



Alpha-gal syndrome

Overview

Alpha-gal syndrome is a recently identified type of food allergy to red meat and other products made from mammals. In the United States, the condition is most often caused by a Lone Star tick bite. The bite transmits a sugar molecule called alpha-gal into the person's body. In some people, this triggers an immune system reaction that later produces mild to severe allergic reactions to red meat, such as beef, pork or lamb, or other mammal products.

The Lone Star tick is found predominantly in the southeastern United States, and most cases of alpha-gal syndrome occur in this region. The tick can also be found in the eastern and south central United States. The condition appears to be spreading farther north and west, however, as deer carry the Lone Star tick to new parts of the United States. Alpha-gal syndrome also has been diagnosed in Europe, Australia and Asia, where other types of ticks carry alpha-gal molecules.

Researchers now believe that some people who have frequent, unexplained anaphylactic reactions — and who test negative for other food allergies — may be affected by alpha-gal syndrome. There's no treatment other than avoiding red meat and other products made from mammals.

Avoiding tick bites is the key to prevention. Protect against tick bites by wearing long pants and long-sleeved shirts and using insect repellents when you're in wooded, grassy areas. Do a thorough, full-body tick check after spending time outside.

Symptoms

Signs and symptoms of an alpha-gal allergic reaction are often delayed compared with other food allergies. Most reactions to common food allergens — peanuts or shellfish, for example — happen within minutes of exposure. In alpha-gal syndrome, reactions usually appear about three to six hours after exposure. Red meat, such as beef, pork or lamb; organ meats; and products made from mammals, such as gelatins or dairy products, can cause a reaction.

Signs and symptoms of alpha-gal syndrome may include:

- Hives, itching, or itchy, scaly skin (eczema)
- Swelling of the lips, face, tongue and throat, or other body parts
- Wheezing or shortness of breath

- A runny nose
- Stomach pain, diarrhea, nausea or vomiting
- Sneezing
- Headaches
- A severe, potentially deadly allergic reaction that restricts breathing (anaphylaxis)

Doctors think the time delay between eating red meat and developing an allergic reaction is one reason the condition was overlooked until recently. A possible connection between a T-bone steak with dinner and hives at midnight was far from obvious.

When to see a doctor

See your primary care doctor or a doctor who specializes in the diagnosis and treatment of allergies (allergist) if you experience food allergy symptoms after eating — even several hours after eating. Don't rule out red meat as a possible cause of your reaction, especially if you live or spend time outdoors in the southeastern United States or in other parts of the world where alpha-gal syndrome is known to occur.

Seek emergency medical treatment if you develop signs or symptoms of anaphylaxis, such as:

- Difficulty breathing
- Rapid, weak pulse
- Dizziness or lightheadedness
- Drooling and inability to swallow
- Full-body redness and warmth (flushing)

Causes

A Lone Star tick bite most commonly causes the condition in the U.S. Bites from other types of ticks can lead to the condition in the U.S., Europe, Australia and Asia.

Tick bites

Ticks that cause alpha-gal syndrome are believed to carry alpha-gal molecules from the blood of the animals they commonly bite, such as cows and sheep. When a carrier tick bites a human, the tick injects alpha-gal into the person's body.

For unknown reasons, some people have such a strong immune response to these molecules that they can no longer eat red meat or products made from mammals without a mild to severe allergic reaction. People who are exposed to many tick bites over time may develop more-severe symptoms.

The cancer drug cetuximab

People with antibodies related to alpha-gal syndrome can have allergic reactions to the cancer drug cetuximab (Erbix). Cetuximab-induced cases of this condition are most common in regions

with a high population of Lone Star ticks, suggesting a possible link between Lone Star tick bites and an increased vulnerability to alpha-gal syndrome. More research is needed to understand the connection between ticks that carry alpha-gal in certain regions and cases of alpha-gal syndrome that don't seem directly linked to tick bites.

Researchers think the hallmark time-delayed reaction of alpha-gal syndrome is due to the alpha-gal molecules taking longer than other allergens to be digested and enter your circulatory system.

Risk factors

Doctors don't yet know why some people develop alpha-gal syndrome after exposure and others don't. The condition mostly occurs in the southeastern United States and parts of New York, New Jersey and New England. You're at increased risk if you live or spend time in these regions and:

- Spend a lot of time outdoors
- Have received multiple Lone Star tick bites
- Have a mast cell abnormality such as indolent systemic mastocytosis

In the past 20 to 30 years, the Lone Star tick has been found in large numbers as far north as Maine and as far west as central Texas and Oklahoma in the United States.

Alpha-gal syndrome can also occur in other parts of the world such as Europe, Australia and parts of Asia, where bites from certain types of ticks also appear to increase your risk of the condition.

Complications

Alpha-gal syndrome can cause food-induced anaphylaxis, a medical emergency that requires treatment with an epinephrine (adrenaline) injector (EpiPen, Auvi-Q, others) and a visit to the emergency room.

Anaphylaxis signs and symptoms can include:

- Constriction of airways
- Swelling of the throat that makes it difficult to breathe
- A severe drop in blood pressure (shock)
- Rapid pulse
- Dizziness, lightheadedness or loss of consciousness

Based on recent research, doctors now believe that some people with unexplained, frequent anaphylaxis may be living with undiagnosed alpha-gal syndrome.

Prevention

The best way to prevent alpha-gal syndrome is to avoid areas where ticks live, especially wooded, bushy areas with long grass. You can decrease your risk of getting alpha-gal syndrome with some simple precautions:

- **Cover up.** When in wooded or grassy areas, wear shoes, long pants tucked into your socks, a long-sleeved shirt, a hat and gloves. Try to stick to trails and avoid walking through low bushes and long grass. Keep your dog on a leash.
- **Use insect repellents.** Apply insect repellent with a 20% or higher concentration of DEET to your skin. Parents should apply repellent to their children, avoiding their hands, eyes and mouths. Keep in mind that chemical repellents can be toxic, so follow directions carefully. Apply products with permethrin to clothing or buy pre-treated clothing.
- **Do your best to tick-proof your yard.** Clear brush and leaves where ticks live. Keep woodpiles in sunny areas.
- **Check yourself, your children and your pets for ticks.** Be especially vigilant after spending time in wooded or grassy areas.
- **It's helpful to shower as soon as you come indoors.** Ticks often remain on your skin for hours before attaching themselves. Showering and using a washcloth might remove unattached ticks.
- **Remove a tick as soon as possible with tweezers.** Gently grasp the tick near its head or mouth. Don't squeeze or crush the tick, but pull carefully and steadily. Once you've removed the entire tick, dispose of it and apply antiseptic to the bite area.

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