

**A NEW CASE OF LOUSE-BORNE RELAPSING FEVER IN SICILY: CASE REPORT
AND MINI REVIEW**

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Abstract

Body lice transport *B. recurrentis* from man to man and humans are the only host. The presence of lice in Italy and an increasing number of cases in migrants can contribute to the onset of autochthonous cases. In this paper, we report a new case of Louse-borne Relapsing Fever (LBRF) diagnosed among migrants in Sicily exactly one year after the first case was recorded. We reviewed all cases reported in Europe from February 2016 until now. Our study identified two new cases of LBRF in migrants arrived in Europe: one who came from Somalia and one from Mali. Here we report data on a new case in Sicily. The number of migrants and refugees to transit in Sicily has increased, and this has led to the introduction of infectious diseases. Therefore, in our opinion it is essential to upgrade control of the sanitation conditions of migrants.

Keywords: *B. recurrentis*, Louse-borne Relapsing Fever, migrants

Introduction

Louse-borne relapsing fever (LBRF) caused by *Borrelia recurrentis* occurs in epidemics amid poor living conditions, famine and war in the developing world [1].

LBRF has been restricted to East Africa for many decades with most cases reported from Ethiopia where significant disease remains because poverty, lack of hygiene and crowded living conditions are responsible for large outbreaks [2-3].

In the context of an ongoing influx of refugees from East Africa into Europe over the last year, four cases of louse-borne relapsing fever (LBRF) caused by *B. recurrentis* were reported between July and December 2015 in migrants from Somalia to refugee camps in Sicily, Italy [4-5]. In the same period a total of 33 new cases of LBRF were reported between July and December 2015 in migrants arrived in Europe. In detail, 11 had been described in Italy, one in Switzerland, one in Belgium, two in Finland, two in the Netherlands and 16 in Germany [4-9].

In addition, two new sporadic cases of LBRF have been reported in Europe from February 2016 until now.

The aim of this paper was to report a new case of LBRF in a migrant from Somalia to refugee camps in Sicily in July 2016, and to review all cases reported in Europe in the same period.

Case report

The patient was a 16-year-old girl from Somalia who arrived in Palermo, Italy, on July 12, 2016. Fever, arthromyalgia, severe dehydration and mental confusion developed 4 days after her arrival, and she was admitted to the Paolo Giaccone University Hospital in Palermo. She had severe thrombocytopenia (69,000 platelets/ μ L); mild anemia (hemoglobin level 10 g/dL); increased levels of aminotransferases (aspartate aminotransferase 47 U/L), lactate dehydrogenase (872 U/L [reference range 240 U/L–480 U/L]), alkaline phosphatase (219 U/L [range 0-187 U/L]), d-dimer (7,366 ng/mL [reference range 10

ng/mL–250 ng/mL]), C-reactive protein (285.7 mg/L [reference range <5 mg/L]).

In order to rule out malaria, we immediately performed thick and thin blood films and antigen tests with negative results. However, Giemsa-stained thick and thin films revealed filamentous structure attributed to spirochetes, with microbiological features attributable to *Borrelia* species (Figure 1).

DNA was extracted from blood in EDTA and used for molecular identification and characterization of the etiologic agent of LBRF. We used a species-specific real-time PCR for *B. recurrentis* and *B. duttonii*, which targeted an internal region of the *recN* gene. Multispacer sequence typing of the *16S rRNA* gene was used for bacterial identification and genotyping [10-11]. The blood sample was positive for *B. recurrentis* by real-time PCR. Multispacer sequences showed 100% identity with sequences of *B. recurrentis* reference strain A1 (GenBank accession no. CP000993).

The patient recovered after treatment with doxycycline (100 mg/d) and ceftriaxone (2 g/d) for 10 days. We conducted a PubMed search and found four articles reporting five cases of LBRF in Europe from February 2016 until now.

One case was reported in Germany and involved Somalis and one in Italy involved a patient from Mali [12,13]. Data concerning clinical characteristics, diagnostic approaches and therapy are reported in Table 1.

All the cases had analogous clinical symptoms, and following therapy the outcome was good. Moreover, in the three cases the diagnosis was based on visible spirochetes on Giemsa films and confirmed by PCR.

Discussion

For *B. recurrentis* and *B. duttonii*, a natural host other than humans has not been identified, and the vector is also the reservoir. Furthermore, humans' role is amplification of infected vectors and can be considered as the reservoir for infection. Kisinza et al. in the Dodoma region of Tanzania found 5% of febrile children had positive blood

slides for *Borrelia* spp. Others studying non-febrile persons have reported that 3% of them are spirochetemic by blood film examination [14].

The ongoing “humanitarian crisis” with thousands of refugees and migrants arriving daily in Sicily after perilous journeys in crowded and poor hygienic conditions is a definite risk factor for possible explosive outbreaks of arthropod-borne diseases [15,19-21].

In all the cases reported, LBRF was not suspected because its clinical presentation is similar to other diseases such as dengue, malaria and secondary hemophagocytic lymphohistiocytosis [16,17, 22,23].

However, in order to avoid that spirochetes in blood films go unnoticed, the microbiologist should be alerted to the risk of LBRF infection in patients from endemic areas [9].

In addition, PCR targeting 16S rRNA was used to confirm the presence of spirochetes and to identify the species level, because it is problematic to discriminate between LBRF and tick-borne relapsing fever by microscopic analysis alone. Furthermore, discrimination between the two diseases is significant for treatment: for LBRF a single dosage of 500 mg tetracycline is the conventional cure, while tick-borne relapsing fever needs to be treated for at least 7 days [18].

Based on this evidence, the presence of lice in Italy associated with the increasing number of cases as a consequence of the new migration wave from endemic areas could be a source of infected vectors. Consequently, the occurrence of cases of autochthonous disease can be supposed, and this highlights the need for clinicians to consider LBRF when treating a patient from Eastern Africa with fever.

References

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Figure 1. Giemsa-stained showing one spirochete.**Table 1.** Characteristics of patients with LBRF, method of diagnosis and treatment.

Reference	Age/Sex	Country of origin	Symptom	Methods of diagnosis	Therapy
Grecchi C et al. 2017	20/M	Mali	- Fever - Headache - abdominal pain	- Microscopy - NAAT	Doxycycline and ceftriaxone
von Both U and Alberer M. 2016	16/M	Somalia	- Fever - Headache - Asthenia	- Microscopy - NAAT	Doxycycline
This case	16/F	Somalia	- Fever - Headache - Artromyalgia	- Microscopy - NAAT	Doxycycline and ceftriaxone

M= male, F= female, NAAT= nucleic acid amplification techniques