

Human visceral leishmaniasis: Epidemiological analysis of the Brazilian territory.

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Abstract

Visceral leishmaniasis is a chronic disease of visceral manifestation caused by a protozoan of the *Leishmania* genus belonging to the Trypanosomatidae Family. The causative agent of visceral leishmaniasis in Brazil is *Leishmania chagasi*, a mandatory intracellular parasite. The current study aimed at a quantitative retrospective approach on human visceral leishmaniasis in Brazil, according to data from a Ministry of Health platform, SINAN, reporting on the number of cases in the Brazilian states in January 2003 To December 2013. In the period established, Brazil had 36,658 cases, an average of 3,675 cases per year. The most endemic region is the Northeast, with 21,049 (47.14%) of the total confirmed cases in the Brazilian territory, followed by the Southeast (21.58%), North (20.35%) and Central West and South with 10%, 81% and 0.12% respectively.

Keywords: Leishmaniasis, American visceral leishmaniasis, *Leishmania chagasi*, Calazar.

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Introduction

Visceral leishmaniasis is a chronic disease of visceral manifestation caused by a protozoan of the genus *Leishmania* [1]. The genus belongs to the family Trypanosomatidae, and the causative agent of visceral leishmaniasis (LV) in Brazil has been described as *Leishmania infantum* [2]. They later described the causative agent of visceral leishmaniasis in the America as *Leishmania chagasi*, noting that *Leishmania infantum* is a different species of *Leishmania chagasi* [3,4]. LV is popularly known as Calazar being one of the most deadly diseases in the world.

It is estimated that 200 to 400 thousand new cases of LV per year and that 6 countries including Brazil account for 90% of these new cases. The number of confirmed cases in Brazil each year is increasing, which is a concern for public health, an opinion of the Ministry of Health 5 reports the increase in LVH lethality from 3.4% in 1994 to 5.5% In 2008, an increase of 61.8% in this period.

In Brazil, approximately 90% of the reported cases of human visceral leishmaniasis (LVH) in the 1990s occurred in the Northeast region. Over the years, the disease spread to other regions. In 2010, the Northeast had 48% of the national cases [5].

Leishmania chagasi

Protozoan parasite obligatory intracellular that needs to complete its life cycle in two types of hosts. One of the hosts is an invertebrate belonging to the Family Psychodidae, Subfamily Phlebotominae, being in Brazil of the genus *Lutzomyia longipalpis* known popularly as a straw or birigui mosquito, this one presents in its digestive tube the flagellate form of the protozoan 6 known as Promastigota, and the second host is a mammalian vertebrate, being the human and domestic dog (*Canis lupus familiaris*) [6].

Wild hosts

In the state of Mato Grosso do Sul, wild animals naturally infected with *Leishmania chagasi* were found: opossums (*Didelphis albiventris*), foxes (*Cerdocyon thous*) and foxes (*Lycalopex vetulus*) [7].

Vector transmission

In Brazil the main transmitter is *Lutzomyia longipalpis* popularly known as straw mosquito or birigui [8]. It is hematophagous diphtheria that when feeding the prey, in the case the susceptible mammalian vertebrate host regurgitates along with the saliva the protozoa in the promastigote form. Once inoculated into the animal, this protozoan may invade mainly the macrophages, thus hiding itself from the other cells of defence. When the macrophage phagocytes the flagellated forms, they are not destroyed, transforming later to the amastigote form, non-flagellated forms. These forms can reproduce inside the cells by binary division, increasing more and more the amastigote forms of the protozoan, until breaking the macrophage wall falling into the bloodstream and infecting new cells [9]. There are no confirmed cases of direct transmission in humans, that is, from person to person. The protozoan needs to complete the 2 life cycles, respectively in the invertebrate and mammalian vertebrate, in order to be transmitted by the vector to the human.

Diagnosis

The disease is characterized mainly by irregular fever, weight loss and enlargement of the liver and spleen. The diagnosis of LVH is confirmed in the laboratory, through clinical and laboratory analyzes, consisting of parasitological tests for identification of the protozoan and immunological tests.

Vaccination and treatment

According to the Brazilian Society of Tropical Medicine, the vaccine for Leishmaniasis in humans is still something futuristic and that the vaccine against Canine LV is in a way much more efficient for the control of the disease [10]. As for the treatment, two main drugs are used in Brazil: A pentavalent antimonial and Amphotericin B. The Ministry of Health 5 recommends N-methyl Glucamine Antimonate as the initial drug for the treatment of LVH [11].

