

AMERICAN CUTANEOUS LEISHMANIASIS IN THE STATE OF SÃO PAULO, BRAZIL - EPIDEMIOLOGY IN TRANSFORMATION

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Abstract: American cutaneous leishmaniasis, a disease of great worldwide importance, especially on the American continent, has had its epidemiological modifications. These are revised and discussed in view of the current situation of recent increase in its incidence in regions with low morbidity since 1950, where no apparent cause that would justify an epidemic outbreak could be found. We analysed the causes of these alterations and the profile now seen in the State of São Paulo, Brazil.

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INTRODUCTION

American cutaneous leishmaniasis is an anthroponosis caused by a protozoan of the genus *Leishmania*, whose vector is an insect *Phlebotomus* [19].

It afflicts man and different species of wild and domestic animals in hot, underdeveloped regions of the Old and New World [29].

It is characterized by the parasitisation of the cells of the mononuclear phagocytic system of the vertebrate host and by cutaneous lesions arising at the point of the parasite's inoculation, possibly developing into mucosa lesions after dissemination [29].

The importance of leishmaniasis relies on its high incidence. The sickness can show various severity in particular cases and can lead to severe permanent mutilation in thousands of people every year around the world, with repercussions in the public health of many nations [19].

At present in Brazil the disease presents two characteristic epidemiological patterns: epidemic outbreaks associated with deforestation for the construction of highways and access to villages in pioneer regions. This pattern is characterized by zoonosis of wild animals, which attack

anyone who comes into contact with zoonotic foci, which is the pattern initially described. The second pattern is leishmaniasis in old colonial regions, not associated with deforestation, where dogs, horses and rodents seem to play an important role as reservoirs of the parasite [34].

This paper attempts to show the current situation of this illness in Brazil, specifically in the State of São Paulo.

HISTORIC

The first researcher to observe the parasites belonging to the genus *Leishmania* in cases of visceral leishmaniasis was Wright, in 1885 in India [51]. After that, in 1898, Borovsky, the Russian scientist, described in detail these parasites in cases of cutaneous leishmaniasis, but he did not name them [24]. In 1903 they were observed by Leishman, who attributed to them the etiology of the Indian disease kala-azar [8].

It is accepted that cutaneous leishmaniasis is an autochthonous disease of the American continent [8]. In Peru, the pre-columbian Indians sculptured these destructive lesions, especially on the nostrils and upper lips on ceramics with human shapes called huacos, that when analysed with our current knowledge leave no doubt as to



Figure 1. Environment classically described as endemic for leishmaniasis (by courtesy of the Secretaria de Saúde do Estado de São Paulo).

its leishmaniatic nature [39]. Already in 1908, Escomel indicated the great similarity existing between the physiognomy presented by the huaco and people afflicted with cutaneous leishmaniasis [14].

In Brazil in 1895, Moreira observed the existence of this illness, clinically identifying it with Biskra's nodule [35].



Figure 2. City of Campinas, State of São Paulo, Brazil, with autochthonous cases of leishmaniasis described in recent years.



Figure 3. *Phlebotomus (Lutzomia)*. Species involved in the transmission in our region (by courtesy of the Secretaria de Saúde do Estado de São Paulo).

In Italy in 1895, Breda described the disease in Italians who had returned from São Paulo to their homeland [8]. In 1908, in the Santa Casa de São Paulo a great number of sick people with leishmaniasis appeared [36]. The disease received various denominations (Bauru ulcer, sharp wound, Northeast wound) without the etiological cause being known [36]. Then, on 30 March 1909, Adolfo Lindenberg announced the discovery of the leishmaniasis parasite [27, 28]. In 1911, Pedroso and Dias da Silva, using the Neal, Nory and Nicolle medium, obtained *Leishmania* cultures from material from Bauru ulcers [37].

The idea that cutaneous leishmaniasis was transmitted by man-biting insects of the genus *Phlebotomus* was suggested for the first time in 1905 by Sergent *et al.* [43]. In 1922 in Brazil, Aragão succeeded in reproducing ulceration in a dog by injecting squashed infected insects [5, 34].

