

Vesicular Eruption Secondary to Bites by Larval *Amblyomma americanum*

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PRACTICE POINTS

- The range of *Amblyomma americanum* has expanded north in recent years from its core range in the southeastern United States. Warming temperatures also have increased the duration of the ticks' active season.
- *Amblyomma americanum* can lay several thousand eggs. A person happening upon a newly hatched nest of larval ticks could sustain a widespread vesicular eruption secondary to tick bites.
- It is important to keep larval tick infestation in the differential when evaluating a patient with a new widespread vesicular eruption to expedite prompt removal of the offending ticks and to begin clinical monitoring.

Tick-borne illness is an increasingly concerning cause of human infectious disease. Not only do ticks transmit disease, but their bites also may cause impressive local reactions. This report highlights a case of a widespread vesicular eruption secondary to bites by larval *Amblyomma americanum* sustained by a 58-year-old woman. This case posed a diagnostic challenge because of the unusually large number and wide distribution of bites as well as the subsequent vesicular reaction that ensued. It is necessary for dermatologists in tick-endemic areas to keep tick bites in the differential when evaluating vesicular eruptions. In addition, it is important for dermatologists to be aware of the tick species in their area.

Cutis. 2022;109:224-227.

Case Report

A 58-year-old woman presented to the dermatology office with a widespread pruritic eruption of 3 days' duration that started in the groin and spread to the rest of the

body. No treatments had been attempted. She had no notable medical history, and she denied any recent illness, change in personal care products, or new medications or supplements. She reported a camping trip 2 weeks prior to presentation on the east end of Long Island, New York. She later learned that others on the same trip developed a similar, albeit less widespread, eruption.

Physical examination revealed clear vesicles on the arms, legs, trunk, and pubic area (Figure 1). Dermoscopy revealed a small lone star tick larva in the center of one of the vesicles (Figure 2). The type of tick larva was identified using resources from the Centers for Disease Control and Prevention (Figure 3).¹ Careful inspection revealed dark marks on various vesicles, mostly in the perineum, yielding nearly 20 larvae, which were removed with forceps. The patient was counseled to cover herself in petrolatum for 2 to 3 hours with the hope of smothering any remaining tick larvae. She was given triamcinolone cream and was encouraged to take a nonsedating antihistamine for itch. The patient was seen back in clinic 2 weeks later and the eruption had resolved.

Comment

Spread of Tick-Borne Disease—Ticks and tick-borne disease are increasing major health concerns for humans, domesticated animals, and livestock. Reported cases of bacterial and protozoan tick-borne disease doubled in the United States between 2004 and 2016. Ninety percent of the nearly 60,000 cases of nationally notifiable vector-borne diseases reported in 2017 were linked to ticks.² Geographic ranges of multiple tick species continue to expand, which is thought to be secondary to rising global temperatures, ecologic changes, reforestation, and

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The authors report no conflict of interest.

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doi:10.12788/cutis.0497

increases in commerce and travel (Figure 4).³ Not only have warming temperatures contributed to geographic range expansion, they also may extend ticks' active season. The lone star tick (*Amblyomma americanum*) is widely distributed throughout much of the eastern United States.⁴ The range of *A americanum* has expanded north in recent years from its prior core range in the southeastern United States.² One study found that from 2006 to 2016, the vector tick species most commonly collected from humans and submitted to a tick surveillance system in New Jersey shifted from *Ixodes scapularis* to *A americanum*.⁵



FIGURE 1. A, Widespread vesicles on the patient's lower extremities. B, Clear vesicles on an erythematous base.

Bites by *Amblyomma* Ticks—As with most hard ticks, the life cycle of *A americanum* lasts 2 years and includes the egg, the 6-legged larva or “seed tick,” the 8-legged immature nymph, and the 8-legged reproductively mature adult (Figure 3). *Amblyomma americanum* can lay several thousand eggs.² Because our patient had numerous bites, it is plausible that she came into contact with a nest of newly hatched tick larvae. Morphogenesis from larva to nymph, then nymph to adult, requires a blood meal.^{6,7} The larvae emerge from eggs deposited on the ground and then crawl up low vegetation where they can easily attach to passing hosts. The tick clings to hair or clothing and waits until the host is at rest before moving to a favorable location and then bites.⁸ When attaching, ticks inject an anesthetic akin to lidocaine, making the bite painless. A tick may spend up to 24 hours on the host prior to biting and then feed for 2 hours to 7 days before releasing.⁹ For the majority of tick-borne illnesses, the tick must remain attached for 24 to 48 hours before disease is transmitted.¹⁰

All stages of *Amblyomma*, excluding the egg, are capable of transmitting disease.^{8,11} *Amblyomma americanum* is called the lone star tick because of the

