

# Incidence of American Tegumentary Leishmaniasis in the Municipality of Rondoland - MT in the Period 2010 to 2018

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## To cite this article:

Gleison Faria, Graciely dos Santos da Luz, Thais Antunes Betin. Incidence of American Tegumentary Leishmaniasis in the Municipality of Rondoland - MT in the Period 2010 to 2018. *International Journal of Chinese Medicine*. Vol. 3, No. 3, 2019, pp. 34-40.

doi: 10.11648/j.ijcm.20190303.11

Received: April 21, 2019; Accepted: July 9, 2019; Published: July 23, 2019

**Abstract:** American tegumentary leishmaniasis (ACL) is an infectious, non-contagious disease that causes ulcers on the skin and mucous membranes. The disease is caused by protozoa of the genus *Leishmania*. The objective of the research was to verify the incidence of American cutaneous leishmaniasis in the municipality of Rondolândia - MT from 2010 to 2018. The methodology and of the transversal, documental, descriptive and quantitative type, the information will be obtained from the analysis of epidemiological data provided by health surveillance of the municipality of Rondolândia - MT, who were attended at the Hueverton basic health unit Bruno da Silva Rabelo, who will be separated through a questionnaire carried out by the researchers themselves containing 4 basic questions based on the SINAN compulsory notification form. It was verified that 40 cases of American tegumentary leishmaniasis were reported in the municipality of Rondolândia-MT between 2010 and 2018, 90.0% being male and 10.0% female in the age group with the highest incidence 18 to 59 years of age to 85.0% of the reports and 45.0% of the patients were brown, 95.0% of the patients presented skin lesions and were classified as new cases. The patients' diagnoses were confirmed by 85.0% laboratory, 90.0% of the patients were treated with pentavalent antimonial and 90.0% of the patients were from the rural area of the municipality of Rondolândia-MT. It is concluded that the incidence of cases of American tegumentary Leishmaniasis in the municipality of Rondolândia-MT has been increasing over the years, that is, approximately 1 case per 100 inhabitants, thus, the annual average of these cases corresponding to 5 cases of the annual disease. An urgent action is required by the health surveillance department of the municipality to carry out disease control, since if it continues without prevention in the municipality, this annual index may suffer a great increase over the years.

**Keywords:** Investigation, Epidemiology, Treatment

## 1. Introduction

Infectious disease, however, non-contagious, caused by parasites of the genus *Leishmania*. The parasites live and multiply inside the cells that are part of the individual's defense system, called macrophages. There are two types of leishmaniasis: cutaneous or cutaneous leishmaniasis and visceral leishmaniasis or kalaazar [1].

Cutaneous leishmaniasis is characterized by skin wounds that are most often located in the body's uncovered parts. Suddenly, sores on the mucous membranes of the nose, mouth, and throat may appear. Visceral leishmaniasis is a systemic

disease, therefore, it affects several internal organs, mainly the liver, the spleen and the bone marrow. This type of leishmaniasis affects mainly children up to ten years of age; after this age it becomes less frequent. It is a disease of long evolution, lasting for a few months or even exceeding the period of one year [1].

In the Americas, 11 dermatropic *Leishmania* species that cause human disease and 8 species described only in animals are currently recognized. However, in Brazil, 7 species have already been identified, 6 of the subgenus *Viannia* and 1 of the subgenus *Leishmania* [2].

In Brazil, American tegumentary leishmaniasis, popularly known as "bauri ulcer" or "bruised wound", is transmitted by

the mosquitoes of the genus *Lutzomyia*, known as straw mosquitoes, and the treatment is done under the guidance of the dermatologist. of injectable drugs, known as pentavalent Antimonyals [3].

From 2001 to 2014, a total of 797,849 new cases of cutaneous and mucosal leishmaniasis were reported to PAHO / WHO with an annual average of 56,989 distributed in 17 of the 18 endemic countries of the Americas. A stable regional trend is observed, however, analyzing the periods individually, there is an increase in cases up to 2005. A total of 75% of the detected cases were reported by Brazil (20,418) [4].

Tegumentary leishmaniasis (LT) is therefore justified throughout Brazil, with a record of autochthonous cases in all units of the federation (UF) since 2003, especially in wild and rural areas. It is considered to be a neglected disease because it affects mainly low-income populations [5, 6].

The general objective of the research was to verify the incidence of American cutaneous leishmaniasis in the municipality of Rondolândia-MT from 2010 to 2018.

