

# Reflectance confocal microscopy: a useful and non-invasive tool in the in vivo differentiation of benign pigmented skin lesions from malignant melanoma. Report of a case

Ramin Mofarrah, M.D.<sup>1</sup>, Verena Ahlgrimm-Siess, M.D.<sup>2</sup>, Cesare Massone, M.D.<sup>1</sup>,  
Rainer Hofmann-Wellenhof, M.D.<sup>1</sup>

<sup>1</sup>Department of Dermatology, Medical University of Graz, Austria

<sup>2</sup>Department of Dermatology, Paracelsus Private Medical University of Salzburg, Austria

**Key words:** reflectance confocal microscopy, seborrheic keratosis, melanoma, histopathology, dermoscopy

**Citation:** Mofarrah R, Ahlgrimm-Siess V, Massone C, Hofmann-Wellenhof R. Reflectance confocal microscopy: a useful and non-invasive tool in the in vivo differentiation of benign pigmented skin lesions from malignant melanoma. Report of a case. *Dermatol Pract Conc*. 2013;3(1):9. <http://dx.doi.org/10.5826/dpc.0301a09>.

**Received:** May 7, 2012; **Accepted:** July 31, 2012; **Published:** January 31, 2013

**Copyright:** ©2013 Hofmann-Wellenhof et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Funding:** None.

**Competing interests:** The authors have no conflicts of interest to disclose.

All authors have contributed significantly to this publication.

**Corresponding author:** Rainer Hofmann-Wellenhof, M.D., Department of Dermatology, Medical University of Graz, Auenbruggerplatz 8, 8036 Graz, Austria. Tel. +43.316.385.2371; Fax. +43.316.385 2466. Email: [rainer.hofmann@medunigraz.at](mailto:rainer.hofmann@medunigraz.at).

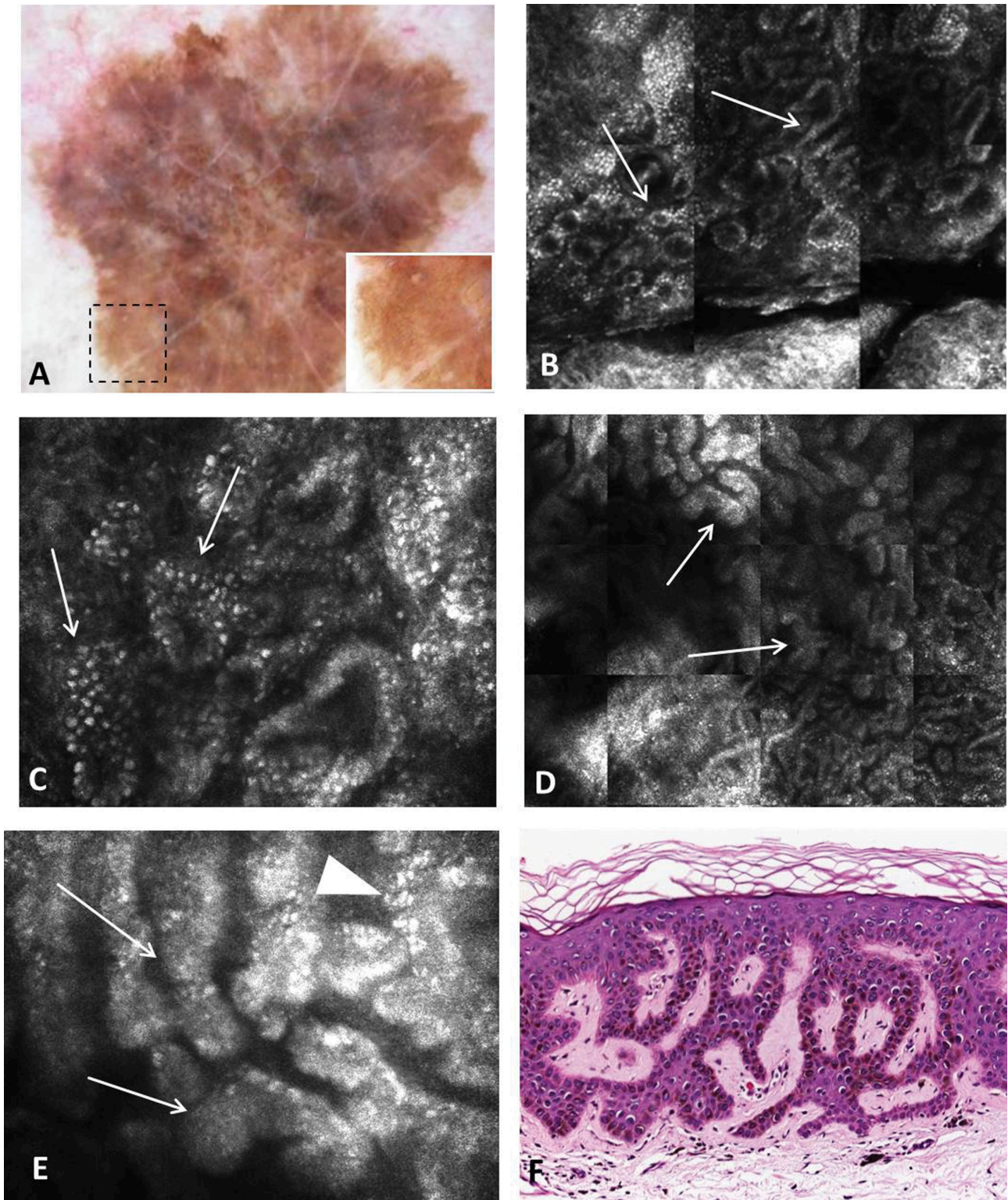
**ABSTRACT** The diagnosis of seborrheic keratoses (SK) undergoing regression can be challenging clinically and dermoscopically. We report a case of a SK with a history of change and equivocal dermoscopic features, thereby showing confocal features suggestive of solar lentigo/early SK. The present case emphasizes the potential value of reflectance confocal microscopy (RCM) in the differentiation of malignant from benign pigmented skin lesions.