Methodology

This is a retrospective descriptive research aimed at collecting epidemiological data regarding LVH in the period from January 2003 to December 2013. Values collected from the online database of the Ministry of Health/SVS-Notification-SINAN, aiming at the schematic presentation of the number of confirmed cases in the period stipulated in the federative units of Brazil. The results were filtered by specific year of infection occurrence and Federative Unit (UF), later worked on Excel 2010 spread sheets.

Table 1. Confirmed cases of human visceral leishmaniosis in Brazil (2003-2013).

Region/Federative unit (UF)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Total/UF	̄/UF	Total/Region/̄/UF	
Midwest	Distrito Federal	0	73	98	80	57	61	59	37	40	38	45	588	53	3963 (10.81%) (360/year)
	Goiás	30	27	22	30	19	28	23	33	29	28	32	301	27	
	Mato Grosso Do Sul	194	238	240	241	234	252	195	213	273	320	244	2644	240	
	Mato Grosso	10	19	21	21	31	55	68	55	55	60	35	430	39	
Northeast	Alagoas	52	59	58	48	32	25	31	34	37	37	25	438	40	21049 (47.14%) (1913/year)
	Bahia	374	465	516	376	233	197	349	394	378	314	322	3918	356	
	Ceará	241	313	410	371	550	556	677	541	611	439	481	5190	472	
	Maranhão	735	435	395	371	301	404	370	354	381	239	519	4504	409	
	Paraíba	37	30	32	37	25	41	21	33	42	41	37	376	34	
	Pernambuco	75	95	98	104	76	85	83	67	85	71	73	912	83	
	Piauí	446	549	495	367	363	452	267	248	313	317	398	446	383	
	Rio Grande Do Norte	75	61	53	75	71	93	96	84	121	101	80	910	83	
	Sergipe	18	37	45	50	75	40	45	90	78	58	50	586	53	
	North	Rondônia	0	2	0	0	3	0	0	0	1	2	2	10	
Roraima		11	17	12	5	2	2	6	16	14	10	20	115	10	
Tocantins		277	183	192	248	424	488	464	372	519	374	297	3838	349	
Acre		0	0	0	0	0	0	0	0	0	0	0	0	0	
Amapá		0	0	0	0	1	1	0	0	0	0	0	2	0.2	
Pará		193	370	484	501	370	366	0	312	365	258	252	3471	316	
Amazonas		2	4	5	2	1	4	3	1	1	2	0	25	2	
Southeast	Espírito Santo	4	3	4	2	0	3	8	2	11	2	4	43	4	7909 (21.58%) (719/year)
	Minas Gerais	369	620	479	437	423	526	579	580	506	412	339	5270	479	
	Rio De Janeiro	2	3	4	10	3	0	6	2	0	5	9	44	4	
	São Paulo	197	168	184	281	264	307	231	226	234	257	203	2552	232	
South	Paraná	1	3	3	2	3	3	1	5	2	5	0	28	3	45 (0.12%) (4/year)
	Rio Grande Do Sul	1	0	0	1	0	0	0	2	2	0	3	9	1	
	Santa Catarina	0	2	0	0	1	0	0	0	2	2	1	8	1	
Total of cases/year	3344	3776	3850	3660	3562	3989	3582	3701	4100	3392	3471	40427	36658 (100%) (3675/year)		

Results

The collection of retrospective epidemiological data is important for the epidemiology of the disease to be mapped, reporting the regions that present confirmed cases and the most endemic states, allowing later work on these data.

As shown in Table 1, the Central-West Region had the state of Mato Grosso do Sul with the highest 37 number of cases, 2,644 (67.2%). In the Northeast, the state with the highest number of cases was Ceará with 5,190 cases, representing 24.7% of the total number of confirmed cases in the region. In the North, the states of Tocantins with a total of 3,838 cases and Pará with a total of 3,471 cases, representing respectively 51.4% and 46.5% of the total cases in the region. In the Southeast Region the state with the highest number of cases was Minas Gerais with a total of 5,270 (66.6%) followed by the State of São Paulo with 2,552 (32.2%). Southern Brazil is the region least affected by the disease, the state with the highest number of cases was Paraná with 28 (62.2%).

