ORIGINAL ARTICLE

Classifying distinct basal cell carcinoma subtype by means of dermatoscopy and reflectance confocal microscopy

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Background: The current guidelines for the management of basal cell carcinoma (BCC) suggest a different therapeutic approach according to histopathologic subtype. Although dermatoscopic and confocal criteria of BCC have been investigated, no specific studies were performed to evaluate the distinct reflectance confocal microscopy (RCM) aspects of BCC subtypes.

Objectives: To define the specific dermatoscopic and confocal criteria for delineating different BCC subtypes.

Methods: Dermatoscopic and confocal images of histopathologically confirmed BCCs were retrospectively evaluated for the presence of predefined criteria. Frequencies of dermatoscopic and confocal parameters are provided. Univariate and adjusted odds ratios were calculated. Discriminant analyses were performed to define the independent confocal criteria for distinct BCC subtypes.

Results: Eighty-eight BCCs were included. Dermatoscopically, superficial BCCs (n = 44) were primarily typified by the presence of fine telangiectasia, multiple erosions, leaf-like structures, and revealed cords connected to the epidermis and epidermal streaming upon RCM. Nodular BCCs (n = 22) featured the classic dermatoscopic features and well outlined large basaloid islands upon RCM. Infiltrative BCCs (n = 22) featured structureless, shiny red areas, fine telangiectasia, and arborizing vessels on dermatoscopy and dark silhouettes upon RCM.

Limitations: The retrospective design.

Conclusion: Dermatoscopy and confocal microscopy can reliably classify different BCC subtypes. (J Am Acad Dermatol http://dx.doi.org/10.1016/j.jaad.2014.04.067.)

Key words: basal cell carcinoma; dermatoscopy; dermoscopy; diagnosis; infiltrative basal cell carcinoma; nodular basal cell carcinoma; reflectance confocal microscopy; superficial basal cell carcinoma.

The current guidelines for the management of basal cell carcinoma (BCC) suggest a different approach according to distinct BCC subtype, with nonsurgical treatments considered the first-line options for superficial (sBCC) tumors, surgical excision being the criterion standard

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for nodular BCC (nBCC), and Mohs micrographic surgery representing the optimal choice to avoid incomplete excision or recurrence of infiltrative BCC (iBCC).[1-4]

A correct subtype classification of BCC is therefore crucial to choose the most appropriate therapy. Histopathologic examination, especially when performed after wide excision rather than as a punch biopsy specimen,[5] represents the most accurate method to assess BCC subtype. However, a rapid preoperative subtype classification could be useful to avoid interventions performed for diagnostic purposes, reducing both patient morbidity and financial costs related to the excision procedure.

Dermatoscopy has been shown to facilitate the clinical recognition of BCC, enabling its discrimination from other skin tumors and nonneoplastic diseases.[6-18] Recently, certain dermatoscopic criteria have been correlated with different BCC subtypes and the technique was assessed to accurately discriminate superficial BCC from other BCC subtypes with a sensitivity of 81.9% and a specificity of 81.1%.[7-9,13-16,19-21]

Reflectance confocal microscopy (RCM) is a novel tool that can provide quick scanning of the skin with nearly histologic resolution.[22] Although the value of RCM for BCC diagnosis has been extensively shown,[22-41] no specific criteria related to different BCC subtypes, including infiltrative types, have been defined.

The aim of our study is to provide the key confocal features of different BCC subtypes—sBCC, nBCC, and iBCC—and investigate whether RCM, as an adjunct to dermatoscopy, could further enhance accurate preoperative subtype classification.

CAPSULE SUMMARY

- Dermatoscopy and confocal microscopy enhance diagnostic accuracy for basal cell carcinoma.
- The presence of certain dermatoscopic and confocal microscopic criteria are suggestive of superficial basal cell carcinoma, while other criteria are associated with infiltrative and nodular subtypes.
- Classifying the basal cell carcinoma subtype preoperatively assists in planning the most appropriate treatment.

METHODS

BCC cases were collected in 4 centers in Italy, Spain, Florida, and Australia. Ethics committee approval was waived because the study affected neither the routine diagnostic nor therapeutic management of these cases.

Inclusion criteria were a definite histopathologic diagnosis of BCC, including subtype classification, the availability of clinical, dermatoscopic, and confocal images of the tumor, and the availability of histopathologic slides. All lesions were classified histologically as pure nBCC, sBCC, and iBCC subtype. Mixed forms were preferentially excluded, unless they showed a largely prevalent component; in this case, the classification was based on the most prevalent component.

RCM and a histologic examination were performed as standard of care in our centers. Cases in which RCM images could not be evaluated because of poor image quality or the presence of extensive ulceration were excluded.

Only cases with a complete wide excision were included, and no histopathologic examination was a result of a punch or shave biopsy.

The subtype classification was based on previously described standard criteria for each subtype,[42] and included nBCC, sBCC, and iBCC.

Dermatoscopic images were captured with Dermlite Foto equipment (3Gen, Dana Point, CA) at 10-fold magnification.

RCM images were acquired by means of a Vivascope 1500 (Caliber ID, Rochester, NY), which uses an 830 nm laser beam with a maximum power of 20 mW. Instrument and acquisition procedures have been described elsewhere.[22,32,36]

Clinical images were evaluated to classify each tumor as flat, elevated, or nodular. Pigmentation of the tumor was assessed on dermatoscopic images and evaluated as follows: hypopigmented, partially pigmented (pigmentation area of <25% of the lesion), or pigmented (pigmentation area of >50% of the lesion), as noted by Menzies et al.[43]

Dermatoscopic variables were selected based on previously published data on dermatoscopy of BCC[6,7,9,13] and included: (1) arborizing vessels, (2) blue-gray ovoid nests, (3) ulceration, (4) multiple blue-grey dots/globules, (5) leaf-like structures, (6) spoke wheel areas, (7) superficial fine telangiectasias, (8) multiple small erosions, (9) concentric structures, (10) multiple in focus blue-grey dots, and (11) shiny white to red structureless areas.

Confocal parameters assessed in this study were as follows[24-41]: (1) ulceration, (2) streaming of the epidermis (keratinocytes that appear to be focally elongated and distorted along the same axis), (3) small tumor islands (diameter <300 μm),