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REVIEW ARTICLE

Cutaneous Leishmaniasis: Clinical Picture, Diagnosis and Differential Diagnosis

[1] Amani Masoud Mohammed Alasswad, [1] AmanyAbdelrahmanNassar, [2] KhameesAlmabrouk Mohammed, [1] Hagar Osama Nofal

[1] Department of Dermatology, Venereology & Andrology, Faculty of Medicine, Zagazig University, Egypt

[2]Department of Dermatology, Medical College, Gharyan University, Gharyan Central Teaching Hospital, Libya

Corresponding author*
Amani Masoud Mohammed Alasswad

Email-
amanialaswad04@gmail.com

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ABSTRACT

Cutaneous leishmaniasis (CL) is caused by female sandflies carrying the protozoan parasite Leishmania, which is a vector-borne disease. There are 12 million cases overall with an annual incidence of 2–2.5 million. CL is classified by the World Health Organization as a category 1 emerging and uncontrolled disease and as a seriously neglected disease. Because of the significant clinical diversity and overlap across the Leishmania species, none of the clinical manifestations are specific to a single species, despite the fact that each may have its own peculiar signs and areas of endemicity. This is due to the fact that factors pertaining to both the host and the Leishmanian species that induce infection affect the clinical picture. These include the parasite's virulence, infectiousness, hematogenous and lymphatic dissemination, immunological response, and host genetic susceptibility. It used to be quite difficult to identify the infecting parasite, but new DNA techniques have made it reasonably easy to identify the Leishmania species, allowing for a more informed choice of therapy. The recent advancements in the diagnosis of cutaneous leishmaniasis (CL), which is brought on by both Old and New World Leishmania species, are the main topic of this review.

Keywords: Cutaneous, leishmaniasis, parasite.

INTRODUCTION

Leishmaniasis is a neglected vector-borne parasitic infection that caused by over 20 species of the genus Leishmania. It can produce a wide range of disorders with erratic symptoms. Numerous risk factors, including poverty, malnutrition, migration, and substandard housing, are associated with it. Its prevalence is increasing in several parts of the world, such as Syria, Turkey, and Jordan, as a result of migration brought on by war and the ensuing refugee crisis. Expanding international travel is another factor contributing to the growing issue of imported leishmaniasis [1, 2].

Cutaneous leishmaniasis (CL) is the most prevalent type of leishmaniasis, affecting between 600,000 and 1 million new cases globally each year. Though not fatal, CL is a condition that needs to be identified and treated since it can result in long-term psychological effects, stigma, diminished quality of life, and permanent scarring [3].

A multimodal strategy is needed for prevention and control, including but not restricted to vector control, illness surveillance, prompt diagnosis, and suitable therapy [4].

Epidemiologic perspective

The World Health Organization listed leishmaniasis as one of the 20 neglected tropical illnesses as of the beginning of 2019. Youngsters are most affected by leishmaniasis. With the exception of Australia and Antarctica, leishmania infections affect people in almost 90 nations worldwide. The parasite is able to adapt to a wide range of environmental settings, including deserts and rain forests. The majority of the tropical and temperate regions that make up the disease's global distribution are found in developing nations. Due to fluctuations over time, it is challenging to pinpoint the precise number of cases; still, the estimated annual incidence of CL ranges from 600,000 to 1 million [4].

Leishmaniasis and its vectors can spread due to human factors and changing environmental conditions, such as migration or travel habits, an increase in immunosuppressed individuals, or reduced use of insecticides. However, in 2015, more than two-thirds of new cases of CL were limited to six countries: Afghanistan, Algeria, Brazil, Colombia, the Syrian Arab Republic, and the Islamic Republic of Iran [4].

Similar to the earlier outbreaks in Iran, Iraq, and Colombia, the current CL epidemic in the Syrian Arab Republic has resulted in outbreaks in Lebanon, Jordan, and Turkey [5]. This further demonstrates the link between leishmaniasis and conflict .