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Brazil presented a total of 36,658 cases and the most endemic region is the Northeast, with 21,049 (47.14%) of the total number of confirmed cases in Brazil, Figure 1 shows the concentration of confirmed cases in each Federative Unit with a schematization of the climatic map of Brazil from Köppen-Geiger.

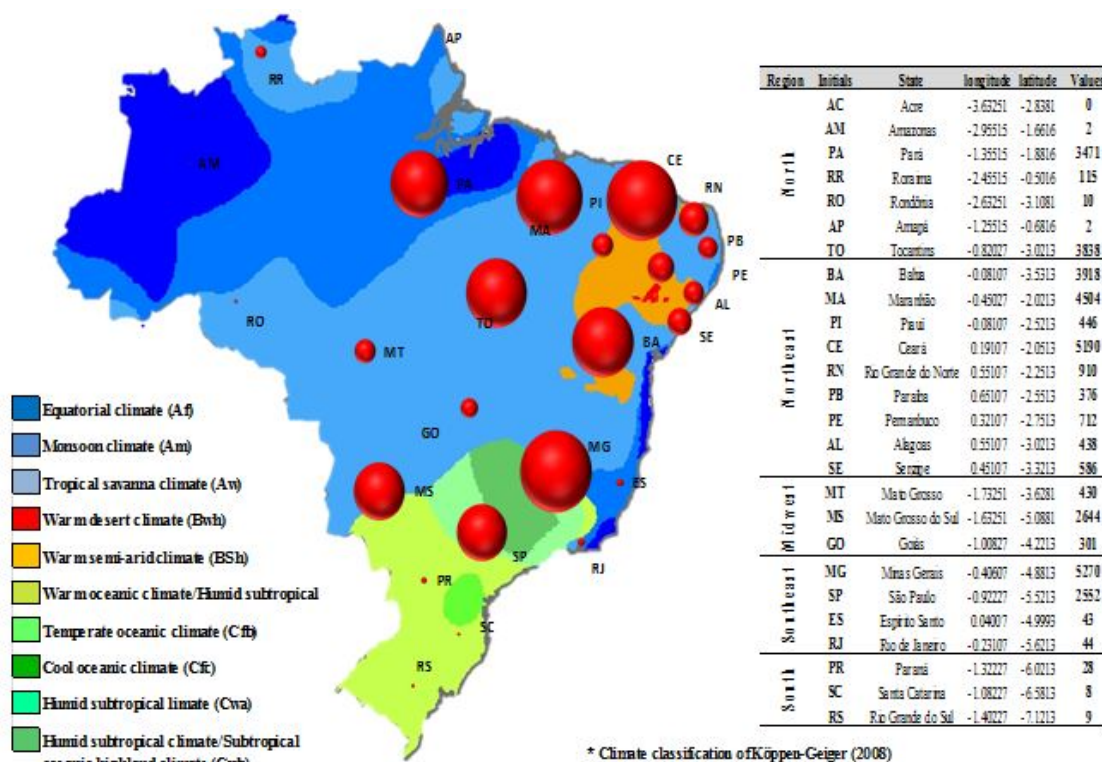


Figure 1. Concentration of cases of LV per federative unit in a climatic map of Brazil (2003-2013).

Discussion

Brazil is among the most endemic countries on the planet in relation to LVH. The fact that this disease is an anthroozoonosis justifies its difficult control since, among the population we have a culture installed for many generations, in which the creation of dogs in the home environment. It is often regarded as an animal guardian of the house or even a family member. The point to think about is the 3 aspects necessary for the installation of LV; Firstly, the presence of man and the dog

is emphasized, but what leads to the occurrence of cases is precisely the presence of the peridomiliary environment.

Some regions of Brazil have shown an increase in the number of LVH cases, which shows an advance of the disease in the country, a clearer way of seeing this is in the tabulation of epidemiological data confirmed in the country, to complement this study and to prove the increase in Disease in the country, a survey carried out by the Ministry of Health 11 found in 19 years of notification (1984-2002) a total of 48,455 cases of LVH confirmed in Brazil.

Conclusion

The epidemiological situation of Brazil in relation to the number of cases analyzed in the period 2003-2013 is superior to the data demonstrated in the epidemiological survey carried out by the Ministry of Health of 1984-2002.

Control and awareness measures are necessary, mainly for the knowledge and combat of the vector, a measure homologated to combat dengue. For the reduction or population control of these vectors provides the reduction of new cases.

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