## 2. Methodology

The present work presented as a retrospective, transverse, descriptive documentary with a quantitative approach [7]. The research was conducted in the municipality of Rondolândia-MT, had as a data collection instrument a semi-structured questionnaire of 04 questions of multiple choices that were extracted from the disease notification form itself, addressing inclusion criteria with the following variables: Identify the profile of the age, sex, color, schooling, area of occurrence and treatment indicated, with the purpose of directing the collection of data, which extracted the secondary information from the database of the information system of notification diseases - SINAN which were provided by the municipal health department of the municipality epidemiology sector by the responsible server, made available to the researchers in the form of spreadsheets in Microsoft Excel® [8].

Evaluated by the ethics and research committee (CEP) of the Faculty of biological sciences of Cacoal-RO (FACIMED) by its approval received the number of the opinion substantiated nº 2.882.724.

The survey began in August and September 2018, and obtained a sample of 40 reports of the disease. There was no exclusion of notification, because before receiving the data, the data needed for the survey were sent via e-mail to the epidemiology department (10 to 14, 18, 21, 33, 39, 40, 42 and 47) of the notification form, thus facilitating the filtering of the SINAN database for the epidemiology officer, who after being made available as requested to the researchers, does not listen to costs or remuneration for the data obtained and no exposure of the integrity of the notified patients, it was not necessary to use the informed consent form - TCLE because the data were secondary and thus requested the exemption of the same to the CEP.

They had as exclusion criterion all the notifications that did

not have necessary information for the study, not belonging to the municipality of Rondolândia-MT or the cases not closed in the period.

## 3. Results

There was a sample of 40 confirmed cases of American cutaneous leishmaniasis in the municipality of Rondolândia-MT, being 100% of the cases belonging to the rural area of the municipality (Table 1). The reported data were collected and tabulated through information provided by the municipal health department of the municipality through the statistical sector that were extracted by the SINAN database [8].

Distribution of cases of American cutaneous leishmaniasis, according to the year, in the municipality of Rondolândia-Mato Grosso State. Brazil, 2010 to 2018.

**Table 1.** Notifications of American tegumentary leishmaniasis by year of occurrence - Rondolândia- MT - 2010 to 2018.

ANO	LOCALIDADE			
	URBAN	%	RURAL	%
2010	-	0	03	7,50
2011	-	0	01	2,50
2012	-	0	03	7,50
2013	-	0	07	17,50
2014	-	0	08	20,00
2015	-	0	01	2,50
2016	-	0	03	7,50
2017	-	0	03	7,50
2018	-	0	10	25,00
TOTAL		0	40	100

Source: SINAN/SEMUSA/MS, 2010-2018, Rondolândia – MT.

As shown in table 1, 2014 had a higher incidence of American tegumentary leishmaniasis with 20.00% (n = 8) and followed the year 2013 with 17.50% (n = 7), 2018 with 25.00% (n = 10) and in the previous years 2010, 2012, 2016 and 2017 with 7.50% (n = 3) and 2011 and 2015 with 2.50% (n = 1).

Table 2 shows the socio-demographic profile of the patients reported with tegumentary leishmaniasis americana in the municipality, with 90.00% (n = 36) being males and 10.00% (n = 4) females. The age groups of the patients correspond to <18 years (under 18 years) with 10.00% (n = 4) and > 18 years <59 years 85.00% (n = 34) and > 60 years 5.00% (n = 2). Regarding the schooling of the reported victims, it describes that 2.50% (n = 1) are illiterate or have a complete 4th grade, 5.00% (n = 6) have incomplete 5th to 6th grade, complete primary education, Incomplete secondary school, 7.50% (n = 3) 1st to 4th grade incomplete and 67.50% (n = 27) of this information was ignored by the notifier. In relation to race / color of the victims 40,00 (n = 16) white, 45,0% (n = 18) brown, 7,50% (n = 3) black, 5,00% 2.50% (n = 1) were ignored.

Characteristics of cases of American cutaneous leishmaniasis in the municipality of Rondolândia, State of Mato Grosso. Brazil, 2010 to 2018.

**Table 2.** Demographic profile of patients diagnosed with American cutaneous leishmaniasis in the municipality of Rondolândia, State of Mato Grosso, Brazil, 2010 to 2018.

