

# Reflectance confocal microscopy of an inverted follicular keratosis mimicking a squamous cell carcinoma

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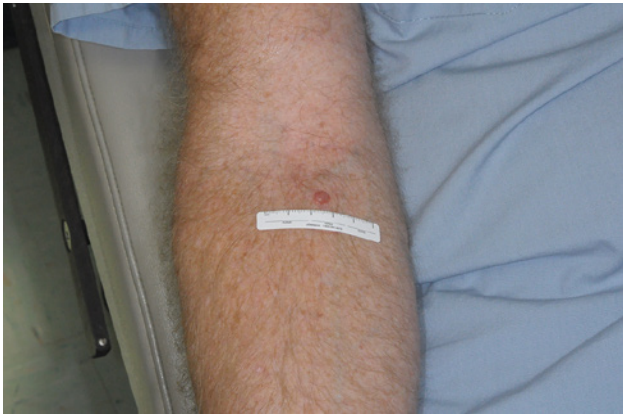
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**ABSTRACT** Distinguishing between benign and malignant neoplasms of the skin is a daily challenge to dermatologists. With the use of a dermatoscope and other imaging devices, the diagnosis is often more precise. The confocal microscope is a device that uses a near-infrared laser to perform noninvasive imaging of the skin. The benefit is that the images immediately provide additional, cellular-level information that can assist in diagnosis. However, lesions may share overlapping characteristics on confocal microscopy, and hence, benign lesions can still display confocal features concerning for a cancerous process, justifying a biopsy. Here, we present a case of an inverted follicular keratosis imitating a squamous cell carcinoma on confocal microscopy.

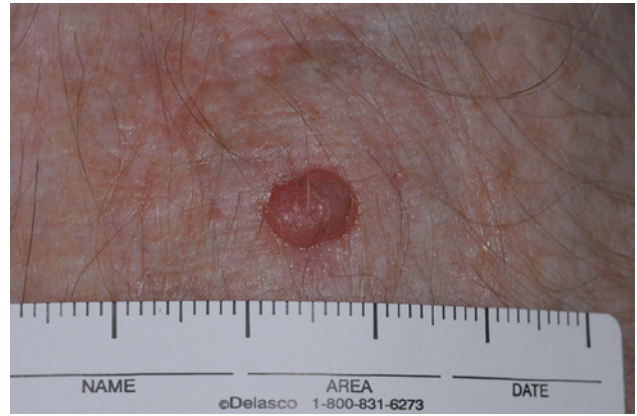
## Introduction

Inverted follicular keratosis (IFK) is an uncommon diagnosis, occasionally issued by the dermatopathologist. It refers to a benign tumor that typically originates on the face, with middle-aged men affected twice as often as females [1]. Clinically, IFK is described as a tan or pink papule. The clinician will frequently diagnose the lesion as a verruca vulgaris or irritated seborrheic keratosis, with a differential diagnosis of squamous cell carcinoma (SCC) and basal cell carcinoma [2]. Many dermatopathologists are of the opinion that IFK actu-

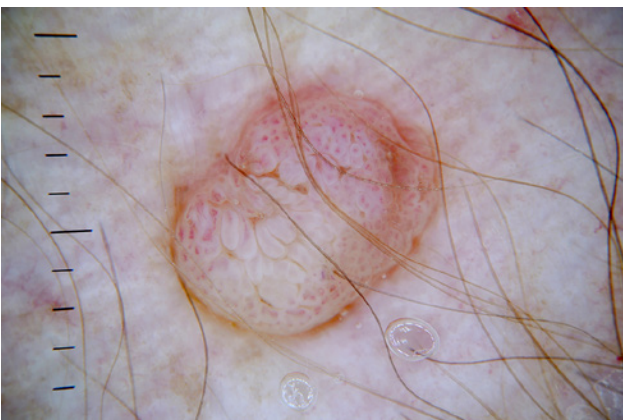
ally represents an endophytic, follicularly oriented seborrheic keratosis or verruca [3]. Armengot-Carbo et al describe the dermoscopic findings in IFK as radial peripheral hairpin vessels surrounded by a whitish halo arranged around a central white-yellowish amorphous area [2]. Histopathologically, IFK has been described as an exo-endophytic proliferation of keratinocytes that is sharply circumscribed; the proliferation has a lobular arrangement showing basaloid cells at the periphery and keratinocytes with more squamous differentiation at the center. Some of the keratinocytes form concentric configurations termed “squamous eddies.” Hyper- and/



