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Single Case

A Case of α-Gal-Unrelated Red Meat-Induced Urticaria Treated by Omalizumab

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Keywords
Red meat-induced urticaria · α-gal · IgE · Beef · Pork · Omalizumab

Abstract
A 70-year-old healthy woman was referred to our hospital for chronic urticaria. She did not have a history of allergy, asthma, and rhinitis. She was initially diagnosed with α-gal-related urticaria based on an episode of delayed-type urticaria after eating red meat. The results of the intracutaneous allergen test for beef and pork were negative. Fluorenzyme immunoassays specific for IgE against α-gal, beef, and pork were also negative. She was diagnosed with an α-gal-unrelated red meat allergy following the reproduction of urticaria by a food challenge test. The patient was unresponsive to several drugs, including antihistamines or immunosuppressants. However, omalizumab administration suppressed her symptoms. ***Key Clinical Message:*** The diagnosis of red meat allergy may require a repeatability test by consuming red meat even though serum α-gal IgE antibody might be negative. The α-gal-unrelated red meat urticaria may be responsive to omalizumab.

Introduction

Sensitization to α-gal has been linked to delayed-type urticaria after eating beef and pork. This phenomenon is related to tick bites inducing IgE antibodies against α-gal. In such cases, we first alert the patient not to consume beef and pork and also to avoid tick bites as the urticaria can be intractable and resistant to several therapies. We report a case of α-gal-unrelated red meat-induced urticaria with a detailed clinical course.

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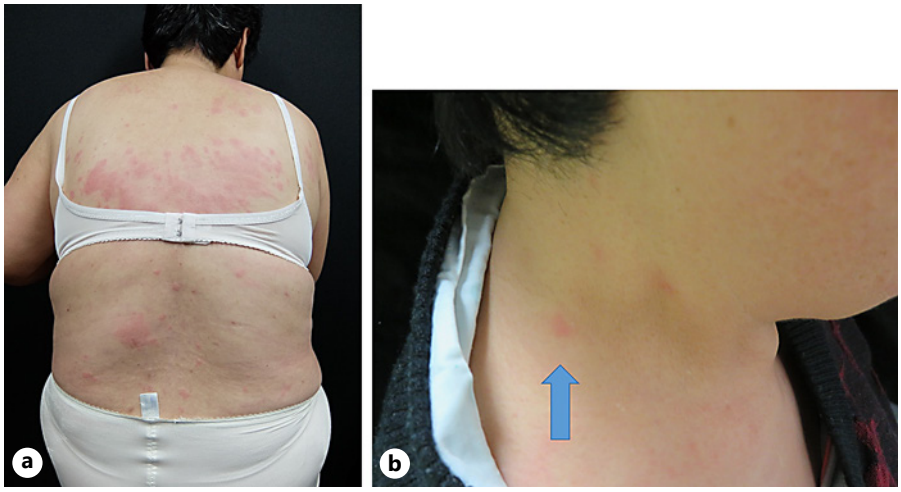

Fig. 1. a Urticaria developed on her whole body at the first consultation. **b** Arrowhead shows small urticaria welts on the neck.

Case Presentation

A 70-year-old healthy woman had chronic urticaria for several years. The patient lived near a forest. Her severe symptoms appeared after consuming red meat, including beef and pork. One day after consuming flounder roe, she developed severe urticaria. Upon visiting our emergency room, she received intravenous steroids. She developed urticaria on her entire body without anaphylaxis when she consulted our department (Fig. 1a).

