

An approach to a patient with suspected meat allergy due to underlying alpha-Gal syndrome in a resource-limited setting



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INTRODUCTION

The alpha-Gal syndrome is a type of food allergy in which antibodies against the galactose α -1, 3-galactose are generated.¹ Patients with alpha-Gal syndrome typically present with symptoms related to allergic reactions, such as pruritus, urticaria, angioedema, and even anaphylaxis 3 to 6 hours after eating meat.¹ Diagnosis is often a combination of a compatible clinical presentation with additional testing that can include skin prick test, prick-by-prick testing, and serum immunoglobulin E (IgE) antibodies against galactose- α -1, 3-galactose.¹ Management often includes dietary restriction of meat and meat-derived products and appropriate treatment, when exacerbations occur.

The goal of this report is to present an interesting case of alpha-Gal syndrome and describe some of the challenges associated with the management of this condition in a developing country.

CASE REPORT

A 55-year-old man presented to our office with complaints of wheals and itching in the groin area that appeared 5 hours after eating a meat-based lunch. According to him, these symptoms had been recurring for the past 8 months; time, in which he consulted various outpatient clinics and was diagnosed with food allergy. During his last episode, which occurred 1 month earlier, he went to the emergency department and was treated with intravenous hydrocortisone, fexofenadine, and

Abbreviation used:

IgE: immunoglobulin E

hydroxyzine with resolution of symptoms a few hours later. His past medical history was fairly unremarkable with no history of smoking or recent prolonged hospital admissions. However, the patient is an avid horse rider and recalled several instances of tick bites 2 years previously.

On physical examination, several wheals were noted on the inner portion of the thigh and intergluteal area, accompanied by itching of moderate intensity. Based on his clinical presentation and history, a presumptive diagnosis of meat allergy was made, and the patient underwent prick testing using Immunotek's standardized protein extract F027-COWMEAT. However, the result was interpreted as negative (Fig 1).

At the next appointment, a prick-by-prick test using a set of fresh meat samples cooked to different temperature levels was performed, again yielding a negative result. Following the diagnostic algorithm (Fig 2), the patient then underwent testing for IgE antibodies against galactose- α -1, 3-galactose, but due to limited availability in the country, the blood sample had to be sent to a laboratory in the United States. Two weeks after the initial consultation, the result came back positive with a galactose- α -1, 3 IgE level of 19.70 Ku/L (reference range, <10 Ku/L). A

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Fig 1. Skin prick test using standardized protein extract yielded a negative result.

final diagnosis of alpha-Gal syndrome was made, and the patient was advised to avoid the consumption of related foods.

DISCUSSION

Meat allergy is uncommon, particularly in adulthood; therefore, a high index of suspicion is key for a timely diagnosis to prevent future life-threatening events. This condition is typically caused by a type I hypersensitivity reaction, which manifests 15 to 30 minutes after antigen exposure.² However, despite being driven by the same pathogenic mechanism, the alpha-Gal syndrome usually has a delayed onset. As a matter of fact, in a publication including 24 patients with meat allergy, all of them reported recurring urticaria, angioedema, or anaphylaxis with an onset from 3 to 6 hours after beef consumption.³ It must also be noted that the clinical presentation may vary, as, prior to this “delayed reaction,” some patients reported nausea, diarrhea, indigestion or itching, with the latter being the most common.³ Likewise, our patient reported an 8-month history of recurring urticaria presenting 5 hours after beef ingestion, always preceded by severe itching.

Aside from identifying the former clinical picture, a careful history focused on screening for risk factors is of outmost relevance. For instance, atopic dermatitis and cow’s milk allergy during childhood have been linked to alpha-Gal syndrome.⁴ There is also growing evidence of an association between tick bites and nonprimate mammalian meat allergies or between blood groups A and O on galactose- α -1, 3-galactose sensitization.^{5,6} We reported that during

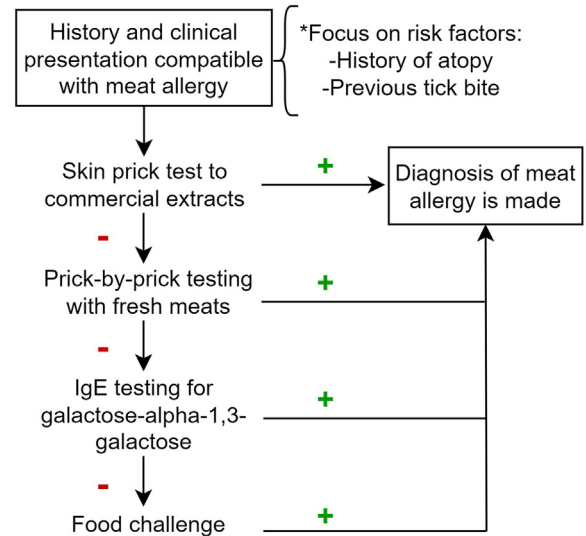


Fig 2. Diagnostic algorithm for suspected cases of meat allergy. *IgE*, Immunoglobulin E.

the medical interview the patient recalled an episode of tick bite in his right groin area 2 years previously, while his blood typing results were compatible with Group O and positive for Rh antigen. The role of such risk factors as causative agents remains unclear.

Regarding the definitive diagnosis of alpha-Gal syndrome, there is no official guideline on how it should be approached, as there is poor correlation between the clinical history and skin prick test, intradermal tests to foods, food-specific IgE immunoassays, and food challenge results.^{4,7} At first, a skin prick test using the Immunotek standardized protein extract F027-COWMEAT was performed, yielding negative results. However, this finding was not surprising, since it has been reported that commercial extracts result in a wheal response with diameters of less than 4 mm.³ Further, a set of fresh meat samples cooked at different temperatures was applied, also leading to false-negative results. There are several possible explanations for these findings. For example, it has been proposed that, unlike proteins, carbohydrate epitopes have a relatively small charge, which may not suffice to cross-link the IgE antibodies anchored to the membrane of mast cells.⁸

Some authors consider serum IgE specific to alpha-gal to be the most effective diagnostic test, as alpha-Gal-decorated glycoprotein bovine thyroglobulin has shown a diagnostic sensitivity of 100% and a specificity of 92%.⁹ However, it must be highlighted that such test is not widely available in developing countries. This has been highlighted in a literature review, where the authors state that data regarding food allergy in Latin America are scarce due to low

availability and affordability of diagnostic tools, as well as due to the lack of well-trained physicians.¹⁰

Conclusion

There are no international guidelines addressing the workup of patients with this type of allergy, which is why a high clinical suspicion, careful screening of risk factors, and various tools to support the diagnosis are required. In developing countries, low availability and affordability of technical resources and well-prepared physicians are significant barriers that result in delayed diagnosis, if diagnosis is not missed. There are many unmet needs and disparities in the management of alpha-Gal syndrome, and further research is required to reach global consensus on how to best approach patients with this uncommon condition.

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Conflicts of interest

None disclosed.

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