**Figure 1A.** Clinical photograph demonstrating a red papule on the right volar forearm near the antecubital fossa. [Copyright: ©2017 Hocker et al.]



**Figure 1B.** Clinical close-up photograph showing a 7 mm red papule. [Copyright: ©2017 Hocker et al.]



**Figure 2.** Contact non-polarized dermoscopy demonstrating hairpin vessels surrounded by a white structureless area. [Copyright: ©2017 Hocker et al.]

or parakeratosis can also be seen [4]. Reflectance confocal microscopy (RCM) features of IFK have been previously described by Armengot-Carbo et al. These include epidermal projections, broadened honeycomb pattern, disarranged dermoepidermal junction, and looped vessels in the dermis [2]. The authors added that these findings could also be observed in other lesions, such as SCC.

Herein, we present the dermoscopic and RCM features of a single forearm lesion that was diagnosed by the pathologist as IFK.

## Report of a Case

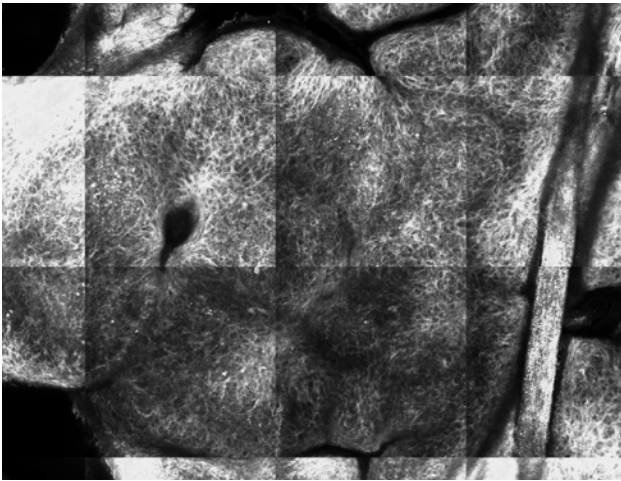
A 43-year-old male presented to the clinic for an evaluation of an isolated lesion on the right forearm, which he had noted three weeks prior. Clinically, this was a 7 mm pink to erythematous papule with a verrucous surface (Figure 1A, B). Dermoscopy revealed a lobular arrangement with multiple ridges and fissures, whereby lobules were white with central coiled vessels or twisted-loop vessels (Figure 2).

The differential diagnosis included SCC, irritated seborrheic keratosis, and verruca vulgaris. RCM imaging of the lesion demonstrated an overall lobular arrangement of the epidermis. At closer examination, there was an irregular honeycomb pattern of the granular and spinous layers, with variability in the brightness and thickness of the lines and size of the holes composing the honeycomb. The corneal layer did not display a thick scale or parakeratosis. The dermal papillae were well demarcated and occasionally showed edged papillae and some bright dots (compatible with inflammatory cells) (Figure 3A, B).

