Case report of African tick-bite fever from Poland

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Abstract

A confirmed case of rickettsiosis acquired in South Africa and recognized in Poland was described. The patient fulfilled clinical criteria highly suggestive of African tick bite fever, such as eschars, regional lymphadenitis, cutaneous rash within 10 days after his return from sub-Saharan Africa. Infection with *Rickettsia africae* was confirmed by polymerase chain reaction and sequencing.

Key words: Rickettsia africae, polymerase chain reaction sequencing, imported infection.

Introduction

African tick bite fever (ATBF) is caused by *Rickettsia africae*. The pathogen occurs as an endemic organism in sub-Saharan Africa and the eastern Caribbean. Cattle are the most important domestic reservoir, and the human is an accidental host [1]. Cattle ticks of the *Amblyomma* genus (mainly *A. hebraeum* and *A. variegatum*) are both reservoirs and vectors of this pathogen. Nearly 70% of *R. africae* infections are carried by *A. hebraeum* in endemic areas and indigenous cases occurring during agricultural work [2, 3]. However, there are cases of this disease among individuals who have returned from an African trip. Usually, the disease is mild and self-limited but some cases require hospitalization. African tick bite fever presents as an acute febrile disease with headache, myalgia, lymph node swelling, and maculopapular eruption with inoculation eschars.

In this study, we report a case of ATBF imported to Poland. A 45-year-old man without significant medical history was admitted to the 1st Department of Infectious Diseases in Wroclaw (south Poland) with fever of 38°C, muscle pain and weakness. Symptoms appeared about 5 days after his return from a 10-day safari in South Africa (near the Kruger National Park). The patient reported that after his return, he found several small ticks attached to the upper part of his thighs.

On admission to the hospital the patient was in fairly good condition, with body temperature of 37°C. Physical examination revealed 0.5 cm ulcers and eschars at the sites of tick bites as well as disseminated macular and maculo-papular rash on the trunk and arms (Figures 1 and 2). In the left groin there was a tender, enlarged, 1.5-cm lymph node. A rickettsial disease was considered.

Case report

Blood samples and scrapings from eschars were collected for serologic and polymerase chain reaction (PCR) tests. The IgM and IgG *Rickettsia* spp. level of serum antibodies, were detected with microimmunofluorescence test (Rickettsia IFA IgG, Focus diagnostic, USA). DNA from blood and skin samples was extracted with QIAamp Tissue Kit (Qiagen, Hilden, Germany). Bacterial DNA was examined by PCR for the presence of *Rickettsia* sp. citrate synthase gene (*gltA*) method with RpCS.409d and RpCS.1258n primers, outer-membrane protein A (*ompA*) gene with primers Rr190-70 and Rr190-701 and 17 kDa outer membrane protein gene with primers pair Rr17.61p and Rr17.492n specific for SFG rickettsiae [4–6]. The QIAquick PCR purification kit (QIAGEN GmbH, Hilden, Germany) was used for the purification of PCR products to sequencing. All amplicons were sequenced with ABI 377

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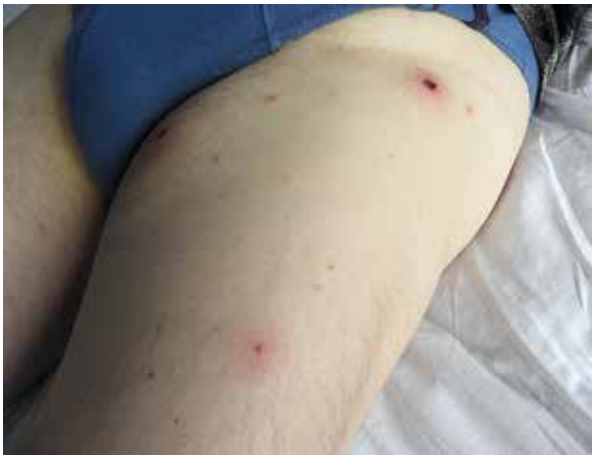

Figure 1. Cutaneous manifestations on the left upper leg: eschars and maculo-papular rash

Figure 2. Eschar on the left upper leg

DNA Analyzer (Applied Biosystems, USA) according to the manufacturer's recommendations. All sequences were edited using AutoAssembler software (Applied Biosystems, USA) and identified with the BLAST software and compared with sequences available in GenBank.

In laboratory findings, C-reactive protein (CRP) was elevated to 35 mg/dl and elevated liver enzyme levels (GPT – 57 IU/l, GOT – 57 IU/l, GGT – 69 IU/l). Chest X-ray and abdominal ultrasound did not reveal any abnormalities. One week after onset of symptoms, IgG serum antibodies in titer of 256 and IgM antibodies in titer of 128 reacting with *R. rickettsii* antigen were detected.

DNA of *Rickettsia* sp. was found in PCR with primers specific to the citrate synthase (*gltA*), outer membrane protein A (*ompA*) and the 17 kDa protein genes in scrapings from eschars. Sequences of *gltA* gene fragment (605 nucleotide positions) revealed 99% identity with *R. africae* strain ESF-5 and *Rickettsia* sp. CG13 strain sequences (GenBank accession no. CP001612.1 and HM538186.1). The sequence of amplicon (371 nucleotide positions) amplified with primers specific to 17 kDa protein gene showed a 99% similarity to the *R. africae* eSf-5 gene (GenBank accession no. CP001612.1).

The patient was given doxycycline 100 mg twice a day for 14 days. The fever and muscle pain resolved after the first two doses of doxycycline, disseminated rash after 2 days of treatment and the eschars and ulcers healed within 2 weeks after initiation of therapy.

Discussion

A confirmed case of rickettsiosis acquired in South Africa has been recognized in Poland. The patient fulfilled clinical and epidemiological criteria highly suggestive of ATBF, such as multiple inoculation eschars, regional lymphadenitis, cutaneous rash within 10 days after his return from sub-Saharan Africa. *Rickettsia africae* infection was confirmed by PCR (detected sequences of genes characteristic of *R. africae* strains) and serology (IgG titres ≥ 64 and IgM titers ≥ 32 to SFG *Rickettsia* antigens). In 2011, two indigenous SFG cases were recognized in Poland but with serology only [7, 8].

Rickettsia africae has been isolated or found by PCR in a number of African countries, including Niger, Mali, Burundi, Sudan [9], Chad, Ethiopia [10, 11], and in most countries of equatorial and Southern Africa [12] as well as in Senegal [13].

So far more than 350 travel-associated cases have been reported in Europe, North America, Australia, Argentina, and Japan. Most cases have been acquired in South Africa, where many popular wildlife attractions are organized in an area highly endemic for *R. africae* infections. African tick bite fever has been reported in a wide spectrum of travelers, including leisure safari tourists, business travels, foreign aid workers and soldiers [14]. Many reports have showed that rickettsial infections could account for 5.6% of all acute febrile infections developed in travelers returning from sub-Saharan Africa [13]. Until now, only a few cases however, have been reported in Central Europe [15, 16]. In Poland this is the first case of ATBF but the numbers may increase with the development of business and tourism travel to sub-Saharan Africa.

Rickettsia africae was detected in the Slovak Republic in fleas collected from migratory birds returning from Africa. This is a new aspect in the epidemiology of this pathogen [17]. Many species of birds migrate from Africa into the Polish territory, and many of them nest near human settlements. Each year, for example, about 100 thousands of storks (*Ciconia ciconia*) fly to Poland after winter spent in Africa. The role of bird ectoparasites in the maintenance and dissemination of rickettsial infections is still unknown. Infection with *R. africae* may affect not only humans visiting Africa.

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