Dermatology Practical & Conceptual

Dermoscopic Pattern of Basal Cell Carcinoma in H- and Non-H-zones

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ABSTRACT

Introduction: Basal cell carcinoma (BCC) localized in the H-zone, the region of fusion of embryonic masses, has been associated with a higher risk of deeper invasion and more frequent recurrence.

Objectives: The aim of the study was to compare dermoscopic features of BCC in H and non-H zone that may most appropriately characterize those two locations.

Methods: Dermoscopy images of histopathologically confirmed BCCs from 120 patients were retrospectively analyzed. Dermoscopy features of BCC in H- and non-H zone were described and a comparative study of the dermoscopic pattern of BCC between the two locations was performed.

Results: Of 120 BCC cases included in this study, 41 (34.2%) were located in the H-zone. The most frequent histological type was nodular (51.3% in H- zone and 61.6 % in non-H-zone) followed by superficial (5.1% and 19.8 % in H and non-H-zone respectively).

In dermoscopy, there was a higher prevalence of ulceration (73.2% versus 43.6%, $P < 0.001$) in H-zone and a lower prevalence of brown globules (26.8% versus 53.2%; $P = 0.01$), when compared with the non-H-zone.

Conclusions: Our results show that dermoscopic features of BCC on the face fulfill a typical pattern regardless of the region, except for the prevalence of the ulceration which is significantly more frequent in H-zone and the brown globules present significantly more often in the non-H-zone It can be hypothesized that H-zone might predispose to more aggressive course of BCC complicated by ulceration and consequently deeper tissue destruction.

Introduction

Basal cell carcinoma (BCC) is the most often diagnosed cancer in the fair-skinned population and its prevalence has increased dramatically over the last years [1]. Although BCC has generally a good prognosis, due to its high prevalence, it generates significant medical and economic problems worldwide. The most important risk factor of BCC is exposure to ultraviolet radiation, which is why it arises most frequently de novo on the face [1,2]. BCC has a generally slow-growing pattern, however, lesions located on the face appear to be more aggressive [3,4].

The facial area called the H-zone, consisting of the nose, eye and ear region correspond to the locations of fusion of embryonic masses of mesoderm and the ectoderm. This zone is related to the higher risk of occurrence of BCC and its more aggressive expansion [5-7].

Clinically, the accuracy of BCC diagnosis is approximately 60%, while dermoscopy, as an easily available and noninvasive diagnostic technique, can increase this quotient to over 90% [8,9]. The dermoscopy pattern of BCC has been extensively studied, including the differences depending on the anatomical location, however, the diagnostic criteria are continuously updated [10,11].

Objectives

Taking into consideration the reported differences in the clinical course of the BCCs located in the H-zone, the aim of the study was to compare dermoscopic features of BCC in the H-zone and non-H-zone that may most appropriately characterize those two locations.

Methods

Dermoscopy images of 120 BCCs of patients with skin phototype II recruited from the Department of Dermatology, Medical University of Silesia in Katowice, and "Estevita" Specialist Medical Practice between 2017 and 2020, were analyzed. The location and histological type of the lesion, age and gender of each patient, were analyzed. Patients with genetic disorders predisposing to BCC were excluded from the analysis. The anatomic location of tumors was classified as H-zone (nose, ear, eye) and non-H-zone (forehead, cheek, chin and the rest of the face and neck) based on the decision of two separate authors. If the lesion had been located in the border zone between the aforementioned anatomical locations or there was a discordance in the authors decision, its eventual classification was based on the discussion of all three authors. Classical dermoscopic features of BCC like arborizing telangiectasias, leaf-like structures, blue-gray ovoid nests, blue-gray non-aggregated globules, spoke-wheel structures, ulceration and less specific features like milia cysts, brown globules and short fine telangiectasias (SFT) and shiny white areas were assessed by two independent authors.

All features were classified as present or absent and then comparison between H and non-H zone was made. Dermoscopic evaluation with light pressure and solely with ultrasound gel was performed with Medicam 1000 FotoFinder Systems GmbH camera by 3 experienced observers.

Statistical Analysis

The categorical variables were presented in both absolute numbers and percentages, while the due to non-normal distribution of the continuous variables, their results were summarized using the median with a quartile 1 and 3. Normality of distribution was tested using the Shapiro-Wilk test. Between-group comparisons of continuous variables were conducted using the Mann–Whitney U test, while Pearson chi-squared test was used to evaluate the categorical variables. The interval of two-sided $P < 0.05$ was considered statistically significant. STATISTICA 10 (StarSoft Inc.) was used for all calculations. The approval of the bioethics committee was not required, based on the PCN/0022/KB/34/21 decision of the Bioethics Committee of the Medical University of Silesia in Katowice. All patients gave an informed written consent to participate in the study.

