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Original article

Dermoscopic Features of Basal Cell Carcinoma

Danica Tiodorović[1,2], Andrija Jović[1], Danijela Popović[1], Hristina Kocić[1], Aleksandra Ignjatović[2,3], Jovana Antonijević[2], Filip Veličković[2]

[1]*Clinic of Skin and Venereal Diseases, Clinical Center Niš, Niš, Serbia*
[2]*University of Niš, Faculty of Medicine, Niš, Serbia*
[3]*Public Health Institute, Center for Informatics and Biostatistics in Healthcare, Niš, Serbia*

SUMMARY

The aim of this study was to analyze the dermoscopic features in patients with pathohistologically confirmed basal cell carcinoma (BCC).

Our retrospective study included 54 patients with 76 BCCs in total, diagnosed in 2016 and 2017. All lesions were classified into four clinical types: nodular, pigmented, superficial and infiltrative. Digital dermoscopic images were evaluated by three observers. We selected five dermoscopic features for analysis, including: the absence of pigment network, the presence of arborizing vessels, blue-gray globules and ovoid nests, leaf-like areas and ulcerations.

In the total of 54 patients, there were 22 females and 32 males. At the moment of establishing the diagnosis, the patients' age was in the range from 31 to 84 years (median age 67 years). The most frequent clinical type was the nodular type with 28 confirmed diagnoses. Nodular BCC was more frequently localized on the head and neck areas compared to the trunk and limbs ($p < 0.01$). Dermoscopically, the absence of pigmented network was verified in all cases. Arborizing vessels were present in 71 (93.4%) lesions, blue-gray globules and ovoid nests in 33 (42.1%), ulcerations in 44 (57.9%), and leaf-like areas in 5 (6.6%) lesions. Blue-gray globules and ovoid nests were significantly frequent in pigmented BCC in comparison to other clinical types of BCC ($p < 0.01$).

In conclusion, using dermoscopy, it is entirely possible to make a reliable diagnosis of BCC as well as to differentiate it from others skin tumors.

Key words: **basal cell carcinoma, dermoscopy, differential diagnosis**

Corresponding author:
Danica Tiodorović
Email: danica.dr@gmail.com

INTRODUCTION

Basal cell carcinoma (BCC) is the most common skin cancer, and one of the most common cancers overall (1-5). The incidence of BCC is growing worldwide, reaching 10% annually, and therefore is expected to reach the prevalence of all the other cancers together (3). As the incidence of this disease is constantly growing, this neoplasm is considered today a global health problem. Although a large number of BCC is diagnosed annually, metastases are extremely rare, accounting from 0.0028 to 0.5% (1-5).

Etiology is multifactorial, being usually associated with the exposure to the ultraviolet and ionzing radiation, occupational chemicals, and immunosuppression. In addition, both constitutional factors and genetic predisposition contribute to the pathogenesis of BCC (3-7). Repeated exposure to tanning beds is highly associated with the development of BCC. Furthermore, this association is stronger for patients with exposure at younger age (8). Also, more recent study demonstrated that longer duration of statin use is associated with increased risk of BCC among men (9). Public awareness about the risk factors, early and precise diagnosis are fundamental for successful treatment.

Clinically, BCC is a slow-growing, locally invasive tumor with a high tendency for recurrence. BCC typically presents in adults of advanced age, though it can be seen in younger population and children. The lesions are usually located on the areas of the body that are frequently exposed to the ultraviolet radiation, such as the scalp, ears, face and neck (1-3).

Morphological presentation differs in various types of BCC, so that the nodular type presents as a pearly nodule, at times revealing a central crusting or ulceration. In pigmented variant, there is a well-defined area of increased melanization. The superficial type presents as erythematous, well-circumscribed macule that may resemble eczema, whereas the infiltrative type presents as a local thickening of the skin (1-4). Diagnosis of BCC is usually straightforward, although in some cases diagnosis may be hard even for an experienced dermatologist.

Dermoscopy has proved to be a diagnostic method that largely facilitates the clinical recognition of BCC, especially in the early stage of the disease, also enabling its differentiation from other malignant and inflammatory skin lesions. Diagnostic sensitivity of this method for BCC is 95-99%, depending on the clinical type of a lesion (10, 11).

