SHORT REPORT

What is the impact of tumour size on dermoscopic diagnosis of BCC?

M. Popadić,[1]* J. Vukićević[1,2]

[1]Clinic of Dermatovenereology, Clinical Centre of Serbia, Belgrade, Serbia
[2]Faculty of Medicine, University of Belgrade, Belgrade, Serbia
*Correspondence: M. Popadić. E-mail: popmira@gmail.com

Abstract

Background The effect of size on diagnostic performance of dermoscopy in basal cell carcinomas (BCCs) is yet to be determined.

Objectives To investigate the differences in dermoscopic features between small- and large-sized BCCs.

Methods A total of 151 BCCs consecutively collected during a 2-year period were analysed. These tumours were evaluated for the presence of various dermoscopic features (colours, structures and vessels) using the contact polarized dermoscopy. Differences in proportions were evaluated by means of chi-squared test and Fisher's exact test, when appropriate.

Results In all, 62 (41.1%) small (≤1 cm) and 89 (58.9%) large (>1 cm) BCCs were included. Arborizing vessels, short fine telangiectasias (SFT) and multiple small erosions were significantly ($P < 0.05$) more frequent in the group of large BCCs. Further analysis of the effect of size on dermoscopic features within the specific groups, nodular, superficial and ulcerated, found significant difference only in the group of nodular BCCs. Structureless hypopigmentation was significantly ($P < 0.05$) more frequent in the group of large nodular BCCs in comparison with the small ones.

Conclusions Despite determined differences in vascular features and multiple erosions between the small and large BCCs, the results of further investigation within the specific groups indicate that dermoscopy is reliable for the diagnosis of BCC regardless of its size.

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Conflicts of interest

None.

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None.

Background

Basal cell carcinoma is by far the most common cancer that affects fair-skinned population, with an increasing incidence particularly in young individuals. Incidence is rising rapidly, 10% each year worldwide, and soon prevalence will equal that of all other cancers together.[1] As a consequence of such high incidence, BCCs make an enormous financial burden on the health care system.

Despite the low mortality rate associated with them, BCCs destroy underlying tissues and should be removed at the earliest possible stage.[2] Therefore, early detection and surgical removal are mandatory to avoid significant morbidity caused by this tumour.

Dermoscopic features of BCCs have been extensively studied and well defined.[1–8] Their assessment has definitely improved the diagnosis of BCC. However, the impact of tumour size on diagnostic performance of dermoscopy in BCCs has not yet been determined.

Therefore, the aim of the study was to assess the differences in terms of dermoscopic features between the small and large BCCs.

Materials and methods

A prospective observational study analysed the adult patients consecutively admitted to the University Clinic of Dermatovenereology, during a 2-year period (2009–2011), who had clinically suspected BCC. Information on gender, age at excision, tumour size, tumour location and histological diagnosis was also obtained.

The study focused on the differences in the frequencies of dermoscopic features between the small and large BCCs. Individual lesions were categorized according to the size of BCC as:

Table 1 Distibution of dermoscopic features in BCCs of different sizes

Dermoscopic features	≤1 cm (*n* = 62)	>1 cm (*n* = 89)	Chi-square stat. *P* value
Classical dermoscopic features			
1. Large blue-grey ovoid nests	18	25	0.899
2. Leaf-like areas	13	16	0.646
3. Spoke-wheel areas	9	13	0.988
4. Multiple blue-grey globules	17	37	0.074
5. Arborizing vessels	16	37	**0.046**
6. Arborizing microvessels	31	43	0.838
7. Ulceration	11	24	0.186
Non-classical dermoscopic features			
8. Milky-red background	50	78	0.239
9. SFT	7	23	**0.027**
10. Multiple erosions	17	42	**0.014**
11. Multiple dots	16	19	0.523
12. White lines	16	32	0.188
13. White areas	30	48	0.502
14. Translucency	20	19	0.132
15. Structureless hyperpigmentation	25	37	0.878
16. Structureless hypopigmentation	14	33	0.058

(significant difference is shown in bold values).

small (≤1 cm) and large (>1 cm). Furthermore, three larger histological groups, nodular, superficial and ulcerated, were also assessed according to the tumour size.