Results

Of 120 BCC cases included in this study, 41 (34.2%) were located in the H-zone as presented in Table 1 and the Figure 1. The most frequent histological type was nodular (51.3% in the high-risk zone and 61.6 % in the non-H-zone) followed by the superficial (5.1% and 19.8% in H- and non-H-zone respectively) as demonstrated in Table 2.

Arborizing telangiectasias and short fine telangiectasias were the most frequently seen dermoscopy features in both face regions, with similar prevalence in the H and non-H zone. Arborizing telangiectasias were present in 78.0% and 77.2 % and short fine telangiectasias in 78.0% and 84.8 % in H-zone and non-H-zone respectively. The features of pigmentation such as leaf-like structures, blue-gray ovoid nests blue-gray globules were present in comparable incidence in both groups, with exception of brown globules, which were present significantly more often in the non-H- zone (53.2% versus 26.8%, $P = 0.01$). Moreover, there was a significantly higher prevalence of ulceration in the H-zone than in the non-H-zone (73.2% versus 43.6 %, $P < 0.001$).

Conclusions

BCC develops mainly as a result of interactions between environmental and genetic factors. However, disorders during

Table 1. Comparison of dermoscopic features in H- and non-H-zones*.

Analysed Dermoscopic Features		H-zone (N=41)	Non-H-zone (N=79)	P
Arborizing teleangiectasias, N (%)				0.91
	Absent	9 (22.0%)	18 (22.8%)	
	Present	32 (78.0%)	61 (77.2%)	
Leaf-like structures, N (%)				0.14
	Absent	33 (80.5%)	52 (65.8%)	
	Present	8 (19.5%)	27 (34.2%)	
Blue-gray ovoid nests, N (%)				0.22
	Absent	28 (68.3%)	45 (57.0%)	
	Present	13 (31.7%)	34 (43.0%)	
Blue-gray non-aggregated globules, N (%)				0.055
	Absent	29 (70.7%)	40 (50.6%)	
	Present	12 (29.3%)	39 (49.4%)	
Spoke-wheel structures, N (%)				0.13
	Absent	39 (95.1%)	67 (84.8%)	
	Present	2 (4.9%)	12 (15.2%)	
Milia cysts				0.16
	Absent	21 (51.2%)	51 (64.6%)	
	Present	20 (48.8%)	28 (35.4%)	
Short fine teleangiectasias, N (%)				0.45
	Absent	9 (22.0%)	12 (15.2%)	
	Present	32 (78.0%)	67 (84.8%)	
Brown globules, N (%)				0.010
	Absent	30 (73.2%)	37 (46.8%)	
	Present	11 (26.8%)	42 (53.2%)	
Ulceration, N (%)				<0.001
	Absent	11 (26.8%)	44 (56.4%)	
	Present	30 (73.2%)	35 (43.6%)	
Shiny white areas, N (%)				0.37
	Absent	12 (29.3%)	29 (36.7%)	
	Present	29 (70.7%)	50 (63.3%)	

the process of embryogenesis and their consequences on the clinical course of BCC still remain incompletely examined. H-zone, the region corresponding to places of fusion of embryonic masses, is considered a region of higher occurrence and recurrence of BCC, although it is uncertain, whether the location of the tumor plays a similar role in the development and prognosis of BCC as other, already established risk factors such as histologic subtype, the diameter of the lesion, and the patient health condition [7,12].

Dermoscopic criteria of BCC, which include arborizing telangiectasias, large blue/gray ovoid nests, multiple blue/gray globules, short fine telangiectasia, leaflike areas, multiple in-focus blue/gray dots, ulceration were proposed by Menzies et al [9].

The main results of our analysis are: 1) The dermoscopic image of the BCC cases differs depending on their development in the H-zone and non-H-zone 2) The prevalence of ulceration in the H-zone is significantly higher than in the non-H zone 3) The BCCs located in the non-H-zone tend to present brown globules in a significantly higher percentage than BCCs from the H-zone.

