Absence of lesional features on reflectance confocal microscopy: Quality control steps to avoid false-negative results

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TECHNOLOGY CHALLENGE

Reviewing reflectance confocal microscopy (RCM) mosaics that do not explain dermoscopic features of concern is frustrating. This situation usually occurs for 1 of 3 reasons: mechanical error during imaging, inherent depth limitation of RCM, and reader inexperience. Each must be considered and excluded to avoid false negatives.

SOLUTION

Asking yourself questions during the RCM analysis helps identify the cause and serves as quality control to increase diagnostic confidence and accuracy. First ask, "Are the dermoscopic features that should be visible on RCM identified and present in their expected location?" These include landmarks (ie, hair follicles), crusts, ulcers, the pigment network, and vascular patterns. If your answer is no, the confocal-to-skin interface might have slipped out of position and is no longer on the lesion (Fig 1). The lesion must be reimaged.[1] Second ask, "Could the dermoscopic findings represent a deeper dermal process than accessible by RCM?" If your answer is yes, do a punch biopsy (Fig 2). RCM provides a virtual shave biopsy that cannot image deeper dermal structures below 200-300 um.[2] Third ask, "Are the dermoscopic findings nonspecific?" and "Do the RCM mosaics demonstrate only subtle findings?" If you are unfamiliar with the RCM features, request a second RCM opinion or biopsy the lesion.[3]

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Ms Fox is employed by and owns shares in Caliber, Imaging and Diagnostics Inc, the manufacturer of the Vivascope 1500, which is the device that is used to collect the in vivo reflectance confocal microscopic images described in this article.

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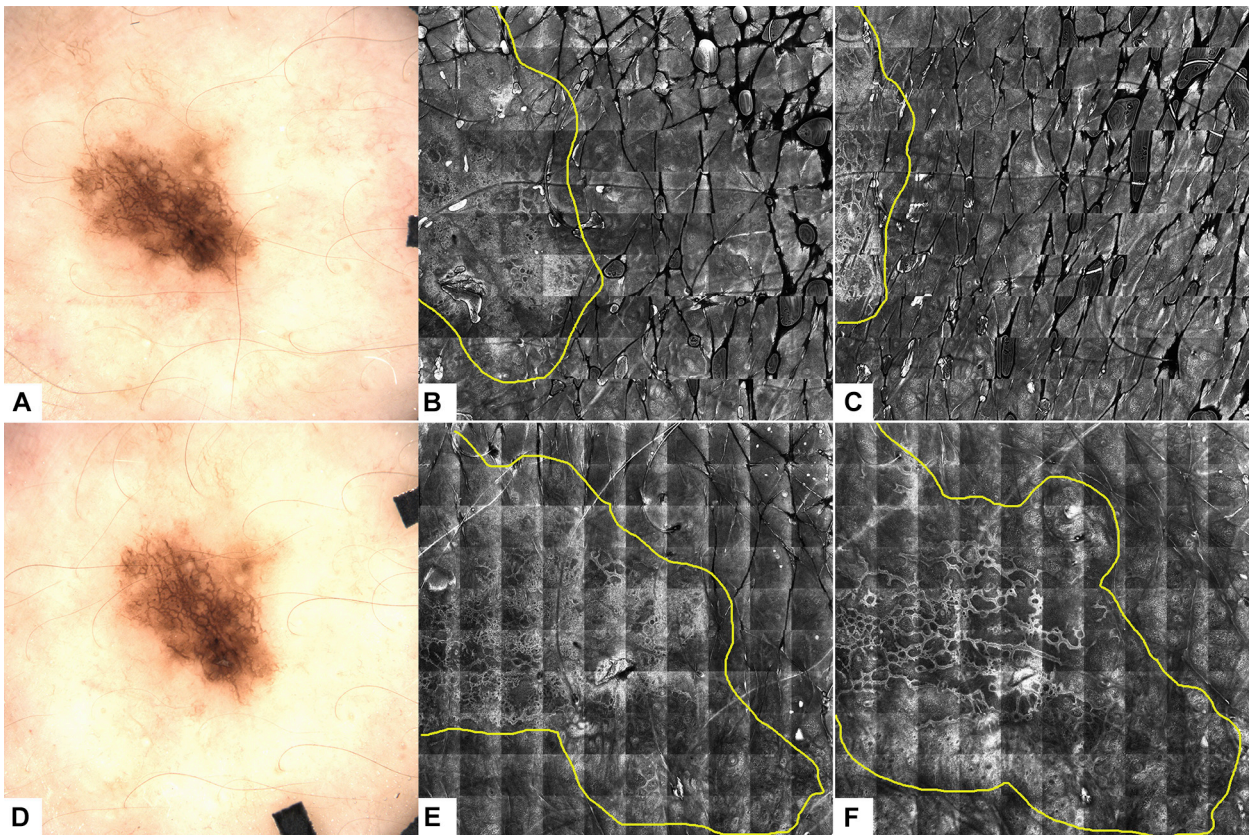

