

MINI REVIEW

Leishmaniasis in North Western Yemen

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Abstract

Leishmaniasis is one of the common infectious diseases in developing countries including Yemen. Information and knowledge on the ecology and epidemiology of leishmaniasis is very important for disease control. This knowledge could be focused on detection and identification of the parasite and the vector(s), as well as identification of reservoir host(s). The leishmaniasis is widespread in Yemen and it is the most prevalent skin infectious disease. There is a clear increase in the number of cases, which is worrying in Yemen. Reports were taken from Yemen Ministry of Public Health and Population web site (2007- 2012) showing increased leishmaniasis from 1009 cases in 2007 to 2475 in 2012. In spite of this no fully documented reports for leishmaniasis are available in Yemen. Although there have been a few previous reports. Cutaneous leishmaniasis (CL) is widespread in Yemen, but its extent has not been fully documented.

Key words: Leishmaniasis, Cutaneous leishmaniasis, CL, Yemen. Developing Countries.

Information and knowledge on ecology and epidemiology of leishmaniasis is very important for control of the disease. This knowledge could be focused on detection and identification of the parasite and the vector(s), as well as identification of reservoir host(s). The leishmaniasis is widespread in Yemen and it is the most prevalent skin infectious disease. There is a clear increase in the number of cases, which is worrying in Yemen. Reports were taken from Yemen Ministry of Public Health & Population web site (2007- 2012) showing increased leishmaniasis from 1009 cases in 2007 to 2475 in 2012 [1]. In spite of this no fully documented reports for leishmaniasis are available in Yemen. Although there have been a few previous reports [2-3]. Cutaneous leishmaniasis (CL) is widespread in Yemen, but its extent has not been fully documented [4]. Yemen is one of the poorest countries in the world with over 45% of the population living on less than 2 USD a day [5] and is endemic for seven neglected tropical diseases. Leishmaniasis is a public health problem with a nationwide distribution and is responsible for 60% of DALYs (Disability Adjusted Life Years) the sum of years of potential life lost due to tropical-cluster diseases prevalent in Yemen [6].

The armed conflict occurring in Yemen, has affected all aspects of life in the country. Risk factors are known to accumulate during such conflicts leading to an enhanced transmission of infectious diseases this may explained the increasing number of CL and visceral leishmaniasis (VL) during the last years in Yemen and Iraq [7-9]. Risk factors such as imparted primary health care services of the endemic areas, poor detection and treatment of cases, massive human migration from cities to villages and /

or village to village pose additional risk factors, because people were more prone to get infected and at the same time introduce diseases to these villages.

Moreover, the isolated of *L. tropica* from human cases of VL among the US soldiers returning from Operation Desert Storm in Gulf countries [10,11] posed another risk factor, as to whether *L. tropica* could manifest in the form of VL in Yemen. The potential of this species to cause VL, the most virulent form of leishmaniasis, will exacerbate the situation in Yemen [12]. These risk factors were also elucidated and considered in Libya due to the armed conflict which occurred from February till October 2011 [13]. Since different *Leishmania* species (*L. tropica*, *L. infantum*, and *L. donovani*) were identified from human [4] in North Western Yemen.

The topographical diversity is the important natural measure in Hajjah. There are three different topographical forms: Tihama Lowlands, West Highland, and Interior Highland. The climate of the governorate varies with the topography of the terrain. In the mountain areas, a moderate climate prevails in the summer, and a cold climate characterizes the winter. In the plain areas of the governorate, a tropical hot climate with some humidity prevails in summer, while a moderate climate is prevalent in winter. The population dynamics of sand flies in Hajjah were greatly affected by seasonal variations and consequently the dynamics of the disease transmission, Fig 1.



Figure (1): The Topographical diversity is the important natural measure in Hajjah governorate. A- B, Al-Sharagi and C, Al-Saefiah D, Gareb Al-Hawmarah.

The most common form of leishmaniasis in Yemen is CL which is mutilating, disfiguring and sometimes disabling in the case of multiple lesions. The clinical pattern of the disease showed variation in the severity and duration and low response to treatment in some cases raising the possibility of the existence of different *Leishmania* species causing CL. The inability to determine the species of *Leishmania* limits the knowledge associated with CL. Species identification is crucial because although it is known that the common causative agent of CL is *L. tropica*, this species has also been identified as causing VL which is the more severe type of leishmaniasis. Sarnelli, reported five cases of mucocutaneous leishmaniasis seen in Sana'a as early as 1933 [1]. Later Rioux et al., (1986) identified *Leishmania tropica* in the lesions of 18 patients with CL in Naghdi Dhamran and Quadi Dhamran in Yemen [14]. They mentioned that CL seemsto be endemic in this region for almost two decades. Khatri and his colleague are in 2006 detected *Leishmania* amastigotes in 128 cases of CL from northern Yemen. Of these, four *Leishmania* isolates were characterized using the isoenzyme electrophoresis technique and *L. tropica* was identified in all these cases Khatri et al. (2009) carried out using PCR- RFLP a study, involving 155 CL cases, originated from 10 governorates of northern Yemen [3,4]. The results highlighted the possibility of CL being caused by more than one species of *Leishmania*. This study detected *L. tropica* in 133 cases (85.80%), *L. infantum* in 17 cases (10.97%) and *L. donovani* in 5 cases (3.23%). Mahdy et al. (2010) carried out a study on Giemsa stained smears, positive for *Leishmania* from the archives of the Central Health Laboratory, Sana'a- Yemen which is referral diagnostic laboratory under the Ministry of Health. The predominance of the anthroponotic species *L. tropica* indicates the probability of anthroponotic transmission of cutaneous leishmaniasis in Yemen [12]. Mogalli et al., (2013) also published a report of 32 cases from Hajjah and neighboring areas using nested PCR and detected *L. tropica* in all cases [15]. CL due to *L. tropica* in Yemen was previously reported by Khatri [4], Mahdy et al. (2010) and Mogalli et al. 2016 identified *L. tropica* [12-16], Fig 2.



Figure (17): A. Multiple lesions on different parts of the body, B. Thick verrucous plaque and multiple lesions of which four ulcerative lesions on lower lip and cheek, C. Chronic CL on the nose, D. Plaque lesion on the cheek, E. Noduloulcerative lesion on lower lip, F. Thick verrucous CL on the ear, G. Nodular lesion of CL. on the eyelid, H. Primary noduloulcerative lesion with subcutaneous nodular lesions on the hand, I. Chronic CL with infiltrated mildly scaly lesion on the forearm, J. Large ulcer with thick crust on the leg.

Understanding the different parasites life cycles and parasite –vector- reservoir interplays is important for applying affective prevention strategies, control measures, for the design of surveillance protocols or guidelines for monitoring the burden of disease in different parts of the country and for evaluating the effectiveness of these control measures. " In order to address the problem of leishmaniasis in the Eastern Mediterranean Region, WHO is supporting ministries of health through a strategic plan focusing on (a) training programme managers and health workers on diagnosis and case management; (b) establishing a harmonized regional surveillance system; (c) creating a regional network of experts; (d) promoting political commitment of national governments"[17].

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