

## Prevalence of Tick-Borne Relapsing Fever in Febrile Patients Suspicious for Malaria Admitted in Chabahar

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Article information	Abstract
<p>Article history: Received: 12 Feb 2013 Accepted: 17 Apr 2013 Available online: 18 May 2013 ZJRMS 2014; 16 (4): 35-37</p> <p>Keywords: Ticks-Born Relapsing fever Southeast of Iran Prevalence</p>	<p><b>Background:</b> According to unpublished reports that there have been cases of relapsing fever in the years ago. We decided to determine prevalence of ticks-born relapsing fever in Chabahar.</p> <p><b>Materials and Methods:</b> This study conducted from March 2011 to February 2012, on all individuals suspected of malaria in Chabahar. The peripheral blood smears examined using a dark field microscope.</p> <p><b>Results:</b> A total of 12, 203 smears evaluated, of which, 5.7% of the patients confirmed to have malaria, but spirochetemia were not seen in any of the samples.</p> <p><b>Conclusion:</b> Our study showed that TBRF is not common in Chabahar city.</p> <p>Copyright © 2014 Zahedan University of Medical Sciences. All rights reserved.</p>

### Introduction

Tick-borne relapsing fever (TBRF) is a zoonotic disease caused by spirochetes from genus borrelia [1]. TBRF has been reported from all over the world including Iran, Turkey, Iraq, Afghanistan, Syria, Palestine and China [2, 3]. In Iran, *Borrelia persica* is wide spread, mainly found in East and West Azarbaijan provinces as well as mountainous areas around Alborz and Zagros mountains [4]. On the other hand, *Ornithodoros erraticus* has been also an important vector of the disease in many provinces of Iran including Sistan and Baluchestan, Kerman, Isfahan, Tehran, Khuzestan, Fars and coasts of Persian Gulf [3-5]. Most cases of the disease occur during summer and early autumn. The most important effective factor in disease transmission in endemic areas is adjacency of human dwellings to animal shelters and nocturnal stay at wooden buildings [2, 6, 7]. Patients with TBRF typically aren't aware of their exposure to the tick bites [8, 9]. Most common manifestations of the disease are sudden fever, chills, and headache. Without treatment, TBRF patients might experience as many as 10 relapses. In majority of the patients, each episode of the relapse will be milder and shorter than the previous [10]. Mobile spirochetes can be seen in smears of peripheral blood prepared with Wright's or Giemsa stain using dark field microscopy [3]. Other diagnostic alternatives include direct inoculation of the pathogen into peritoneal cavities of mice, molecular methods, and serologic methods [11]. Malaria and Lyme disease are the two main differential diagnoses that must be considered for relapsing fever; however, TBRF is commonly missed in Malaria-endemic regions.

### Materials and Methods

In this study we aim to determine the epidemiology of TBRF in Chabahar province and report the frequency of

the disease in patients suspicious for malaria from March 2011 to February 2012. Study population included all febrile patients referring to health care centers of Chabahar province with systemic symptoms similar to malaria (fever, headache, myalgia). Informed written consents were taken from all patients and those not willing to participate were excluded from the study. Peripheral blood smears were taken from each patient. Collected samples were transferred to Infectious Diseases Research Center in Boo-Ali hospital of Zahedan and examined by dark field microscopy.

All patients were asked to complete a questionnaire including demographic characteristics and clinical and epidemiological data of TBRF (including age, gender, and residence in urban or rural areas). Data was analyzed using SPSS-17 and  $\chi^2$  test.

### Results

A total of 12203 blood samples from febrile patients suspicious to malaria were examined in this study from whom 6577 patients (53.9%) were men and 5626 (46.1%) were women. Age distribution of the studied patients was as following: 805 (6.6%) patients were under 5 years old; 3053 (25.02%) were 5-15 years old; 3956 (32.42%) were 15-30 years old; 2919 (23.92%) were 30-45 years old; 1146 (9.39%) patients were 45-60 years old; and 324 (2.65%) patients were older than 60 years.

The frequency of rural and urban residents was 7432 (60.9%) and 4771 (39.1%) respectively. Of the studied patients, 5296 (43.4%) referred at spring; 3624 (29.7%) in summer; 1550 (12.7%) in autumn and 1733 (14.2%) in winter. The diagnosis of malaria was confirmed in 707 (5.7%) cases. According to dark field microscopy examination, none of the samples of the patients were infected by spirochetes.

## Discussion

Relapsing fever is an acute febrile endemic disease in Iran and is a major health problem for travelers to some rural areas [1]. According to unpublished reports, there have been cases of relapsing fever years ago and malaria is endemic in Chabahar, so research about this is necessary. In this study on patients suspicious to malaria in Chabahar during 2011, a total of 12,203 blood samples were examined for spirochetemia. Finally, 5.7% of the patients were confirmed to have malaria; however, none of them were infected by spirochetes causing TBRF. *Borrelia* species causing TBRF are widely spread all over the world. The incidence of human infections with these pathogens is usually underestimated and underreported. TBRF is highly endemic in Sub-Saharan Africa, but it has also been frequently reported from Mediterranean countries, Middle East, South Russia, India, Central Asia, and China, and less frequently from North, Central, and South America [8, 9].

