

Original Research Article

Preliminary Study of Cutaneous Leishmaniasis (CL) in Zinder

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Abstract: Introduction: Cutaneous leishmaniasis (CL) is the most common clinical manifestation of leishmaniasis, a neglected tropical disease (NTD). It is caused by *Leishmania* transmitted to humans by the bite of a small infested sandfly: the female sandfly. The objective of our study is to determine the epidemiological, clinical profile and the nature of the parasite responsible for LC in Zinder. **Materials and Method:** This is a cross-sectional descriptive study. Retrospective data was collected from patients registered at the laboratory level of the district hospital and the Kara-kara health center from January 2017 to May 2021. This study helped determine the frequency of CL in the Zinder region as well as the socio-demographic characteristics of the cases. The prospective collection carried out at the HNZ over a period of seven (7) months from June 01, 2021 to December 31, 2021, made it possible to determine the nature of the parasite responsible for CL in Zinder as well as the management practices. **Discussion/Conclusion:** This study is the first to identify in molecular biology the parasite responsible for CL in Niger. The parasitic species identified in circulation in the city of Zinder was *L. major* for all PCR positive cases. Metronidazole was the reference treatment; administered orally. The evolution was favorable with a cure rate of 66% and 44% of sight loss.

Keywords: Cutaneous Leishmaniasis, Epidemiology, *L. major*, Zinder.

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INTRODUCTION

Cutaneous leishmaniasis (CL) is the most common clinical manifestation of leishmaniasis, a neglected tropical disease (NTD) [1]. It is caused by *Leishmania* transmitted to humans by the bite of a small infested sandfly: female sandfly [2]. The clinical presentations of CL are very varied, sometimes including localized skin nodules, diffuse non-ulcerated papules, dry or wet ulcers and mucosal lesions in the form of extensive mucosal destruction in the nose, mouth and throat [3].

The disease is endemic in 87 countries around the world and nearly 350 million people are at risk of infection. Every year, 1.5 to 2 million new cases and 20 to 30 thousand deaths are registered worldwide, especially in tropical and subtropical regions [4].

In sub-Saharan Africa, the frequency of LC is greatly underestimated. However, a recent analysis reveals that nearly 40% of the hyper-endemic countries in the world are located in sub-Saharan Africa [5]. In

addition, in West Africa, for example, there is no organized control effort except during epidemics where chemo-prophylactic treatment is administered to people. The diversity of epidemiological characteristics is unknown, yet the nature of the lesions, their severity and their evolution varied according to the species [6]. Likewise, vector control with insecticides remains largely underused due to the blow and neglect of the disease [7].

Niger is one of the hyper-endemic countries in sub-Saharan Africa [5]. Cutaneous leishmaniasis is frequently seen in consultation especially with ulcerated or ulcerocrustal type of lesions [8]. In 2007, more than 120 cases of CL had been notified in the city of Zinder [9]. However, little data exist on the severity of the lesions, the nature of the parasite involved, as well as the follow-up after treatment of these patients. The disease generally affects vulnerable populations [6]. The difficulty of accessing health facilities capable of recognizing lesions accentuates the under-notification of cases. In this context, the use of self-medication is common and various plants are used in precarious

hygienic conditions as reported in Burkina Faso [7]. It is not uncommon to encounter superinfected lesions exposing patients to sepsis and death. The lack of data on the frequency of the disease, the nature of the parasite as well as the detailed description of the lesions, would limit the possibilities of intervention and deprives the MTN program of access to certain financing. This research aims to study the hospital frequency, the nature of the parasite involved and the clinical characteristics of patients admitted for CL in Zinder.

MATERIALS AND METHOD

This cross-sectional descriptive study was carried out using a retrospective data collection of patients registered at the laboratory level of the district hospital and the Kara-kara health center from January 2017 to May 2021. This study helped determining the frequency of CL in the Zinder region as well as the socio-demographic characteristics of the cases. The prospective collection carried out at the HNZ over a period of seven (7) months from June 01, 2021 to December 31, 2021, made it possible to determine the nature of the parasite responsible for the CL in Zinder. The smears were made and stained at giemsa in the laboratory of the district hospital of Zinder and the swabs were sent at room temperature for PCR / sequencing in Cayenne. This second study also made it possible to confirm the effectiveness of Metronidazole in the management of patients.

The data were entered on an Excel sheet, exported and analyzed using the Epi-info software version7. The significance level of 5% and the confidence interval of 95% were used. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

Retrospective Data

This part extends over a period of 4 years and 5 months from January 1, 2017 to May 31, 2021. The study involved a total of 175 patients.

The most frequent source for cases of leishmaniasis is the Kara-Kara center with more than 36.57% of cases of leishmania research request notified, including 21.71% of negative cases and 14.86% of positive cases. The sex ratio was 1.69 for the search for leishmania, with respectively 37.14% of negative cases

against 25.71% of positive cases for the male gender and 24% of negative cases against 13.15% of positive for the female gender.

