SKIN

BRIEF ARTICLE

A Missed Diagnosis of Alpha-gal Allergy in the Northern United States: A Case Report

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ABSTRACT

Alpha-gal syndrome is an acquired mammalian meat allergy transmitted via tick bite. Herein, we describe a case of alpha-gal syndrome in the Northern United States that goes unrecognized by multiple healthcare professionals. This case highlights the importance of keeping this diagnosis in mind when treating patients with unexplained urticaria and anaphylaxis.

INTRODUCTION

Alpha-gal syndrome is a serious, potentially life-threatening “meat allergy” acquired from a tick bite, most commonly the lone star tick. The tick bite results in the transmission of an oligosaccharide known as galactose-alpha-1,3-galactose, or “alpha-gal” into the person’s skin.[1,2] The onset of alpha-gal is usually 4-6 weeks after the tick bite. When sensitization occurs, patients present with gastrointestinal symptoms, urticaria, and possible anaphylaxis 3-6 hours after meat ingestion due to an immune-mediated immunoglobulin E (IgE) antibody reaction to alpha-gal, also found in non-primate mammals.[1,2,3,8] Diagnosis includes an IgE antibody blood test. Sensitized patients should be prescribed epinephrine autoinjectors and counseled to avoid mammalian meat such as beef, lamb, and pork, as well as some milk products. [1,3,5,8]

Primary care providers, dermatologists, and allergists are becoming more aware of alpha-gal syndrome. However, this may not be the case in the Northern parts of the country, as alpha-gal was originally thought not to impact this region.[4,7] Numerous sources, including the most recent 2022 CDC guidelines on Alpha-gal Syndrome, site its distribution in the southeastern and eastern United States. [3,7] However, cases have recently been reported in Minnesota. A recent retrospective study of patients in the Mayo Clinic Health System found five cases reported in Minnesota from 2008-2018.[7]

Here, we report a case of alpha-gal syndrome in Minnesota in September 2022. We review a case of a 59-year-old female who develops a severe reaction to red meat. Delayed diagnosis can result in a preventable life-threatening anaphylaxis reaction. Thus, medical providers should consider this important differential in an adult presenting in the summer months with an urticarial eruption.

CASE REPORT

A 59-year-old Caucasian woman with no prior medical history of allergy, developed a

round pink scaly rash surrounding a tick bite she received in Minnesota. At that time, she went to her primary care provider and was diagnosed with erythema migrans and treated with a 2-week course of doxycycline, and the rash subsequently resolved.

Thirty-four days later, she presented to a Minnesota urgent care clinic with two days of rash. She reported that the rash began on the posterior neck the previous night and spread to her chest. At the urgent care clinic, she was prescribed oral prednisone (0.5-1 mg/kg) for three days for a presumptive diagnosis of urticaria. The following day, the patient presented to the emergency room with full body urticaria (**Figures 1 and 2**), cough, shortness of breath, and throat constriction. She was treated with intramuscular epinephrine and intravenous fluid resuscitation. She was discharged the same day with a prescription for an epinephrine autoinjector and encouraged to schedule a follow-up visit with her primary care doctor. Following the emergency room discharge, she continued to have flares of urticaria and developed a new rash on her posterior neck and chest.

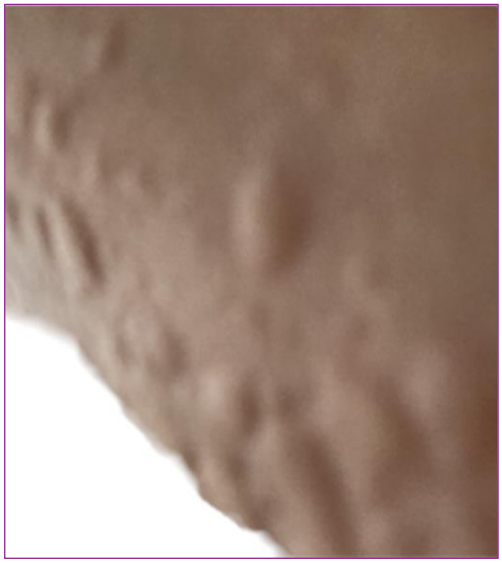

Figure 1. An urticarial rash began on the arms 10 hours after meat ingestion.