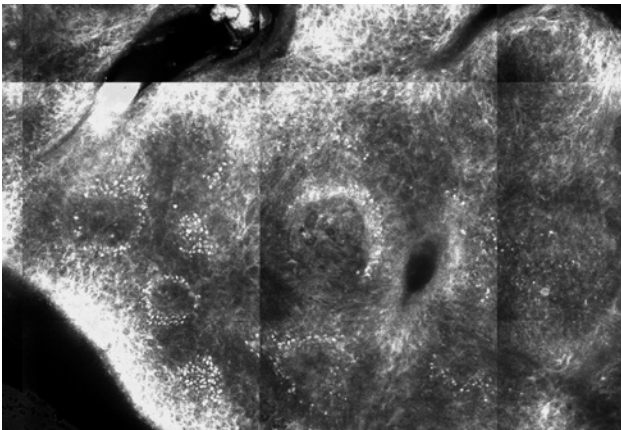
An area showed widening of the interpapillary spaces, consistent with acanthosis. The RCM findings were equivocal—the irregularity of the honeycomb pattern raised concern for SCC, while the lack of scale/parakeratosis did not support that diagnosis. To reach a definitive diagnosis, a biopsy was performed. Histopathology revealed exo-endophytic epidermal hyperplasia, with hyperkeratosis, hypergranulosis, and a slightly disorganized and crowded proliferation of basaloid and squamous keratinocytes with occasional squamous eddies. In the underlying papillary dermis, the blood vessels were dilated and tortuous. (Figure 4A, B, C). The dermatopathologist's diagnosis was IFK.

## Comment

Controversy exists regarding the recognition of IFK as a distinct entity, or a variant of verruca vulgaris or irritated seborrheic keratosis. Herein, we presented a case of an isolated lesion on the right forearm that mimicked a SCC with RCM examination. Weedon posited that the endophytic portion of IFKs helps to differentiate between IFKs and seborrheic keratoses and that human papillomavirus is not identified in most cases of IFK [5]. In contrast, Ackerman concluded that, “inverted follicular keratosis is a resolving verruca vulgaris usually positioned on a face and associated with squamous



**Figure 3A.** RCM mosaic (1.5 X 1.5 mm<sup>2</sup>) at the spinous and granular layers displaying an irregular honeycomb pattern. [Copyright: ©2017 Hocker et al.]



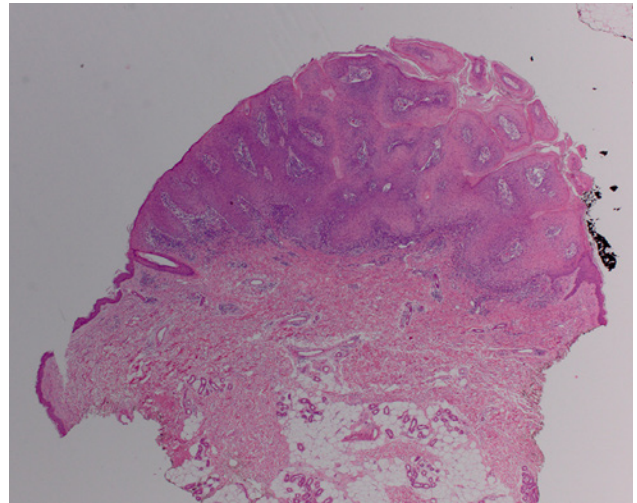
**Figure 3B.** RCM image (1X1mm<sup>2</sup>) at the dermo-epidermal junction showing bright-edged papillae. An irregular honeycomb pattern was identified in the adjacent spinous layer. [Copyright: ©2017 Hocker et al.]

eddies” [6]. He also wrote that human papillomavirus has been demonstrated in IFK.

