ILLINOIS DEPARTMENT OF PUBLIC HEALTH
IDPH
PROTECTING HEALTH, IMPROVING LIVES

HEALTH ALERT

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Alpha-gal Syndrome

Summary and Action Items

- Alpha-gal syndrome is a serious, potentially life-threatening allergy resulting from a tick bite, for which no treatment exists. The only prevention method is to avoid tick bites.
- According to a recent CDC MMWR, suspected cases of Alpha-gal syndrome have increased substantially since 2010, mostly impacting states, including Illinois, with established populations of lone star ticks.
- Health care providers should consider Alpha-gal syndrome in patients with delayed allergic reactions following consumption of red meat, dairy or mammalian-derived products and **conduct appropriate diagnostic tests** e.g. IgE immunoassays for galactose-alpha-1,3-galactose (alpha-gal).
- Providers should familiarize themselves with new clinical training resources through CDC on alpha gal syndrome.
- Providers should familiarize themselves with products that contain alpha-gal including certain gelatin contain medications that could trigger allergic reactions.

Background and Epidemiology

Alpha-gal syndrome (AGS) was first described in the early 2000s. Galactose-α-1,3-galactose (alpha-gal) is a molecule found in most mammals, such as cows and pigs, and in certain mammalian-derived products, but not in people. AGS is a hypersensitivity reaction to alpha-gal. Unlike typical food allergies, symptoms are often delayed by two hours or more after exposure and can arise suddenly following years of safe meat consumption. Research suggests that the bite of some tick species induces immunoglobulin E (IgE) antibodies to alpha-gal, sensitizing patients to subsequent alpha-gal exposures. Of note, not all meat allergies are related to Alpha-gal.

Meats with high amounts of alpha-gal include beef, pork, lamb, venison, rabbit, or other meat from mammals. Many other food and pharmaceutical products also contain alpha-gal in variable quantities. Some milk and milk products may also contain alpha-gal; however, many patients with AGS can tolerate milk products. Some patients with AGS may also be sensitive to alpha-gal found in gelatin made with pork or beef, products made or cooked with mammal fat, like lard, tallow or suet, or meat broth, bouillon, stock and gravy. Many biologic drugs, including some monoclonal antibodies like cetuximab, can contain alpha-gal due to the mammalian cell lines used in production. Gelatin capsules used for oral medications may also be derived from animals, posing a risk. Some vaccines can contain alpha-gal, as well as bioprosthetic devices, including heart valves and cardiac patch materials, which are often made from animal tissue and can trigger reactions in AGS patients. Other products, such as certain topical products, anti-venoms, and some lubricants, may contain alpha-gal or mammal-derived ingredient. Poultry, fish and seafood do not contain alpha-gal.

As documented in a July 2023 CDC Morbidity and Mortality Weekly Report (MMWR), the number of U.S. AGS cases has increased substantially since 2010. The highest prevalence was found throughout a nearly contiguous region of the southern, midwestern and mid-Atlantic U.S., including the southern tip

of Illinois. Further, suspected AGS cases were predominantly located in areas where the lone star tick is known to be established or reported (which includes all of Illinois).

Potential Exposures

In the United States, AGS is most closely associated with lone star tick (*Amblyomma americanum*) bites. Research has suggested that other tick species, including *Ixodes* species, may also be associated with AGS development.

Symptoms

Clinical presentation is broad with no one symptom, or cluster of symptoms, consistently predominate among AGS patients. However, skin reactions, like urticaria, and anaphylaxis are quite common. Patients may also present with gastrointestinal or respiratory symptoms. Acute onset of any one or more of the following occurs ***two to ten hours after ingestion*** (i.e. a delayed reaction) of pork, beef, lamb, any other mammalian meat, or any mammalian-derived product (e.g. gelatin):

- Abdominal pain
- Nausea
- Diarrhea
- Vomiting
- Heartburn/indigestion
- Hives
- Itching
- Anaphylaxis as diagnosed by a provider
- Swelling of one or more of the following: lips, tongue, throat, face, eyelids, or other associated structures
- Shortness of breath
- Cough
- Wheezing
- Acute episode of hypotension

Diagnosis

Health care providers should take a detailed patient history to understand prior occurrences of tick bites or time spent in tick habitats/outdoors. Diagnosis relies on a history of symptoms following exposure to mammalian products along with a commercially available blood test for immunoglobulin-E antibodies specific to alpha-gal (alpha-gal lgE). Of note, having elevated IgE levels may not always imply symptomatic or clinically overt allergies to products with alpha-gal. Additionally, allergic reactions to antibiotics in meat, particularly penicillin or streptomycin, can appear like an allergy to meat itself and may not represent alpha gal syndrome or other forms of meat allergy. An allergy skin test may also be used to diagnose AGS, by assessing sensitivity to one or more mammalian meats or other mammalian-derived products.

Prevention

The best way to prevent Alpha-gal syndrome is to prevent tick bites by:

- Using Environmental Protection Agency-registered insect repellents with one of the following active ingredients: DEET, picaridin, IR3535, oil of lemon eucalyptus (OLE), para-menthane-diol (PMD), or 2-undecanone.
- Wearing clothing and gear treated with 0.5% permethrin.
- Showering and checking your body for ticks after coming indoors.

Treatment

There is currently no treatment or vaccine to prevent AGS. Management of AGS includes avoidance of the allergen and management of allergies with agents such as antihistamines or epinephrine as well as preventing further tick bites. Those with IgE-mediated meat allergy should be equipped with self-administered epinephrine and taught how and when to use it. There have been some published reports of successful desensitization efforts in both adults and children with alpha-gal allergy. Since alpha-gal allergy will often remit or resolve over time in the absence of future tick bites, the risks versus benefits of desensitization need to be further established.

LHD and IDPH Response

AGS is not a reportable condition in Illinois or nationally. Local health departments are funded through IDPH to conduct environmental active tick surveillance in their local jurisdictions. Ticks are collected by trained LHD personnel who enter tick habitats to collect ticks from the environment, which are then sent to IDPH for identification and tickborne disease pathogen testing. Current tick distribution ranges and tick pathogen test results can be found on the Illinois Tickborne Disease Dashboard. IDPH also monitors hospital data to track the occurrence of the disease with syndromic surveillance.

Contact

Health care providers and laboratories should contact their local health department with questions. Local health departments should contact the IDPH CD Section, Vectorborne Disease Program at 217-782-2016 with any questions.

Additional Resources

IDPH Alpha-gal Syndrome
CDC: Alpha-gal Syndrome
NIH: The Meat of the Matter: Understanding and Managing Alpha-Gal Syndrome
CDC Fast Facts: Products That May Contain Alpha-gal
CSTE Standardized Case Definition for Alpha-Gal Syndrome
CDC: MMWR Geographic Distribution of Suspected Alpha-gal Syndrome Cases – US, January 2017 – December 2022

Target Audience

Local Health Departments, Infectious Disease Physicians, Hospital Emergency Departments, Infection Control Preventionists, Health Care Providers, and Laboratories

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