

Non-Invasive Imaging Techniques (Dermoscopy, Reflectance Confocal Microscopy, and Line-Field Confocal Optical Coherence Tomography) for the Diagnosis of Cutaneous Leishmaniasis

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Introduction

Cutaneous leishmaniasis (CL) is an infectious disease caused by the *Leishmania* genus of flagellate protozoan. The disease is widespread in most countries in the Mediterranean basin, including Italy. Dermoscopy is a noninvasive diagnostic tool that has been used to describe different skin lesions: neoplastic, inflammatory, infectious, hair disorders [1,2]. Other non-invasive diagnostic technique, such as reflectance confocal microscopy (RCM) and line-field confocal optical coherence tomography (LC-OCT), are nowadays used to help the clinician to make the correct diagnosis.

Case Presentations

We describe a series of two patients with CL studied with dermoscopy, RCM, and LC-OCT in the Dermatology Section of University of Siena, Italy. The clinical presentation was similar: a single well-circumscribed nodular lesion on head and neck, with an orangish erythematous color with a tendency to enlarge (Figure 1A and B). The only relevant anamnestic datapoint was that both patients used to spend time in the countryside.

Dermoscopy showed generalized erythema, with streaks and enlarged vascular polymorphous structures were present

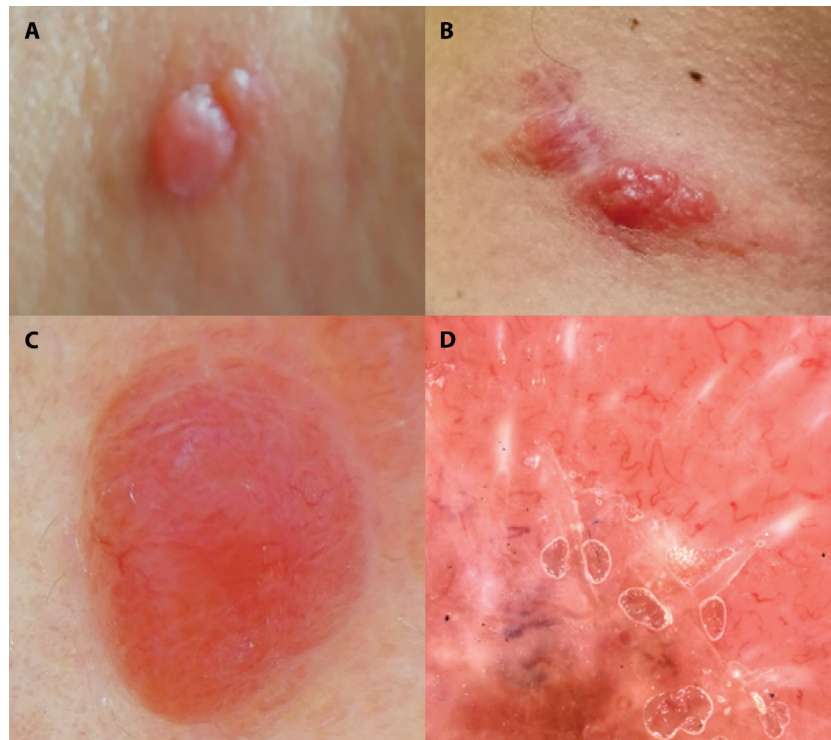


Figure 1. (A, B) Clinical images of cutaneous leishmaniasis. (C) Dermoscopy, $\times 10$ magnification and (D) $\times 40$.

