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Introduction of the exotic tick *Hyalomma truncatum* on a human with travel to Ethiopia: A Case Report

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Abstract

An Oregon resident returned from a photography trip to Ethiopia with a male *Hyalomma truncatum* tick attached to the skin on his lower back. The tick was identified morphologically and deposited in the U.S. National Tick Collection housed at Georgia Southern University, Statesboro, Georgia. The public health importance of *Hyalomma* species of ticks and diagnostic dilemmas with identifying exotic ticks imported into the U.S. are discussed.

CASE REPORT

A 59-year-old previously-healthy male presented to his primary care clinic on December 9, 2013, after discovering a tick on his lower back the preceding day. He had initially mistaken the tick for a skin tag and bluntly removed it. After identifying it as a possible tick, he placed it in a plastic bag with moistened napkin and placed it in the refrigerator. The patient had returned from a photography trip to Ethiopia where he had visited several rural towns and villages approximately five days prior to presentation. After returning to the U.S., he had spent time in California but did not hike nor camp. The patient had reported a self-limiting headache the previous day and chills during the flight home. He was otherwise asymptomatic and had not experienced arthralgias or myalgias. On examination, the patient was afebrile and appeared well. The area surrounding the attachment site was raised, firm, and tender, surrounded by a reddened, concentric rash that was three inches in diameter [Fig. 1]. The case was discussed with the local infectious disease specialist via telephone. Given the patient's mild symptoms, serologies were not recommended unless he developed worsening symptoms. However, because of the risk of acquiring rickettsial diseases with

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this species of tick, the patient was started on 100 mg doxycycline twice daily for a total of 21 days.

The tick was sent to the Oregon State University Plant Clinic for identification, where it was determined to be a genus or species of hard tick not commonly occurring in the Pacific Northwest. Digital images of the tick were shared with the first author, who made the tentative identification of an adult stage *Hyalomma*. Diagnostic features supporting the genus-level identification included the presence of eyes, irregular festoons, elongate mouthparts, an inornate dorsal shield, and a characteristic banding pattern seen on the legs of many *Hyalomma* species [Fig. 2], as well as having the spurs on the forecoxae subequal in length [Fig. 3] (Mathison and Pritt 2014). Digital images were shared with Dr. Dmitry Apanaskevich at the U.S. National Tick Collection (USNTC) at Georgia Southern University who suggested an identification of *H. truncatum*. The specimen was forwarded to the Centers for Disease Control and Prevention, Division of Parasitic Diseases and Malaria, where the identification of *H. truncatum* was confirmed based on the following morphologic criteria: a dorsal shield irregularly punctate, denser posteriorly; lateral grooves [Fig. 2] deep and reaching the eyes; subanal plates in-line with the adanal plates [Fig. 3] (Apanaskevich and Horak 2008c). The specimen (a male) was deposited in the USNTC for archiving.

DISCUSSION

Hyalomma is one of the most medically-important tick genera in the Old World. Species in this genus have been reported to transmit a variety of viral, bacterial, and parasitic diseases of medical and veterinary importance (Bakheit et al. 2012). One of the most important human viral agents transmitted by *Hyalomma* spp. is Crimean-Congo hemorrhagic fever (CCHF) virus. Sexually and transovarially transmission of CCHF virus was observed experimentally in *Hyalomma truncatum* (Gonzalez et al 1992). In addition, extensive documentation exist showing that several tick species transmit this virus in different geographical areas of the world: *H. marginatum* in southern Russia, Turkey, and the Balkan and Crimean Peninsulas, *H. anatolicum* in Iran, Pakistan, Turkmenistan, and Tajikistan, *H. asiaticum* from central Asia to China, and *H. rufipes* in Africa (Hoogstraal 1979; Bakheit et al. 2012; Goddard 2012). Other important disease agents of humans and their documented vectors include *Rickettsia conorii* (*H. rufipes* and *H. truncatum*), *R. aeschlimannii* (*H. marginatum*, *H. truncatum*, and *H. scupense*), *R. sibirica* (*H. asiaticum*, *H. excavatum*, and *H. truncatum*), *Anaplasma phagocytophilum* (*H. lusitanicum*), and *Coxiella burnetii* (*H. aegyptium* and *H. scupense*) (Beati et al. 1997; Bakheit et al. 2012; Goddard 2012), and Dugbe virus (Hoogstraal et al. 1981). Kumsa et al. (2014) detected *R. aeschlimannii* in *H. margniatum* and *H. truncatum* in Ethiopia. Paştiu et al. (2012) found *H. aegyptium* naturally infected with *Ehrlichia canis* and *A. phagocytophilum* in Romania. *Hyalomma truncatum* has been suggested as a possible vector of Rift Valley fever virus (Linthicum et al. 1989; Nchu and Rand 2013). *Hyalomma* species have also been implicated in tick paralysis in humans (Edussuriya et al. 2003; Gürbüz et al. 2010; Doğan et al. 2012). In general, prophylaxis is not recommended for prevention of rickettsial or viral tickborne infections (Wormser et al. 2006, Bakken et al. 2006). However, a course of ribavirin may be considered for prophylaxis of CCHF in individuals at high risk of severe disease (Appannanavar et al. 2011).

