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Diagnostic challenge

Fever and arthralgia after 'volcano boarding' in Nicaragua



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Outdoor activities may put travelers at risk for infectious diseases. We saw a 25-year old woman and 31 years-old man at our hospital because of a fever. They had returned 2 weeks earlier from a 3-week roundtrip in Nicaragua. Both individuals presented with high fever up to 40 °C, chills and myalgia. The female also had prominent arthralgia in her fingers, wrists, ankles and hips. Both had an unremarkable past medical history and had received the recommended travel vaccinations. Laboratory examinations in both partners showed normal leukocyte and platelet counts and an elevated C-reactive protein level (43 mg/L in the female and 55 mg/L in the male). Blood cultures and acute and convalescent serology for dengue, chikungunya and leptospirosis were negative. The fever persisted despite empiric antimicrobial therapy including doxycycline and azithromycin. The chest X-ray upon presentation in the female was unremarkable, however, a follow-up chest X-ray 5 days later showed a consolidation in the upper lobe of the right lung. She also developed an erythema nodosum on the shins. The chest X-ray on presentation in the male showed signs of bilateral hilar lymphadenopathy. Based on the clinical features, acute histoplasmosis was suspected and itraconazol was initiated. This presumptive diagnosis was supported at a later stage by a positive result of a

histoplasma serum antigen test in both individuals (5.15 ng/ml in female and 0.69 ng/ml in the male; MVista[®] histoplasma quantitative antigen test; reference value < 0.4 ng/ml).

Histoplasmosis is caused by the fungus *Histoplasma capsulatum*. Exposure occurs by inhalation of spores. Most acute infections in immunocompetent subjects are asymptomatic. Symptomatic infections are usually characterized by pulmonary manifestations, fever, myalgia and general malaise. Rheumatic manifestations and erythema nodosum, as observed in our female patient, may also occur. Histoplasmosis is widely endemic in Central America and infections in travelers to Nicaragua have previously been reported. Exposure to bird and bat droppings in caves or otherwise exposure to contaminated soil are well-known risk factors for infection. When asked for possible exposures, the couple reported to have had massive soil exposure during volcano boarding from the Cerro Negro Volcano near Leon. This activity is widely advertised and consists of sliding down the steep slope of this 728 m high active volcano on a wooden sled (see Fig 1). Speeds up to 90 kph can be reached and our patients reported to have inhaled considerable amounts of volcanic dusts. The couple had not visited caves, excavations or had other exposures to bird or bat guano or soil during their stay in Nicaragua.

We examined one sample of volcanic sand from the Cerro Negro Volcano in Leon on the presence of *H. capsulatum* using a polymerase chain reaction (PCR). This test yielded a negative result. The sand sample was collected in mid-December, during the dry season, while our patients visited the volcano during the wet season in September. This, and the small amount of sand that was investigated, may explain why the PCR on *H. capsulatum* was negative.

In conclusion, even though we have no formal proof that the *H. capsulatum* infection indeed occurred during volcano boarding,

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Fig. 1. Volcano boarding from the Cerro Negro Volcano in Nicaragua.
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we consider this likely. We would therefore like to raise attention that volcano boarding may be a new risk factor for histoplasmosis and that risk groups, such as immunocompromised persons, should preferably refrain from this activity.

Conflict of interest statement

The authors declare that there are no conflicts of interest.