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Alpha-Gal Allergy and Anaphylaxis in a Hardware Store Employee: A Case Report

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Introduction

- Alpha-gal syndrome (AGS)
  - Emerging allergic condition
  - IgE antibodies against galactose-α-1,3-galactose
  - "Red-Meat Allergy"
  - Associated with tick bites from Lone Star Tick
- This case report highlights:
  - Alpha-gal related occupational exposure
  - Climate change related geographic expansion
  - Anaphylaxis of unclear etiology

Lone Star Tick (*Amblyomma americanum*)

Case:

A 60-year-old male hardware store employee presented to the occupational medicine clinic with a three-year history of recurrent anaphylactic episodes, suspected to be related to his alpha-gal allergy and potential workplace triggers. His first episode occurred while unloading fertilizer bags at his retail hardware job, followed by symptoms of whole-body hives, dyspnea, gastrointestinal distress, and acral cyanosis, which required treatment for anaphylaxis at the emergency room. A subsequent allergist referral revealed elevated tryptase levels, babesiosis, high serum anti-alpha-gal IgE, and positive skin tests for mammalian meats and bee venom. The patient recalls tick exposure the summer prior to his first episode, as his dogs frequently brought ticks into the home, and he found ticks on his own body.

Over the next three years, he experienced 12-15 anaphylactic episodes with consistent symptoms, alongside chronic brain fog and fatigue. Despite eliminating red meat and treating his babesiosis (confirmed resolved), the frequency and intensity of episodes remained unchanged. He cannot identify specific triggers, though 70% of episodes occurred at work, and his co-workers have no similar symptoms. His current management includes omalizumab, strict avoidance of red meat, and acute treatment with epinephrine and diphenhydramine. His occupational history includes 13 years as a hardware store associate, with prior experience in landscaping and construction. Workplace exposures include fertilizers, pesticides, paints, solvents, and other common hardware chemicals.

Discussion:

- Diagnostically, there are a limited number of likely causes of **delayed and unpredictable anaphylaxis**
  - Exercise-induced anaphylaxis
  - Drug reactions
  - Mast cell activation disorder
  - Systemic mastocytosis
  - Hereditary alpha tryptasemia
  - **Alpha-gal syndrome (AGS)**
- Key features and challenges of AGS:
  - **Delayed onset allergy following exposure to mammalian products** (several hours)
  - Latency causes difficulty in diagnosis
- Occupational considerations
  - Attributable cause in outdoor roles (agriculture, forestry, landscaping)
  - Potential triggers exist in workplace such as hardware store (e.g., **organic fertilizers**, animal based glues)
- Environmental implications:
  - Climate change expanding Lone Star Tick population (Figure 1)
  - Increased AGS incidence parallels Lone Star tick habitat expansion (Figure 2)
  - Lone Star tick reported as far north as Ontario, Canada
- Key Takeaways:
  - Significant and underappreciated illness
  - Difficult to diagnose
  - Relevant for diagnostic, epidemiologic, occupational, and environmental factors

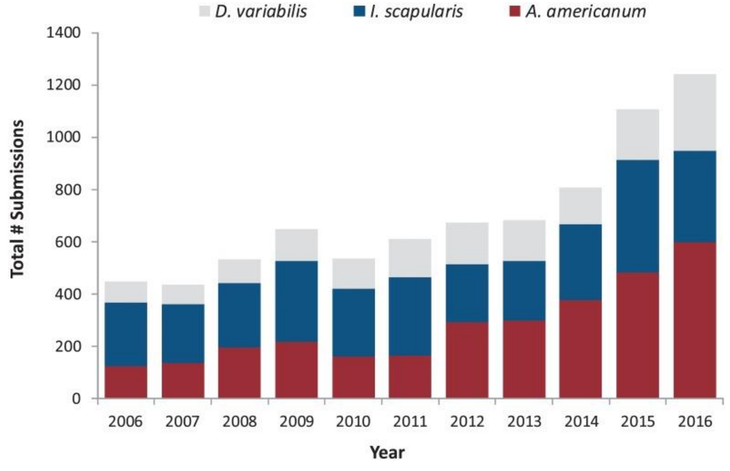

Figure 1:
Increasing proportion of Lone Star tick among tick submissions in Monmouth County, New Jersey

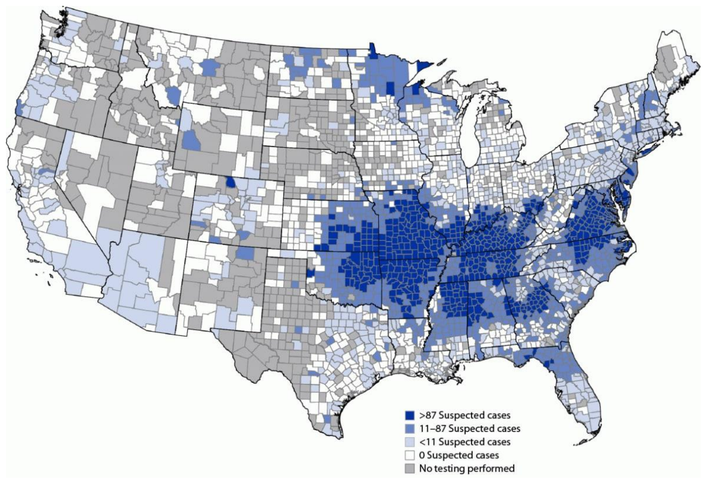

Figure 2:
Geographic distribution of alpha-gal cases. This closely matches the known range of the lone-star tick.

Please contact the authors for full references
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