The most affected age group was that of patients aged 20 to 30 years in 33.76% (**Table I**). Most of the patients were registered during the cold dry season (49.14%) especially during the months of October and February.

Prospective Data

This part consisted in analyzing the cases of cutaneous leishmaniasis received in consultation between June 1 and December 31, 2021 at the National Hospital of Zinder. Eleven suspected cases were registered with a solid lesion or a chronic wound as the reason for consultation.

Of the cases identified, there was a male predominance with a sex ratio of 2.5. The average age was 20 years with extremes of 6 months and 42 years. The majority of the patients came from the city of Zinder (n=7) with an equiprobability of the neighborhoods. Pupils, students and housewives were the most affected with 18.18% respectively for each group (**Figure**). The average time between the appearance of the lesions and the consultation was 4 months with extremes of 2 to 9 months. The number of lesions varies between 1 to 13. Patients who presented a single lesion were the most frequent with 27.27% (n=3). The clinical aspect of the lesions was very variable. Ulcerative-crusty lesions were the most encountered in 45.45%. Among them, a case of co-infection with HIV had been noted. An association of papular and nodular lesions with 27.27%, one (1) case of ulcerative-crusty tumor mass (9.09%); nodular lesions/ulcerated nodule each make 9.09%. The predictive seat was the uncovered areas of the body: The lower limbs (MID) most concerned (33.33%); followed by the upper limbs (MS) (29.17%). Of the 11 patients, 9 had received a PCR examination. The implicated species found was *Leishmania major* for all PCR-positive cases, of which 5/9 were positive for 3'UTR PCR and 2/9 were positive for HSP70 PCR (**Table II**).

The evaluation of the therapeutic methods used against CL shows that the molecule prescribed for the specific treatment of leishmaniasis was 100% metronidazole, antihistamines and antibiotics were each used at 72,73%; analgesics at 45.45% and antiseptics at 27.27%.

Table I: Distribution of Cutaneous Leishmaniasis by Age Groups

Age range (years)	n	%
≤10	20	12.74
>10 – 20	37	23.57
>20 – 30	53	33.76
>30 – 40	23	14.65
>40 – 50	19	12.10
>50	5	3.18
Total	157	100.00

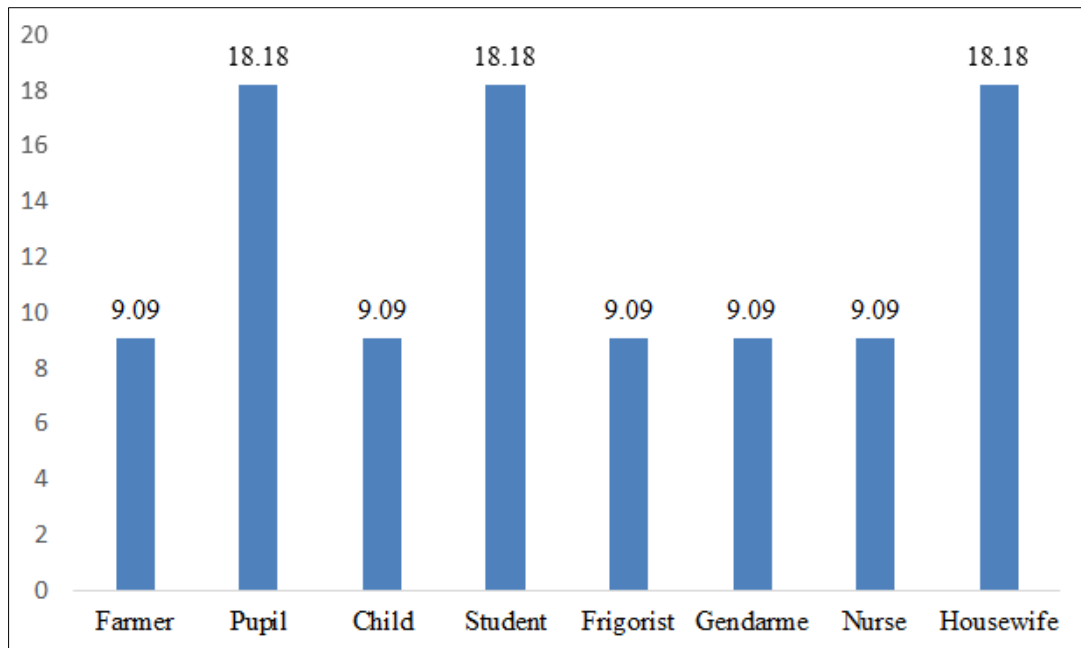


Figure: Distribution of Cutaneous Leishmaniasis by Professional Status

Table II: Identification of the PCR

Frequency	PCR HSP70 Result	3'UTR-HSP70 Result
Positive	2	5
Negative	7	4
Total	9	9

DISCUSSION

We had collected a total of 192 cases over a period of 5 years. The Kara-Kara health center had recorded more cases of LC with 36.57% of Leishmania research request notified. This could be explained by the fact that this second-level center was the first center for the management of skin diseases in the city of Zinder.