Additionally, human invasions of sandfly-inhabited forest areas or the exposing of vulnerable hosts in endemic areas might result in outbreaks. One place in the United States where CL is endemic is south central Texas. A more recent study found that endemic human leishmaniasis is diagnosed more commonly in Texas than travel-acquired diseases, and that leishmaniasis may not be properly reported [6].

Clinical perspective

There are now three recognized clinical types of leishmaniasis. The interaction of parasite characteristics (such as species, virulence, and tropism) and the host immune response determines the clinical presentation [3].

Cutaneous leishmaniasis

Geographically speaking, CL is commonly classified into two groups: Old World and New World. Both groups usually start off as tiny papules at the site of inoculation, which is frequently an exposed body part like the head or extremities. This papule gradually grows into a nodule that eventually ulcerates. The last ulcer, which is typical of CL, heals on its own in three to eighteen months, depending on the species. It is predicted that up to 10% of CL cases will develop, turn chronic, and display more severe clinical characteristics [3].

Old World CL comes in two main forms: zoonotic (also called early ulcerative and typically caused by L. major) and

anthroponotic (sometimes called late ulcerative and mainly caused by L. tropica) [7].

Anthroponotic CL has a longer course, is primarily encountered in metropolitan settings, and is spread from person to person by a vector. The two uncommon but significant presentations of Old World CL are chronic lupoidleishmaniasis and leishmaniasisrecidivans (LR). The term "LR" describes the emergence of fresh papular lesions either during or following the acute lesion's recovery. In clinical settings, it typically manifests as tiny, scaly, erythematous papules around the edges of CL lesions that have healed. The peripheral papules are not harmful, but they may seem on diascopy to be apple-jelly colored—the same color as lupus vulgaris (Figure 1). LR lesions can grow slowly over several years, either separately or simultaneously [8].A small percentage of CL patients experience persistent early lesions that do not improve within the anticipated time frame. An infection is classified as F2 chronic CL if it persists for more than two years (Figure 2). Chronic CL lesions have a low parasite burden and can last for several years. They typically don't ulcerate and are therapy-resistant [9].

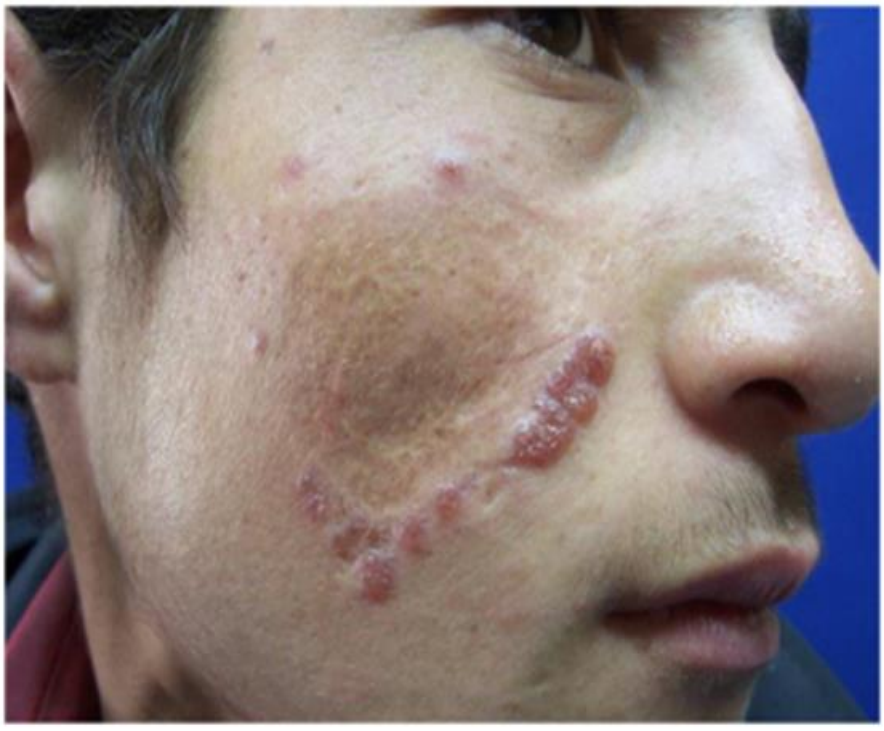

Figure (1): Leishmaniasisrecidivans; atrophic healed center and newonset papules in the periphery **[8].**