Fig 1. Reflectance confocal microscope (RCM) slipped out of position. **A**, Dermoscopic image showing a pigmented lesion centered on the tissue coupling ring that locates the dermoscopy to the RCM image. A 5 × 5 mm mosaic in the suprabasal layer showing the lesion (*yellow outline*) (**B**) and the same lesion (*yellow outline*) (**C**) biased toward the left side of the mosaic, indicating that the lesion is no longer centered on the ring due to sliding. Poor alignment or stitching of the individual images comprising the mosaic is further indication that the ring is not coupled securely to the skin. **D**, Dermoscopic image of the same lesion after reapplication of the tissue coupling ring. **E**, A 5 × 5 mm mosaic at in the suprabasal layer showing the lesion (*yellow outline*) centered more appropriately in the imaged field. **F**, A 5 × 5 mm mosaic at the dermoepidermal junction showing that the lesion (*yellow outline*) remains in the same location in consecutive mosaics, indicating the ring is stable on the skin. The shape and size of the lesion changes slightly as subclinical information is revealed. *RCM*, Reflectance confocal microscope.

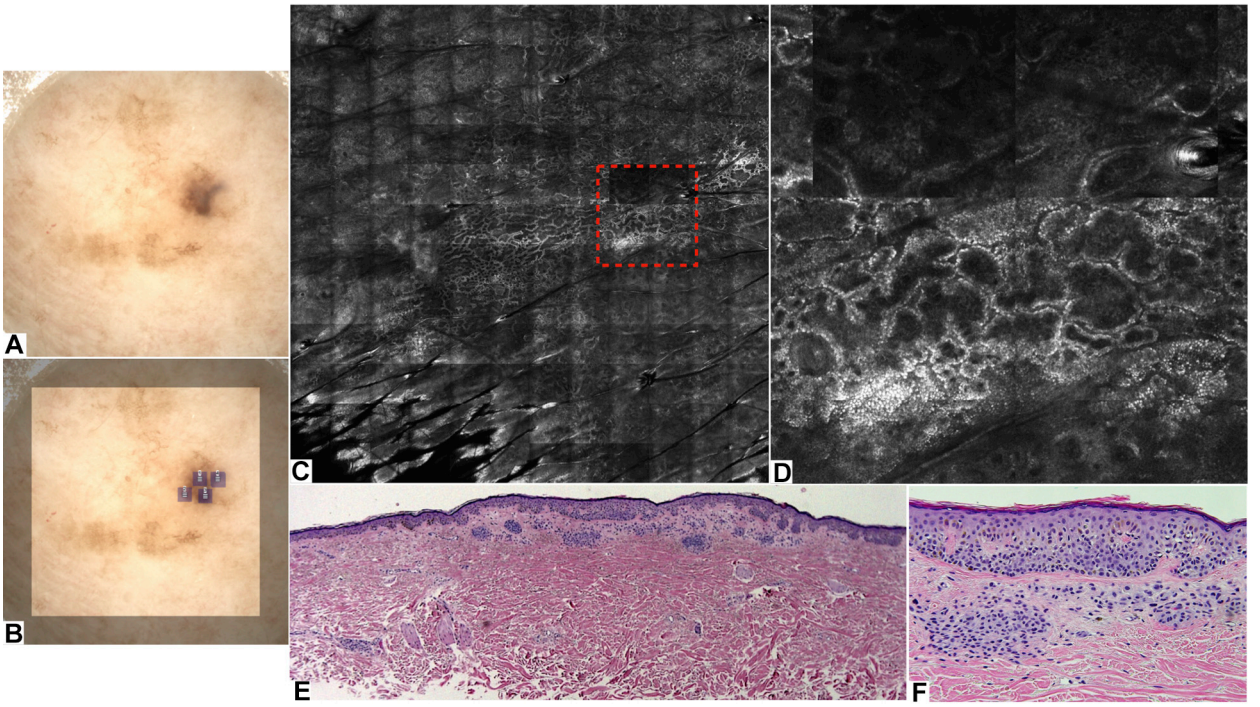

Fig 2. Deeper dermal lesion not reached by reflectance confocal microscopy (RCM) imaging. **A**, An 8-mm lesion from the back of a 56-year-old woman showing multiple colors, irregular border, and blue-white veil on dermoscopy. **B**, Dermoscopic image with RCM imaging map. *Gray border* surrounds mosaic image area, and *gray numbered squares* indicate location of stack images. **C**, Deepest RCM mosaic captured shows dermoepidermal junction and dermis with features of solar lentigo, including hyperreflective and irregularly shaped dermal papillary rings in the absence of atypical cells and melanocytic nests. The *red box* indicates the area corresponding to the blue-white veil on dermoscopy. **D**, RCM submosaic detail of area within *red box* (in **C**) confirms the absence of features to explain the dermoscopic blue-white veil, such as dermal nests, dermal dendritic melanocytes, or dermal melanophages. **E**, Scanning of hematoxylin-eosin stained tissue shows the RCM identified solar lentigo characterized by hyperpigmentation of the basal layer and variably elongated and club-shaped rete ridges above and extending beyond a dermal nevus the size of the blue-white veil, which was not seen on RCM. **F**, Higher power image of the hematoxylin-eosin stained tissue containing the nevus shows nested melanocytes in the superficial dermis along with occasional melanophages, explaining the blue-white veil on dermoscopy. *RCM*, Reflectance confocal microscopy.

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