The list of dermoscopic features observed in BCC has been updated several times. Several dermoscopic features are contained in dermoscopic criteria associated with BCC, including: the absence of the pigment network, the presence of telangiectasia and arborizing vessels, ulcerations and erosions. Also, pigmented structures as maple leaf-like areas, multiple blue-gray globules and ovoid nests, in-focus dots, concentric areas as well as "spoke wheel areas" are observed in dermoscopic appearance of BCC. In addition to stromal reaction to neoplastic cells, shiny white-red structureless areas and short white streaks (chrysalis) can be also detected in BCC (10-13).

AIMS

The aim of this study was to analyze the dermoscopic features in patients with pathohistologically confirmed BCC and to determine the most common dermoscopic features among different clinical types of BCC.

PATIENTS AND METHODS

This retrospective study included 54 patients with 76 histopathologically verified cases of BCC collected at the Clinic of Skin and Venereal Diseases, Clinical Center Niš during 2016 and 2017 year. The study included 22 females and 32 male patients. All patients were Caucasian. Clinical data were obtained from each patient, including the following: age and sex, the number of lesions in each patients, localization (head and neck/trunk and limbs) and the clinical type of the lesion (nodular, superficial, infiltrative, and pigmented).

Each lesion was evaluated for the presence of specific dermoscopic features using DermLite® FOTO dermatoscope at 10-fold magnification. Dermoscopic images were obtained using a Nikon Coolpix 4500 digital camera (Nickon Corporation, Japan). Digital images of BCC were studied by the three examiners with various degree of experience, who applied a blind evaluation method. The analyzed dermoscopic features were selected based on the prior publications on dermoscopy of BCC which included the following dermoscopic features: the absence of the pigment network, the presence of telangiectasia and arborizing vessels, blue-gray globules and ovoid nests, leaf-like areas, erosions and ulcerations (Figure 1 and 2).

The association of dermoscopic features with different clinical types of BCC as well as the influence of clinical types on the localization of BCC was tested by χ^2 test ($p < 0.05$). Statistical analysis was performed by SPSS 16.0.

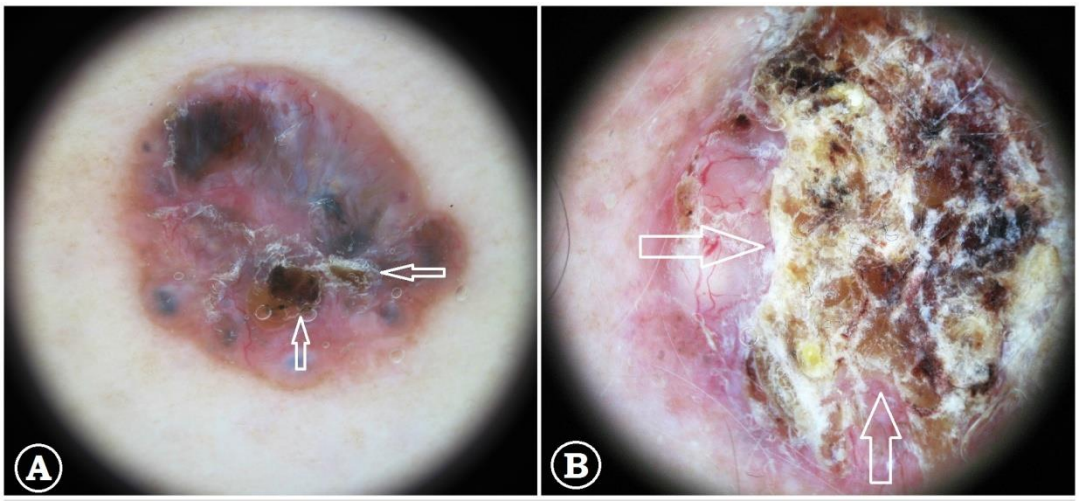


Figure 1. **Dermoscopic features of BCC:**
A. Pigmented type: there are two small ulcerations (arrows) surmounted by dark crusts
B. Nodular type: there is large ulceration (arrows) surmonted by hemorrhagic crust