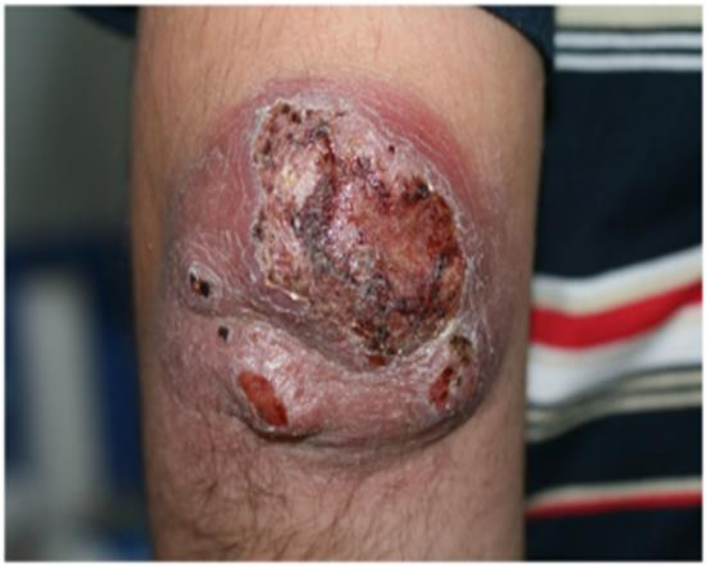

Figure (2): Chronic cutaneous leishmaniasis; tumoral lesion on the right elbow for 4 years. Histopathologically, it had been diagnosed as lupus vulgaris and was unresponsive to antituberculous drugs for 9 months **[9].**

A diagnostic problem arises from the clinical and histopathologic similarity between chronic lupoidleishmaniasis and the lupus vulgaris variant of cutaneous tuberculosis. It's possible that clinical observations alone won't be enough to differentiate between these two illnesses. When a clinical diagnosis of CL is made, the diagnosis should be verified by at least one laboratory technique due to the wide range of disorders that make up the differential diagnosis spectrum. It is important to note that diffuse and disseminated CL are frequently associated with immunosuppression. Clinically, diffuse CL presents as many non-ulcerating papules and papulonodules on the face and limbs, similar to lepromatous leprosy. Typically, it is linked to a weakened cellular immunological response [3].

Many lesions resembling those of classic CL, typically with ulceration or mucosal involvement, are the hallmark of disseminated CL. This type is found in Latin America and is linked to decreased production of tumor necrosis factor-alfa and interferon-gamma as well as the presence of anti-Leishmania antibodies. Disseminated and diffuse CL serve as examples of how various cellular immune responses translate into various clinical presentations [3].

Diagnosis

Clinical, parasitologic, or immunologic methods can be used to diagnose CL. To evaluate CL clinically, a high index of suspicion is necessary, particularly in non-endemic or recently affected locations [8].

Anamnesis is not as reliable for clinical diagnosis of sandfly bites because the bites may be painless and the patient may not detect them. A definitive parasitologic diagnosis is preferred for precise diagnosis, suitable medication selection, and prognostic prediction, even though in some circumstances a clinical diagnosis based on typical lesion morphology in a patient with relevant history has a significant pretest predictive probability [10].

It is advised to combine histology, culture, and DNA amplification techniques to maximize sensitivity and enable species-specific identification as there is currently no gold-standard parasitologic diagnostic test. It's

advised to get in touch with a reference laboratory ahead of time in order to get specimens because nearly all specimen collecting methods and laboratory diagnostic processes related to Leishmania require extremely precise knowledge. Furthermore, it is advisable to take into account a simultaneous diagnostic approach for other potential etiologies, such as syphilis, blastomycosis, sporotrichosis, and mycobacterial diseases [11].

