Published in final edited form as:

Br J Dermatol. 2018 February ; 178(2): e136–e137. doi:10.1111/bjd.15964.

Variation in dermoscopic features of basal cell carcinoma as a function of anatomic location and pigmentation status

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Research Letter

Detecting basal cell carcinomas (BCCs) early and at relatively small sizes may expand therapeutic choices and enable less invasive treatment options. To this end, dermoscopy is a useful tool to diagnose BCC at early stages with high sensitivity and specificity.¹ Superficial BCCs have been shown to be independently associated with location on the trunk and extremities and nodular BCCs have been independently associated with a head/neck location.^{2,3} Few studies have evaluated dermoscopic variation in BCC morphology as a function of anatomic location and pigmentation status.^{4,5} Herein, we evaluate BCC dermoscopic morphology based on pigmentation status and anatomic location.

We conducted a retrospective analysis of patient demographics and dermoscopic and clinical features of consecutive histopathologically proven BCCs that had been biopsied from December 1, 2007 and March 1, 2014 in the Pigmented lesion clinic of Skin and Cancer Associates, Plantation, Florida, USA. Collision and recurrent tumours, and cases with poor image quality were excluded. Clinical and dermoscopic images were taken *in vivo* with a Nikon Coolpix 4500 camera Nikon USA, Inc., Melville, USA and DermLite II Pro HR and DermLite II Fluid dermoscopes, 3Gen Inc., San Juan Capistrano, USA at 10×. Dermoscopic images were routinely taken via non-polarised and polarised contact and non-contact

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The authors have no conflict of interest to declare.

Preliminary data from this study was previously presented at the American Academy of Dermatology Poster Presentation in 2017.

dermoscopy. Each lesion was classified by anatomic site as: head/neck, upper extremities (UE), trunk, and lower extremities (LE). Lesions were assessed for pigmentation and for the presence/absence of dermoscopic features.

Of 479 consecutively biopsied BCCs evaluated, 392 histopathologically proven BCCs on 348 unique patients were included in the study (87 excluded with poor image quality). Tumours were on the head/neck for 169 (43.1%) lesions, trunk for 129 (32.9%), LE for 54 (13.8%), and UE for 40 (10.2%). The average patient age was 64.9 years (min/max: 50.0–79.8). Pigmented lesions significantly varied across anatomic sites, with the highest frequency on the UE (65.0%) and lowest frequency on the head/neck (49.1%).

Compared to other anatomic sites (head/neck, UE, and trunk) combined, BCCs on LE had a higher frequency of polymorphous vessels (74% v. 44%), thin serpentine vessels (81% v. 63%), shiny white blotches (85% v. 46%), long white strands (76% v. 45%), erythema (87% v. 59%), and erosions/ulcers (69% v. 35%) ($p = 0.01$ for all comparisons). BCCs on the LE had the lowest frequency of arborizing vessels (24% v. 78%) ($p = 0.0001$) when compared to all anatomic sites.

Overall, while 264 lesions contained arborizing vessels, 84 contained additional vessel morphologies resulting in the polymorphous attribute. Clinically 35.2% BCCs were pigmented, and 57.7% were pigmented under dermoscopy. Compared to pigmented BCCs, non-pigmented BCCs were more likely to have arborizing vessels (77% v. 59%), erythema (57% v. 46%), shiny white blotches (48% v. 34%), and long white strands (47% v. 33%) ($p < 0.05$ for all) (Table 1).

BCCs on the LE have been associated with female gender, a younger age at diagnosis, and a superficial histopathological subtype.⁶ While studies examined dermoscopic morphology of BCC of the head/neck v. truncal location,⁵ data is limited on dermoscopic features of BCCs on the LE. In corroboration with Suppa et al, we found that BCCs of the head/neck frequently presented with arborizing vessels and BCCs on the trunk frequently presented with leaf-like structures, concentric structures, erosions/ulcers, and polymorphous vessels. It is important to note that our analysis included the full spectrum of BCC histopathologic subtypes (including infiltrative and morpheaform). In addition, the present study evaluated all BCCs with non-polarised and polarised images.^{4,5} By including non-polarised and polarised images for every lesion, we characterised the full spectrum of dermoscopic features in BCC.

The dermoscopic picture of BCCs on the LEs described in this study is strikingly different from those on the head/neck. Our study has established that SWS, polymorphous vessels, and ulceration/erosions should raise suspicion for BCC.⁷ This is an important finding since polymorphous vessels and ulceration are features highly associated with melanoma.⁸ Our experience and the findings show that the combination of dermoscopic features of polymorphous vessels, ulcerations/erosions, and SWS, identified via polarised light, can tilt the differential towards BCC, especially in LE lesions.

In the present study, the BCC subtype was predominantly nodular, then infiltrative, superficial, and other. The subtype distribution reflects an older population with sun-

damaged skin presenting to the study clinic. Our sample size precluded us from meaningfully exploring the relationship between BCC subtype and anatomic. Other limitations include use of images from a single practice and a retrospective study design. Despite these limitations, we demonstrate BCCs have varying presentations depending on anatomic location and pigmentation status, with a novel description of the unique presentation of BCCs on the LEs.

Acknowledgments

This research was funded in part through the NIH/NCI Cancer Center Support Grant P30 CA008748.

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Table 1

Dermoscopy features as a function of anatomic location and pigmentation

Dermoscopy Features	Total (N=392)		Head/Neck (N=169)		Lower Extremity (N=54)		Other* (N=169)	
	Pigmented (N=226)	Non-pigmented (N=166)	Pigmented (N=83)	Non-pigmented (N=86)	Pigmented (N=33)	Non-pigmented (N=21)	Pigmented (N=110)	Non-pigmented (N=59)
Blue-Grey Ovoid Nests	96 (43%)	–	43 (52%)	–	10 (30%)	–	43 (39%)	–
Blue-Grey Globules	135 (60%)	–	45 (54%)	–	19 (58%)	–	71 (65%)	–
Brown Ovoid Nests	39 (17%)	–	16 (19%)	–	2 (6%)	–	21 (19%)	–
Leaf-like Structures	79 (35%)	–	24 (29%)	–	7 (21%)	–	48 (44%)	–
Erosions/Ulcers	63 (28%)	54 (33%)	18 (22%)	15 (18%)	20 (61%)	17 (81%)	25 (23%)	22 (37%)
Dots	179 (79%)	0 (0%)	54 (65%)	0 (0%)	28 (85%)	0 (0%)	97 (88%)	0 (0%)
Long white strands	74 (33%)	78 (47%)	16 (19%)	28 (33%)	23 (70%)	18 (86%)	35 (32%)	32 (54%)
Shiny white blotches	76 (34%)	79 (48%)	15 (18%)	25 (29%)	26 (79%)	20 (95%)	35 (32%)	34 (58%)
Thin Serpentine	129 (57%)	83 (50%)	40 (48%)	29 (34%)	27 (82%)	17 (81%)	62 (56%)	37 (63%)
Polymorphous vessels	86 (38%)	63 (38%)	21 (25%)	23 (27%)	22 (67%)	18 (86%)	43 (39%)	22 (37%)
Arborizing Vessels	134 (59%)	128 (77%)	49 (59%)	74 (86%)	4 (12%)	9 (43%)	81 (74%)	45 (76%)
Erythema	103 (46%)	95 (57%)	25 (30%)	28 (33%)	26 (79%)	21 (100%)	52 (47%)	46 (78%)

* Other is a combination of upper extremities and trunk. Pigmentation status is based on dermoscopy.

Bolded values indicate significance of p<0.01 by the Fisher's two-tailed exact test when compared to pigmented counterpart.