

IN VIVO REFLECTANCE CONFOCAL MICROSCOPY OF SPOKE-WHEEL STRUCTURES IN A PIGMENTED BASAL CELL CARCINOMA. CASE REPORT

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Summary

The "Consensus net meeting on dermatoscopy" of 2000 determined a set of significant dermatoscopic features for the diagnosis of pigmented basal cell carcinoma (pBCC). These included small ulcerations, maple leaf-like areas, multiple blue-grey globules, large blue-grey ovoid nests, arborizing telangiectasia, and spoke-wheel structures. The latter have been defined as brown to gray, well circumscribed, radial projections meeting at a darker brown central hub. Spoke-wheel structures have a reported specificity of 100% for pBCC. Because the correlation between dermatoscopy and histology is often difficult owing to the different incidences from which lesions are seen (horizontal in dermatoscopy vs vertical in histology), in this paper we sought to highlight the underpinnings of this particular dermatoscopic feature through *in vivo* reflectance confocal microscopy (RCM) examination. RCM is a non-invasive imaging technique capable of delivering images of *en face* optical sections at nearly histological resolution, thus facilitating the correlation with dermatoscopy. RCM examination of a pBCC exhibiting spoke-wheel structures revealed flower-shaped bright tumor islands infiltrated by dendritic cells, surrounded by dark areas of clefting at the level of the dermal-epidermal junction and papillary dermis. These tumor islands were connected to the epidermis through several cord-like projections.

Key words: dermoscopy, carcinoma, basal cell, microscopy, confocal, structures, spoke-wheel.

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Introduction

Basal cell carcinoma (BCC) is the most prevalent of all skin cancers in the white population and, for that matter, of all cancers. Epidemiological data show that keratynocyte carcinomas, and especially basal cell carcinoma[1], are a growing public health problem, in spite of continuously increasing awareness and sun-protective measures.

Dermatoscopy is an *in vivo*, non-invasive imaging technique which increases diagnostic accuracy in pigmented skin lesions, while also being valuable in non-pigmented skin

disorders[2-4]. The "Consensus net meeting on dermatoscopy" of 2000 formulated a set of significant dermatoscopic features for the diagnosis of pigmented BCCs (pBCCs). These criteria included small superficial ulcerations, arborizing telangiectasia, multiple blue-gray globules, large blue-gray ovoid nests, maple leaf-like areas, and spoke-wheel structures[5,6]. Spoke-wheel structures have been defined as well-circumscribed radial projections, usually light-brown but occasionally blue or gray, meeting at a darker (dark brown, black or blue) central axis, typically located at the border of a structureless, red to white, area[7].

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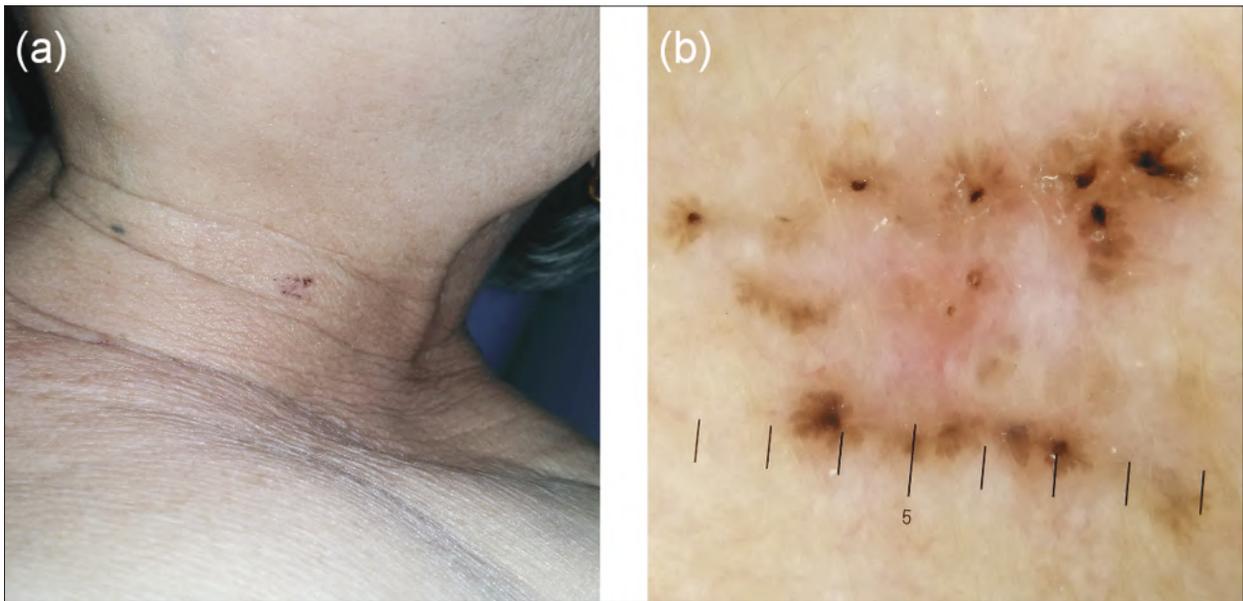