Dermatoscopy

Numerous dermatoscopic characteristics have been reported, including salmon-colored ovoid structures, teardrop-like structures, white starburst-like patterns, and yellow tears. However, more research may be necessary to determine the specificity of these results [12].

Leishmania smear

It is advised to take a smear sample for the initial assessment, which will be directly examined using Giemsa stain. Smears are thought to be an affordable, straightforward, and quick method for diagnosing CL. Samples can be obtained via slit-skin, scraping, touch (imprint) smear, and fine-needle aspiration, among other techniques [8]. While the identification of Leishmania amastigotes through microscopic examination suffices for diagnosis, it necessitates a high level of competence. A more current diagnostic algorithm suggests that anti-Leishmania treatment should be used after a positive direct microscopic examination using smear, while a negative initial examination should be subsequently investigated using a skin biopsy [8].

Culture

It is advisable to try to culture the parasite because isolation of the parasite in culture media allows for diagnosis confirmation and the isolates can be used for additional tests. It is feasible to check for other potential agents on the samples that were acquired for culture. In order to prevent residual iodine and alcohol from affecting the growth of parasites on culture media, sterile sampling methods are necessary for parasitologic culture [11].

One of the most important aspects in culturing Leishmania is transport in a suitable medium, as it is an extremely picky microbe. Prior to sample collection; get in touch with the reference laboratory to arrange for transport and culture media. The Centers for Disease Control and Prevention's particular recommendations may be used if this is not practical [13].

Leishmania germs are grown on a unique culture medium called NovyMacNeal-Nicolle (NNN). Depending on the lesion and parasite characteristics, the sensitivity of the combination of direct parasitic evaluation and the culture methods ranges from 50% to 90% [10].

Promastigotes grow during the course of two days to two weeks on culture media. For a quick diagnosis of CL, a sensitive microcapillary culture technique has been devised. The microcapillary culture method was claimed to have a reduced inoculum size of parasites and to have a higher sensitivity and faster detection time when compared to the classic culture approach. Once the species has been isolated in the culture, reference laboratories identify it using isoenzyme analysis or DNA-based analysis. There is some indication that, especially in New World CL, identifying the precise species may help with therapeutic decision-making [8].

Polymerase chain reaction

Currently, the most sensitive technique for detecting Leishmania is PCR analysis. PCR

can be performed on almost any tissue material as long as it is treated carefully after collection. The technique also makes it possible to identify the parasite depending on species. As lesions become older and the number of parasites diminishes, diagnostic tools' sensitivity usually declines as well. Nonetheless, PCR exhibits a high sensitivity (97% to 100%) irrespective of the lesion's age [14].

Histopathology

Histopathologic analysis is a crucial diagnostic technique that can assist in distinguishing between illnesses that resemble CL. Ideally; both the afflicted and unaffected tissue around the edge of an ulcer or nodule should be biopsied. The age of the lesion and host-parasite interaction determine the histopathologic features of all leishmaniasis types. Acute lesions from both New World and Old World CL exhibit similar histopathology. A dense and diffuse dermal infiltrate of parasitized histiocytes, lymphocytes, plasma cells, and varying numbers of neutrophils is indicative of the early stages of CL. In 50% to 70% of Old World CL skin biopsies with early lesions, amastigotes can be seen [15].

Ulcers have less amastigotes as they are more chronic. An uninvolved papillary dermis (Grenz zone) might exist. As the lesions proceed, huge cell epithelioid cell granulomas form in the upper dermis; as the lesions become chronic, little tuberculoid granulomas start to replace the parasitized histiocytes that are becoming fewer in number [16].

A significant number of plasma cells may be present during the later stages of CL. There may be epidermal changes including ulceration, acanthosis, atrophy, or pseudoepitheliomatous hyperplasia [15].