Leishmania brasiliensis was experimentally inoculated in man by Montenegro in 1923 and later by Herrer and Batistini in 1951 [36]. Based upon these studies, Montenegro introduced in 1926 the intradermal test, currently still in use for the diagnosis of leishmaniasis [34, 36].

As classically described by Rey in 1973, leishmaniasis is a wild animal zoonosis, especially affecting rodents, transmission of which depends on *Phlebotomus* spp. living in primitive tropical forests (Fig. 1) [36].

Lately, however, leishmaniasis in Brazil has presented certain epidemiological aspects that are distinct from the classical concept, with the appearance of endemic foci apparently not connected to the forest. This pattern is observed by the Secretary of Health in our region (Fig. 2).

NATURAL HISTORY OF THE DISEASE

The transmission occurs through bites of various insect species of *Phlebotomus* sensu lato belonging to different genera (*Psychodopygus*, *Lutzomia*), depending on the geographical localization (Fig. 3) [34]. These small insects, measuring from 2 to 3 mm, take cover during the day in humid and dark hiding places [29]. They start their activities at nightfall, and only the female is hematophagous [42]. Forest species bite also during the day when disturbed by



Figure 4. Leishmaniac ulcer on the nose with edges in frame and granulated background.

man, and peridomestic species such as *Lutzomia intermedia* can penetrate houses [29].

Human leishmaniasis is evoked by promastigote forms of the parasite transmitted by the bite of *Phlebotomus* to uncovered parts of the skin [36]. After the incubation phase, which can last from 1 to 12 months, the parasites multiply in the form of amastigotes. The culmination of this process is the appearance of the leishmaniac lesions (Figures 4–5) [34].

EPIDEMIOLOGY

The importance of leishmaniasis in the world increases. In 1989, WHO [50] estimated that 350 million people were exposed to the risk of acquiring the disease, and 12 million people were infected in 1992. This places leishmaniasis as one of the six most important infecto-parasitary diseases in the world.

Its importance in America is great, the area of appearance of the illness extending from the south of the USA down to the north of Argentina [42]. In Brazil, cases have been noted in practically all the States. In recent years, the Ministry of Health has registered an average of



Figure 5. Leishmaniac lesion on the thigh.



Figure 6. Geographical distribution of leishmaniasis in Brazil. Areas with higher frequency of cases and proportion of occurrence are indicated by region.

25,000 new cases of American cutaneous and visceral leishmaniasis each year, thus the disease in this area presents the highest prevalence in the world (Fig. 6) [23].

After a general reduction in the occurrence of the different forms of leishmaniasis in the 1950's, the number of registrations has been progressively growing in the last 20 years. Epidemic outbreaks can be observed in the south-east region in which the State of São Paulo is located [34].

The epidemiologic analysis of the incidence of American cutaneous leishmaniasis in various decades reveals the predominantly endemic nature of the disease [19]. Special circumstances that have driven a large human contingency to come into contact with virgin forests have led to the above quoted outbreaks [19]. The natural history of this parasitosis in Brazil has registered in numerous events of this kind, which first occurred some time ago, when the Atlantic Forest (Mata Atlântica) in the south-east region was extensively destroyed (Fig. 7). Nowadays, this scenario is being repeated in a more expressive form with the destruction of the Amazon Forest, but occurs on a smaller scale over the rest of the country, due to the destruction of the residual forest (Mata) [6, 12, 18, 49].