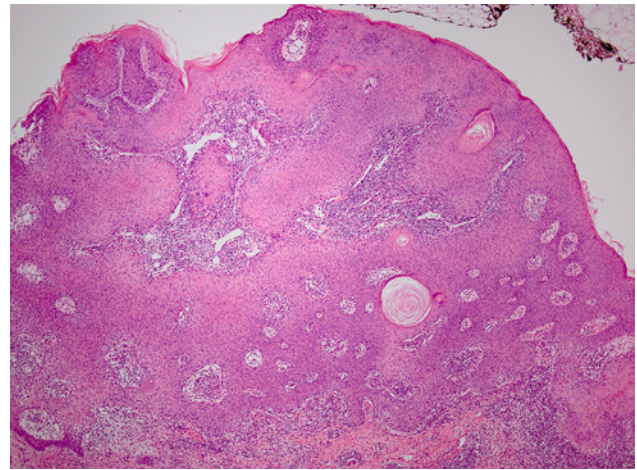
Based on the clinical and dermoscopic appearance of our case, we believe this case diagnosed as IFK may actually represent an irritated seborrheic keratosis. While the RCM pattern observed in this lesion can also be seen in an irritated seborrheic keratosis, the irregularity of the honeycomb pattern posed a diagnostic pitfall that required a biopsy to exclude SCC.

## References

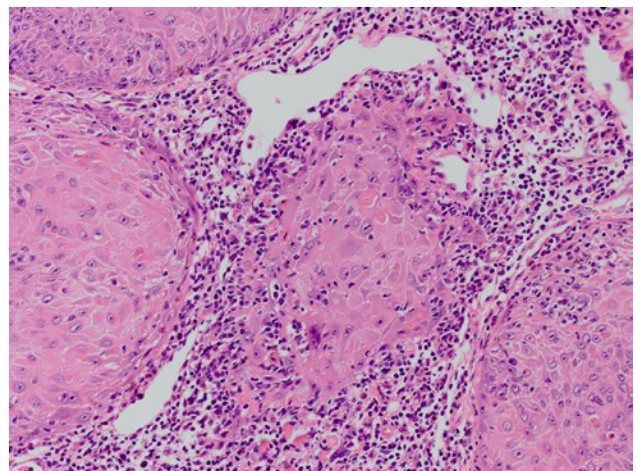
1. Bologna JL, Jorizzo JL, Rapini RP. Benign epidermal tumors and proliferations. In: Bologna J, Jorizzo JL, Rapini RP, et al. *Dermatology*. 2nd ed. London: Mosby Elsevier; 2008:1666.
2. Armengot-Carbo M, Abrego A, Gonzalez T, et al. Inverted follicular keratosis: dermoscopic and reflectance confocal microscopic features. *Dermatology*. 2013;24;227(1):62–66.



**Figure 4A.** Histopathology image at scanning magnification revealing an exo-endophytic epidermal proliferation. [Copyright: ©2017 Hocker et al.]



**Figure 4B.** Histopathology image at higher magnification demonstrating an acanthotic epidermis with slight squamous disarray, squamous eddies and crowded basaloid cells. There are dilated, tortuous vessels in the dermal papillae. [Copyright: ©2017 Hocker et al.]



**Figure 4C.** Histopathology image at higher magnification showing squamous eddies, dyskeratotic keratinocytes, and a predominantly lymphocytic inflammatory infiltrate. (A, B, and C, hematoxylin-eosin stain.) [Copyright: ©2017 Hocker et al.]

3. Spielvogel RL, Austin C, Ackerman AB. Inverted follicular keratosis is not a specific keratosis but a verruca vulgaris (or seborrheic keratosis with squamous eddies). *Am J Dermatopathol*. 1983;5(5):427-442.
4. Azzopardi JG, Laurini R. Inverted follicular keratosis. *J Clin Pathol*. 1975;28(6):465-471.
5. Weedon D, Strutton G, Rubin AI. Tumors of cutaneous appendages. In: Weedon D, Strutton G, Rubin AI. *Weedon's Skin Pathology*. Edinburgh: Churchill Livingstone/Elsevier; 2010:765-766.
6. Ackerman AB. Inverted follicular keratosis, tricholemmoma, and desmoplastic tricholemmoma? In: *Resolving Quandaries in Dermatology, Pathology & Dermatopathology*. Volume II. New York, NY: Ardor Scribendi, Ltd., 2003