

Letter to the Editor

Title:

Leeches as further potential vectors for rickettsial infections

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We were very interested in the discovery and comprehensive investigation by Dieme *et al.* (1) of mosquitos as potential vectors for *Rickettsia felis*. We would like to draw attention to another ectoparasite that we encountered as a possibly overlooked potential vector for rickettsial infections: the leech. In 2008, a 39 year-old diabetic woman was admitted to a hospital in Northern Laos with a 7-day history of fever, headaches, limb pains, chills and 2 days of nausea and vomiting. She had a typical eschar on her left anteromedial thigh (7x4mm, Fig. 1). She remembered being bitten by a terrestrial leech (*Haemadipsida* spp.) whilst working in a rice field exactly at the eschar site five days before onset of fever. No tick or other ectoparasite was observed at this site until eschar manifestation. Molecular characterization of eschar biopsy revealed amplicons of 100% identity to the *Rickettsia felis*-URRWXCal2 strain (2). The patient responded promptly to treatment with oral doxycycline.

Balcells *et al.* (3) reported rickettsiosis from Chile with a characteristic eschar at the site of a bite by a terrestrial leech (*Xerobdellidae*). Molecular analysis of eschar and skin biopsy revealed 97% sequence similarity with isolates of *O. tsutsugamushi*. Closely related *Rickettsia* species have been described in leeches (*Glossiphoniidae*) of frogs and fish in Japan with nearly 100% vertical transmission (4).

Leech bites are uncommon in urban environments but might play a considerable role in endemic rural areas. In a household survey in the patient's village in 2010, 146 (75.3%) of 194 villagers aged ≥ 15 years reported that they had been bitten by leeches in the previous year (266 of eligible villagers were absent, 3 did not consent; *unpublished data*). Leech bites were associated in multivariate analysis with being a farmer and younger age (both $p < 0.001$), and correlated with frequency of field visits (Pearson's correlation coefficient $r = 0.15$, $p = 0.04$). Bites were noted mainly during the raining season (*Haemadipsida* spp.: 5.17 bites/month vs. 0.58/month during dry season, $p < 0.001$). 113/194 villagers (58.2%) associated health

problems with leech bites; 85 (43.8%) had itching, 30 (15.5%) a rash, 25 (12.9%) bleeding, 16 (8.2%) scratches/wounds, 8 (4.1%) pain, and 7 (3.6%) infection including two (1.0%) with febrile illnesses. Three villagers (1.5%) reported seeking hospital treatment after leech bites.

No data of *Rickettsia* spp. within Lao leeches are yet available. So far, research has focused mainly on nosocomial *Aeromonas* infections by medicinal leeches. Recent studies of leeches' digestive tract microbiota suggest more diverse potential infection transmission by leeches (5). Transmission might not only occur via the bite per se but be exacerbated during removal by human manipulation such as squeezing, dropping salt solutions on leeches, or burning them. The wound could also be inoculated with regurgitated blood from previous hosts. Further parasitological and microbiological research is needed to clarify the role of leeches as potential vectors for infectious diseases.

References

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Figure 1: Typical eschar at the right anteromedial thigh at the site of a leech bite in the patient with *R. felis* infection.

