Chapter 3

Leishmaniases in West Africa: Past and Current

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Additional information is available at the end of the chapter

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Abstract

Leishmaniases are vector-borne diseases. Cutaneous leishmaniasis (CL) is endemic in West Africa. Sporadic and anecdotal cases of visceral leishmaniasis (VL) have been reported in the past. Recent data showed the changing of epidemiology of leishmaniases in West Africa, with the occurrence of outbreak of CL due to *Leishmania major* in urban and rural areas. CL is transmitted by *Phlebotomus duboscqi.* The role of *Sergentomyia (Spelaeomyia) darlingi* as vector in rural areas has been evoked but not confirmed. Cases of VL due to *Leishmania spp*. have been described in West Africa; however, parasites species were not identified and dogs were suspected to be the reservoir. No humans' case of symptomatic VL due to *L. infantum* has been described in West Africa. Recent data in rural areas of Senegal confirmed dog as reservoir of *L. infantum.* In the same study in Senegal, *Sergentomyia* sandflies were found infected with *L. infantum*, indicating a possible role in leishmaniasis transmission. Coinfection leishmaniases-HIV is reported but rare. In this chapter, we included most recent publications and propose an updated landscape of CL and VL epidemiology in West Africa.

Keywords: leishmaniases, epidemiology, West Africa

1. Introduction

Leishmaniases are anthropozoonoses common in animals and humans. Leishmaniases are endemics in 98 countries. The annual incidence is 0.7–1.2 million cases of cutaneous leishmaniasis (CL) and 0.2–0.4 million of cases of visceral leishmaniasis (VL) causing 20,000–40,000 deaths annually [1]. In sub-Saharan African region, the estimated annual incidence of CL was between 770 and 1500 cases. *Leishmania* parasites are characterized by their enzyme electrophoretic profile that defines zymodemes. *L. major* is the main parasite causing CL and its

zymodemes MON-26, MON-25, MON-17 and MON-117 have been identified in West Africa [2–4]. CL has been cited earlier as endemic in rural areas. However, outbreaks of CL in urban areas have been recently reported, showing a change in CL epidemiology [5]. VL presents a different epidemiological pattern in West Africa. Previous data described VL as a rare condition, with occurrence of sporadic and anecdotal cases in limited areas [6–8]. Recent data on VL in West Africa showed the occurrence of several cases of canine visceral leishmaniasis and asymptomatic human infections [9–11]. We will describe an updated dynamics of CL and VL characteristics in West Africa.

2. Burden and characteristics

2.1. Cutaneous leishmaniasis

The overall burden of CL is poorly characterized, due mainly to paucity of data. The frequency of CL in suspected patients was 78.4% in Mali [12], and Niger it was 66.7% [13]. In Burkina Faso, CL was perceived as a public health problem due to occurrence of outbreaks with an average incidence of 0.1% [14] and hospital frequency of 1.1% [15]. In Senegal, the frequency of CL in hospital based study was 38 cases over 4 years (9.5 cases per year) [16].

In Mali, recent positive LST survey showed a higher prevalence (49.9%) in Diema, Kayes region [17]. LST prevalence in Kayes was 25.7% in 1969 [18]. This difference in LST prevalence in the region of Kayes over a period of more than 45 years is likely to indicate an increasing trend in CL transmission.

L. major is the main species of *Leishmania* reported in Mali and has been identified in humans as a causative agent of CL [19]. The reservoirs of *L. major* in West Africa are rodents in Senegal. *Mastomys erythrolocus*, *Tatera gambiana* and *Arvicanthis niloticus* were found infected by *L. major* [20, 21]. *Phlebotomus duboscqi* previously was cited as vector of CL. *L. major* DNA was identified recently in *P. duboscqi* confirming its role in CL transmission in Mali [22, 23]. *Sergentomyia (Spelaeomyia) darlingi* may also play a role in *L. major* transmission [22]. Other species of *Leishmania* causing CL such as *L. tropica* has been identified in *S. dissimillima, S. ingrami, S. simillima, S. dissimillima, and S. hamoni* in Ghana [24], but this species has been not identified in humans in West Africa.