Fig. 1. Clinical and dermatoscopic aspect of the lesion: (a) Clinical image showing a well defined, pinkish, slightly elevated papule speckled with numerous dark brown dots on the left latero-cervical area; (b) Dermatoscopic image showing a central, structureless, red to white area presenting multiple, tan, spoke-wheel structures on its perimeter.

Because of the difference in perspective between dermatoscopic and histologic examinations (horizontal vs vertical, respectively) in this paper we sought to highlight the underpinnings of spoke-wheel structures through a direct correlation between the dermatoscopic aspect and the structures observable through *in vivo* RCM examination in a pBCC located in the left latero-cervical region of a 64-year-old female patient.

Case report

We report the case of a 64-year-old woman with Fitzpatrick skin phototype III who presented for the evaluation of a lesion which had started growing one month ago on her left latero-cervical area. Her medical history revealed a left breast carcinoma treated 15 years ago by radical mastectomy, radiation and chemotherapy. Clinically, an 8 x 6 mm, well defined, pink-colored, slightly scaly papule speckled with multiple dark brown dots was observed (Fig. 1a). The clinical differential diagnosis included pigmented basal cell carcinoma, irritated seborrheic keratosis, pigmented actinic keratosis, and melanoma.

On polarized-light dermatoscopy, a central, structureless, red to white area presenting short-fine telangiectasia, and multiple spoke-wheel structures on its perimeter could be observed (Fig. 1b).

RCM examination of the lesion revealed, in the spoke-wheel areas (Fig. 2a), flower-shaped, hyper-refractile, bright tumor islands infiltrated by dendritic cells (corresponding to melanocytes, melanophages, and Langerhans cells) and surrounded by dark areas of peritumoral clefting (corresponding to mucin deposits)[8] at the level of the dermo-epidermal junction and papillary dermis (Fig. 2b,c,d). Note that some cord-like projections emanating from these tumor islands were connected to the epidermis (Fig. 2c).

Excisional biopsy of the lesion was performed under local anesthesia, and the subsequent histopathologic examination confirmed the diagnosis of pigmented BCC (Fig. 3a). The histological structures corresponding to the dermatoscopic spoke-wheel areas and the flower-shaped tumor islands seen under RCM are basaloid cell aggregates located in the superficial dermis, displaying multiple connections to the epidermis (Fig. 3b,c).

