

## Newly Recognized $\alpha$ -Gal Syndrome in the Upper Midwestern United States



**To the Editor:**  $\alpha$ -Gal syndrome is a recently recognized entity in which allergy to mammalian meat may be acquired by exposure to the disaccharide galactose- $\alpha$ -1,3-galactose ( $\alpha$ -gal) antigen through the saliva of the Lone Star tick. Subsequent exposure to the antigen in meat may result in the delayed presentation (3 to 6 hours after ingestion) of systemic hypersensitivity reactions (eg, urticaria, angioedema), gastrointestinal symptoms, or life-threatening anaphylaxis.<sup>1,2</sup> Anaphylaxis is potentially fatal, and identifying the cause is critical. Patients with  $\alpha$ -gal hyperreactivity treated in a referral clinic were diagnosed less than 10% of the time at the initial presentation, despite severe symptoms.

$\alpha$ -Gal syndrome is an IgE-mediated reaction to  $\alpha$ -gal,<sup>1,3</sup> which is present in mammalian meat (eg, beef, pork, lamb, buffalo, kangaroo) and mammalian products (eg, dairy products, gelatin).<sup>1,2,4</sup> Allergic reactions to several medications can occur in  $\alpha$ -gal syndrome.<sup>4</sup> An increased burden of coronary artery disease has recently been confirmed in  $\alpha$ -gal-sensitized individuals.<sup>5</sup>

The association between red meat allergy and tick bites was first described in 2007 in Australia.<sup>4</sup> It has now been reported on all continents except Antarctica and has been increasingly recognized throughout the southeastern, northeastern, and central United States.<sup>4,6</sup> The 2011 Centers for Disease Control and Prevention map of the

range of the Lone Star tick did not include Michigan, Wisconsin, or Minnesota, but the vector range is increasing.<sup>6</sup>

We conducted a retrospective review of patients with  $\alpha$ -gal syndrome, seen from 2008 to 2018, at Mayo Clinic (Rochester, Minnesota) and Mayo Clinic Health System (multiple locations in Minnesota, Iowa, and Wisconsin). This study was approved by the Mayo Clinic Institutional Review Board. We identified 259 patients who were evaluated for possible  $\alpha$ -gal syndrome; of these, only 47 patients (25 male, 22 female) had positive IgE test results for  $\alpha$ -gal allergy. Anaphylaxis was reported by 25 patients (53%), recurrent anaphylaxis by 14 (30%), angioedema by 11 (23%), recurrent angioedema by 9 (19%), chronic or recurrent urticaria by 25 (53%), and recurrent rash by 11 (23%). Four patients (9%) had severe complications, including admission to an intensive care unit. Deer tick bite was recorded for 4 patients (9%) and Lone Star tick bite for 3 patients (6%). Eleven patients (23%) lived in states where the Lone Star tick was not previously known to be present (Minnesota, n=5; Wisconsin, n=4; Michigan, n=1; Alaska, n=1). Eight of those 11 patients reported serious reactions but lacked a recognized history of meat allergy. We acknowledge that this is a single health system study that is also limited by sampling bias and small sample size.

In conclusion, exposure to  $\alpha$ -gal through tick bite seems to be markedly immunogenic and can cause systemic allergic reactions to certain foods.<sup>5</sup> We propose that  $\alpha$ -gal syndrome be considered in the

differential diagnosis of all patients with recurrent anaphylaxis or urticaria. Because meat allergy due to tick bite is relatively new and uncommon, it is potentially underrecognized in our geographic region.

### POTENTIAL COMPETING INTERESTS

The authors report no competing interests.

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