In the prospective series, the majority of patients came from the south-east of the city of Zinder ($n=7$) with an equiprobability of the neighborhoods. These localities are overcrowded, characterized by the existence of favorable conditions for the development and multiplication of sandflies, vectors of leishmaniasis. Leishmaniasis is a tropical infection that affects certain disadvantaged and resource-poor areas of the world [9].

The male gender was predominantly represented (62.85%) with a sex ratio of 1.69. The age groups of 10 to 20 years (23.57%) and 20 to 30 years (33.76%) were the most affected. The predominance of young subjects in this series could be linked to the epidemiological context of leishmaniasis. Sandflies have a nocturnal activity that exposes more young subjects and especially of the male sex who regularly attend leisure places such as the "fadas" of young people around tea or walk in the gardens ...). This has been reported by several authors [10].

CL is more frequent during the dry and cold season (49.14%) especially in the months of February and October. The predominance of the infection during this period had previously been described by J.P Dedet *et al.*, El-Mouhdi Karima *et al.*, in Morocco [11,12]. Considering that the majority of patients consulted after two months of evolution of the disease and adding the incubation period of 1 to 4 months, we can conclude that the majority of infesting bites occurred at the beginning of the rainy season, that is to say in the months of June-July. Pupils, students and housewives, who are more exposed to environmental conditions favoring sandfly bites, are the most affected (18.18%).

The majority of patients consulted on average after 3.6 months of the symptomatology. The indolent nature of the lesions, the frequent recourse to self-medication and traditional treatments, the difficult access to care and the lack of knowledge of the disease could be the causes of the delay in diagnosis. Similar results were reported by Er rami *et al.*, (2017) in Morocco (3.8 months) [13]. In Morocco, Baghdad *et al.*, (2020) also reported that patients came for consultation after 2 months of evolution and could exceed 6 months in some cases testifying to the insidious nature of the disease and the multitude of differential diagnoses responsible for a diagnostic error [14].

The functional signs were pruritus and pain. Cutaneous leishmaniasis in its classical form is not accompanied by functional signs. This pain is probably

related to bacterial superinfection or the spread of Leishmanian infection along the lymphatic cords.

The number of lesions was variable. Patients who presented a single lesion were the most frequent in this study and several authors had reported the same observation [15]. Some authors had reported the predominance of multiple and multifocal lesions in their series [13-16]. These numerous lesions would be due either to multiple bites in several places by a single infected sandfly or by the bites of several sandflies.

Five types of lesions were observed, however the most frequent were ulcerative-crusty lesions (45.45%). The long duration of consultation as well as the use of traditional plants would favor the superinfection of the lesions. The predominance of ulcerative-crusty lesions had been described in Morocco in 2013 and in Mauritania in 2019 [13-17]. These two studies have in common that they have *L. major* as the parasite involved.

A case of leishmania / HIV co-infection was in our study with large and deep ulcerative lesions, indeed the co-infection with HIV infection had been reported by several authors and would be the cause of their dissemination regardless of the species [18-20]. The uncovered parts are the most affected, including the lower limbs (MI) at 33.33% followed by the upper limbs (MS) at 29.17%.

Of the 10 patients who benefited from the smear, 54.55% of the slides were negative against 36.36% of positive slides. The results of direct examination revealed the parasite in amastigote form. The negativity of the examination does not eliminate the diagnosis [17]. The high number of negative smears in this series is probably due to the superinfections of the lesions. The majority of the slides were covered with bacteria making the identification of the parasite very difficult.

This study is the first to use molecular biology for the identification of the species of leishmania implicated in the LC in Niger. All positive cases in PCR was *Leishmania major* (*L. major*). Indeed, the parasitic isolations and species identifications carried out make it possible to advance with almost certainty that *L. major* was the largely responsible species (or even exclusive according to the reported data) of CL in West Africa [21].

Metronidazole was the anti-leishmanicide treatment administered to our patients. Only one case of clinical therapeutic failure had been recorded, after two months of follow-up. A change of molecule was carried out after a small surgery. The substitute molecule was Glucantime.

The interest of metronidazole in the treatment of CL is controversial in the literature. Although

metronidazole does not have marketing authorization (MA) as a leishmanicide [22], several authors have mentioned its effectiveness in the treatment of LC [22, 23].

CONCLUSION

It emerges from this study that the rainy season would seem to be the period of infestation. Clinically, the single ulcerative-crusty lesion localized on a discovered part was the most represented and on a paraclinical level *L. major* was the species identified by PCR.

We consider the findings of this study to be preliminary. Thus, they need to be better supported in the future by large comparative and multicenter prospective studies with a more representative sampling, over a longer period.

Conflicts of Interest: none

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