For each suspected skin lesion, close-up clinical and dermoscopic images were photographed *in vivo* using immersion oil and digital camera (Nikon Coolpix 4500; Nikon Corporation, Tokyo, Japan) (4.0 megapixels, 4 × zoom) and stored in the study database (Excel, Microsoft office). Dermoscopic photographs were taken with contact polarized dermoscopy (DermLite Photo dermatoscope, 3Gen LLC, Dana Point, CA, USA) coupled with the above-mentioned digital camera. The study was approved by the Institutional Review Board and Ethics Committee.[9,10]

The diagnostic system used for dermoscopic examination was pattern analysis. All clinically suspected lesions of BCC were scored for the presence of dermoscopic features defined according to previous studies,[1–8] and included: (i) large blue-grey ovoid nests, (ii) leaf-like areas, (iii) spoke-wheel areas, (iv) multiple blue-grey globules, (v) arborizing vessels, (vi) arborizing microvessels, (vii) ulceration, (viii) milky-red background, (ix) SFT, (x) multiple erosions, (xi) multiple dots, (xii) white lines, (xiii) white areas, (xiv) translucency, (xv) and (xvi) structureless hyperpigmentation/hypopigmentation (areas devoid of dermoscopic structures and without regression). The presence of dermoscopic feature was considered positive to diagnose BCC.

Afterwards, each lesion was subsequently excised or biopsied, and diagnoses were confirmed by a pathologist, who also classi-

Table 2 Distribution of dermoscopic features in nodular, superficial and ulcerous BCCs of different sizes

Dermoscopic features	Nodular BCCs			Superficial BCCs			Ulcerated BCCs		
	≤1 cm (*n* = 32)	>1 cm (*n* = 28)	Chi-square *P* value	≤1 cm (*n* = 18)	>1 cm (*n* = 39)	Chi-square *P* value	≤1 cm (*n* = 7)	>1 cm (*n* = 14)	Fisher exact test
Classical dermoscopic features									
1. Large blue-grey ovoid nests	6	11	0.078	5	11	0.973	2	1	0.247
2. Leaf-like areas	3	3	0.863	8	12	0.315	0	0	–
3. Spoke-wheel areas	5	3	0.577	4	7	0.704	0	0	–
4. Multiple blue-grey globules	8	12	0.143	5	19	0.137	2	3	1.0
5. Arborizing vessels	14	17	0.189	0	7	0.055	2	10	0.159
6. Arborizing microvessels	18	14	0.628	7	13	0.683	4	10	0.638
7. Ulceration	4	8	0.121	0	1	0.493	7	14	1.0
Non-classical dermoscopic features									
8. Milky-red background	25	21	0.775	18	38	0.493	4	12	0.280
9. SFT	0	2	0.124	6	16	0.579	1	2	1.0
10. Multiple erosions	7	12	0.081	10	25	0.538	0	0	–
11. Multiple dots	9	6	0.550	7	9	0.217	0	2	0.533
12. White lines	7	9	0.369	5	16	0.335	3	3	0.354
13. White areas	16	19	0.162	6	18	0.362	4	5	0.397
14. Translucency	17	18	0.382	0	0	–	0	0	–
15. Structureless hyperpigmentation	12	12	0.673	10	16	0.306	0	3	0.521
16. Structureless hypopigmentation	3	9	**0.028**	10	21	0.904	0	0	–

(significant difference is shown in bold values).

fied the BCC subtypes into six histological categories. In mixed-type lesions, the superiority rule was applied according to the most unfavourable subtype: aggressive > non-aggressive. In the case of two mixed non-aggressive subtypes, the predominant subtype was considered.