Recent findings revealed *L. infantum* in a HIV-positive child suffering from CL in Senegal [25]. A new species of *Leishmania* classified as *Leishmania enrietti* complex was found in humans in Ghana [26]. These findings call to strengthen CL diagnosis and stimulate efforts to determine the causative *Leishmania* species in human infections.

The enzymes electrophoresis analysis identified several strains of *L. major* in West Africa. The most frequent strain in Mali was MON-26 and MON-74 was the more frequent in Burkina Faso [2, 4, 27]. Travelers visiting endemic areas in West Africa are at risk of getting infected with *Leishmania* [28].

In West African countries (**Figure 1**), CL outbreaks may occur in rural areas where health care centers personnel are not well trained for diagnosis or case management. Often, an

investigation post-outbreak is conducted to determine the *Leishmania spp*., the vectors and reservoirs involved [5, 29]. In urban areas [30], outbreaks are occurring in larger population. Rapid urbanization is considered as a favoring factor that also makes uneasy outbreak control.

Coinfection CL-HIV is rare in West Africa. In Mali, the frequency of coinfection was 1% [31]. Coinfection CL-HIV has been reported in Burkina Faso and Ghana [32, 33]. In patients with coinfection, diffuse CL, mucosal involvement and bone marrow invasion have been reported [16, 34–36].

2.2. Visceral leishmaniasis

In West Africa, VL has been described, and previous data have shown the scarcity of disease (**Figure 1**). For several years, anecdotal and sporadic cases of VL were reported. Up to today, the data reviewed identified most of the clinical cases of VL in Ivory Coast and Niger [6–8]. In the Gambia, a case of VL has been reported in humans and in dogs [37, 38]. Underreporting of diseases is a known feature of West African health care system. This is also true for VL. The underreporting of VL in West Africa could be favored by the absence of appropriate biological diagnosis and the absence of specificity of VL clinical symptoms. VL cases may be confounded with others frequent parasitic diseases such as malaria or schistosomiasis. It is also assumed that the parasite strains found in West Africa are less virulent than those found elsewhere (Asia and East Africa). The strain identified in Senegal and likely those in West Africa are coming from Mediterranean basin [39].