There are scattered reports in the literature of *Hyalomma* species being imported into the United States, most-commonly on animals and animal products. Mertins and Schlater (1991) documented five species of *Hyalomma* on ostriches imported from Africa and Europe. Burridge and Simmons (2003) documented *H. aegyptium* imported on Greek tortoises to New York, Florida, and North Carolina. Becklund (1968) and Keirans and Durden (2001) presented comprehensive overviews of imported ticks into the U.S. Most of the records for *Hyalomma* spp. are from animals or products made from animals (e.g. trophy hides), but Keirans and Durden (2001) did report one case of *H. marginatum* being found on a human with travel history to Greece. In the USNTC, there is a specimen of *H. truncatum* collected from a human in Illinois following travel to Botswana (Dmitry Apanaskevich, pers. comm. 2013). *Hyalomma truncatum* has a wide host range; Apanaskevich and Horak (2008c) documented seven mammalian hosts for the immature stages and 18 mammalian hosts (including humans) for adults in South Africa. As such, the risk for a person to acquire this tick in an endemic area would be greater than for those species whose normal hosts are tortoises and fossorial or other wild animals that have less human contact.

Because *Hyalomma* species are not native to North America, medical practitioners and diagnostic microbiologists and parasitologists may not consider them in the differential diagnosis when identifying ticks removed from patients treated in the U.S. Given their morphologic features (elongate mouthparts, eyes present, festoons present), *Hyalomma* spp. might be misidentified as *Amblyomma* in most keys to North American ticks. *Hyalomma* can best be separated from *Amblyomma* by having festoons of varying size, an inornate dorsal shield (scutum), and spurs on the coxae I roughly equal in length (Mathison and Pritt 2014). Many *Hyalomma* species also have a characteristic banding pattern on their legs whereby the legs are dark with white maculae at the joints (Fig. 2). Regional keys for *Hyalomma* are available for the United Kingdom (Arthur 1963), Russia [former U.S.S.R.] (Pomerantzev 1950), Sudan (Hoogstraal 1956), Uganda (Matthysse and Cobo 1987), Saudi Arabia (Hoogstraal et al. 1981), Pakistan and the Indian subcontinent (Kaiser and Hoogstraal 1964), and Iran (Hosseini-Chegeni et al 2013). Recent systematic treatments are available for the subgenera *Euhyalomma* (Apanaskevich and Horak 2005a, 2005b, 2007, 2008a, 2008b, 2008c, 2008d, 2009, 2010a, 2010b) and *Hyalommina* (Apanaskevich et al. 2009). As with other ectoparasites, detailed travel history can be important for obtaining a definitive diagnosis of ticks, as well as to help assess the risk of vector-borne diseases.

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Fig. 1.
Skin lesion observed at the bite site.

Fig. 2.
Dorsal image of the *Hyalomma* specimen (male). (**EY**, eye; **LG**, lateral groove; **FS**, festoons).

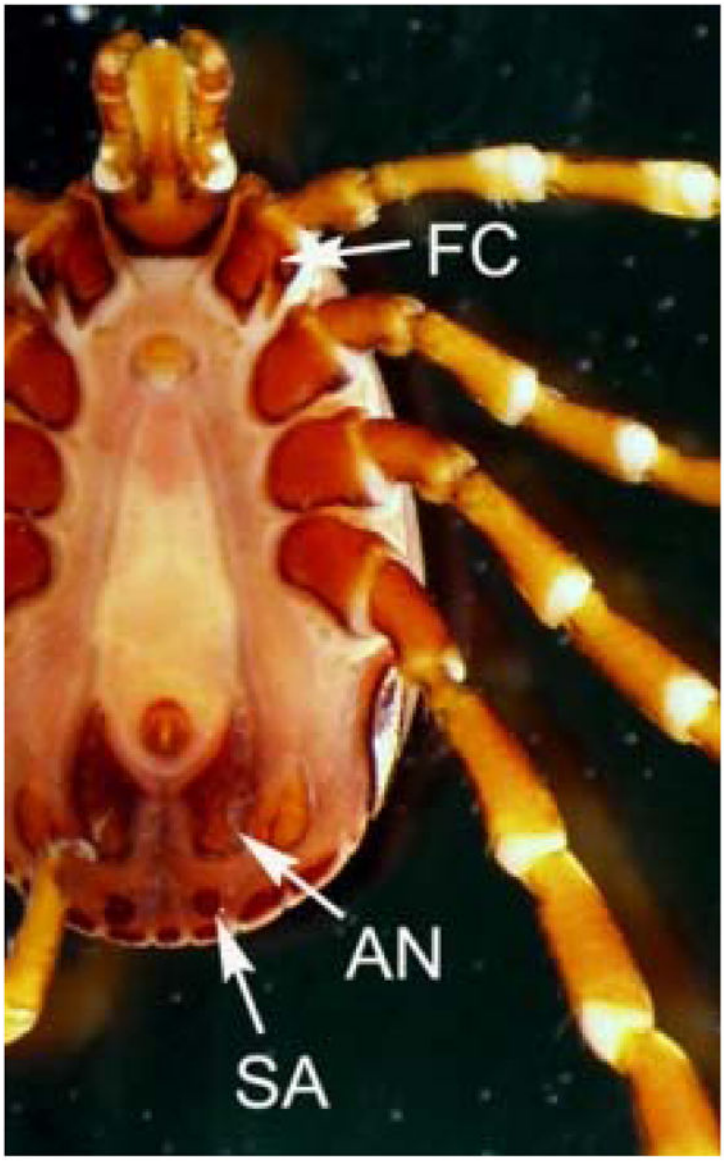

Fig 3.

Ventral image of the *Hyalomma* specimen (male). (**FC**, spurs on the forecoxa; **AN**, adanal plate; **SA**, subanal plate).