Live, remote control of an in vivo reflectance confocal microscope for diagnosis of basal cell carcinoma at the bedside of a patient 2500 miles away: A novel tele-reflectance confocal microscope approach

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TECHNOLOGIC CHALLENGE

In the United States, billing codes were recently acquired for reflectance confocal microscopy (RCM), a tool that is being integrated into dermatology practices. However, reading RCM images is challenging for novice readers.[1] RCM via store-and-forward (SAF) teledermatology is popular for expert consultation.[2] Unfortunately, SAF teledermatology cannot provide remote control of the device, bedside diagnosis, and immediate management. We report a new live interactive method (LIM)—tele-RCM—to overcome existing limitations.

THE SOLUTION

A patient with a suspicious lesion was scheduled for RCM imaging at a Los Angeles dermatology clinic. An online commercial WebEx screen share link was sent to an expert RCM reader in New York. During imaging, the expert reader had remote control access of the Vivascope 1500 (Caliber Imaging and Diagnostics Inc, Andover, MA). There was direct phone communication between the expert reader and clinician, and during the phone call, areas of suspicion were discussed (streaming, tumor nodules, canalicular vessels) (Fig 1). A diagnosis of nodular basal cell carcinoma was established. The imaging procedure took ~15 minutes, throughout which the patient was comfortable (Video 1). The patient was pleased to avoid biopsy and discuss treatment options immediately. Mohs surgery was recommended, and frozen section histology at the time of surgery confirmed nodular basal cell carcinoma (Fig 2). To our knowledge, this is the first time this tele-RCM approach has been described in the literature. Because of the consultative nature of the interaction between the clinician and expert reader, improved physician–patient communication, opportunity to train novice readers, and cost savings for health care, we believe that LIM tele-RCM has advantages over SAF and that this method represents a potential major paradigm shift. Future studies will focus on comparisons between SAF teledermatology and LIM tele-RCM workflows.

Fig 1. Tele-reflectance confocal microscopy imaging on a lesion suspicious for basal cell carcinoma (BCC) on the right nasal sidewall of a 48-year-old female patient. The right panel shows a screenshot of the live tele-reflectance confocal microscopy session, showing a macroscopic image of the lesion acquired with Vivacam (Caliber Imaging and Diagnostics Inc, Andover, MA). The confocal image in the middle panel shows BCC tumor nodules (*stars*) with palisading (*yellow arrowhead*) and clefting (*green arrow*) and a canalicular vessel (*yellow arrow*), features consistent with the diagnosis of BCC. *BCC*, Basal cell carcinoma.
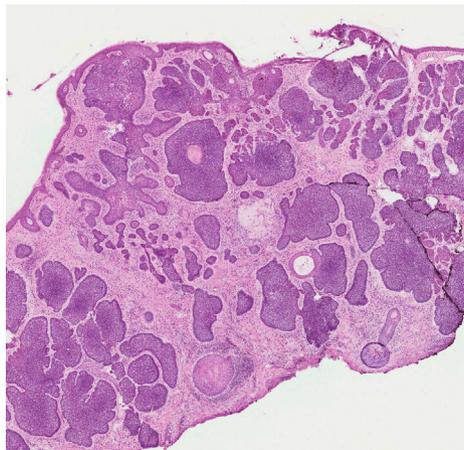

Fig 2. Histopathology image of the lesion diagnosed as basal cell carcinoma on reflectance confocal microscopy, confirming the diagnosis of a nodular basal cell carcinoma on frozen-section biopsy performed during Mohs surgery. (Original magnification: ×4.)

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