While the interobserver error of the method was not formally tested, the model provided strict morphologic definitions for each feature[1–8] and used only present or absent scoring criteria.

Statistical analysis

Mean ± SD and frequencies were calculated for clinical, dermoscopic and histological data. To examine whether there was a significant statistical difference between categories, chi-squared and Fisher's exact tests were applied. The chi-square statistic for trend was used to test the null hypothesis of no association between the proportion of variation and the categorical variables. All *P*-values cited were two sided, and *P*-values of less than 0.05 were considered statistically significant.

Results

The final test set included 151 histologically confirmed BCCs. The tumours were obtained from 64 males (55.2%) and 52 females (44.8%), aged from 29 to 92 years, [median age, 67.7 years, (SD:12.2)]. Individual lesions were located on the head/neck region (61.6%), followed by trunk (31.1%) and extremities (7.3%). The majority of study population had skin phototype I or II.[9,10]

The diameters of the lesions, measured clinically, ranged from 0.3 to 7 cm [mean 1.55 cm, (SD 1.17)]. Sixty-two (41.1%) BCCs were 1 cm or smaller and 89 BCCs (58.9%) had diameters between 1.1 and 7 cm. Of the 62 small BCCs, 51.6% were nodular, 29% superficial, 11.3% ulcerated and 8.1% pigmented. In the group of large BCCs, 43.8% were superficial, 31.5% nodular, 15.7% ulcerated, 4.5% morpheaform, 3.4% infiltrative and 1.1% pigmented.

All lesions included in the group of small tumours were primary BCCs, whereas in the group of large BCCs, one (1.1%) was recurrent BCC (infiltrative type). All aggressive BCCs of the study were in the group of large BCCs.

On dermoscopic examination, all tumours showed asymmetry in terms of morphologic structures, pigmentation and vessels. Dermoscopic evaluation showed an overall lack of pigment network (144 of 151, 95.3%), and the presence of one or more positive features. In all, 16 dermoscopic features were scored for every lesion. The distribution of dermoscopic features among test groups and P-values are shown in Tables 1 and 2.

Relevant dermoscopic features in BCCs 1 cm or smaller in diameter (Fig. 1) were compared with those in BCCs 1.1 cm and larger (Fig. 2); arborizing vessels, SFT and multiple erosion were significantly ($P < 0.05$) more frequent in the group of large BCCs in comparison with the small BCCs. Furthermore, regarding the group of nodular BCCs, significant difference ($P < 0.05$)