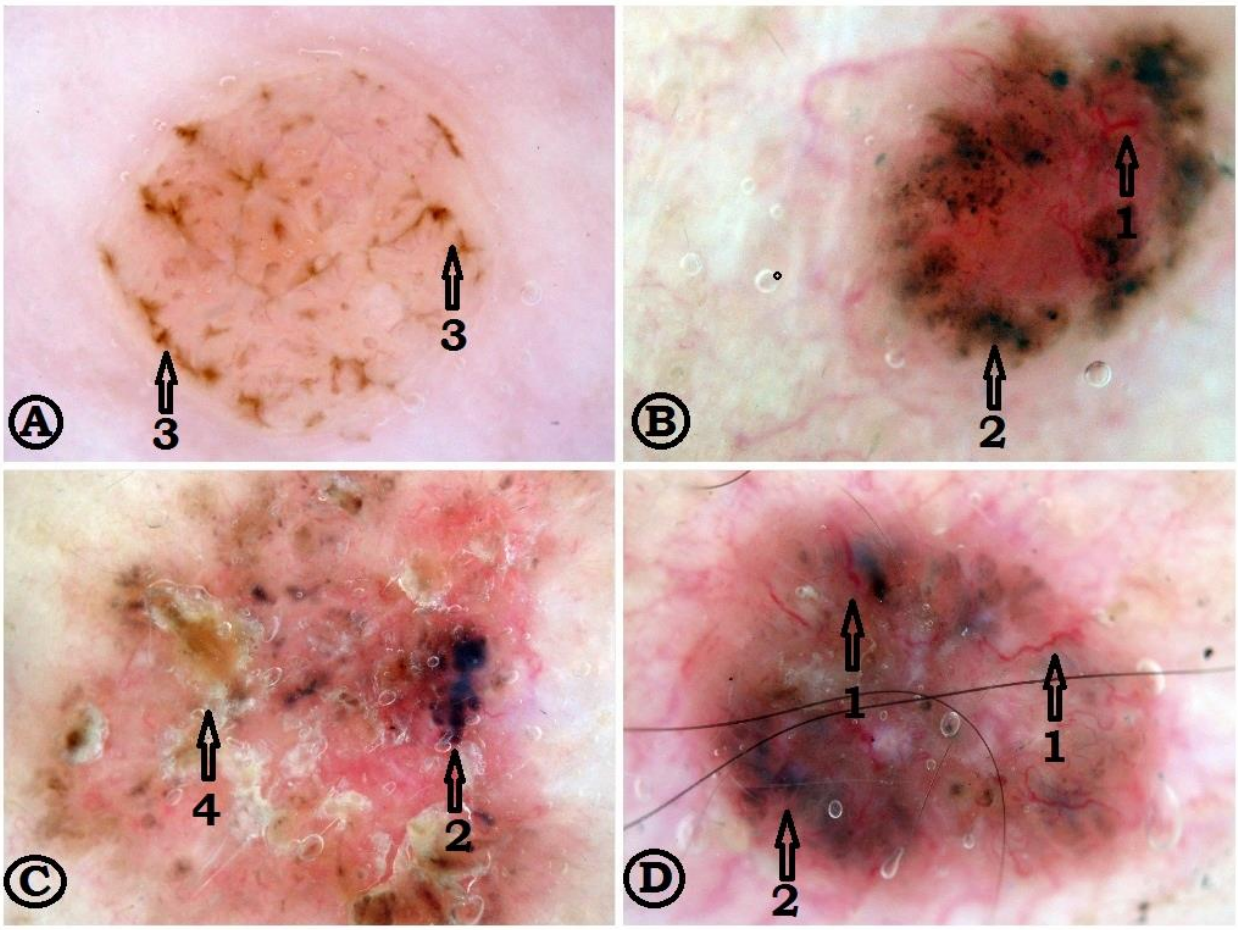


Figure 2. **Dermoscopic features of pigmented BCC (A, B, C, D):**
1. Arborizing vessels (arrows);
2. Blue-gray globules (arrows);
3. Leaf-like structures (arrows);
4. Ulceration (arrow) .