CLINICAL DATA		N	%
SEX	Male	36	90,00
	Female	4	10,00
	TOTAL	40	100
Age group (age)	<18	4	10,00
	18-59	34	85,00
	>60	2	5,00
	TOTAL	40	100
	Illiterate	1	2,50
Schooling (years of study completed)	1st to 4th grade incomplete	3	7,50
	4th complete series	1	2,50
	5th to 6th grade incomplete	2	5,00
	Complete primary education	2	5,00
	Complete high school	2	5,00
	Incomplete high school	2	5,00
	Ignored	27	67,50
	TOTAL	40	100
	White	16	40,00
Color	black	3	7,50
	brown	18	45,00
	Indigenous	2	5,00
	Ignored	1	2,50
TOTAL	TOTAL	40	100

Source: SINAN/SEMUSA/MS, 2010-2018 – Rondolândia-MT

Based on the table 3 that corresponds to the clinical data of the patients reported with American tegumentary leishmaniasis, 95.00% (n = 38) patients had a cutaneous lesion and 5.00% non (n = 2) presented lesion cutaneous lesions, but presented mucosal lesion also corresponding to 5.00% (n = 2). 95% (n = 38) of the reports were registered as new cases and 5.00% (n = 2) recurrence, on the criterion of confirmation of symptoms 85.00% (n = (N = 36) were used

for laboratory treatment and 15.00 (n = 6) were clinical / Epidemiological, 90.00% (n = 36) were used antimonial pentavalent and 10.00% (n = 4) which were not reported in the notification form.

Clinical data of patients reported with American cutaneous leishmaniasis in the municipality of Rondolândia-MT between 2010 and 2018.

**Table 3.** Complementary data of cases of American cutaneous leishmaniasis in the municipality of Rondolândia, State of Mato Grosso, Brazil, 2010 to 2018.

CLINICAL DATA		N	%
Skin lesion	Yes	38	95,00
	No	2	5,00
	TOTAL	40	100
Mucosal lesion	Yes	2	5,00
	No	38	95,00
	TOTAL	40	100
	New case	38	95,00
	Recurrence	2	5,00
Case classification	Download	0	0
	Ignored	0	0
	TOTAL	40	100
	Laboratory	34	85,00
confirmation criterion	Clinical / Epidemiological	6	15,00
	TOTAL	40	100
Treatment	Pentavalent Antimony	36	90,00
	Other	4	10,00
	TOTAL	40	100
	Urban	0	0
Place of occurrence	Rural	40	100
	TOTAL	40	100

Source: SINAN/SEMUSA/MS, 2010-2018 – Rondolândia-MT

## 4. Discussion

American cutaneous leishmaniasis (LTA) is an infectious

disease caused by protozoan species of the genera *Leishmania* amazonenses, *Leishmania Viannia braziliensis*, *Leishmania Viannia guyanensis*, *Leishmania Viannia lainsoni*, *Leishmania Viannia naiffi*, *Leishmania Viannia shawi*. The vector is

known as straw mosquito. American tegumentary leishmaniasis is considered a neglected disease, since it affects mainly low-income populations [9].

The research is an epidemiological study with secondary data provided by the statistical sector of the municipality of Rondolândia-MT, thus, more detailed data such as patient charts and laboratory tests identifying the species diagnosed were not informed [8].

According to the Ministry of Health (BR), there are three forms of epidemiological manifestations of tegumentary leishmaniasis, being wild, occupational and leisure, and rural and peri-urban [10].

The municipality of Rondolândia-MT is located in the interior of the state of Mato Grosso located 1,182.0km from the capital Cuiabá, its territorial extension and 12,670,852 km<sup>2</sup> composed of 3,966 inhabitants [2, 5, 10, 11].

The municipality of Rondolândia-MT presented 100% of the cases of American tegumentary leishmaniasis in the rural zone, which can be said that the type of epidemiological manifestations occurred were "wild" and "occupational and leisure", being wild "the transmission occurs in primary vegetation area and is fundamentally a zoonosis of wild animals and the occupational and leisure transmission is associated with the disorderly exploitation of the forest and the clearing of forests for the development of agricultural activities, settlement", extraction which is the main source of income of the municipality [8].

The incidence of American cutaneous leishmaniasis has been increasing in the municipality of Rondolândia-MT, presenting common symptoms such as: skin lesion in the nose, ear, upper limb and lower extremity of the notification were not informed of the locations in the notification form and thus it is not possible to quantify the location that has the most preference for the vector [8].

According to Zóia's research (1993), lesions appeared as single or multiple lesions in various places of the body, usually in more unprotected (naked) areas, such as in the arms, legs, face and neck, in the form of ulcers, very often these lesions do not have a foul odor, they are reddish and shiny [12, 13].

In the year 2014, the municipality of Rondolândia-MT presented 20.00% of cases ( $n = 8$ ), all occurring in males, being ( $n = 7$ ) in the age group of 20 to 39 years.