In a study on West Iran from 2000 to 2007, 148 cases were found with TBRF and the majority of them were living in rural areas [1]. TBRF shows a wide spread all over the world. In a study on epidemiology of TBRF in United States from 1997-2000, a total of 450 cases were detected from 11 states. TBRF was reported to be most prevalent in mountainous regions of the United States and Canada and in limestone caves in central Texas [7]. Incidence of the disease has been reported 6.4 in 100,000 people among Israeli soldiers from 1971 to 2002 [12]. In Jordan, 72 new cases were reported annually from 1959 to 1969 [6].

In a study on frequency of TBRF in West Africa from 1990 to 2000, mean frequency of TBRF during this 14 year period was 11 cases per 100 people per year [13]. Moreover, most studies of the relapsing fever in Iran were performed in the west and center of Iran, but there were any studies in the southeast of Iran. Masoumi et al. investigated frequency of TBRF in Iran from 1997 to 2006 and reported a total of 1415 cases. The highest prevalence was observed in year 2002 with the incidence

rate of 0.41.100,000 population. In general, of the 21 provinces studied, the highest infected areas were Ardebil, Hamedan, and Zanjan provinces, respectively, and Isfahan was found to have the lowest prevalence of TBRF. Of the 1415 TBRF patients, 55% were men, 44% were children younger than 10 years old, 92% were living in rural areas and the majority of them were working in farming and animal husbandry [14]. In another study from 2000-2007 in western regions of the country, a total of 148 patients were diagnosed with TBRF from whom 91% were in the young age category. Most of the cases in this study were from rural areas and lived in the old mud-and-thatch houses. The region with highest frequency in this study was Bijar [1]. In addition, in a study in Ardebil from 1998 to 2001, 391 cases of TBRF were detected from whom more than 84% were rural residents and 83.4% were children [15]. The diagnostic method in the mentioned studies was similar to ours (dark field microscopy). However, using other diagnostic methods is recommended in patients highly suspicious for relapsing fever. Future studies might investigate the disease vectors as well.

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## Conflict of Interest

The authors declare no conflict of interest.

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## References

1. Moemenbellah-Fard M, Benafshi O, Rafinejad J and Ashraf H. Tick-borne relapsing fever in a new highland endemic focus of western Iran. *Ann Trop Med Parasitol* 2009; 103(6): 529-37.
2. Dworkin MS, Shoemaker PC, Fritz CL, et al. Epidemiology of tick-borne relapsing fever in the United States. *Am J Trop Med Hyg* 2002; 66(6): 753-8.
3. Assous MV, Wilamowski A. Relapsing fever borreliosis in Eurasia-forgotten/but certainly not gone. *Clin Microbiol Infect* 2009; 15(5): 407-14.
4. Karimi Y, Hovind-Hougen K, Birch-Anderson A and Asmar M. *Borrelia persica* and *B. baltazardi* sp.nov: Experimental pathogenicity for some animals and comparison of the ultrastructure. *Ann Microbiol* 1979; 130: 157-68.
5. Parola P, Raoult D. Ticks and tickborne bacterial diseases in humans: an emerging infectious threat. *Clin Infect Dis* 2001; 32(6): 897-928.
6. Vasil'eva IS, Ershova AS, Vilisov GM, et al. The current status of foci of tick-borne relapsing fever in the western Pamirs. *Med Parazitol (Mosk)* 1990; 6: 31-4.
7. Colebunders R, De Serrano P, Van Gompel A, et al. Imported relapsing fever in European tourists. *Scand Infect Dis* 1993; 25(4): 533-6.
8. Horton JM, Blaser MJ. The spectrum of relapsing fever in the Rocky Mountains. *Arch Intern Med* 1985; 145(5): 871-5.
9. Perine PL, Teklu B. Antibiotic treatment of louse-borne relapsing fever in Ethiopia: A report of 377 cases. *Am J Trop Med Hyg* 1983; 32(5): 1096-100.
10. Cuevas LE, Borgnolo G, Hailu B, et al. Tumor necrosis factor, interleukin-6 and C-reactive protein in patients with louse-borne relapsing fever in Ethiopia. *Ann Trop Med Parasitol* 1995; 89(1): 49-54.
11. Rebaudet S, Parola P. Epidemiology of relapsing fever borreliosis in Europe. *FEMS Immunol Med Microbiol* 2006; 48(1): 11-15.

12. Sidi G, Davidovitch N, Balicer RD, et al. Tickborne relapsing fever in Israel. *Emerg Infect Dis* 2005; 11(11): 1784-6.
13. Vial L, Diatta G, Tall A, et al. Incidence of tick-borne relapsing fever in west Africa: Longitudinal study. *Lancet* 2006; 368(9529): 37-43.
14. Masoumi Asl H, Goya MM, Vatandoost H, et al. The epidemiology of tick-borne relapsing fever in Iran during 1997-2006. *Travel Med Infect Dis* 2009; 7(3): 160-4.
15. Arshi S, Majidpoor A, Sadeghi H, et al. Relapsing fever in Ardabil, a northwestern province of Iran. *Arch Iranian Med* 2002; 5(3): 141-145.

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