## Report of case

A 67-year-old man was referred to our department because of a pigmented skin lesion that was clinically suspicious for melanoma. The patient presented with several pigmented skin lesions on the back. He reported that they had been present for a few years and that he had noticed a change in color and slow enlargement in one pigmented skin lesion on his right shoulder.

Clinically, there was a light-to-dark brown patch approximately 1.5 cm in diameter. Dermoscopy showed a light-to-

dark brown homogenous-reticular pattern with focal gray-brown to gray-white areas (Figure 1A). The clinical and dermoscopic features were most suggestive of a solar lentigo / early seborrheic keratosis (SK) with regression, but a melanoma on sun-damaged skin or a collision of a melanoma with an SK were considered in the differential diagnosis. With reflectance confocal microscopy (RCM), a slightly atypical honeycomb pattern was seen at the superficial epidermal layers. At the basal layer, multiple densely packed edged papillae of different sizes and shapes were observed (Figure 1B).



**Figure 1.** (A) Dermoscopy showed a light to dark brown homogenous-reticular pattern (insert; area within the dashed square at higher magnification) with focal gray-brown to gray-white areas. (B) On RCM, dense edged papillae (arrows) are observed at the basal layer at low magnification (1.5 x 1.5 mm). (C) At high magnification (0.5 x 0.5 mm), small bright, monomorphous cells are seen outlining dermal papillae of different sizes and shapes (arrows). (D) Cord-like structures (arrows) are displayed at the DEJ at low magnification (1.5 x 1.5 mm). (E) Bright, branching tubular structures ("cords," arrows) are observed at the DEJ at high magnification (0.5 x 0.5 mm). Plump, bright cells are found within the upper dermis (arrowhead). (F) Histology showed epidermal hyperplasia characterized by thin strands of basaloid cells and basal hyperpigmentation without increase of melanocytes. In the superficial dermis, few melanophages and solar elastosis were present. [Copyright: ©2013 Hofmann-Wellenhof et al.]

The bright cells surrounding the dermal papillae were monomorphous in size and shape (Figure 1C). In addition, bright branching tubular structures “cords” and bulbous projections were seen at the dermo-epidermal junction (DEJ) (Figure 1D). The superficial dermis displayed aggregated bright, round to triangular, non-nucleated cells, suggestive of melanophages (Figure 1E). The overall RCM impression was of a seborrheic keratosis undergoing regression.

The lesion was surgically removed by shave biopsy due to the history of change and the presence of regression structures together with a pigment network in dermoscopy. Histology showed epidermal hyperplasia characterized by thin strands of basaloid cells, horn cysts and basal hyperpigmentation without increase of melanocytes. In the superficial dermis, a few melanophages and solar elastosis were present (Figure 1B). The diagnosis of a reticulated seborrheic keratosis was made.

## Discussion

Seborrheic keratoses are benign skin neoplasms that can usually be recognized either clinically or dermoscopically [1]. However, seborrheic keratoses displaying regression structures in dermoscopy can occasionally mimic melanomas. In addition, melanomas arising in association with seborrheic keratoses have been described in the literature [2-4].