The incidences of the disease cases in the municipality of Rondolândia-MT were common in males, the total samples corresponded to 90.00% of the cases as observed in (Table 2). In male (men) generally transmission occur due to exposure associated with forest environments, whereas in women and children at home [14] According to Jordano [15], leishmaniasis affects 97% economically active males in the age group 25 to 34 years of age [15] It is believed that man is more susceptible to infection due to occupations / professional activities in the field and fishing [12, 13].

The state of mato grosso presents a total of 21,083 cases of American tegumentary leishmaniasis reported in the period from 2010 to 2018, that is, the samples extracted from the municipality of Rondolândia-MT in relation to the state data correspond to 1.66 / 1000hab / cases [16].

The incidence of the disease in the municipality of Rondolândia-MT in relation to the population of the municipality can be considered high, since it presents 1.00 / 100habitantes / cases.

Regarding the color of the patients reported the Rondolândia-MT survey showed that the highest incidence is related to patients of brown color with 45.71% and followed by white color 40.0%. According to the study by Almeida [13] conducted in the state of Acre, the incidence occurred in 70% of patients of brown color. The Valadão survey [13] carried out in the interior of the state of Rondônia states that the color that had the greatest predominance was also the brown color [13, 17]. In relation to the data obtained by the secretary of health of mato grosso, it is confirmed that the major incidence occurs in patients of brown color corresponding to 47.67% ( $n = 10.052$ ) [18].

Regarding lesions, 95% of the patients who were notified in the municipality of Rondolândia-MT presented a cutaneous lesion "usually manifest initially with an ulcerated skin lesion, which in turn may be unique anywhere in the body [19].

The appearance of ulcerated skin lesions usually occurs in regions such as: forearm, wrist, nape, face, wrist, ear and leg", cutaneous leishmaniasis (LC) is defined by the presence of lesions exclusively on the skin, point of inoculation of the infective promastigotes through the vector bite to any of the Leishmania species that cause the disease [20].

In the municipality of Rondolândia-MT, about 5.0% of the patients had mucosal lesions, and these cases were reported as recurrences. The sites that presented the lesions were not informed in the notification form, but all patients who started treatment within the municipality stated that they had lesions on the mouth, nose, and ear.

Cutaneous lesions are the most common symptoms of American tegumentary leishmaniasis, however, usually presented at the beginning or after one year, may present mucosal lesion. This symptomatology caused by mucosal lesion is usually caused by Leishmania Viannia braziliensis, and its preferential areas are the mouth, lips, pharynx and larynx [21].

According to the author Lessa [21] a study conducted in the city of Três Brazos-BA shows that the disease with mucosal lesions may occur within 264 months after the cutaneous lesion, however, only 7% of the patients developed the involvement of the mucosa after more than 10 years of the appearance of the cutaneous lesion.

According to the data obtained in Rondolândia-MT, 85.0% of the patients had their diagnosis confirmed by the laboratory. There are several methods of laboratory diagnosis of American tegumentary leishmaniasis, one of the most used is the direct search of the parasite, and the intradermalimulation test, if one observes the clinical aspect presented by the disease in the suspected patient [9]. According to Kings [21] the montenegro intradermalimetre test is used to detect Leishmania infection in humans. The technique is based on a delayed hypersensitivity reaction.

With respect to the Rondolândia-Mato Grosso do Sul city survey, 15.0% of the cases had another way of confirming the

patients' diagnosis, being the clinic / epidemiologist, where the professional has to be well aware of the incidence of the disease in the region, for which can not be confused with other diseases. When assessing the patient's skin, the professional should attend to and exclude present skin lesions, stasis, traumatic ulcers, diabetes, tropical diseases, pyoderma, sickle cell anemia, paracoccidioidomycosis, sporotrichosis, cutaneous neoplasias, chromoblastomycosis, syphilis and tuberculosis [22].

According to the Ministry of Health (BR) treatment manual, there are two types of pentavalent antimonials on the international market, being "meglumine antimoniate" and "sodium stibogluconate", the most used being meglumine antimoniate (5ml vial containing 1.5 g = 405 mg of Sb + 5) and sodium stibogluconate is not marketed in Brazil. Administration in adult patients with meglumine antimoniate can be done intravenously (IV / EV) or intramuscular (IM) and the intravenous route is the most used because it does not present pain in the place and can be diluted in 100 ml of 5% glycosated serum slowly infusing in up to 30 minutes, or, can be administered directly undiluted using 25x7 and 25x8 [11] gauge needles.

It is always recommended to monitor the adverse effects presented by patients, and the electrocardiogram (ECG), daily heart auscultation at the time of the administration of meglumine antimoniate is performed weekly to identify possible arrhythmias, if such effects are abusive or frequent, the medication is indicated be suspended and the medical team notified so that a second choice is then prescribed.

