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Letter to the Editor

Scrub typhus in Tierra del Fuego: a tropical rickettsiosis in a subantarctic region

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To the Editor,

Scrub typhus is a potentially severe tropical rickettsiosis, which has been known for centuries in the Asia Pacific region, where it threatens >1 billion people, causing significant morbidity and mortality [1]. In recent years, however, scrub typhus caused by a distinct *Orientia* species has been discovered in various regions of Chile [2,3]. Here we report a scrub typhus case from the extreme south of Chile, where the infection has never been detected before.

A 34-year-old previously healthy man consulted 4 days after returning from a trekking expedition on the island of Tierra del Fuego in subantarctic Chile (Fig. 1, left). In the middle of his 10-day hike through Yendegaia National Park, he had noticed a small crust-like skin lesion on his lower abdomen. On his last day of trekking he suffered from chills and headache, and felt progressively weak and dizzy. However, he managed to reach a small coastal village from which he returned to Santiago. In the following days he had fever up to 38.5°C, severe fatigue, arthralgia, myalgia and night sweats, and he noticed a rash on his abdomen and arms. On examination he presented with a small painless necrotic skin lesion on his right flank and a generalized maculopapular rash, sparing palms, soles and oral mucosa (Fig. 1, right). Laboratory tests showed a C-reactive protein of 1.35 mg/dL and slightly elevated values of alanine aminotransferase, aspartate aminotransferase, gamma glutamyl transferase and lactate dehydrogenase (all within 1.5-fold normal range). The patient was referred home and empirical treatment was initiated with doxycycline 100 mg twice a day (for 7 days). Samples for *Orientia* molecular testing (eschar material, eschar swab and EDTA blood) and serological examinations were taken the following day. The diagnosis of scrub typhus was confirmed by *Orientia*-specific qPCR targeting a 94 bp fragment of the 16S rRNA gene (*rrs*) and by semi-nested PCR assays for the 16S rRNA (*rrs*) and 47 kDa (*htrA*) genes [3,4], which all were positive in DNA preparations from eschar material and swab, while the buffy coat sample remained negative. Amplicons of *rrs* (520 bp) were sequenced, showing 99.2–99.6% identity to those from *Candidatus* Orientia chiloensis from southern Chile [4]. Indirect immunofluorescence IgG testing (Fuller Laboratories, Fullerton, USA) was low-titre positive (1:64) against *Orientia tsutsugamushi* antigens (Boryong and Gilliam strains). During the next days the patient recovered completely.

Scrub typhus is recognized as a tropical rickettsiosis, occurring in tropical/subtropical Asia and Australasia within the so-called tsutsugamushi triangle, where it is caused by *O. tsutsugamushi* and transmitted by trombiculid mites [1]. Patients suffer an acute febrile illness often accompanied by generalized rash and characteristic inoculation eschar; rates of complications and fatality are relevant, especially if patients remain untreated [1]. Since scrub typhus mainly affects rural populations, the disease and its vector are notoriously under-recognized [5].

In recent years, various paradigms regarding this important rickettsial infection have shifted, most importantly its geographical restriction to the tsutsugamushi triangle. Endemic regions now