RCM is a novel, non-invasive imaging technique that allows for examination of the epidermis and superficial dermis at a cellular resolution [5]. Confocal criteria for the diagnosis of benign and malignant melanocytic skin lesions have been extensively described in the literature [6-7]; however, there are only a few reports in the literature dealing with confocal features of solar lentigines/seborrheic keratoses [8-10]. The main RCM features of solar lentigo/seborrheic keratosis undergoing regression (lichen planus-like keratosis) and their relative frequencies found in the study by Bassoli et al were: (i) typical honeycomb pattern of the spinous layer (78.6%); (ii) elongated cords and/or bulbous projections at the dermal-epidermal junction (75%); and (iii) numerous plump-bright cells and/or bright stellate spots in the superficial dermis (92.9%) [11]. These RCM features correlated with the following histopathological findings: (i) spinous-granular layers without significant atypia of keratinocytes; (ii) elongated, bulbous rete ridges; and (iii) dense infiltration of melanophages and lymphocytes in superficial dermis. With the use of these diagnostic criteria 71.4% of LPLK could be classified correctly, while misclassification of any of the skin cancers as lichen planus-like keratosis was avoided.

In our patient, we observed characteristic RCM features of SK, such as densely packed edged papillae, bright branching tubular structures, and bulbous projections at the DEJ.

In addition, we observed multiple bright, round to triangular, non-nucleated cells, suggestive of aggregates of melanophages due to partial regression. Confocal criteria suggestive of a melanoma, such as bright, pagetoid nucleated cells, cerebriform cell clusters, or a disarrangement of the DEJ with non-edged papillae were not seen. These findings were in line with the RCM criteria of lichen planus-like keratosis reported by Bassoli et al [11].

In our opinion, the present case demonstrates the potential value of RCM in the diagnosis and differentiation of benign and malignant pigmented skin lesions. RCM may improve the diagnostic accuracy and spare unnecessary excisions of benign pigmented skin lesions with equivocal clinical and dermoscopic features.

## References

1. Elgart GW. Seborrheic keratoses, solar lentigines, and lichenoid keratoses. Dermatoscopic features and correlation to histology and clinical signs. *Dermatol Clin*. 2001;19(2):347-57.
2. Pastar Z, Lipozencić J, Rados J, Stajminger G. Regressing seborrheic keratosis—clinically and dermoscopically mimicking a regressing melanoma. *Acta Dermatovenerol Croat*. 2007;15(1):24-6.
3. Braga JC, Scope A, Klaz I, Mecca P, Spencer P, Marghoob AA. Melanoma mimicking seborrheic keratosis: an error of perception precluding correct dermoscopic diagnosis. *J Am Acad Dermatol*. 2008;58(5):875-80.
4. Argenziano G, Rossiello L, Scalvenzi M, et al. Melanoma simulating seborrheic keratosis: a major dermoscopy pitfall. *Arch Dermatol*. 2003;139(3):389-91.
5. Rajadhyaksha M, Grossman M, Esterowitz D, Webb RH, Anderson RR. In vivo confocal scanning laser microscopy of human skin melanin provides strong contrast. *J Invest Dermatol*. 1995;104(6):946-52.
6. Langley RGB, Rajadhyaksha M, Dwyer PJ, et al. Confocal scanning laser microscopy of benign and malignant melanocytic lesions in vivo. *J Am Acad Dermatol*. 2001;45(3):365-76.
7. Pellacani G, Cesinaro AM, Seidenari S. Reflectance-mode confocal microscopy of pigmented skin lesions—improvement in melanoma diagnostic specificity. *J Am Acad Dermatol*. 2005;53(6):979-85.
8. González S, Gill M, Halpern AC. *Reflectance Confocal Microscopy of Cutaneous Tumors. An Atlas with Clinical, Dermoscopic and Histological Correlations*. 2nd ed. London: Informa Healthcare, 2011.
9. Langley RG, Burton E, Walsh N, Propperova I, Murray SJ. In vivo confocal scanning laser microscopy of benign lentigines: comparison to conventional histology and in vivo characteristics of lentigo maligna. *J Am Acad Dermatol*. 2006;55(1):88-97.
10. Hofmann-Wellenhof R, Pellacani G, Malvehy J, Soyer HP (eds). *Reflectance Confocal Microscopy for Skin Diseases*. Berlin: Springer-Verlag, 2012.
11. Bassoli S, Rabinovitz HS, Pellacani G, et al. Reflectance confocal microscopy criteria of lichen planus-like keratosis. *J Eur Acad Dermatol Venereol*. 2012;26(5):578-90.