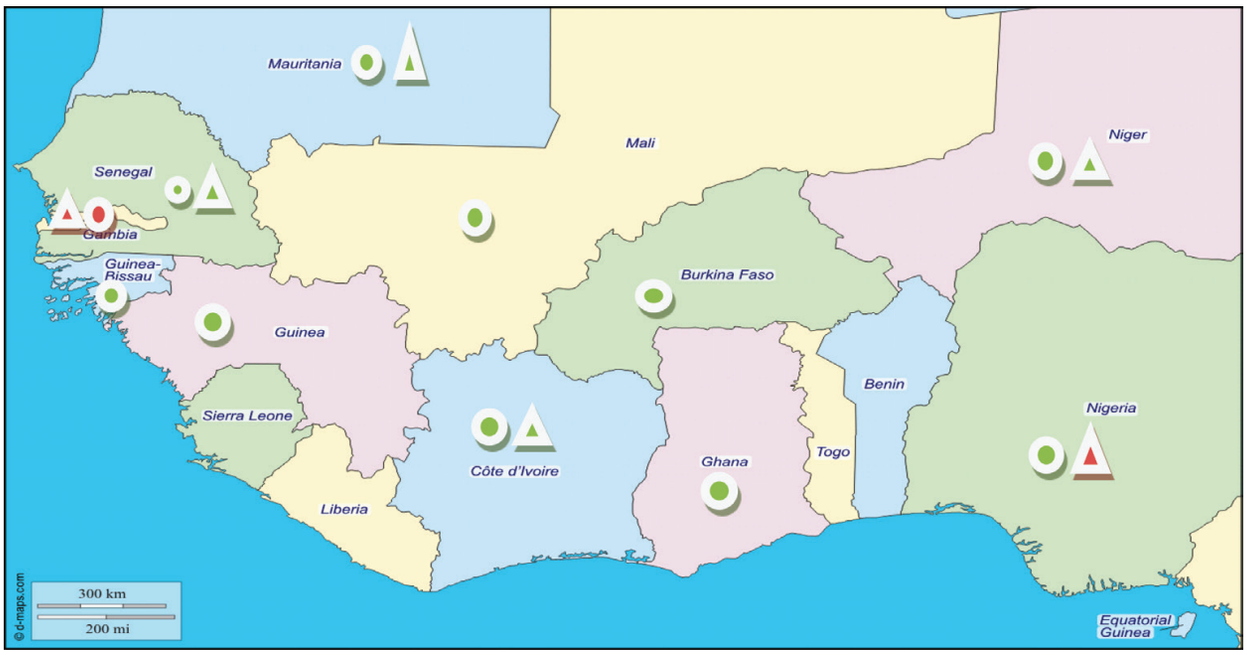

Figure 1. Modified map of West Africa from map (http://d-maps.com/carte.php?num_car=36688&lang=fr) and status of leishmaniasis endemicity in West Africa (WHO weekly report 2017) [45]. : Cutaneous leishmaniasis endemic; : Cutaneous leishmaniasis previously reported; : Visceral leishmaniasis endemic; : Visceral leishmaniasis previously reported.

Parasite species identified in West Africa is *L. infantum* using serology method in asymptomatic Senegalese [11]. *L. donovani* has not yet been identified in West Africa. Cases of VL encountered in Niger and Ivory Coast had their parasite identified by microscopy [6–8]. It is known that microcopy cannot distinguish between *Leishmania* species. For species, diagnosis serology or molecular biology is required.

Sandflies of the genus *Sergentomyia* (*Se. dubia*, *Se. schwetzi* and *Se. magna*) have been found infected with *L. infantum* in Mont-Roland district in Senegal [40]. This raises the possibility that *Sergentomyia spp.* may be involved in VL transmission in Senegal.

Canine visceral leishmaniasis is well described in West Africa. Recent studies in domestic dogs showed that *L. infantum* was the causal pathogen in Senegal, in Burkina Faso and Nigeria [9, 10, 41].

Geographic diversity: the area of transmission could be wider, therefore underestimating the cases of leishmaniasis. In Senegal, previous studies have shown that the vectors *Phlebotomus* or *Sergentomyia* are found in many areas of the country (Kédougou, South East, Keur Moussa in Dakar region, Ferlo area [42]. Environmental changes are risk factors of explosion.

3. Management and control

VL is rarely encountered in West Africa. Most cases of human Leishmaniasis are cutaneous leishmaniasis. Often, CL cases are under-diagnosed, and their clinical management is poorly done. This is particularly true for cases encountered at peripheral health care centers with personnel poorly trained. For those encountered at referral health care facilities with good capacity for the diagnosis, treatment is available. In Mali, CL cases are referred to National Center for Diseases Control [CNAM acronym in French for Centre National d'Appui à Lutte contre la Maladie]. Treatment is done using either meglumine antimoniate locally or local thermotherapy [43]. In Burkina Faso, meglumine antimoniate is the first line treatment [15]. Treatment outcome is favorable with healing of lesions in 2–4 weeks. Treatment response in HIV coinfected patients is also favorable but hampered by the frequency of relapses [44].

In rural areas where these treatments are not available dermatologists advice to clean skin lesions and apply tetracycline ointment until healing [43]. Meglumine antimoniate and amphotericin B have been used to treat VL in West Africa [6–8].

4. Conclusion

Compared to other endemic parts of the world, leishmaniases are not very common in West Africa. CL is widely distributed in few West African countries such as Burkina Faso, Mali, Nigeria and Senegal. Urbanization is the main risk factor. Human VL human is sporadic in few countries. Also, VL affects more domestic dogs. Our review acknowledged the changing of CL epidemiology with more report of outbreaks and description of new parasite species in West

Africa. A surveillance system based on referral health care centers with training of health care personnel will help to better address clinical and diagnostic challenges imposed by leishmaniasis.

Conflict of interest

No conflict of interest declared.

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