Epidemiological, Clinical and Therapeutic Trends of Leishmaniasis in the Wilaya of Mostaganem, Northwestern Algeria (2019–2025): A Still Active Disease

Évolution épidémioclinique et thérapeutique de la leishmaniose dans la Wilaya de Mostaganem, Algérie: Une pathologie toujours active

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Abstract

Leishmaniasis remains a significant and evolving public health challenge in Algeria, particularly in regions previously considered low-endemic. The Wilaya of Mostaganem, located in the semi-arid northwest of the country, has experienced a notable resurgence of both cutaneous and visceral forms over the past decade. This study describes the epidemiological, clinical, and therapeutic characteristics of leishmaniasis cases recorded at CHU Mostaganem between 2019 and 2025.

We conducted a descriptive retrospective study at the Department of Infectious Diseases, CHU Mostaganem. All patients with confirmed leishmaniasis — defined by parasitological (direct examination, culture) or serological evidence — admitted between January 2019 and June 2025 were included. Cases with incomplete records or lost to follow-up were excluded. Data were collected from medical records and cross-referenced with the Mostaganem Health Directorate (DSP) notifications.

Twenty cases were recorded over the study period, comprising 15 cutaneous (75%) and 5 visceral (25%) forms. A marked increase was observed in 2024 (n=8) and continued into 2025 (n=7 by June). Cases were predominantly male (55%) and affected all age groups, with visceral leishmaniasis disproportionately affecting children under 15 years and adults over 60. Rural communes — particularly Kheïr Eddine, Hassi Mameche and Bouguirat — were most affected. A fatal outcome occurred in a 2-month-old infant with visceral leishmaniasis presenting with pancytopenia and multi-organ involvement. All cases were treated with meglumine antimoniate (Glucantime®), with a global relapse rate of approximately 2%, confined to mucocutaneous forms.

This study documents an ongoing and accelerating resurgence of leishmaniasis in a traditionally low-endemic Algerian wilaya, with the emergence of visceral forms in new geographical foci. These findings underscore the need for reinforced vector surveillance, improved early diagnosis, and coordinated intersectoral response.

Keywords: Leishmaniasis; cutaneous; visceral; Leishmania infantum; meglumine antimoniate; Algeria; epidemiological surveillance; vector control

Résumé :

La leishmaniose représente un problème majeur de santé publique en Algérie, notamment dans la wilaya de Mostaganem, où une recrudescence des cas a été récemment observée. Cette étude vise à analyser les aspects cliniques, épidémiologiques et topographiques des cas de leishmaniose cutanée et viscérale déclarés entre 2022 et 2025. On a mené une Étude rétrospective descriptive basée sur les déclarations de cas à la Direction de la Santé de Mostaganem et ceux hospitalisés au service des maladies infectieuses et en pédiatrie. L'analyse a porté sur la répartition temporelle et spatiale, les formes cliniques, les tranches d'âge, et la répartition par sexe.

Une augmentation du nombre de cas était observée en 2024. La forme cutanée prédomine (près de 90 % des cas), touchant principalement les enfants et les sujets jeunes en zone rurale. La forme viscérale, demeure préoccupante par sa gravité. La majorité des cas sont concentrés dans certaines communes rurales (Kheïr Eddine, Hassi Mameche, Fornaka). La distribution saisonnière montre un pic entre novembre et janvier.

Le renforcement de la surveillance épidémiologique, l'éducation des populations et l'amélioration du diagnostic sont des priorités

Mots clés : Leishmaniose (Cutanée, Viscérale), Glucantime, Diagnostic parasitologique, Surveillance épidémiologique.

I. Background

Leishmaniasis is a vector-borne parasitic disease transmitted through the bite of infected female phlebotomine sandflies of the genus Phlebotomus in the Old World. Caused by protozoa of the genus Leishmania, it manifests across a clinical spectrum ranging from self-healing cutaneous ulcers to potentially fatal visceral disease [1,2]. Globally, the World Health Organization (WHO) estimates nearly one million new cases annually since 2017, with an upward trend linked to climate change, unplanned urbanization, and population displacement [1,3].