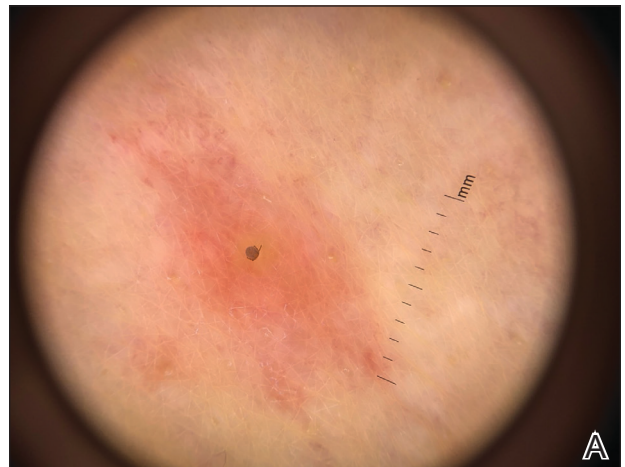


FIGURE 2. A and B, Dermoscopic images of *Amblyomma americanum* at the center of a vesicle (original magnification $\times 10$).

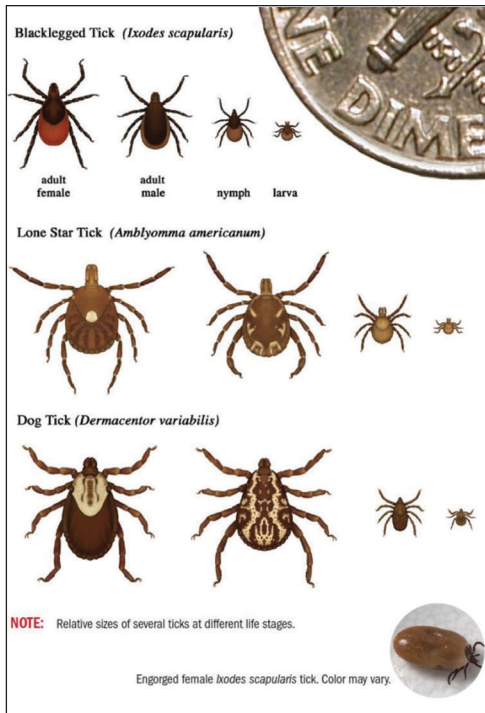
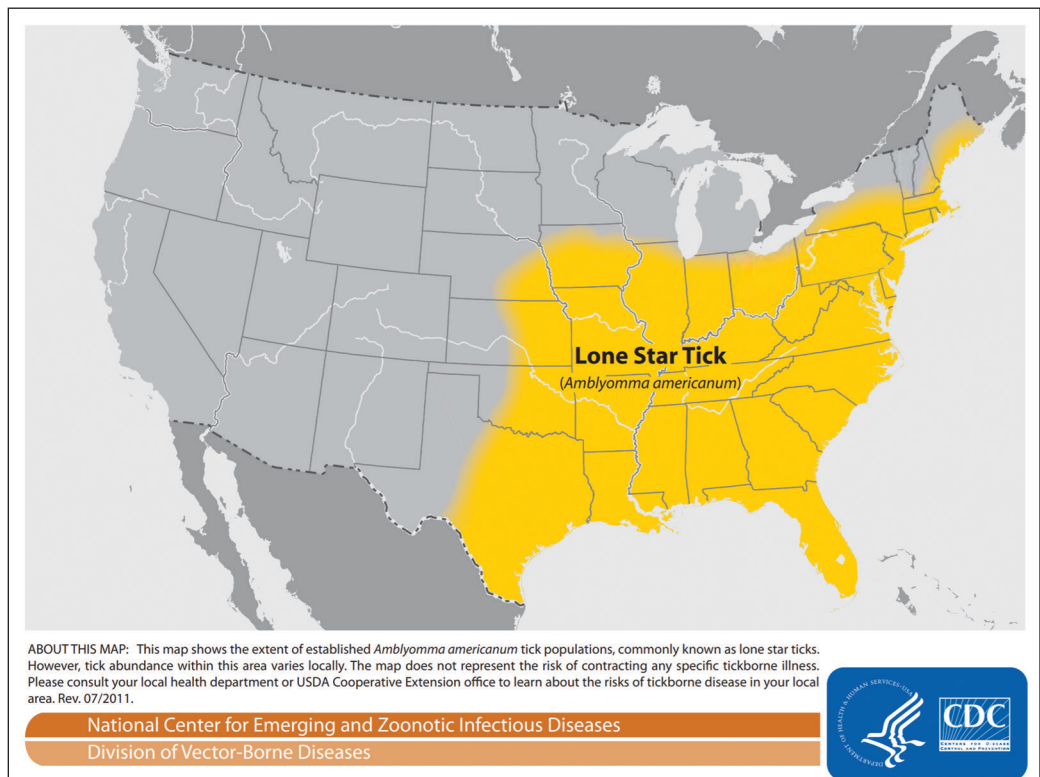