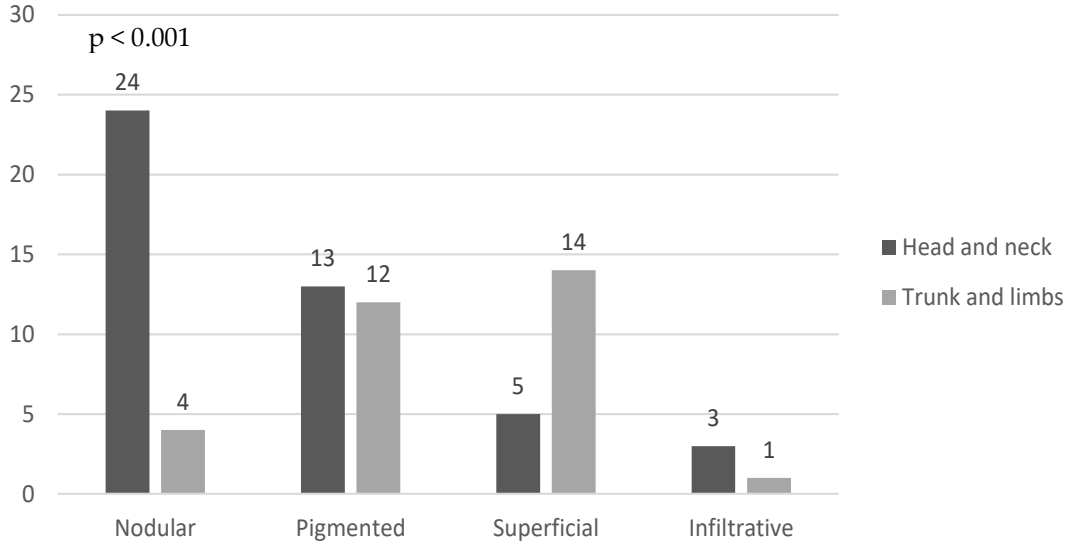
RESULTS

This study included 54 patients with pathohistologally confirmed diagnoses of BCC [22 (40.7%) females versus 32 (59.3%) males]. The age of the patients ranged from 31 to 84 ages (median age 67 years). In 8 (14.81%) patients, two or more BCCs were detected. In one female patient with 10 separate lesions with different clinical and dermoscopic features, the diagnosis of genodermatosis (Gorlin-Goltz syndrome) was established.

There was a higher predilection of BCC on the sun-exposed parts of the body (scalp, face and neck) compared to the trunk and limbs [45 (59.2%) versus 31 (40.8%)]. The most common clinical type was the nodular BCC, accounting for 28 (36.8%) confirmed diagnoses. It is followed by the pigmented BCC-25 (32.9%) cases, the superficial BCC-19 (25.0%), and the infiltrative BCC-4 (5.3%) cases. Nodular BCC was significantly more often on sun-exposed parts of the body than on the trunk and limbs ($p < 0.01$) (Table 1, Graph 1).

Table 1. **Association of gender and clinical type of BCC with localization**

Parameter	Patients		Head and neck BCC		Trunk and limbs BCC		p
	Nr.	(%)	Nr.	(%)	Nr.	(%)	
Gender							
Male	32	59.3	23	51.1	17	54.8	0.931
Female	22	40.7	22	48.9	14	43.2	
Total	54		45	59.2	31	40.8	
Clinical type							
Nodular	28	36.8	24	53.3	4	12.9	< 0.001
Pigmented	25	32.9	13	28.9	12	38.7	
Superficial	19	25.0	5	11.1	14	45.2	
Infiltrative	4	5.3	3	6.7	1	3.2	
Total	76		45		31		



Graph 1. **Distribution of different clinical types of BCC regarding the localization**

An analysis of the five selected dermoscopic features indicated the absence of the pigment network in all 76 (100%) cases with BCC. Arborizing vessels were confirmed in 71 (93.4%) tumor lesions; blue-grey globules and ovoid nests in 33 (42.1%) lesions; leaf-like areas in five (6.6%), and surface defects such as erosions and ulcerations in 44 (57.9%) lesions. Blue-gray globules and ovoid nests were significantly frequent in pigmented BCC in comparison to other clinical types of BCC ($p < 0.01$) (Table 2).