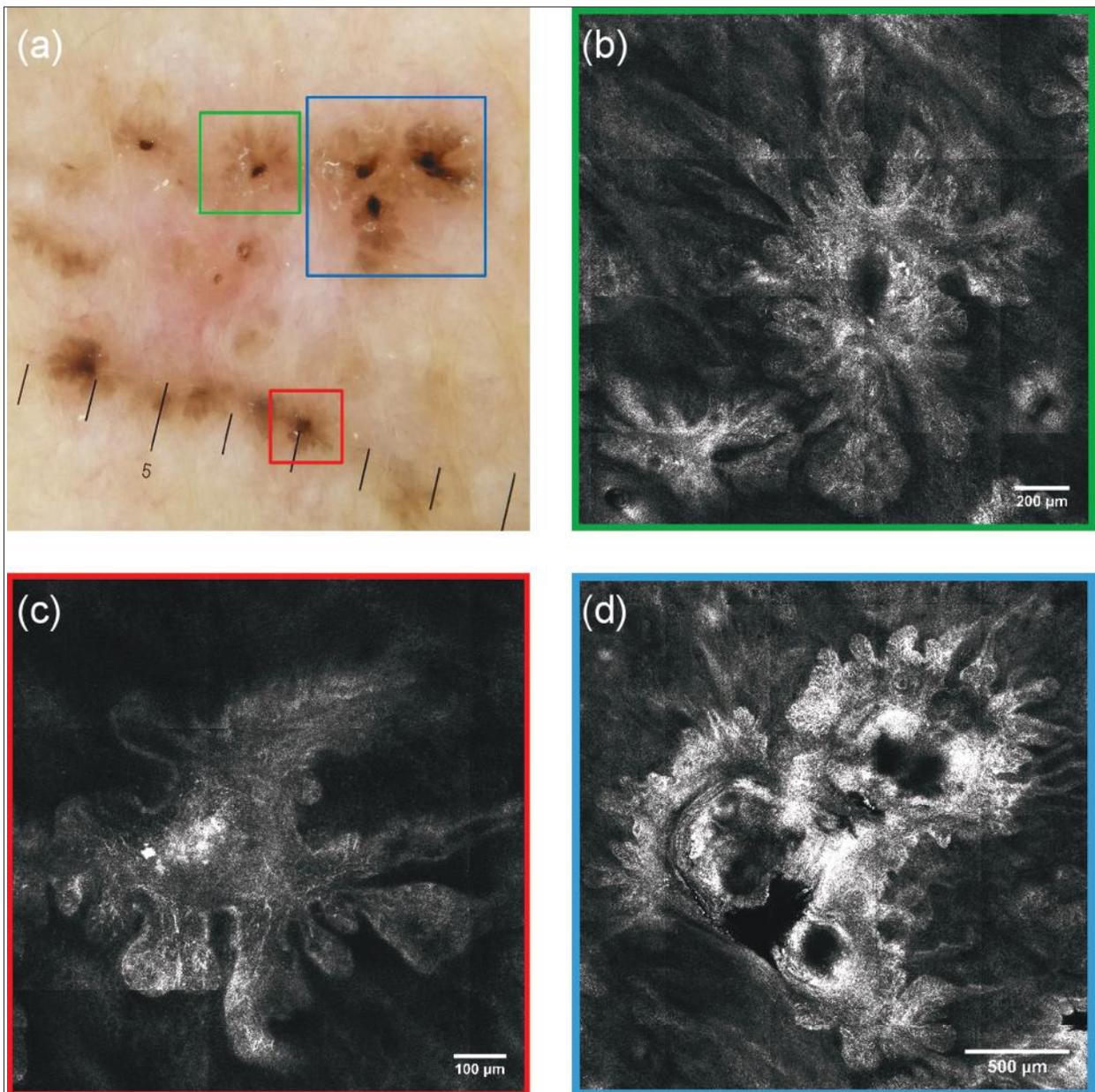


Fig. 2. Dermatoscopic and RCM images: (a) Dermatoscopic image for orientation of the RCM examination (red, green, and blue squares are areas shown with RCM in the next panels); (b) RCM mosaic (~2x2 mm) showing a bright, flower-shaped tumor island with peritumoral clefting; (c) RCM mosaic (1x1 mm) of another bright tumor island with dendritic cell infiltration and cord-like processes connecting the tumor island to the epidermis; (d) RCM mosaic (2.5x2.5 mm) revealing a cluster of bright tumor islands with radiating, bright cord-like projections.