The reports in 10.0% of the patients who were diagnosed with American cutaneous leishmaniasis were female, and were not pregnant, therefore, and one of the recommendations of the ministries of health does not administer meglumine antimoniate as it crosses the transplacental barrier. In 5.0% of the diagnosed cases were in the age group of over 60 years of age, the health ministry advises medical professionals that it is not recommended the use of pentavalent antimonials in first choice in patients over 50 years of age who are carriers of heart disease, liver disease, nephropathy, and who are allergic to some component of the medication. Constant monitoring of the cardiac system, blood count, renal system (creatinine and urea), pancreatic system and hepatic system should be performed in all patients [11, 23].

The treatment performed in children should preferably be administered intravenously and slowly for at least five minutes, a maximum of three ampoules per day should be infused, and dilution in 100 ml of 5% glycosated serum should also be indicated to facilitate and avoid possible Adverse reactions. They are the most common "myalgias, arthralgia, headache, anorexia, nausea and fever".

Patients with laboratory tests such as ALT / AST, alkaline phosphatase, amylase, lipase, urea and creatinine, hemoglobin and white blood cell count should be monitored regularly. cardiac arrhythmia, auscultating daily for arrhythmias, disordered P, T, S, T waves or prolongation of the QTc interval which is the most serious and associated adverse effect of death. When any of these effects occur, it should be reported to the healthcare provider and the medication stopped immediately [3, 11, 18].

Calculations for correct dosage of systemic use for patients with confirmed diagnosis of American tegumentary leishmaniasis should be used the example of meglumine antimoniate indicated by the ministry of health (BR), for a patient of 60kg; [11, 23].

$$10\text{mg/kg de Sb} + 5/\text{dia} \times 60\text{kg} = 600\text{mg de Sb} + 5\text{dia} \\ 600\text{ mg} \div 81\text{mg Sb} + 5 = 7,4\text{ml} = 1,5\text{ ampoules / day} \quad (1)$$

$$15\text{ mg/kg de Sb} + 5/\text{dia} \times 60\text{kg} = 900\text{mg de Sb} + 5\text{dia} \\ 900\text{ mg} \div 81\text{mg Sb} + 5 = 11,1\text{ml} = 2\text{ ampoules / day} \quad (2)$$

$$20\text{ mg/kg de Sb} + 5/\text{dia} \times 60\text{kg} = 1.200\text{mg de Sb} + 5\text{dia} \\ 1.200\text{ mg} \div 81\text{mg Sb} + 5 = 14,8\text{ml} = 3\text{ ampoules / day} \quad (3)$$

According to the data obtained, 100% of the cases belonged to the rural area of the municipality of Rondolândia-MT, the municipality and surrounded by a lot of indigenous area with a vast unexplored woodland which is the main source of income of the municipality [8, 11, 23].

All confirmed cases of American tegumentary leishmaniasis detected in the municipality must undergo an epidemiological investigation to identify whether it is an endemic area, or whether it is a new focus arising in the region, whether the case is autochthonous or imported, identify the characteristic of the cases and do of new cases and characterize them in their clinical or laboratory form [24-26].

## 5. Conclusion

It is concluded that the incidence of cases of American tegumentary leishmaniasis in the municipality of Rondolândia-MT has increased over the years, ie, approximately 1 case per 100 inhabitants, with an annual average of 5 cases / year of the disease. An urgent action is required by the health surveillance department of the municipality to carry out disease control, since if it continues without prevention in the municipality, this annual index may suffer a great increase over the years.

The population should follow the guidelines of the Ministry of Health for the prevention of vector-borne disease, such as: using repellents when exposed in vector-friendly environments, avoiding exposure at times of vector activity (evening and in the residences use musketeers, always keep clean around yards and grounds in order to avoid breeding grounds for vector formation, always keep trees and gardens pruned in order to reduce the shading of the ground and do not serve as favorable conditions for the vector, have adequate destination for organic garbage to avoid the approximations of marsupial-type animals and rodents (source of infection for sandflies), keep pets shelters always clean, build homes with a minimum safety distance of 400 to 500 meters of the woods.

It is incumbent upon the health secretariat through guidance in the form of lecture and illustrative pamphlets to guide the population on the incidence of leishmaniasis within the municipality, and try to somehow prevent, so that this incidence will not increase over the years.

## Acknowledgements

We thank the municipal secretary of Rondolândia-MT, especially the person in charge of the epidemiological sector of the municipality, in which we provide the data without measuring any effort.

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