Table 2. **Association of dermoscopic features in different types of BCC**

Dermoscopic features	**All BCCs 76 (100%)**	**Nodular BCC 28 (36.8%)**	**Superficial BCC 19 (25%)**	**Pigmented BCC 25 (32.9%)**	**Infiltrative BCC 4 (5.3%)**	**p-value**
Absence of pigmented network	76 (100%)	28 (100%)	19 (100%)	25 (100%)	4 (100%)	1.000
Blue-gray globules and ovoid nests	33 (42.1%)	5 (17.8%)	3 (15.8%)	25 (100%)	0 (0%)	< 0.001
Arborizing vessels	71 (93.4%)	26 (92.8%)	18 (94.7%)	23 (92%)	4 (100%)	0.43
Leaf-like areas	5 (6.6%)	0 (0%)	0 (0%)	5 (20%)	0 (0%)	0.003
Ulcerations	44 (57.9%)	18 (64.3%)	12 (63.2%)	12 (48%)	2 (50%)	0.77

DISCUSSION

BCC is considered the most common malignant tumor reported for the fair-skinned individuals. It has been registered in all skin types; however, dark-skinned people are rarely affected, which is one of the characteristics for racial and geographical differences in terms of the tumor incidence (1, 2, 5-7). All participants in our study were Caucasian.

Men are considered to be more commonly affected than women due to the higher professional exposure to sun. Our study has not demonstrated a drastic difference in the distribution of BCC with respect to the sex, which is in accord with some studies (5-7).

The tumor can appear in the third decade of life already, however, it is primarily the disease occurring in the advanced age, and the incidence considerably grows with advancing age in both sexes (2-5). Increased incidence of BCC has been observed among the young patients within the last decade (14, 15). Those patients account for 1% to 5.5% of the total number of patients with BCC (16). Clinically, there is no difference in biologic behavior and prognosis of BCC in younger and the elderly patients (16, 17). However, Leffell et al. found a significantly higher number of aggressive BCCs among patients younger than 35 years (18). In this study, the youngest participant was 31 years old, whereas the oldest was 84 years old.

About 80% of all BCC types appear on the head and neck, 15% on the trunk, and 5% affect the limbs (1-5). This investigation showed that 59.2% of lesions were located on the neck and head regions, while 40.8% of all cases of BCC were located on the trunk and limbs. Neale el al. demonstrated that BCCs occurring on the trunk

were associated with extensive sun exposure (19). Furthermore, in the aforementioned study, there was a strong association with the number of reported sunburns and solar lentigines on the trunk with BCC located on the same location (19).

The frequency of the clinical types of BCC varies among different populations. Several clinical types are known, including: nodular, superficial, pigmented, infiltrative or morpheaform type, and less common fibroepithelioma of Pinkus (2-5). A large number of studies has shown that the most common is the nodular type (incidence of 45 to 60%) (1-5), which also confirms this study. Also, there was a significant difference in regard to localization of nodular BCC, i.e. nodular type of BCC was significantly more often on head and neck. This is in accord with some reports (1, 4, 5).

The superficial type is mainly found on the trunk and shoulders, usually in the form of multiple lesions. It is characterized by the appearance of erythematous plaques, with or without ulcerations, minimal infiltration, and slow growth. In terms of the differential diagnosis, it should be distinguished from psoriasis, Bowen's disease, and Paget's disease (2, 3). In this study, this clinical type of BCC was present in 25% of the lesions.

The infiltrative type is more locally aggressive and recurrent compared to the prior ones, and is mainly observed on the face. It presents as a plaque or a scar tissue with poorly defined edges, of the erythematous amorphous structure that rarely metastasizes (1, 4, 5). We have shown that this type of lesion has the lowest incidence (5.3%) and was reported in four cases only.