We suspected α-gal-related urticaria from episodes of appearance after consuming beef, pork, and flounder roe. Although we advised her not to consume these foods, the urticarial symptoms recurred due to unexpected intake or contact with the restricted foods. One episode of urticaria continued for several days. Her symptoms were unresponsive to various antihistamines and oral steroids; thus, we subcutaneously administered 300 mg of omalizumab. Urticaria disappeared from the day after injection and did not recur until 3 months. We measured serum IgE levels specific to beef, pork, and α-gal. Total IgE levels were within the normal range, and α-gal-specific IgA, IgG, and IgE levels were less than the measurement sensitivity (Table 1). We repeated the injection of omalizumab (300 mg) at a 3-month interval for the unexpected intake of red meats. Twenty-four days after the second omalizumab administration, we performed a prick test against beef, pork, milk, and normal saline to obtain a definite diagnosis, which yielded negative results. Thirty-eight days after the second omalizumab injection, after obtaining informed consent for the risk of triggering urticaria and anaphylactic reactions, we performed the challenge test for beef. Eight hours after taking beef, she complained of inching and developed urticaria (Fig. 1b). Therefore, we diagnosed her with α-gal-unrelated red meat-induced urticaria.

Discussion

Here, we report a case of urticaria linked to the consumption of beef. Allergic reactions to red meat were suspected when the IgE antibody specific for α-Gal is detected [1]. The clinical manifestation of red meat allergy is mostly urticarial, which develops after a few

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Table 1. Transition of specific and nonspecific antibody

	Day 0	Day 4	Day 172	Day 196	Day 210	Day 211	Day 217
α-Gal IgE, UA/mL normal range: <0.35 UA/mL	0.271	<0.100	NT	0.373	0.329	0.282	0.32
α-Gal IgA, mgA/L normal range: no data	<1.00	<1.00	NT	<1.00	<1.00	<1.00	<1.00
α-Gal IgG, mgA/L normal range: no data	5.65	6.44	NT	12.7	11.7	10.1	11.5
Poak-specific IgE, UA/mL normal range: <0.34 UA/mL	NT	NT	<0.10	<0.10	<0.10	<0.10	<0.10
Beef-specific IgE, UA/mL normal range: <0.34 UA/mL	NT	NT	<0.10	<0.10	<0.10	<0.10	<0.10
Fluke-specific IgE, UA/mL normal range: <0.34 UA/mL	NT	NT	<0.10	NT	NT	NT	NT
Nonspecific IgE, IU/mL normal range: <170 IU/mL	125	107	NT	107	95	116	NT

Day 0: at the first consultation, the first omalizumab administration (data acquired before the injection). Day 4: after omalizumab administration. Day 172: at the second omalizumab injection (data acquired before the injection). Day 196: at time of prick test performed against beef, pork, milk, and normal saline. Day 210: day of consuming beef meat on admission. Day 211: next day, after consuming beef meat. Day 217: before the third omalizumab injection. Day 226: third omalizumab injection.
NT, not tested.

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hours of consuming allergy-inducing foods [1, 2]. We investigated the transition of plasma α-gal-specific IgE, IgA, and IgG in the current patient, whose levels were undetectable. Urticaria could be reproduced following a food challenge test. Currently, no relapse has been observed for 2 years with the use of omalizumab. Thus, omalizumab may help treat α-gal-unrelated red meat allergy. A challenge test against red meat may be necessary to confirm the diagnosis when IgE antibodies against α-gal are not detected.

Statement of Ethics

The study was conducted in accordance with the Declaration of Helsinki. The patient provided written informed consent to publish the case, including the publication of images. The study is exempt from ethics committee approval as only 1 case was reported.

Conflict of Interest Statement

The authors have declared that no competing interests exist.

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Author Contributions

Makoto Kondo treated the patient, conceptualization, and investigation. Makoto Kondo, Shohei Iida, Yoshiaki Matsushima, Ai Umaoka, Takehisa Nakanishi, and Koji Habe prepared the manuscript. Keiichi Yamanaka prepared and edited the manuscript.

Data Availability Statement

The patient data are not publicly available on legal or ethical grounds.

References

1 Chinuki Y, Ishiwata K, Yamaji K, Takahashi H, Morita E. Haemaphysalis longicornis tick bites are a possible cause of red meat allergy in Japan. Allergy. 2016;71(3):421–5.
2 Kondo M, Nakagawa T, Yamanaka K, Mizutani H. Case with acute urticaria by red meat after Haemaphysalis longicornis bite. J Dermatol. 2017;44(7):e168–9.