In Algeria, leishmaniasis is endemic across several ecological zones (Table 1). Zoonotic cutaneous leishmaniasis (ZCL), caused by Leishmania major transmitted by Phlebotomus papatasi, predominates in arid and semi-arid regions. Visceral leishmaniasis (VL), caused by Leishmania infantum with the dog as principal reservoir, is endemic in humid northern regions but has increasingly been reported in areas previously considered low-risk [3,4]. Over 5,000 cases of cutaneous leishmaniasis are reported annually at the national level, with epidemic peaks in Biskra, Tiaret, and more recently in Mostaganem [2,9].

The Wilaya of Mostaganem, situated in the northwestern coastal region of Algeria, has historically been considered a zone of low leishmaniasis endemicity. However, ecological conditions — including the presence of Phlebotomus papatasi populations, rodent reservoirs, and a semi-arid hinterland — create a permissive environment for transmission. Furthermore, recent climatic shifts are predicted to expand sandfly

distribution northward into Mediterranean North Africa [7]. Against this background, a resurgence of both cutaneous and visceral forms has been observed at CHU Mostaganem since 2022, prompting the present analysis.

The aim of this study is to describe the epidemiological, clinical, and therapeutic characteristics of leishmaniasis cases managed at the Department of Infectious Diseases, CHU Mostaganem, between 2019 and 2025, and to contextualize these findings within regional and international trends.

Table 1. Distribution of Leishmania species by clinical form and geographic zone in Algeria [3]

Visceral (VL)	ZCL (L. major)	NCL (L. infantum)	CCL (L. tropica)
Humid & sub-humid zones Also arid/semi-arid	Arid & semi-arid zones	Humid & sub-humid zones	Ghardaïa
Historic: Tizi Ouzou, Médéa, Constantine Emerging: Tlemcen, Mostaganem, Oran	Biskra ("Bouton d'Orient"), M'Sila, Tiaret, Béchar	Kabylie, North Constantine, Ténès, Algiers, Bouira	Ghardaïa (isolated reports)

ZCL: zoonotic cutaneous leishmaniasis; NCL: north-cutaneous leishmaniasis; CCL: chronic cutaneous leishmaniasis.

II. Methods

1. Study design and setting

This was a descriptive retrospective study conducted at the Department of Infectious Diseases, CHU Mostaganem, Algeria, covering the period from January 2019 to June 2025. The CHU serves as the reference center for infectious diseases in the Wilaya of Mostaganem (population approximately 800,000).

2. Inclusion and exclusion criteria

All patients admitted to the department with a confirmed diagnosis of leishmaniasis were eligible for inclusion. Confirmation required either: (i) direct parasitological evidence (visualization of amastigotes on Giemsa-stained smear from cutaneous lesion scraping or bone marrow aspirate), or (ii) positive serology (ELISA or indirect immunofluorescence antibody test, IFAT) for visceral forms, in a compatible clinical context. Patients with incomplete medical records and those lost to follow-up before treatment completion were excluded.

3. Data collection

Data were extracted from medical records using a standardized collection form and cross-referenced with leishmaniasis notification forms submitted to the Mostaganem Health Directorate (DSP). Variables collected included: demographic characteristics (age, sex, commune of residence), clinical form (cutaneous, mucocutaneous, visceral), diagnostic method, treatment received, clinical outcome, and occurrence of relapse.

4. Statistical analysis

Given the descriptive nature of this study and the limited sample size (n = 20), all analyses are purely descriptive. Frequencies and proportions are reported for

categorical variables; medians and ranges for continuous variables. No inferential statistics were performed. Results should be interpreted as hypothesis-generating observations rather than population-level estimates.

III. Results

1. Temporal distribution

Twenty cases of confirmed leishmaniasis were recorded between 2019 and June 2025 (Table 2). No cases were documented during 2020 and 2021, a period coinciding with the COVID-19 pandemic and likely reflecting both reduced healthcare-seeking behavior and disrupted surveillance. Cases re-emerged in 2022 and increased markedly from 2023 onward, with 2024 recording the highest annual count (n=8). By June 2025, seven additional cases had already been confirmed, suggesting a continued upward trajectory.

