

Cat-Pork Syndrome: A Rare Cross-Reactive Food Allergy Linked to Cat Sensitization

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Case Report

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Abstract

Background

Cat-Pork Syndrome is a rare allergic condition caused by cross-reactivity between Fel d 2, a cat serum albumin, and pork albumin. Individuals with cat allergies may experience allergic reactions upon consuming pork due to this immunological overlap. This case series highlights an underrecognized cross-reactivity that can lead to unnecessary dietary restrictions or misdiagnosis.

Case Presentation:

We report the case of two patients with known allergic rhinitis sensitized to cats who experienced recurrent reactions shortly after consuming pork. The reaction for the first case included hives, facial swelling, and mild respiratory discomfort while the reaction for the second case included significant oral pruritis. Both patients had skin prick testing (SPT) revealing sensitization to cat dander and pork, with appropriate positive and negative controls. Through shared decision making, both patients elective for strict avoidance with the second case choosing to carry an EpiPen.

Conclusion

Cat-Pork Syndrome is an important differential diagnosis in individuals with unexplained pork allergy. Awareness of this cross-reactivity can prevent unnecessary dietary restrictions and improve patient management.

Introduction

Cat-Pork Syndrome is a rare but clinically significant allergic condition in which individuals with cat allergies develop allergic reactions after consuming pork. The underlying mechanism is immunological cross-reactivity between Fel d 2, the major cat serum albumin, and structurally similar albumin found in pork muscle. This phenomenon has been documented in only a few case reports, making it a largely underrecognized entity.

Cross-reactivity between animal-derived proteins is well-established in allergy literature, with bovine serum albumin (BSA) playing a similar role in beef allergy. In such cases, individuals allergic to cow's milk often exhibit allergic reactions to beef due to shared protein structures. Similarly, patients sensitized to Fel d 2 may experience an immune response to pork albumin, as both proteins share substantial sequence homology. However, Fel d 2-related pork allergy remains relatively unexplored, contributing to misdiagnosis and unnecessary dietary restrictions in affected individuals.

One of the primary challenges in diagnosing Cat-Pork Syndrome lies in distinguishing it from other food allergies, particularly alpha-gal syndrome (AGS). AGS, which is caused by IgE sensitization to the alpha-

gal sugar found in mammalian meats, typically presents as delayed allergic reactions hours after ingestion of red meat. In contrast, Cat-Pork Syndrome is characterized by immediate hypersensitivity reactions, occurring within minutes of pork consumption. This difference in onset time, along with targeted allergy testing, is crucial for accurate diagnosis and patient management.

Given the potential for misdiagnosis and the lack of widespread recognition of Cat-Pork Syndrome, clinicians must maintain a high index of suspicion in individuals who report pork allergy symptoms and have a history of cat sensitization. This report presents a case of Cat-Pork Syndrome in an adult female, emphasizing the importance of targeted allergy testing, accurate differentiation from AGS, and dietary guidance to optimize patient outcomes.

Case 1

A 49-year-old female with a history of asthma presented with recurrent episodes of hives, lip swelling, and mild shortness of breath occurring 15–30 minutes after consuming pork. She denied previous allergic reactions to other red meats (beef, lamb) or dairy products. There was no history of tick bites. Skin prick testing revealed strongly positive reactions to cat dander (7mm wheal) and pork (6mm wheal), with negative responses to beef and lamb. An oral food challenge was declined by the patient, as symptoms were consistently triggered by pork ingestion. The patient was advised to avoid pork while continuing a normal diet with other meats. She was prescribed antihistamines for mild symptoms and instructed on anaphylaxis recognition, though severe reactions had not occurred. Thus, an EpiPen was not prescribed. At six-month follow-up, she remained asymptomatic with avoidance of pork in her diet.

Case 2

A 43-year-old female with a history of cat allergy, allergic rhinitis, and asthma presented with reproducible oral pruritus after ingestion of undercooked pork and, to a lesser extent, undercooked beef and cow's milk products. Symptoms occurred after eating pork chops, cured pork products, steak, and other meats that were not thoroughly cooked, as well as milk and yogurt. She tolerated pork and beef when they were cooked thoroughly. She had never experienced urticaria, angioedema, respiratory symptoms, gastrointestinal symptoms, cardiovascular symptoms or anaphylaxis in association with these foods. Her food-related symptoms had progressively worsened while she was living with her cat. After her cat passed away, her asthma and allergic rhinitis symptoms gradually improved. She also noted resolution of the oral pruritus previously associated with cow's milk and yogurt. She had no known history of tick bites. Skin prick testing with fresh food demonstrated a 5 mm wheal with an approximately 2.5 cm flare to raw pork and a 5 mm wheal with a 1cm flare to raw beef. Testing with commercial pork extract produced a 4 mm wheal with a 2 cm flare, whereas testing with commercial beef extract produced a 2mm wheal and was interpreted as negative (Fig. 1). Skin-prick testing to cooked pork, cooked beef and cow's milk were all 0 mm, negative. Based on the clinical history and skin-test findings, the diagnosis of cat-pork syndrome was made, with probable additional cross-reactivity to

bovine serum albumin. Avoidance of undercooked pork and beef was recommended. She continues to carry an EpiPen, but has not had to use it to date.

Discussion

The pathophysiology of Cat-Pork Syndrome is rooted in cross-reactivity between cat and pork albumins. Fel d 2, a cat-derived serum albumin, shares high sequence homology with porcine serum albumin, leading to immune system recognition and allergic responses. This mechanism parallels milk-beef syndrome, where bovine albumin triggers cross-reactivity. Recent studies suggest that cross-reactivity between serum albumins is not uncommon among mammalian species. While bovine and porcine albumins share significant structural similarities, the specific sensitization to Fel d 2 in cat-allergic individuals highlights a unique species-specific immunologic response. Unlike BSA, which frequently coexists with dairy allergies, Fel d 2-associated pork allergy can occur without concurrent sensitization to other red meats, making its diagnosis particularly challenging.

Aeroallergen-food cross-sensitization is a well-documented phenomenon where exposure to airborne allergens leads to immune responses against structurally similar food proteins. In addition to Cat-Pork Syndrome, several other clinically relevant examples exist. Dust mite-shrimp allergy is a common cross-reactivity where individuals allergic to dust mites may experience allergic reactions to crustaceans due to shared tropomyosin proteins. Similarly, bird-egg syndrome occurs in individuals sensitized to bird feathers or droppings who later develop egg allergy due to cross-reactivity with avian serum albumin (Gal d 5). These examples highlight the importance of considering environmental allergen exposure when evaluating food allergies.

Abbreviations

BSA
bovine serum albumin
AGS
alpha-gal syndrome
SPT
skin prick test
Gal d 5
avian serum albumin

Declarations

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Author Contribution

Concept and design: JC, TY, SJDrafting of the manuscript: JC, TY, JH, SJSupervision: SJ

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