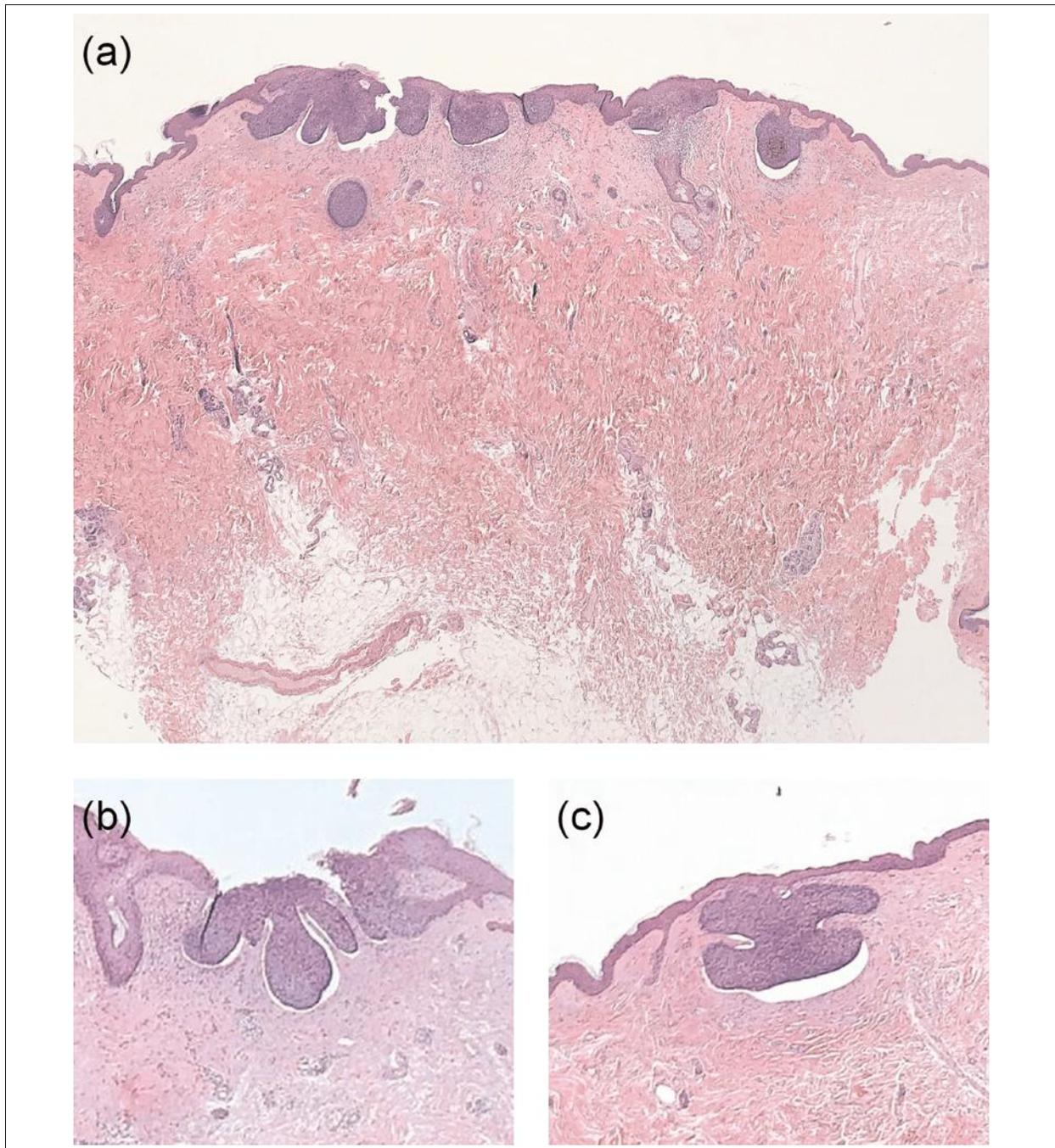


Fig. 3. Histopathological aspect of the lesion: (a) Tumoral proliferation of basaloid cell masses, some emanating from the epidermis, some invading the deeper dermis, intratumoral melanin deposits and melanophages, confirming the diagnosis of pigmented basal cell carcinoma (H&E, magnification 2x); (b,c) Basaloid cell aggregates in the superficial dermis, exhibiting connections to the overlying epidermis (H&E, magnification 2x, cropped).

Discussion

With a reported specificity of 100%[9], spoke-wheel structures have been well-established as a highly accurate dermatoscopic finding for the diagnosis of pBCCs. These dermatoscopic structures have been histologically associated with neoplastic aggregates arranged in cords located in the papillary and/or reticular dermis, connected to the epidermis at several points, radiating from a central pigmented core[10]. However, given the different incidences from which lesions are viewed in dermatoscopy compared to vertical sections in histology, a perfect correlation cannot be established.

RCM, which shows a good correlation with histology in several BCC histological subtypes[11], produces images in a horizontal plane, thus facilitating the direct correlation with dermatoscopy, which also views lesions horizontally. A previous article has described the confocal appearance of spoke-wheel areas in a superficial

BCC of a Fitzpatrick skin phototype VI male, their findings of bright, stellate-shaped tumor islands with multiple connections to the base of the epidermis being very similar to our own observations.

Conclusion

In summary, we show that spoke-wheel structures, a dermatoscopic feature with extremely high specificity for the diagnosis of pigmented BCC, correlate confocally and histologically with tumor cell aggregates located in the papillary dermis and connecting at several points to the epidermis.

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Conflict of interest
NONE DECLARED

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