Dermal fibrosis and flattened, hyperpigmented epidermis are characteristics of the cicatricial stage. Amastigotes are rare in LR lesions, but a diffuse infiltrate of macrophages carrying amastigotes in the dermis is indicative of diffuse CL. Macrophages' cytoplasm contains clusters of Leishmania amastigotes, sometimes referred to as Leishman-Donovan bodies, particularly in the papillary dermis [16].

Rarely extracellular amastigotes are observed. Every amastigote has an oval or spherical body with a diameter of 2 to 4 μm. Giemsa, Wright, or Feulgen stains can be employed in addition to standard hematoxylin and eosin staining to identify the microorganisms [16].

Other diagnostic techniques

Visceral leishmaniasis can be diagnosed using serologic testing; however, the current serologic tests are not sensitive or specific enough to be used for CL. Up to 90% of individuals with CL or mucocutaneousleishmaniasis lasting longer than three months will test positive for the Leishmanin skin test, also known as the Montenegro skin test or Leishman response. Although a positive result suggests interaction with Leishmania, it cannot be utilized as a diagnostic tool alone. The Leishmanin skin test's diagnostic usefulness is diminished due to its lack of global availability, standardization, or oversight [11].

Although an assay test for interferon-gamma release has been developed for epidemiologic reasons, it is not yet available for purchase [17].

Table (1): Differential diagnosis of cutaneous leishmaniasis**[15].**

Infectious
• Ecthyma
• Furuncle
• Carbuncle
• Sporotrichosis
• North American blastomycosis
• Paracocciomycosis
• Tuberculosis cutis
• Syphilitic gumma
• Yaws
• Prototheca infection
• Condylomaacuminata
• Lupus vulgaris (similar to leishmaniarecidivans)
• Tuberculoid leprosy
• Cutaneous furuncularmyiasis
• Tungiasis
Neoplastic
• Basal cell carcinoma
• Squamous cell carcinoma
• Lymphoma
Other
• Insect bite
• Xanthoma tuberosum
• Sarcoidosis
• Pyoderma gangrenosum

DISCUSSION

Because of its varied symptoms, cutaneous leishmaniasis has been dubbed as one of the "great imitators" in dermatology. While the majority of CL lesions are common and easy to detect, unique clinical presentations can be difficult and take longer to diagnose, particularly in areas where leishmaniasis is not endemic. In certain situations, parasitologic or histopathological techniques can verify the diagnosis. Atypical and odd morphologies may arise in clinical symptoms, or lesions may show unexpected numbers and unique placement. Atypical lesions can present with a variety of clinical presentations, including lupoid, erysipeloid, chancriform, acneiform, annular, palmoplantar, psoriasiform, and panniculitic forms; these are only a few examples of the varied clinical manifestations that can occur with atypical lesions [18].

Because nodular or nodulo-ulcerative lesions are often localized on the face and are chronic in nature, they might be mistaken for cancers such as keratoacanthoma, basal cell carcinoma, or squamous cell carcinoma [8].

Sarcoidosis, lupus vulgaris, lupus erythematosus, pyoderma gangrenosum, and granuloma annulare are just a few of the illnesses that CL can mimic. It can be

challenging to distinguish between lupus vulgaris and chronic lupoidleishmaniasis. Furthermore, it may be necessary to take into account the entire spectrum of infectious cutaneous illnesses when making a differential diagnosis for CL. This may need a thorough microbiologic, histopathologic, or systemic workup. The parasite strain, pathogenicity, virulence, host immunity, and regional considerations are just a few of the variables that can be linked to the morphologically diverse images of CL [19].

• Tumor or squamous cell carcinoma-like

The CL lesions present as tumors or squamous cell carcinoma-like lesions on the face, primarily affecting the nose and extremities. They should be distinguished from eccrine poroma, panniculitis, lymphoma, actinomycosis or mycetoma of the foot, and amelanotic melanoma when they appear on the extremities. Pregnant ladies and the elderly are frequently found to have these lesions. When making a diagnosis of CL, it is important to take into account the lesions' distinctive growth, chronicity, and lack of discomfort. The ulcerative type of chronic CL mostly resembles chronic venous ulcers and typically affects the lower limbs [20].

