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Correlation of Dermoscopic Globule-Like Structures of Dermatofibroma Using Reflectance Confocal Microscopy

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Key Words

Dermoscopy · Reflectance confocal microscopy · Dermatofibroma

Reflectance confocal microscopy (RCM) allows noninvasive imaging of the skin at cellular-level resolution [1]. Like dermoscopy, RCM obtains optical sections in the horizontal plane (en face), thus enabling direct correlations with dermoscopic images [2].

A digital camera (Viva Cam, Lucid Inc., Rochester, N.Y., USA) connected to the RCM computer enables direct viewing of the dermoscopic structures on the RCM monitor. Consequently, the RCM can be guided to provide subsampling of the region of interest on the dermoscopic image. To ascertain the precision of correlation that is done in real time, dermoscopic images obtained by digital dermoscopy are also compared side by side with an RCM mosaic image (64 RCM images, each 0.5×0.5 mm, that are stitched together into a 4×4 mm composite image), for a corresponding location of specific structures of interest [2].

Here we present a 4-mm reddish brown nodule (fig. 1, inset) on the forearm of a 54-year-old male; dermoscopy shows classic features of a dermatofibroma (DF) [3, 4] (fig. 1A), including a central white scar-like area (yellow asterisk) and a delicate peripheral network (yellow square), in addition to central globule-like structures (white square). The RCM mosaic image (4×4 mm) shows closely packed small bright rings in the periphery (fig. 1B, yellow square), correlating with the delicate peripheral network (fig. 1A, yellow square). A high-magnification RCM optical section (0.5×0.5 mm) at the dermal-epidermal junction level of the same peripheral area of the lesion (fig. 1C) shows that the rings are composed of monomorphic, bright, round cells (arrows) around darker appearing dermal papillae (white asterisks). The cells that compose the rings seen on RCM have been previously

Fig. 1. This 4-mm red-brown nodule (inset) shows typical dermoscopic findings of dermatofibroma (A). The delicate peripheral network (A, yellow square) corresponds on the 4×4 mm RCM mosaic image (B, yellow square) and 0.5×0.5 mm RCM optical section (C) with bright rings composed of pigmented basal keratinocytes (C, arrows) around dermal papillae (C, white asterisks). The white scar-like area on dermoscopy (A, yellow asterisk) corresponds on RCM with collagen bundles in the superficial dermis (D, yellow asterisks). The globule-like structures on dermoscopy (A, white square) correspond on RCM (B, white square, and D) with wide bright rings, also composed of pigmented basal keratinocytes (D, arrows) around dermal papillae (D, white asterisks) that are separated by the collagen bundles.

correlated with basal keratinocytes of the epidermal rete ridges [1, 5]. At the center of the lesion, there are similar bright rings (fig. 1B, white square), albeit wider and more spaced apart, that correlate with the globule-like structures seen on dermoscopy (fig. 1A, white square). A high-magnification RCM optical section (0.5 × 0.5 mm) at the dermal-epidermal junction level (fig. 1D) focusing on globule-like structures shows wider rings composed of monomorphic bright, round cells (arrows), around a darker dermal papilla (white asterisks). These cells (fig. 1D, arrows) are similar to those seen as rimming the peripheral rings (fig. 1C, arrows), again compatible with pigmented basal keratinocytes of the epidermal rete ridges. Notably, the rings at the center of the lesion are separated by bright thick fibrillar structures (fig. 1D, yellow asterisks), compatible with dermal collagen [1] that is present in the scar-like area of DF [3]. The lesion was not biopsied in this case due to the overall compelling clinical and dermoscopic features of DF and a history of long-term stability.

While DF is a common benign dermal lesion composed primarily of fibroblasts, histiocytes, collagenous and vascular stroma in variable proportions giving rise to different histopathological variants [6], the pigmentation seen in a proportion of DF is related to epidermal hyperpigmentation. Indeed, the pigmented network seen at the periphery of DF has been correlated with a hyperplastic epidermis with hyperpigmentation of the basal layer and elongated rete ridges [3, 7]. The diagnosis of DF can be mostly made by clinical examination, but infrequently, pigmented DF may represent a differential diagnosis to melanoma. When the classic dermoscopic pattern of a central white patch and a peripheral symmetrical, delicate network is seen on dermoscopy, the diagnosis of pigmented DF is straightforward. However, globule-like structures can be frequently seen in pigmented DF [3] and may confound the observer to consider the lesion as melanocytic [8]. Furthermore, melanoma masquerading as pigmented DF has been described as a diagnostic pitfall [9]. To this end, the direct dermoscopy-to-RCM correlation of pigmented DF shows potential for noninvasive demonstration of tissue attributes responsible for the pigment pattern structures in DF. The dermoscopy-to-RCM correlation suggests that globule-like structures seen in the presented DF are not nests, but rather pigmented ring-like islands of the epidermal rete ridge network, compatible with rete ridges widely separated by broadened dermal papillae. This is in distinction to globules in melanocytic lesions that are due to nests of melanocytes. A clue to the correct recognition of these ring-like structures [pers. experience] is the presence of a small vessel at the center of some of these rings seen on dermoscopy. These preliminary RCM findings and their potential in differentiation from melanocytic lesions need to be further substantiated in a larger series of DF.

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