

Alpha Gal Syndrome: A symptomatic presentation in the Emergency

Room – Case Report

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ABSTRACT

Background: Alpha-gal syndrome (AGS), also known as red meat allergy or tick bite meat allergy, is a life-threatening delayed condition diagnosed in patients allergic to galactose-alpha-1,3-galactose after certain types of tick bites. **Primary Objective:** The primary objective of this case report is to describe the clinical presentation and management of alpha-gal syndrome. **Results and Conclusions:** This case report highlights the importance of recognizing and managing alpha-gal syndrome promptly to prevent severe allergic reactions. It underscores the necessity for specific allergy testing and comprehensive patient education on allergen avoidance. Early detection of alpha-gal syndrome is critical due to its potentially fatal hypersensitivity reaction. Management strategies include allergen avoidance, and educating health workers to recognize that many medications contain mammalian proteins.

Keywords: Alpha-gal syndrome, galactose- α -1,3-galactose, tick-bite, meat allergy, delayed hypersensitivity reaction.



Fig. 1- Lone Star tick

INTRODUCTION

The Alpha-gal syndrome is an Ig E-mediated hypersensitivity condition diagnosed in patients allergic to galactose-alpha-1,3-galactose after certain types of tick bites. *Amblyomma americanum* commonly known as the lone star tick (Fig. 1), is the most common tick associated with this illness in the United States, mostly southeastern United States. The patient's history typically presents with an intolerance to mammalian meat, monoclonal antibodies, prosthetic heart valves, drugs, or vaccines that contain alpha-gal products. Initial symptoms are often misdiagnosed as an allergic drug reaction or anaphylactic reaction [1] and can present with a myriad of symptoms including hives, itchy rash, nausea and vomiting, heartburn, diarrhea, cough, difficulty breathing, hypotension, oropharyngeal edema, angioedema, dizziness, and abdominal pain. The symptoms can present from 2-6 hours after eating or exposure to the allergen alpha-gal.

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CASE DESCRIPTION

A 66-year-old male presented to the Freeman Health System Emergency Department with episodes of vomiting of chewed food, a single episode of diarrhea, a pressured frontal headache with a pain score of 9/10, fever, chills, and hypertension triggered by sausage consumption 6 days prior. He took Advil to ease his pain.

Medical History:

1. Alpha gal syndrome diagnosed 15 months prior after bitten by lone star tick indicated by allergen specific Ig E sensitization to galactose- α -1,3 galactose. He was advised and educated on administration of epinephrine for future symptoms such as swollen throat, urticaria and difficulty breathing.
2. Hypertension, receiving amlodipine 5 mg daily.
3. Pre-diabetes managed by lifestyle changes, diet modification and exercise.
4. Osteoarthritis with surgical history of bilateral knee replacement.
5. No history of smoking, alcohol use, or other illicit drugs.

The patient's allergies were reviewed and listed. The alpha-gal panel was conducted in July of 2023 at the diagnostic center (Table 1.1).

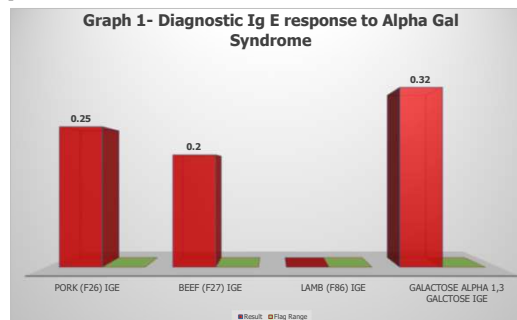
Allergy	Type	Reaction	Severity
Acetaminophen	Allergy	Rash	Mild
Hydrocodone	Allergy	Rash	Mild
Penicillin	Allergy	Rash	Mild
Propoxyphene	Allergy	Rash	Mild
Tramadol	Allergy	Rash	Mild
Latex	Allergy	Rash, Itching	Moderate
Alpha Gal	Allergy	Rash	Severe

Table 1.1 Alpha gal diagnostic panel

Category	Findings
Lab Values	No significant abnormalities
	Elevated creatinine kinase
	Unremarkable: white blood cell, red blood cell, platelets, electrolyte, cardiac enzymes, renal workup, blood glucose
Imaging studies	Chest X-Ray: No acute cardiopulmonary pathology
ECG results	Normal sinus rhythm, normal rate, normal intervals, no ST segment or T wave changes

Table 1.2- Lab Values, Imaging Studies & ECG Results

A comprehensive diagnostic panel workup revealed elevated Pork Ig E, Beef Ig E, Lamb Ig E, and galactose-alpha levels (Graph 1). The patient was recommended a diet without mammalian meat, dairy products, or mammalian protein-containing drugs. Ig E test helps evaluate the etiology of meat allergies in patients with delayed onset of symptoms (2 to 6 hours after eating meat). Ig E antibodies to alpha-gal are the likely mediator of anaphylactic reactions in individuals who develop hypersensitivities to beef, pork, and/or lamb as adults [2].



Due to his history of alpha-gal syndrome, the medications used to treat his symptoms had to be carefully considered so that they would not include any possible mammalian proteins. The options for medication were discussed with the pharmacist and as per their recommendations, the patient was given diphenhydramine and metoclopramide intravenously as well as intravenous normal saline administration. Of note, *although the intravenous version of metoclopramide did not contain any mammalian proteins, the oral version did contain these proteins (as noted by a pharmacist)*. The patient responded to the medication and the symptoms were relieved.

Category	Findings
Patient Orientation	Oriented to person, place, and time
General Appearance	Well-developed, well-nourished, well-hydrated
Physical Examination	Normal Pharynx
	Normal breath sounds
	Regular heart rate and rhythm
	Normal heart sounds
	Equal bilateral pulses
Abdomen: soft, non-tender, normal bowel sounds	No lower extremity edema
Skin	Warm and dry
Hemodynamic Stability	Oxygen saturation: 97% at admission, 100% at discharge
	Blood pressure: 160/87 to 117/76
Emergency Room	No emergent medical or surgical condition

Table 1.3 Comprehensive Patient Evaluation

DISCUSSION

Increasing Incidence: Over the past few decades, there has been an increase in the incidence of alpha-gal syndrome [3]. **Case Report Highlights:** This case report discusses considerations for administering medication to an AGS patient. **Medication Administration:** Possible medication allergy reactions were checked in the emergency department before administering any medication. **Challenges in Avoidance:** Complete avoidance of foods, medications, and other products with alpha-gal antigens is challenging due to the absence of appropriate labeling listing mammalian-derived sources. **Patient Advisories:** Patients were advised to avoid red meat, dairy products, alcohol and follow up with their allergist. **Importance of Collaboration:** Between the treating physician and pharmacist in managing AGS. **Preventive Measures:** Preventive measures to avoid tick bites include wearing long sleeves, long pants, high socks, and using tick repellent. Such measures should reduce the incidence of AGS in the future.

LIMITATION

- Single case and single centered study limitation.
- The retrospective study design and reliance on medical records introduce observational bias.
- Reliance on patient records and self-reports can introduce reporting bias.
- Variability in allergy testing methods and allergen avoidance in non-food products complicate management.
- Further research is needed to understand, improve treatment strategies, and develop effective public health policies.

CONCLUSION

This case report aims to educate health workers to remember that multiple medications are mammalian protein-containing drugs that need to be avoided in these patients. It is essential to confirm with pharmacists that medications that are to be given either in the acute setting, such as the Emergency Department or in an outpatient setting, are approved to be mammalian protein-free medications to prevent any allergic reactions.

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