According to the literature, ulceration is a characteristic feature associated with worse clinical behavior, typically in nodular BCC [10,13,14]. In our study, it was nodular BCC that dominated the analyzed tumors, as it constituted 61.6% of tumors in the non-H-zone and 51.3% of tumors in the H-zone. These facts may indicate that a higher incidence of ulceration in the H-zone in our study does not solely reflect the histological subtypes of the tumors. On the basis of our results, one could hypothesize that tissue interference during mesenchymal fusion in embryogenesis might predispose to a more aggressive course of BCC complicated by ulceration

	H-zone (n=41)	Non-H-zone (n=79)	P
Female gender, n (%)	25 (61.0%)	37 (46.8%)	0.14
Age, median [Q1-Q3]	75 [65-79]	72 [63-80]	0.83
Arborizing teleangiectasias	32 (78.0%)	61 (77.2%)	0.91
Leaf-like structures	8 (19.5%)	27 (34.2%)	0.14
Blue-gray ovoid nests	13 (31.7%)	34 (43.0%)	0.22
Blue-gray non-aggregated globules	12 (29.3%)	39 (49.4%)	0.055
Spoke-wheel structures	2 (4.9%)	12 (15.2%)	0.13
Milia cysts	20 (48.8%)	28 (35.4%)	0.16
Short fine teleangiectasias	32 (78.0%)	67 (84.8%)	0.45
Brown globules	11 (26.8%)	42 (53.2%)	0.01
Ulceration	30 (73.2%)	35 (43.6%)	<0.001
Shiny white areas	29 (70.7%)	50 (63.3%)	0.37

Figure 1. Comparison of the dermoscopic features in H-zone and non-H-zone. In the lesions located in the H-zone, there is a higher prevalence of ulceration, and brown globules are more frequently observed in the non-H-zone.

Table 2. Comparison of histological subtypes in H- and non-H-zones.

Histological Subtype, N (%)	H-zone (N=39)	Non-H-zone (N=73)	P
Nodular	20 (51.3%)	45 (61.6%)	0.03
Superficial	2 (5.1%)	14 (19.8%)	
Infiltrative	3 (7.7%)	1 (1.4%)	
Micronodular	0 (0.0%)	2 (2.7%)	
Morpheiform	2 (5.1%)	0 (0.0%)	
Pigmented	3 (7.7%)	2 (2.7%)	
Multifocal	7 (18.0%)	7 (9.6%)	
Other	2 (5.1%)	2 (2.7%)	

in the H-zones. It has been proved that BCC located in fusion planes may demonstrate a deeper tissue invasion, due to the perpendicular arrangement of fibrous connective tissue favorable to infiltration [15-16].

The influence of the location of BCC on the prognosis, including the recurrence rate is still debated. Even though a recent, thorough analysis of 291 cases of BCC by Conforti et al evaluated their dermoscopy patterns with reference to the anatomical location, the authors included tumors located on the whole-body surface, thus the cancers located on the head/neck constituted approximately 47% of all analyzed cases [11]. Moreover, the cited manuscript did not divide the BCCs on the basis of embryological origin, as has been done in our manuscript.

Although in some studies, a significant increase in the recurrence rate of BCCs located in the H-zone was demonstrated, no such results were confirmed in the other analyses including the study of Yalcin, or Armstrong et al, who did not find any association between BCC location and the risk of invasion, ulceration and recurrence rate [15-17].

We found a significantly higher frequency of brown globules, not reported before in the literature. It should be noted

that these structures were more often visible in the non-H-zones (26.8% versus 53.2% p=0.01). This observation may be at least partially explained by the fact that the visibility of dermoscopic features is significantly instrument-dependent, therefore the same high-resolution device, namely the Medicam 1000 (FotoFinder Systems GmbH) used throughout the diagnostic process made detection of such petite structures possible [12,18]. Finally, an explanation for a lower incidence of brown globules in the H-zone can be the fact that in the presence of ulcerations, most often dominating the optical field of the dermoscopic image of the lesion, the visibility of the other structures may be worse.

It could be speculated that the differences between the dermoscopic features of BCCs present in H- and non-H-zones, which at the present state of knowledge of uncertain significance, may gain further importance with the increasing use of high-resolution equipment, including the use of optical super-high magnification dermoscopy or confocal dermoscopy, which could shed additional light on the dermoscopic diagnostics in BCC [19].

According to our results, the dermoscopic features of BCC on the face fulfil a typical pattern regardless of the region, except the ulceration, which is significantly more frequent in H-zone. Moreover, we found brown globules in a greater frequency than previously described in the literature. Compliance of our results with literature in terms of remaining pigmented and vascular structures can confirm that our study was conducted according to the generally accepted algorithm, moreover that this algorithm applies for H- and non-H-zone as well. Finally, it can be hypothesized that, within the limitations of our study, the location of BCC in the H-zone may predispose to its more aggressive course complicated by ulceration and consequently to deeper tissue destruction but further research is necessary to confirm these hypotheses. Precisely conducted dermoscopy, can be useful in the early detection of BCC and consequently can have a clinical implication in the selection of less invasive treatment options which is of highest importance considering its face localization.

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