• Erysipeloidleishmaniasis

The diffusely erythematous, infiltrated plaques over the cheeks and nose are characteristic of the erysipeloid form of CL, which can be mistaken for a bacterial infection. These lesions, which mimic erysipelas and cover the middle of the face in varied degrees of scaling, are typically not ulcerated. The initial plaque area is more raised or indurated, and the lesions are not evenly flat. There is no involvement of mucosal membranes or lymphadenopathy. Certain clinical characteristics, such as chronicity, lack of pain, and being colder to the touch than one would anticipate for erysipelas, may set erysipeloid CL apart from erysipelas [21].

Females in their middle or advanced years are primarily affected by erysipeloid-type CL. In the event of erysipeloid CL, the aging and fragility of the skin in older people may aid in the parasites' dissemination. Prolonged sun exposure or posttraumatic cutaneous lesions may be factors in the development of this kind of illness. In a similar vein, CL can mimic a furuncle, a carbuncle, or eczema [9].

Acute CL lesions might occasionally resemble impetigo due to secondary infection. An infected lesion is painful, crusty, erythematous, swollen, and warm to the touch. Ulcerative lesions may develop from such lesions. In the same F5 region, impetigo contagiosa may also develop concurrently [22].

• Eczematous or psoriasiformleishmaniasis

There have been reports of psoriasiform, eczema-like clinical variations of CL, which make a high index of suspicion necessary for diagnosis. Similar to psoriasis, CL can manifest as hyperkeratotic plaques or erythematous, scaly lesions. More psoriasiform CL lesions typically occur in HIV-positive patients. Typically, an erythematous infiltrated lesion with crust and scaling occurs at a single focus and extends outward [20].

Clinically, CL might present as vesicular lesions, oozing, crust development, or, less frequentlychronic eczematous lesions in acute dermatitis. It is common for patients with eczematoid CL lesions to have itching. Eczematous CL lesions are found on the dorsum of the hands and feet as hand eczema like lesions, or on the extremities as

nummular eczema-like lesions. This unusual clinical appearance, which is prevalent in HIV patients, is primarily believed to be brought on by a serious dysregulation of cell-mediated immunity. Acanthosis and spongiosis are demonstrated by histopathology, which correlates with the cutaneous features [23].

- Discoid lupus erythematosus like CL

Rarely, CL mimics the butterfly distribution on the face and mimics discoid lupus erythematosus lesions. Misdiagnosis as discoid lupus erythematosus may occur. The appearance of atrophic plaques, central scale, and peripheral papules in LR can be deceiving. Rather than interface dermatitis, leishmanial granulomatous dermatitis is seen in the biopsy material. [21].

- Acneiform CL

Seldom are acne-like lesions seen in CL patients. On the face, they manifest as a number of symmetric, reddish-brown, monomorphic acneiform papules and nodules. It is possible to misdiagnose the disseminated type of CL as an acneiform eruption. It's possible to misdiagnose this clinical disease as granulomatous dermatitis or granulomatous rosacea. [24].

- Sporotrichoid CL

It is crucial to distinguish the sporotrichoid type of CL from other cutaneous infections that also exhibit a sporotrichoid pattern, such as cat scratch disease, sporotrichosis, atypical mycobacterial infections, and nocardiosis. The spread of amastigotes to the subcutaneous tissues through the lymphatic system is the cause of sporotrichomid CL [25].

Lesions on the upper limbs are the predominant symptom of sporotrichid patterns of New World CL from Brazil, which are mostly caused by Leishmaniabraziliensis and primarily affect older women. Due to Leishmania major, sporotrichomid CL is also much more frequent in Sudan and Tunisia [25].

Multiple nodular lesions spread linearly from the main lesion over the limbs via lymphatic channels in sporotrichoid CL. The nodules have a diameter of 5 to 15 mm and are not tender, flexible, and soft. They rarely get ulcerated, and those that do usually do so later in life. In the original lesions, the amastigotes are visible, but not in the secondary lesions. The lymphatic expansion of Leishmania antigens may trigger host immunological responses, as seen by nodules [25].