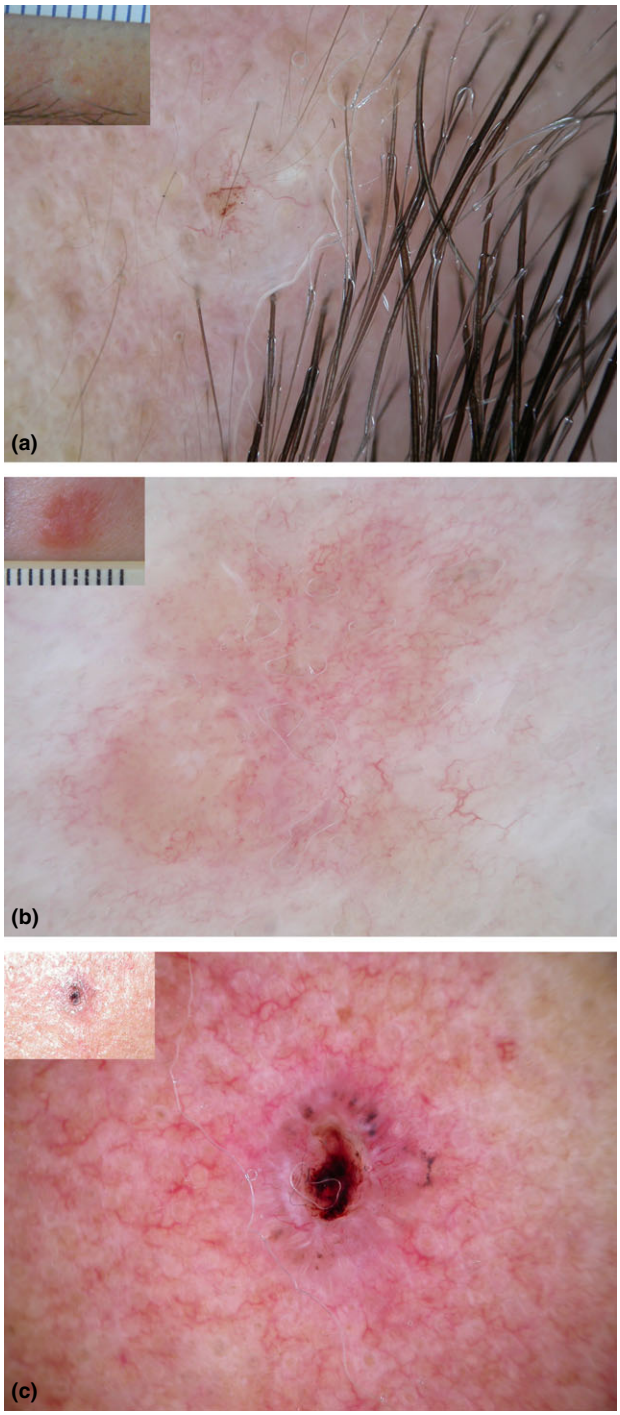

Figure 1 Dermoscopic features of the small BCCs: (a) nodular BCC – arborizing microvessels, small erosion in the center; (b) superficial BCC – arborizing microvessels, structureless hyperpigmentation; (c) ulcerated BCC – central ulceration, white areas, arborizing microvessels, multiple pigmented dots and globules.

