Dermatology Practical & Conceptual

Line-Field Confocal Optical Coherence Tomography in Merkel Cell Carcinoma and Histopathological Correlation

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Introduction

Merkel cell carcinoma (MCC) is an uncommon and aggressive skin cancer that mainly affects the elderly. Clinically, MCC usually appears as a fast exophytic growing, often painful, cherry-red nodule that mostly affects sun-damaged areas, particularly the head and neck region [1]. Pathogenetic factors such as exposure to ultraviolet radiation may contribute to tumor development. MCC has also been associated with immunosuppression and the development of other tumors or virus [1]. Line-field confocal optical coherence tomography (LC-OCT) is a noninvasive diagnostic technique able to provide, through vertical and horizontal sections, real-time in vivo images of the epidermis and upper dermis, reaching nearly histological resolution. LC-OCT improves the technological properties of reflectance confocal microscopy (RCM) and of optical coherence tomography (OCT). LC-OCT has found widespread use in the noninvasive diagnosis of skin tumors and inflammatory dermatological conditions [2].

Case Presentation+ This correspondence describes Merkel cell carcinoma (MCC) in a 58-year-old male kidney-transplant recipient on maintenance immunosuppression. He was referred to our skin cancer unit for a rapidly enlarging, erythematous scalp nodule measuring 2.5 × 3.0 × 2.0 cm. (Figures 1A and B).

Usually, the diagnosis of MCC is based on clinical dermoscopic examination and excisional biopsy for histopathological examination. However, a thorough diagnosis may be difficult in early-stage disease and/or when clinical features are yet to be defined, potentially delaying appropriate therapeutic decisions. The present study aimed to be one of the first articles to

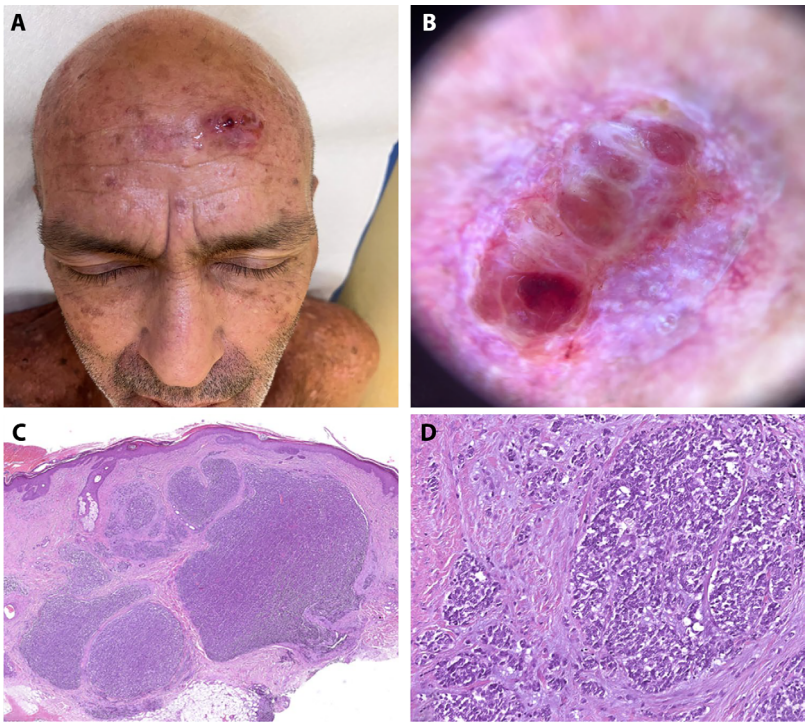

Figure 1. A. A) Clinical view reveals red nodule on the head. B) Dermoscopy image (magnification 10x) shows a reddish background with arborized vessels and a crystalline structure, central serous crust, surrounding whitish areas. C) Scanning magnification of the lesion shows a dermal, nodular, dense proliferation of basophilic cells. The lesion spares the epidermis and shows mostly expansile margins (hematoxylin and eosin, 2.5x magnification). D) At higher magnification, the lesion is composed of medium-sized monomorphic cells with scant cytoplasm and no nucleoli (hematoxylin and eosin, 20x magnification).

evaluate the new microinvasive investigation techniques in dermatology and to compare them with histological imaging with a view to the earliest possible diagnosis. Histologically, MCC is typically characterized as a monomorphous small round blue cell tumor with round or oval nuclei, finely dispersed chromatin, indistinct nucleoli, and scant cytoplasm (Figures 1C and D).

Immunohistochemistry is necessary for histopathological confirmation of MCC in order to distinguish it from other small cell neoplasms, including lymphoma, melanoma, and metastatic small-cell lung cancer. Molecular markers diagnostic for MCC include neuroendocrine markers (chromogranin A, synaptophysin, CD56), cytokeratin 20 (dot-like pattern), neurofilament, and MCPyV large T antigen (LT). Negative TTF1, S-100, and leukocyte common antigen (LCA) can be used to differentiate MCC from small-cell lung cancer, melanoma, and lymphoma, respectively [2]. LC-OCT images demonstrate hyporeflective nests of monomorphous neuroendocrine cells outlined by collagen septa, with occasional bright cells within the nests. These features, visible in both horizontal and vertical LC-OCT sections, closely match the histological structure of MCC. The epidermis appears regular, with a dermo-epidermal junction flattened by underlying dermal proliferation. MCC presents distinct alternations of white lines and dark spaces, differentiating it from other lesions, as shown in Figures 2A and B.

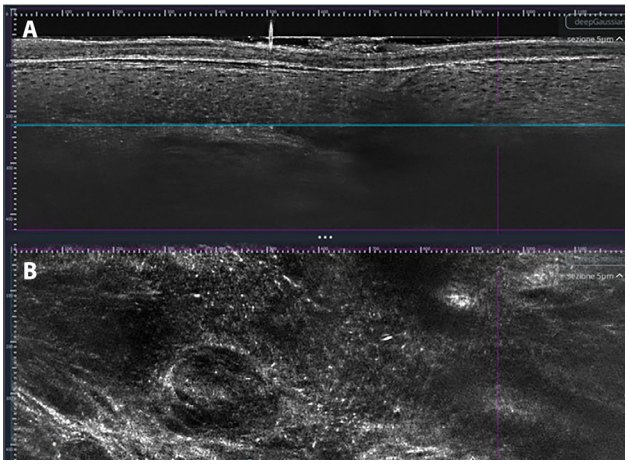

Figure 2. A) LC-OCT examination shows a preserved normal epidermis, dermal-epidermal junction slightly flattened but clearly visible. B) Detail of large central nest, increased cellularity, and collagen fiber septa.

Conclusion

On this basis, the aim of this study was to correlate LC-OCT with corresponding histopathological and dermoscopic clues. LC-OCT's ability to provide high cellular resolution, depth, and 3D views [3,4] makes it an effective tool for distinguishing

MCC from clinically similar skin cancers such as squamous cell carcinoma or basal cell carcinoma and amelanotic melanoma. In conclusion, LC-OCT proved to be a valuable noninvasive diagnostic tool capable of detecting key changes associated with MCC [5,6]. These findings suggest that it may complement traditional clinical diagnostic approaches. In addition, the ability to better characterize this disease could improve clinical management and therapeutic decision-making for patients with MCC. Further multicenter studies on this rare tumor are warranted to further explore LC-OCT specific morphology and the value of MCC features in clinical practice.

Ethics Statement: The patient provided consent for publication.

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