FIGURE 3. Comparison of ticks that regularly bite humans at various life stages. Source: Centers for Disease Control and Prevention.¹ Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the US Government, Department of Health and Human Services, or Centers for Disease Control and Prevention.

prominent white dot on the back of the adult female. It will feed on small or large mammals during any stage of its life cycle. It is known to transmit *Ehrlichia chaffeensis* and *Ehrlichia ewingii*, which cause human ehrlichiosis, and *Francisella tularensis*, which causes tularemia, Heartland virus, Bourbon virus, and Southern tick-associated rash illness. Delayed anaphylaxis to ingestion of red meat has been attributed to the bite of *A. americanum*. *Amblyomma americanum* ticks are not known to transmit Lyme disease. The Centers for Disease Control and Prevention does not recommend prophylactic treatment to prevent ehrlichiosis.¹² Tularemia prophylaxis is only recommended in cases of laboratory exposure to infectious materials. Doxycycline prophylaxis is only recommended if the tick is identified as an adult or nymphal *I. scapularis*.¹²

Even when the ticks do not transmit disease, tick bites can cause impressive local reactions. Uncomplicated bites can be painful and leave a puncture wound that can take 1 to 2 weeks to heal.¹³ Rarely, bites can cause a delayed hypersensitivity reaction including fever, pruritus, and urticaria. Granulomas can develop if a tick is improperly removed.⁹ Other reports describe prurigo lesions, skin hemorrhage, papular urticaria, diffuse papules, vesicles and bullae, necrotic ulcers, and patchy alopecia.^{14,15} A 2015 systematic controlled study of human bite reactions from *A. americanum* demonstrated the development of itchy erythematous papules and vesicles within 48 hours of larval tick attachment to research participants. The study found tissue damage from *A. americanum*

FIGURE 4. Distribution and range of the lone star tick (*Amblyomma americanum*) in the United States. Source: Centers for Disease Control and Prevention, Division of Vector-Borne Diseases.³ Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the US Government, Department of Health and Human Services, or Centers for Disease Control and Prevention.



mouthparts, and degranulating mast cells may be evident in as little as 15 minutes.¹⁶ The severity of individual skin reaction is hypothesized to depend on several variables, such as the duration of feeding, size of mouthparts, type of tick secretions, changes in secretions during feeding, and prior exposures of the host.¹⁴

Tick Removal—If patients present to clinic with ticks attached, removal can be challenging. Removal recommendations call for use of blunt forceps or tweezers. Ticks should be grasped near the skin with consistent pressure, and the tick should be pulled straight out, perpendicular to the skin. Twisting motions can cause the head to separate from the body and remain in the bite wound. Immediately following removal, the area should be cleansed with a disinfectant.^{10,17} After the tick is removed, some studies recommend storing the tick at -20°C ; should the patient develop disease, the tick could be sent for evaluation.^{6,17} If there is no clinical or serologic evidence of infection, testing for the presence of antibodies against tick-borne bacteria at presentation and at 3 and 6 weeks is not recommended due to low sensitivity, low positive predictive value, and cost. Clinicians must only observe and treat if disease occurs.¹⁷

Prevention of Tick Bites—Tick bites are best prevented by avoiding tick-infested areas; when these areas are unavoidable, tick bites may be prevented by wearing long pants with the pant legs tucked into boots. In addition, applying topical DEET (N,N-diethyl-m-toluamide) repellent to exposed skin and treating clothing with permethrin can be helpful.¹⁷ When used alone, DEET provides greater than 90% protection for up to 2.7 hours against *A americanum*.¹⁸ Permethrin-treated clothing alone is 79% to 100% effective at killing *A americanum* ticks or disabling them for several hours.¹⁹

Conclusion

Tick-borne illness is an increasingly important cause of human infectious disease. In addition to their role as a disease vector, ticks can produce primary skin disorders. This case posed a diagnostic challenge because of the unusually large number and wide distribution of bites as well as the subsequent vesicular reaction that ensued. It is important to keep tick larvae or adult tick bites in the differential when evaluating a patient to expedite

tick removal and begin clinical monitoring. Recognition of *A americanum* larvae as a potential cause of pruritic papules may be helpful in similar cases. In addition, it is important for dermatologists to be aware of the tick species in their area.

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