Table 2. Annual distribution of leishmaniasis cases by clinical form, CHU Mostaganem, 2019-2025

Year	Total cases	Visceral	Cutaneous
2019	2	1	1
2020	0	0	0
2021	0	0	0
2022	2	1	1
2023	1	0	1
2024	8	3	5
2025 (to June)	7	0	7
Total	20	5	15

2. Demographic characteristics

The sex ratio (M/F) was 1.2:1, with 11 male and 9 female patients. Cases spanned all age groups (Table 3). Visceral leishmaniasis predominantly affected children under 15 years and elderly patients over 60, consistent with the known immunological vulnerability of these groups. Cutaneous forms were more evenly distributed across age groups, with a concentration in the 15–30 year bracket, reflecting greater occupational and recreational exposure in young adults.

Table 3. Distribution of cases by age group and sex, CHU Mostaganem, 2019–2025

Age group	Male	Female
0–15 years	2	0
15–30 years	4	3
30–45 years	2	1
45–60 years	0	4

Age group	Male	Female
≥ 60 years	4	0
Total	12	8

Note: totals reflect updated and reconciled case records (n=20).

3. Geographical distribution

Most cases originated from rural communes of the wilaya. Cutaneous leishmaniasis cases were predominantly reported from Mesra, Sidi Ali, Achaacha, Aïn Tédelès, and Sayada, while visceral leishmaniasis cases were concentrated in Bouguirat and Kheïr Eddine. Notably, six cases of cutaneous leishmaniasis recorded in 2025 originated from the wilaya capital (chef-lieu), representing an apparent extension of transmission toward peri-urban areas.

4. Clinical features

Cutaneous leishmaniasis (n=15) presented as typical ulcerated nodular lesions in the majority of cases. Two patients (13%) presented with periorficial involvement — affecting perioral and periarticular mucosae — requiring hospitalization and systemic parenteral treatment. These atypical forms carry greater morbidity and potential for secondary bacterial infection. Healing time exceeded six months in approximately 30% of cutaneous cases, with a significant impact on patients' quality of life and social integration, particularly in young patients with facial lesions.

Visceral leishmaniasis (n=5) presented with the classic triad of prolonged fever, splenomegaly, and progressive asthenia, associated with pancytopenia on biological assessment. One fatal outcome occurred in a 2-month-old infant who presented with a temperature of 40°C, extreme pallor, refusal to feed, hepatosplenomegaly, pancytopenia, and combined hepatic and renal failure. This case illustrates the life-threatening potential of visceral disease at the extremes of age, and the diagnostic challenge it poses in young infants.

5. Treatment and outcomes

All patients received meglumine antimoniate (Glucantime®) as first-line therapy, consistent with Algerian national guidelines [Table 4 and 5]. Visceral leishmaniasis was treated with intravenous or intramuscular administration at 20 mg/kg/day for 28–30 days. Cutaneous forms received peri-lesional infiltrations (1–5 mL per lesion, 1–2 times per week for 3–6 weeks) or systemic treatment for periorficial and extensive forms. No patient required switch to liposomal amphotericin B, reflecting the currently preserved sensitivity of local strains to antimonials. The overall relapse rate was approximately 2% (1 patient), affecting a mucocutaneous form with more extensive lesions on recurrence.

Table 4. Epidemiological data on leishmaniasis in selected countries (comparative context) [12,17]

Country	Cases	Area	Trend
Tunisia	2,000 ZCL cases/year	Kairouan, Sidi Bouzid	↓ 40% reduction
Morocco	488 cutaneous cases (2006–2014)	Gharb, Ouarzazate	Oscillating; recent ↑ (2016–2022)

Country	Cases	Area	Trend
Sudan	10,000 cutaneous (1986 epidemic)	Khartoum	Epidemic pattern
France	23 VL/year (autochthonous) 517 CL/year (imported)	Metropolitan France	Stable; mainly imported
Spain	Canine seroprevalence: 2–57%	Ourense, Lleida, Girona	Expanding canine reservoir
Brazil	63 VL cases (2018)	Multiple states	↑ 30%; ongoing resistance to antimonials

Table 5. First-line therapeutic strategies by country and clinical form

Country	Predominant form	First-line treatment	Notes
Algeria	CL; some VL	Glucantime® IM/IV	Standard; alternative in PLHIV
Tunisia	Mainly CL	Glucantime® (infiltration)	Standard; alternative in PLHIV
Morocco	CL; occasional VL	Glucantime® IM; Ampho B if available	Subject to drug availability
Sudan	Mainly VL	Liposomal Ampho B; Miltefosine	Documented antimonial resistance
France	VL (imported)	Liposomal Ampho B	Antimonials abandoned
Spain	VL	Liposomal Ampho B; Miltefosine	Antimonials abandoned
Brazil	VL	Glucantime® or Ampho B	Persistent despite resistance

CL: cutaneous leishmaniasis; VL: visceral leishmaniasis; PLHIV: people living with HIV; Ampho B: amphotericin B.



