Tick-borne red meat allergy (α-gal syndrome)

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1 Tick-borne red meat allergy occurs from sensitization to a carbohydrate, galactose-α-1,3-galactose (α-gal)

The lone star tick (*Amblyomma americanum*) is commonly found in the southern United States, but its prevalence in Canada is increasing.[1] The tick's saliva contains a high level of α-gal, a carbohydrate antigen also present in nonprimate mammalian cell membranes.[2] Skin and bloodstream exposure to this antigen through a tick bite leads to sensitization to the carbohydrate and, subsequently, to red meat allergy.

2 In addition to food sources like red meat, health care–related exposures can trigger α-gal syndrome

In 2023, the US Centres for Disease Control and Prevention declared α-gal syndrome a public health concern.[2] Patients can develop anaphylaxis from unexpected sources of α-gal exposure including vaccines (e.g., live herpes zoster vaccine; measles, mumps and rubella vaccine), supplements (e.g., collagen), medications (e.g., heparin, cetuximab) and heart valve replacements (Box 1).[3]

3 Diagnosis of α-gal syndrome is challenging, given its spectrum of presentations

Unlike other food allergy reactions to protein antigens, α-gal reactions are delayed and occur up to 8 hours following ingestion of red meat. Symptoms can include urticaria, angioedema and respiratory, gastrointestinal and cardiovascular manifestations of anaphylaxis.[4] Some patients have only gastrointestinal symptoms, leading to a misdiagnosis of food intolerance rather than allergy. Diagnosis of α-gal syndrome has increased among patients previously thought to have idiopathic anaphylaxis.[5]

4 Clinicians should consider α-gal syndrome in the differential diagnosis of unusual food or drug reactions

A new onset of reactions to red meat (an uncommon allergen) should alert clinicians to suspect α-gal syndrome. Diagnosis requires a thorough clinical assessment along with immunoglobulin (Ig) E testing, which is commercially available.

5 Management is similar to that of other IgE-mediated allergies

Patients with α-gal syndrome should avoid all red meat and α-gal–containing products, but can safely consume white meat and fish. Patients should carry an epinephrine autoinjector and obtain a medical alert bracelet. Immunotherapy to induce desensitization is not yet available.

Box 1: Potential sources of α-gal antigen

Foods

- Red meat (e.g., beef, pork, lamb)
- Animal viscera (e.g., kidney, liver, heart, intestine)
- Sausage casing
- Dairy (e.g., milk, cheese, yogurt, butter)
- Animal-based shortening (e.g., lard, tallow)
- Gelatin-containing snacks (e.g., marshmallows, gummy bears, fruit snacks)

Supplements

- Collagen

Vaccines

- Gelatin-containing vaccines (e.g., live herpes zoster; measles, mumps and rubella; yellow fever)

Prescription medicine

- Pancreatic enzyme replacement
- Monoclonal antibodies (e.g., cetuximab)

Medical products

- Gelatin-based colloid plasma substitute (e.g., gelafundin)
- Heparin (sourced from porcine intestine)
- Bovine and porcine heart valves

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