The most important dermoscopic feature for the differentiation of BCC from melanocitic lesions is the absence of the pigment network (8, 9), which is confirmed in this study. The surface defects, such as erosions and ulcerations, were found in 57.9% of lesions, mainly in the nodular clinical type. The presence of blue-gray globules was observed in all pigmented BCC, while leaf-like areas were presented in 20%, respectively. Those pigmented patterns, in addition with the absence of pigmented network, are highly specific for differentiating BCC form other melanocitic lesions (10-13).

Morphology of vessels and their archtectural arrangement have a significant value in dermoscopy. Arborizing vessels are dermoscopic hallmarks of nodular BCC. Since those vessels are superficially located, they are completely in focus and appear bright red in color (20, 21). Specific morphology and sharply focused vessels in BCC have high diagnostic accuracy and allow a differention from vascular patterns presented in other skin tumors (8, 9, 20, 21). Arborizing vessels and teleangiectasias were found in 93.4%. Distribution of main dermoscopic features and their manifestations were in accord with previous studies (12, 13, 19).

CONCLUSION

This study confirms that selected dermoscopic features of BCC of the skin can predict clinical diagnosis of these lesions based on the presence of arborizing blood vessels and absence of the pigment network. In addition, we have ascertained that specific pigment patterns in pigmented clinical type of BCC are considered a reliable clinical criterion for the differential diagnosis from other pigmented and non-pigmented skin lesions.

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Dermoskopske karakteristike bazocelularnog karcinoma kože

Danica Tiodorović[1,2], Andrija Jović[1], Danijela Popović[1], Hristina Kocić[1], Aleksandra Ignjatović[2,3], Jovana Antonijević[2], Filip Veličković[2]

[1]*Klinika za kožne i polne bolesti, Klinički centar Niš, Niš, Srbija*
[2]*Univerzitet u Nišu, Medicinski fakultet, Niš, Srbija*
[3]*Institut za javno zdravlje, Centar za informatiku i biostatistiku u zdravstvu, Niš, Srbija*

SAŽETAK

Cilj ovog rada je analiza dermoskopskih nalaza kod bolesnika sa patohistološki potvrđenom dijagnozom bazocelularnog karcinoma (BCK) kože.

Retrospektivnom studijom obuhvaćeno je 54 bolesnika sa ukupno 76 BCK kože dijagnostikovanih u 2016. i 2017. godini. Sve lezije su klasifikovane u četiri klinička tipa: nodularni, pigmentni, superficijalni i infiltrativni. Digitalne dermoskopske slike lezija evaluirane su od strane tri ispitivača. Selektovano je pet dermoskopskih karakteristika za analizu uključujući: odsustvo pigmentne mreže, prisustvo arborizirajućih krvnih sudova, plavo-sivih globula i ovoidnih gnezda, strukturu nalik na "list javora" i ulceraciju.

Od ukupno 54 ispitanika, 22 su ženskog i 32 muškog pola. Starost boleswnika u trenutku postavljanja dijagnoze kretala se od 31 do 84 godine (prosečna vrednost 67 godina). Najveću frekvencu imao je nodularni klinički tip sa 28 potvrđenih dijagnoza. Nodularni BCK bio je češće lokalizovan na glavi i vratu u odnosu na trup i ekstermitete ($p < 0,01$). Dermoskopsko prisustvo pigmentne mreže nije bilo verifikovano u svim ispitivanim BCK. Arborizovani krvni sudovi bili su prisutni kod 71 (93,4%), plavo-sive globule i ovoidna gnezda 33 (42,1%), ulceracije 44 (57 %) i strukture nalik na "list javora" kod 5 (6,6%) lezija. Plavo-sive globule i ovoidna gnezda su signifikanto češće uočena kod pigmentnih BCC u odnosu na ostale kliničke tipove BCK ($p < 0,01$).

U zaključku, dermoskopijom je moguće pouzdano postaviti dijagnozu BCK kože kao i diferencijalnu dijagnozu prema drugim tumorima kože.

Ključne reči: **bazocelularni karcinom, dermoskopija, diferencijalna dijagnoza**