Figure 1 : Real photographs of cases of periorificial cutaneous leishmaniasis

IV. Discussion

This study documents the epidemiological trajectory of leishmaniasis in the Wilaya of Mostaganem over a six-year period, revealing a clear and concerning resurgence — particularly from 2024 onward — in a region historically classified as low-endemic. Although the sample size precludes any statistical inference, the temporal and geographical patterns observed are consistent with regional trends and carry important public health implications.

The apparent absence of cases in 2020–2021 warrants careful interpretation. Rather than reflecting a true interruption in transmission, this gap is more likely attributable to the disruption of health services and surveillance during the COVID-19 pandemic, combined with reduced healthcare-seeking behavior. Similar reporting gaps during this period have been documented across the Maghreb [1,2].

The predominance of cutaneous forms (75%) aligns with the national epidemiological profile, where zoonotic cutaneous leishmaniasis due to Leishmania major accounts for the vast majority of recorded cases [3,9]. However, the emergence of visceral forms caused by Leishmania infantum in Mostaganem is particularly noteworthy. Historically confined to the humid zones of Kabylia and the north Constantine region, visceral leishmaniasis is increasingly being reported in western Algeria, a trend also observed by Aït-Oudhia et al., who documented expanding canine reservoirs in this area [12]. The presence of stray dog populations in peri-urban communes of Mostaganem likely constitutes the principal amplification mechanism.

The geographical extension of cases toward the wilaya capital in 2025, with six cutaneous leishmaniasis cases confirmed in the chef-lieu, may reflect peri-urban expansion of vector habitats secondary to unplanned construction and inadequate waste management. This pattern mirrors observations reported in Morocco, where urbanization has been consistently associated with new leishmaniasis foci [14].

From a therapeutic perspective, meglumine antimoniate remains the standard of care in Algeria, and its efficacy was maintained in our series, with a low relapse rate. This contrasts with the situation in Sudan, France, and Spain, where antimonials have been largely supplanted by liposomal amphotericin B owing to resistance and toxicity concerns [15,16]. Nevertheless, the emergence of antimony-resistant strains in neighboring regions, and the frequent adverse effects of Glucantime® (QT prolongation, hepatotoxicity, cytopenia), justify maintaining vigilance and developing access to second-line therapies in Algeria.

The fatal case of visceral leishmaniasis in a 2-month-old infant is a sobering reminder of the disease's severity at the extremes of age. The unusual age of onset — visceral leishmaniasis is typically described in children over 6 months — raises questions about the timing of exposure and the immaturity of innate immune defenses in the neonatal period. This case alone argues for heightened clinical awareness among pediatricians in northwestern Algeria.

Several limitations of this study must be acknowledged. The retrospective, single-center design and modest sample size (n=20) limit generalizability and preclude robust statistical analysis. Selection bias is inherent, as only hospitalized or referred cases were captured; mild cutaneous cases managed at peripheral health facilities were not systematically included. Additionally, the absence of molecular diagnostic confirmation (PCR) in all cases may have resulted in some species-level misclassification between L. major and L. infantum cutaneous presentations. Finally, the cross-referencing with DSP notification data, while improving data completeness, may introduce heterogeneity in case definitions.

V. Conclusions

Leishmaniasis in the Wilaya of Mostaganem is not a static or disappearing phenomenon — it is active, evolving, and expanding. The resurgence documented here, characterized by increasing case numbers, emergence of visceral forms in a traditionally low-endemic region, and extension toward peri-urban areas, calls for immediate and coordinated public health action.

Priority interventions should include: reinforced entomological and epidemiological surveillance with geographical mapping of active foci; systematic screening and treatment of canine reservoirs; improved accessibility to parasitological diagnosis at primary care level; and sustained health education campaigns targeting rural and peri-urban communities. A multicenter, prospective registry at the regional level would provide the statistical power necessary to characterize risk factors and measure the impact of control interventions.

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