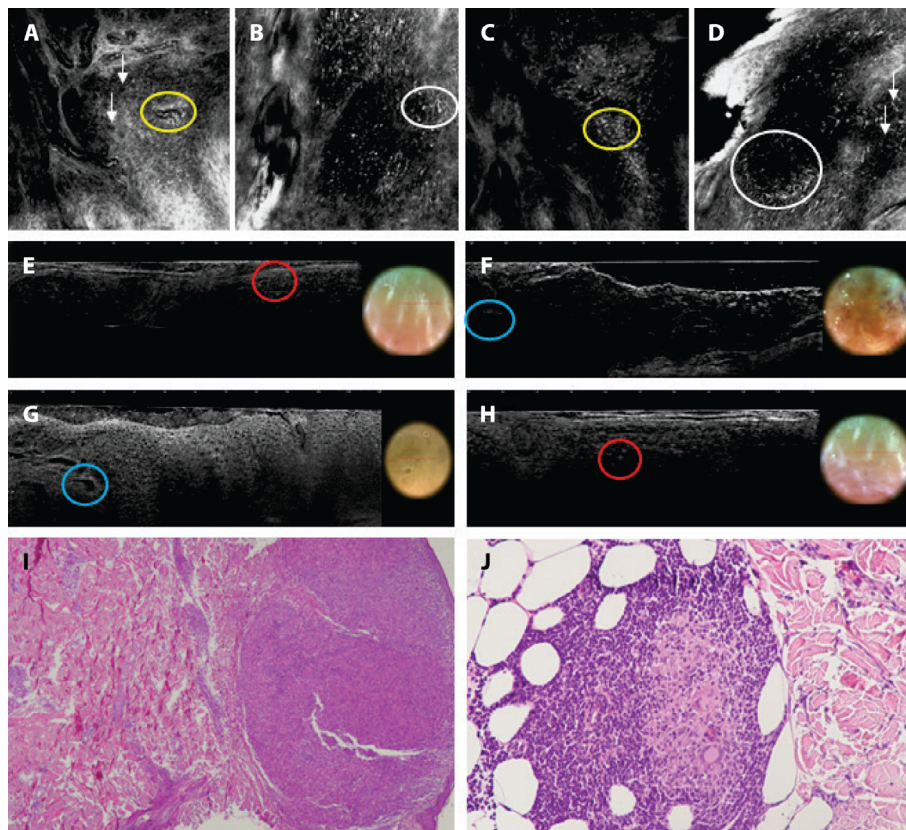


Figure 2. (A-D) Reflectance confocal microscopy of inflammatory cells (yellow circles [A, C]), dendritic cells (white circles [B, D]), and giant cells (white arrows [A, D]). (E-H) Line-field confocal optical coherence tomography of vacuolized areas in the epidermis and upper dermis (blue circles, [F, G]) and polymorphous infiltrate in shape and size (red circles [E, H]). (I, J) Histological examination of cutaneous leishmaniasis.

in all CL lesions (Figure 1C and D). RCM (Vivascope 1500, Mavig) revealed a typical honeycomb epidermal pattern, small bright cells, a dense infiltrate of dendritic cells within the basal layer, and a well-represented inflammatory infiltrate in the upper dermis (Figure 2A-D). In the dermis there were hyper-reflecting interwoven fibers forming roundish structures. Multinucleated giant cells were also observed in the upper dermis. LC-OCT (DeepLive®, DAMAE Médical) showed mild hyperkeratosis, a dense inflammatory infiltrate with some vacuolized areas in the epidermis and upper dermis. The inflammatory infiltrate was extremely polymorphous in shape and size, and it can be well correlated with the classical inflammatory infiltrate present in CL (Figure 2E-H). Histopathology exams (Figure 2, I and J) in a skin sample obtained by punch biopsy revealed a dense mixed infiltrate (lymphocytes, plasma cells, and histiocytes) with small epithelioid granulomas and multinucleated giant cells. In some histiocytes, Donovan bodies were observed. Diagnosis of CL was extremely evocative. The patients were then sent to the regional referral Infectious Diseases Department, which confirmed the diagnosis.

Discussion

Even if the diagnosis remains clinical and requires validation with laboratory tests and histopathological examination, LC-OCT, like other noninvasive diagnostic techniques, can represent a further tool for noninvasive assessment of cutaneous infection and infestation [2,3]. Our preliminary results found that most of the histological features of CL can be visualized on LC-OCT. Our findings suggest that LC-OCT may be useful for the noninvasive diagnosis of CL, allowing it to be distinguished from other neoplastic or infectious diseases for the specific skin patterns and alterations that can be found [4]. LC-OCT may help decrease the need for surgical excision for confirmation of the diagnosis of benign tumors, which can be removed with less invasive surgical techniques.

Conclusion

Although Italy is not a country where CL has a prevalent epidemiology, more and more cases are being recorded in suburban areas [5]. The increase in the incidence of cases of zoonotic diseases can be traced back to a higher prevalence of immigrant and traveler carriers, the application of the newest and integrated diagnostic techniques (such as noninvasive diagnostics), and the greater clinical skill in recognizing pathologies that were once of tropical relevance. However, further studies with a larger number of cases are necessary to demonstrate the diagnostic utility of LC-OCT in the clinical setting.

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