential source for allergens. While it is extremely uncommon to have clinical manifestations from domesticated rabbits, it remains one of the possibilities for allergic disease, and a proper and thorough history should always be taken in an effort to shed light on the diagnosis. It also demonstrates that aerosolized antigens must always be included in the differential diagnosis of atopic disease.

DISCLOSURE STATEMENT

The authors declare there are no competing financial interests.

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