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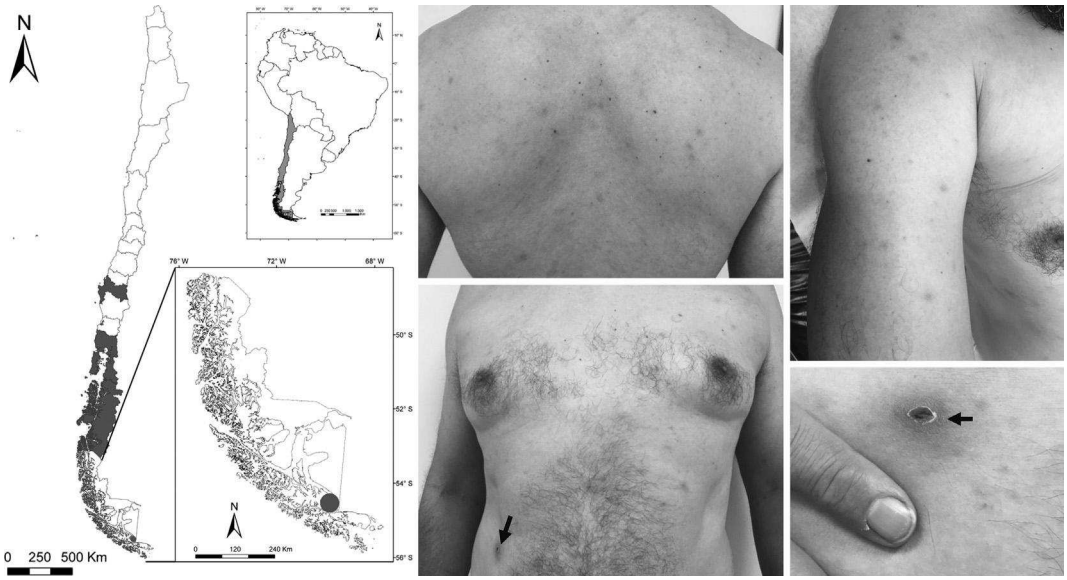

Fig. 1. The left panel displays a map of Chile with current endemic regions of scrub typhus marked in red. The patient was infected in Tierra del Fuego, Magallanes Region (red dot). The four panels on the right show the patient's skin manifestations including a generalized coarse maculopapular rash and the typical eschar on the right flank (arrow).

include southern Chile, where the infection was reported over a distance of >1100 km [3]. With the presented case, however, the geographical range in Chile is further expanded by >800 km southwards into subpolar latitudes (54°S). While most of the known endemic regions in Chile are characterized by Valdivian temperate rain forests, the Tierra del Fuego ecoregion has a cool and wet subpolar oceanic climate with Magallanic forests and an average annual temperature of 3°C to 6°C. By latitude, Tierra del Fuego is far outside the most extreme regions reported for the northern hemisphere (49° N) [6]. However, the capacity of *Orientia*-infected trombiculid mites to inhabit diverse climatic zones is known from the Western Himalaya region, where scrub typhus occurs as high as 3200 m above sea level [6].

Scrub typhus in Chile is caused by a novel pathogen, *Ca.* O. chiloensis [4]. To our current knowledge, the infection is transmitted by trombiculid mites distinct from those transmitting scrub typhus in the Asia-Pacific region [7]. As observed previously, the infection in Chile frequently affects adventure and nature travellers [8]. Our patient, who felt progressively sick during his expedition, raises the question if high-risk travellers should carry doxycycline as a standby medication.

As in other rickettsial infections, timely treatment of patients with scrub typhus is crucial and mostly results in a rapid clinical response [1]. However, since rapid and reliable diagnostic tools are often unavailable, the initial management mainly relies on the clinical judgement of attending physicians. Patients with South American scrub typhus present with fever and other unspecific symptoms (fatigue, headache, myalgia/arthralgia, night sweats), mostly accompanied by an eschar and generalized maculopapular rash, which has a coarse pattern, starts on the trunk, and spares palms, soles and mucosa [2,3].

Physicians attending febrile patients, especially those with compatible skin manifestations, should be aware that scrub typhus caused by different species of *Orientia* might occur worldwide and is not restricted to tropical/subtropical latitudes.

Transparency declaration

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Author contributions

T. Weitzel: Conceptualization, Validation, Data curation, Writing – Original, Draft Writing – Review & Editing, Visualization. M. Aylwin: Resources, Writing – Review & Editing, Visualization. C. Martínez-Valdebenito: Formal analysis, Methodology, Investigation, Writing – Review & Editing. G. Acosta-Jamett: Conceptualization, Validation, Writing – Review & Editing Visualization. K. Abarca: Conceptualization, Validation, Resources, Writing – Review & Editing, Funding acquisition.

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