The following week, the patient was able to schedule a follow-up appointment with her primary care doctor. The physician recommended antihistamines and referred her to an allergist for further evaluation, with which she could not make an appointment for many months. The patient returned to her primary care doctor the following week and was tested for alpha-gal. Four days later, test results revealed serum immunoglobulin E specific to alpha-gal (sIgE) ≥ 0.7 kU/L, confirming the diagnosis of alpha-gal.

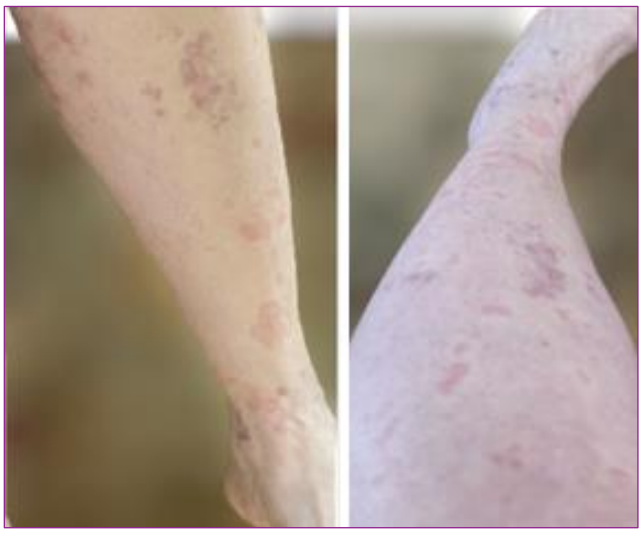

Figure 2. An urticarial rash spread to the legs 30 hours after meat ingestion.

DISCUSSION

We present a case of a patient in the Northern United States who develops alpha-gal syndrome and highlight a “classic” case of alpha-gal syndrome. Classic symptoms include gastrointestinal symptoms (nausea, diarrhea, vomiting, heartburn) as well as rash, hives, and life-threatening anaphylaxis reactions.[1,3,5] These symptoms can be delayed and typically occur 2-8 hours after the ingestion of mammalian meat. Immediate management consists of the administration of intramuscular epinephrine and intravenous

crystalloids for circulatory support. Systemic steroids may be used in the acute setting. Subsequently, patients should be given epinephrine autoinjectors and told to avoid the consumption of red mammalian meat products.[1,3,4,5]

This case highlights the importance of taking a full history from patients presenting with new urticaria. Commins 2020 recommends testing patients for alpha-gal who present with unexplained anaphylaxis or recurring urticaria following exposure to mammalian red-meat products such as beef, pork, rabbit, and lamb as well as gelatin-containing foods and dairy.[3] A confirmatory diagnosis requires serum or plasma immunoglobulin E specific to alpha-gal (sIgE) ≥ 0.7 IU/mL.[3,7]

The patient was diagnosed with erythema migrans, an early cutaneous sign of Lyme Disease, before the development of the alpha-gal allergy. Interestingly, Alpha-gal is classically associated with the Lone Star tick species, which typically is not the vector for Lyme disease. However, cases of other ticks sensitizing patients to alpha-gal have been reported, such as the deer tick and the Ixodes ricinus species in Europe.[4,8] Given that Lyme disease is commonly spread via Ixodes scapularis “deer tick,” and the Lone star tick is rare in Minnesota, it is possible that in this case, alpha-gal was spread via the Ixodes scapularis tick.[2,4,8] However, it is also possible that the patient was never infected with Lyme disease, as cutaneous manifestations of Lone Star ticks bites may present similarly, if not identical to erythema migrans.[9] This mimicking type of rash, known as Southern tick-associated rash illness (STARI), is not associated with Borrelia burgdorferi infection.[9] More research is needed to determine if the population of Lone Star tick is increasing in the northern United States, or if alpha-gal syndrome is associated with additional tick species not previously reported.

CONCLUSION

Given the uncertainty and dynamic character of alpha gal’s distribution, all healthcare workers should be aware of this important differential for urticarial eruptions. This becomes especially true in a severe life-threatening syndrome such as this. This case report emphasizes the importance of educating current and future healthcare workers about this diagnosis in the Northern United States.

Conflict of Interest Disclosures: None

Funding: None

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