The environmental alterations that arise from the devastation of forests has shown that the species *Leishmania amazonensis* and *L. brasiliensis* are apt to survive in an alternative environment [17, 26]. The first species presents a growing distribution in the country [10]. However, as it has a vector with zoophilic characteristics, it hardly signifies a real risk to humans [19]. On the other hand, *L. brasiliensis* has great ecological importance, made evident by its vast distribution in Brazil and the Americas, in areas of ancient colonization where there was great deforestation, thus beginning to bear distinct epidemiological characteristics in the course of

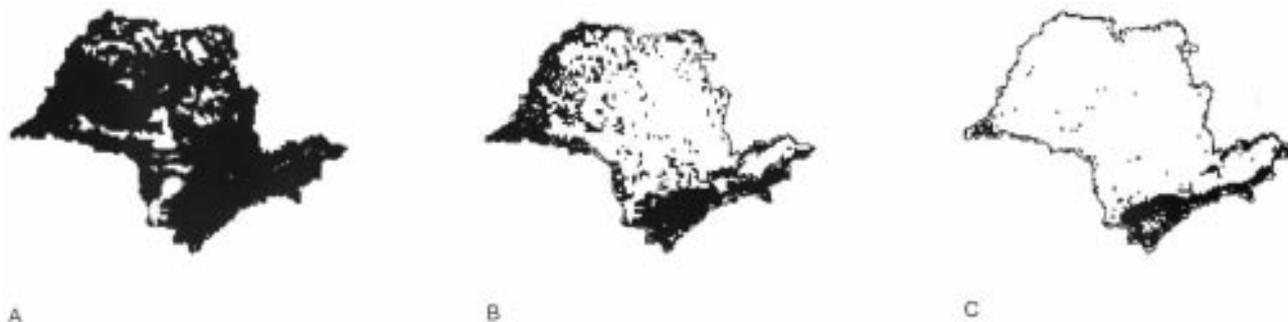


Figure 7. The advance of deforestation in the State of São Paulo. Modified from Victor, 1975. A. Forest covering in the State of São Paulo at the beginning of the century; B. the same area in the 50's - fall in the incidence of leishmaniasis; C. Current situation.

time according to the distribution of the different species of *Phlebotomus* involved in the transmission [25]. In the 1930's and 1940's, during the process of colonization of the south and south-east regions, the transmission was associated with vectors *Lutzomia whitmani*, *Lu. pessoai* and *Lu. mingonei*, of wildlife behaviour [34].

Nowadays, the responsible vector is *Lu. intermedia*, which is found to be associated with the endemic coastal areas, and with the valleys of great rivers of the interior of the country [20, 22] where *Phlebotomus* is found in shelters of domestic animals and surrounding habitations [1, 9, 12, 15, 21, 26, 30, 45, 46, 47]. This occurs because there persists a rigid environmental law which does not allow the deforestation of the banks of rivers in order to avoid obstruction.

The adaptation of *Lu. intermedia* to altered ecosystems is mainly observed when close to forested areas, its presence in forests being quite rare [2, 22].

Up until the present moment, no wild animal has been pointed out as a reservoir of *L. brasiliensis* [29]. However, the encounter of various domestic species that are carriers of the parasite such as dogs, horses and mules is frequent in various Brazilian States [3, 4, 10, 13, 15, 16, 30, 31, 32, 33, 38, 40, 41, 49, 52].

In areas in which *Lu. intermedia* prevails, the endemic has lost its characteristic forest transmission, is not related to occupational activities, and occurs in individuals of both sexes [23] and all ages [19].

In areas where *L. brasiliensis* is present, children and women, as well as domestic dogs, are frequently afflicted, reflecting the dominant character of domestic transmissions [34]. The afflicted population is generally of a low social and economic level [7, 33].

Dogs and horses are the only animals that reproduce an infection that resembles the human disease, and respond to treatment with antimonials [30, 38].

FINAL COMMENTS

American cutaneous leishmaniasis, once considered to be practically eradicated from places of ancient colonization, has again taken on an endemic nature due to the adaptation of the infectious agents and vectors to environments greatly altered by man. Leishmaniasis must still be remembered as

one of the most important infecto-contagious pathologies in the worldwide public health. It is worthwhile remembering that its control is neither difficult nor expensive, therefore the outbreaks of leishmaniasis and their consequences which still occur in our region - supposedly the richest and most developed in Brazil - cannot be justified.

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