Typically, regional lymphadenopathy is not observed. A sporotrichochioid CL has a good prognosis. Topical corticosteroids and immunosuppressive medications cause the lesions to flatten and gradually lose their nodularity. A non-healing unusual clinical appearance of the lesion indicates persistent CL. Granulomatous inflammation in the dermis will be seen during histopathologic investigation [24].

The clinical spectrum has been further expanded by anecdotal accounts of CL mimicking pyogenic granuloma, otitis externa, granulomatous cheilitis, leonine facies, and dermatomyositis. Owing to its very polymorphous nature, Poste kala-azar dermal leishmaniasi (PDKL) can mimic a wide range of other cutaneous conditions, including vitiligo, leprosy, scabies, miliariarubra, pityriasisversicolor, and discoid lupus erythematosus [3].

Other granulomatous dermatoses including leprosy, sarcoidosis, lupus vulgaris, and granulomatous rosacea are included in the histologic differential diagnosis of CL. It can be nearly impossible to clinically distinguish leprosy from lupus vulgaris and tuberculoid leprosy. Furthermore, when making a

differential diagnosis for CL, additional infectious diseases such histoplasmosis, granuloma inguinale, and rhinoscleroma that are characterized by parasitized macrophages should be taken into account [26].

A high concentration of perivascular plasma cells, similar to secondary or tertiary syphilis, may be seen in long-standing CL lesions. When diagnosing difficult cases, paraffin-embedded tissue PCR for Leishmania-specific DNA has shown to be a dependable method with excellent specificity [8].

CONCLUSION

Even in non-endemic countries, leishmaniasis should be considered in the differential diagnosis of lesions with a suspected infectious cause. It will be crucial to diagnose these cutaneous leishmaniasis lesions as soon as possible using biopsy and other diagnostic methods in order to lower morbidity and avoid needless treatments.

Declaration of interest

The authors report no conflicts of interest. The authors along are responsible for the content and writing of the paper.

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REFERENCES

1. **Showler AJ, Boggild AK.** Cutaneous leishmaniasis in travellers: a focus on epidemiology and treatment in. Curr Infect Dis Rep, 2015;17:489.
2. **Isenring E, Fehr J, Gültekin N, Schlagenhauf P.** Infectious disease profiles of Syrian and Eritrean migrants presenting in Europe: a systematic review. Travel Med Infect Dis, 2018;25:65-76.
3. **Burza S, Croft SL, Boelaert M.** Leishmaniasis. Lancet, 2018;392:951-970.
4. **World Health Organization.** Leishmaniasis - key facts. Available at: https://www.who.int/news-room/fact-sheets/detail/leishmaniasis Accessed January 2, 2018.
5. **Du R, Hotez PJ, Al-Salem WS, Acosta-Serrano A.** Old World cutaneous leishmaniasis and refugee crises in the Middle East and North Africa. PLoSNegl Trop Dis, 2016;10, e0004545.
6. **Kipp EJ, Hergert M.** Endemic human cutaneous leishmaniasis incidence in the United States. JAMA Dermatol, 2019;155:259-260.
7. **vanGriensven J, Carrillo E, López-Vélez R, Lynen L, Moreno J.**Leishmaniasis in immunosuppressed individuals. ClinMicrobiol Infect, 2014;20:286- 299.
8. **Uzun S, Gürel MS, Durdu M, Akyol M, FettahlıoğluKaraman B, Aksoy M, et al.** Clinical practice guidelines for the diagnosis and treatment of cutaneous leishmaniasis in Turkey. Int J Dermatol, 2018;57:973-982.
9. **Akilov OE, Khachemoune A, Hasan T.** Clinical manifestations and classification of old world cutaneous leishmaniasis. Int J Dermatol, 2007; 46:132-142.
10. **Magill AJ.**Leishmania species: visceral (kala-azar), cutaneous, and mucosal Leishmaniasis. In: Bennett JE, Dolin R, Blaser MJ, eds. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 8th ed. Philadelphia, PA: Elsevier, 2015; p. 3091-3107.
11. **Aronson, N., Herwaldt, B. L., Libman, M., Pearson, R., Lopez-Velez, R., et al.** Diagnosis and treatment of leishmaniasis: clinical practice guidelines by the Infectious Diseases Society of America (IDSA) and the American Society of Tropical Medicine and Hygiene (ASTMH). Am J Trop Med Hyg, 2017;96: 24-45.
12. **Bustamante MLP, López JS, Campos CD, Sintes RN, Pugnaire AF.**Dermatoscopic signs in cutaneous leishmaniasis. An Bras Dermatol,