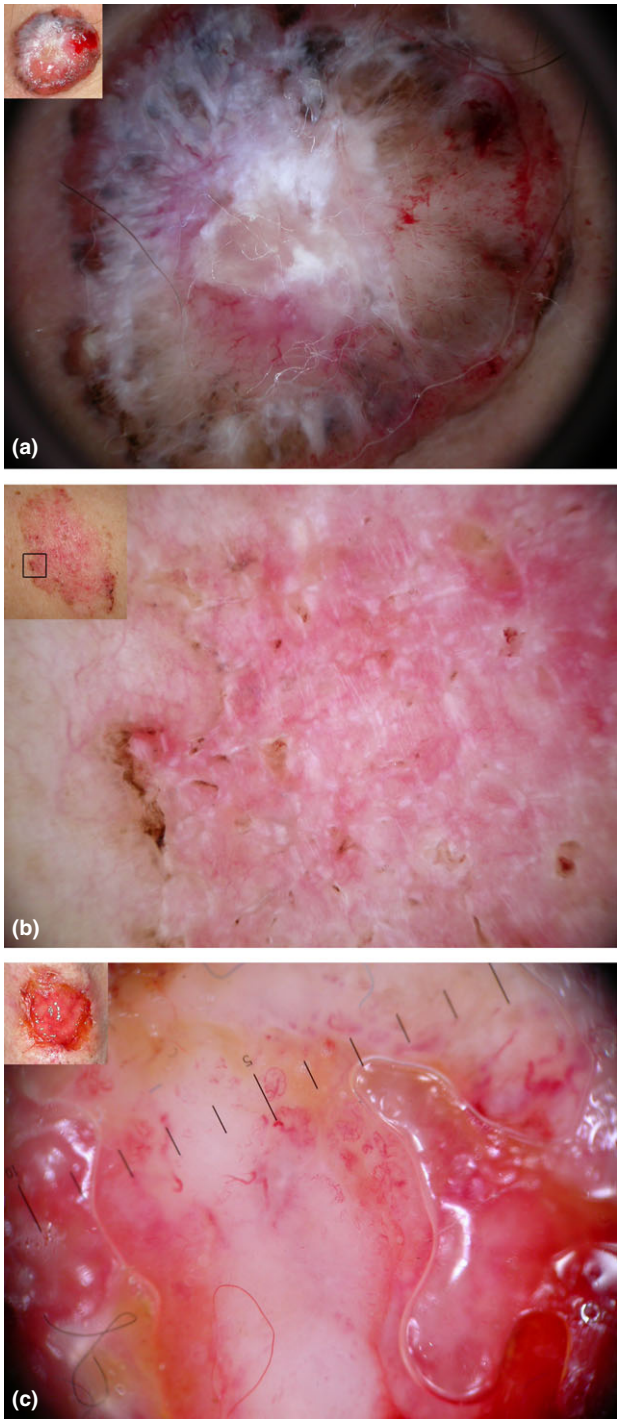

Figure 2 Dermoscopic features of the large BCCs: (a) nodular BCC – arborizing vessels, white shiny areas, blue-grey ovoid nest, multiple blue-grey globule, haemorrhage; (b) superficial BCC – multiple small erosion, milky red background, SFT, white shiny lines; (c) ulcerated BCC – central ulceration, white areas, polymorphous vessels, sticky sign.

was found only for structureless hypopigmentation in favour of large BCCs. In groups of superficial and ulcerated BCCs, no significant differences in terms of dermoscopic features were found between BCCs 1 cm and smaller and the larger ones.

Discussion

Within the past two decades, an exponential number of publications have emerged on the topic of BCC, most, if not all, reporting the benefits of using a dermatoscope. It has been demonstrated that dermoscopy, as an adjunct to clinical examination, improves the diagnostic accuracy of BCCs up to 90%.[2,7]

However, the effect of tumour size on the diagnostic performance of dermoscopy in BCC has not been evaluated. To our knowledge, only one study has taken into consideration the effect of tumour size on dermoscopic finding in BCCs. Sanchez-Martin *et al.*[11] statistically analysed the effect of tumour size on the frequency of dermoscopic features and found no significant differences in terms of dermoscopic features between BCCs 3 mm or smaller and those between 3.1 and 5 mm. Their study showed that typical dermoscopic features of BCC were usually present from the beginning of the natural history of this tumour.[11]

Contrarily, the effect of size on the diagnostic performance of dermoscopy in melanoma has been investigated much more, and proven to be lower for small melanocytic lesions (< 6 mm in diameter).[12,13]

This study shows that tumour development affects dermoscopic features, particularly tumour vascularization. Arborizing vessels and SFT have been statistically more frequent in BCCs larger than 1 cm. Frequent finding of SFT in the larger tumours may be explained by the presence of superficial BCCs in larger proportion in the group of large BCCs; in addition, all aggressive BCCs of the study (morpheaform, infiltrative) were in this group. Furthermore, significant finding of multiple erosions in the larger BCCs is in concordance with BCCs tendency to ulcerate early in contrast to melanoma or SCC.

Furthermore, the study examined the effect of size on dermoscopic features within specific groups, namely, nodular, superficial and ulcerated BCCs. Finding of significant difference for structureless hypopigmentation in favour of larger nodular BCCs has no particular impact on diagnostic performance of dermoscopy, because BCCs are generally non-pigmented lesions. In another words, the diagnostic performance of dermoscopy in BCCs should be high for nodular BCCs of both size, small and large, as well as for two other histological groups, superficial and ulcerated BCCs, for which significant difference in frequency of dermoscopic features between BCCs of different sizes was not established.

In conclusion, the findings of this study reveal that there are significant differences in tumour vascularization and destruction of tumour tissues between the small and large BCCs, which are expected with the natural development of the tumours. How-

ever, significant differences in dermoscopic features within the specific groups were not determined, indicating that BCCs can be accurately diagnosed using dermoscopy, regardless of their size.

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