A Case of Transient Pediatric Pork-Cat Syndrome Caused by Sensitization to Albumin

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Pork-cat syndrome is an unusual condition in which patients who are allergic to cat epithelium develop symptoms of allergy after the ingestion of pork meat. Primary sensitization is presumed to be caused by inhaled Fel d 2 (cat serum albumin), with the patient presenting predominantly respiratory symptoms (mild-moderate rhinitis/asthma) [1] and subsequent reactions to pork due to cross-reactivity between Fel d 2 and pork serum albumin (Sus s 1) [2]. Despite being one of the most frequently named food allergy syndromes, along with others such as egg-bird and latex-fruit syndrome, few cases of patients with pork-cat syndrome have been described in the literature [3,4]. Most reported cases occur in older adolescents or young adults [5]. To date, we have found no cases reported in toddlers [6].

We present the case of a 15-month-old infant who presented with perioral erythema immediately after eating smoked pork loin, which resolved without the need for medication within 1-2 hours. He tolerated well-cooked pork meat and had no problems with meat from other mammals—always well-cooked—or milk. The patient had no pets at home, although he did have occasional contact with a cat, which triggered mild rhinitis. We performed skin prick tests (SPTs) (ALK Allergologist Laboratorium A/S) with various foods and possible related allergens and prick-by-prick tests with smoked pork loin. Total IgE and specific IgE (ImmunoCap, Thermo Fisher Scientific) to the different allergens were also measured. A raw smoked loin extract was prepared by homogenization in phosphate-buffered saline (15% wt/vol), dialyzation, and lyophilization. Ten milliliters of the cat serum (Nextmune S.L.) was concentrated in 30-kDa spin filter devices to obtain an albumin-rich serum extract. To determine the primary sensitizing allergen, ELISA inhibition assays using loin extract and albumin-rich serum extract in the solid phase and loin extract and albumin-rich serum extract at 1 µg/mL

Table. Skin Tests Results, Analytical Determinations, and Symptoms During the Study

	First visit	Year 1	Year 2
Symptoms			
Raw pork meat	OAS	None	None
Cooked pork meat	None	None	None
Cat	MR	None	None
Skin prick test, mm			
Pork meat	6	0	0
Cat dander	0	0	0
Prick by prick raw pork meat	NP	0	NP
IgE, kU/L			
Total IgE	81	57	122
sIgE pork meat	6.20	1.33	1.07
sIgE Sus s 1	7.55	1.83	1.34
sIgE cat	0.22	NP	NP
sIgE Fel d 1/Fel d 2	0/3.62	NP/0.46	NP/0.40
ELISA inhibition, %			
LE, 1/25 µg/mL			
Coated LE	60/85	69/91	NP
Coated ASE	57/79	66/86	NP
ASE, 1/25 µg/mL			
Coated LE	27/35	30/37	NP
Coated ASE	65/80	72/95	NP

Abbreviations: ASE, albumin-rich serum extract; LE, loin extract; MR, mild rhinitis; NP, not performed; OAS, oral allergy syndrome; sIgE, specific IgE.

and 25 µg/mL as inhibitors were performed as described in Gadermaier et al [7]. All the results are shown in the Table and in Table 1, online-only supplemental file. The patient was diagnosed with pork-cat syndrome, and avoidance of raw pork was recommended, leaving the diet free for well-cooked pork. At the 1-year follow-up, the patient tolerated pork in all its forms, including raw pork meat. SPT, determination of total and specific IgE, and ELISA inhibition were also repeated (Table and Table 1 online-only supplemental file). The tolerance of raw pork meat coincided with the decrease in specific IgE-mediated sensitization to both serum albumins, which was confirmed the following year.

Pork-cat syndrome is one of the various types of red meat allergy [1]. Consumption of red meat has increased in recent decades, with the result that allergic reactions to red meat, traditionally considered rare, are becoming more frequent [2,5]. Three main mechanisms are responsible for allergic reactions to red meat: primary beef allergy, causing rapid reactions because of sensitization to Bos d 6 (bovine serum albumin), and in many cases also causing reactions to milk; α-gal syndrome, in which the patient presents late IgE-mediated reactions to galactose-α-1,3-galactose (α-gal); and pork-cat syndrome, which is due to cross-reactions between different serum albumins [5]. The management of pork meat allergy may vary depending on the culprit allergen.

Serum albumin is a multifunctional protein in which some functions are related to its structure and sequence stability [8]. However, it is also a flexible protein, able to change its conformation to bind ligands and act as a carrier protein [8]. Pork serum albumin is thermolabile and can denature with cooking [8]: the reaction mostly occurs with undercooked or raw pork, and tolerance to well-cooked pork is common [2,6]. It is found in many animal products in the human diet, as well as in animal dander [8]. The possibility of remission of serum albumin–mediated allergy in many foods is widely known [9]. Therefore, although the main recommendation for affected patients is an avoidance diet [6,10], it might be reasonable to think that this type of allergy could also subside, as some authors have already suggested [9]. Nevertheless, to date, no cases of remission have been reported.

We present a case of pork-cat syndrome in a 15-month-old infant due to sensitization to albumin with progressive remission of sensitization and eventual tolerance of pork, as well as resolution of symptoms on contact with cat dander. In contrast to the normal pattern in older children and adults [1], the primary sensitization in this case appears to be to ingested smoked pork loin. The skin tests against this animal were negative from the beginning, indicating that extracts containing allergens other than the major ones are essential to avoid underdiagnosis and to ensure an accurate diagnosis of food allergy.

Such an approach will enable better recommendations for avoidance (eg, raw meat intake) and future management.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

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