2017;92:844-846.

13. **Centers for Disease Control and Prevention.** Parasites - leishmaniasis. Available :https://www.cdc.gov/parasites/leishmaniasis/. Accessed January 4, 2018.
14. **Kevric I, Cappel MA, Keeling JH.** New world and old world Leishmania infections: a practical review. DermatolClin, 2015;33:579-593.
15. **Handler MZ, Patel PA, Kapila R, Al-Qubati Y, Schwartz RA.** Cutaneous and mucocutaneousleishmaniasis: differential diagnosis, diagnosis, histopathology, and management. J Am AcadDermatol, 2015;73:911-926 927-928.
16. **Bravo FG. Protozoa and worms**. In: Bolognia JL, Schaffer JV, Cerroni L, eds. Dermatology. 4th ed. China: Elsevier, 2018; p. 1470-1502.
17. **Turgay N, Balcioglu IC, Toz SO, Ozbel Y, Jones SL.**Quantiferon-Leishmania as an epidemiological tool for evaluating the exposure to Leishmania infection. Am J Trop Med Hyg, 2010; (4):822-824.
18. **Bari AU.** Clinical spectrum of cutaneous leishmaniasis: an overview from Pakistan. Dermatol Online J, 2012;18:4.
19. **Meireles CB, Maia LC, Soares GC, Teodoro PP, Gadelha SV, da Silva L, et al.** Atypical presentations of cutaneous leishmaniasis: a systematic review. Acta Trop, 2017;172:240-254.
20. **Solomon M, Greenberger S, Baum S.** Unusual forms of cutaneous leishmaniasis due to Leishmania major. J Eur Acad Dermatol Venereol, 2016;30:1171-1175.
21. **Douba MD, Abbas O, Wali A, Nassany J, Aouf A, Tibbi MS, et al.** Chronic cutaneous leishmaniasis, a great mimicker with various clinical presentations: 12 years experience from Aleppo. J EurAcadDermatolVenereol, 2012;26:1224- 1229.
22. **Momeni AZ, Aminjavaheri M.** Clinical picture of cutaneous leishmaniasis in Isfahan, Iran. Int J Dermatol, 1994;33:260-265.
23. **Ayatollahi J, FattahiBafghi A, Shahcheraghi SH.** Rare variants of cutaneous leishmaniasis presenting as eczematous lesions. Med J Islam Repub Iran, 2014;28:71.
24. **Moravvej H, Barzegar M, Nasiri S, Abolhasani E, Mohebali M.** Cutaneous leishmaniasis with unusual clinical and histological presentation: report of four cases. Acta Med Iran, 2013;51:274-278.
25. **Carvalho LMV, Pimentel MIF, Conceição-Silva F, Vasconcellos CF, Valete-Rosalino CM, Lyra MR, et al.** Sporotrichoidle ishmaniasis: a cross-sectional clinical, epidemiological and laboratory study in Rio de Janeiro State, Brazil. Rev Inst Med Trop Sao Paulo, 2017; 59: e33.
26. **Elewski BE, Hughey LC, Marchiony Hunt K.** Fungal diseases. In: Bolognia JL, Schaffer JV, Cerroni L, eds. Dermatology. 4th ed. China: Elsevier, 2018; 1329-1362.

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