

DEMOGRAPHIC CHARACTERISTICS OF BASAL CELL CARCINOMA: A RETROSPECTIVE STUDY OF 1884 LESIONS

Goran Stevanović^{1,2}, Irena Janković^{1,2}, Jadranka Paravina²,
Dimitrije Janković³, Milena Veličković⁴

Basal cell carcinoma represents one of the most frequent skin cancers, accounting for around 75% of all skin cancers. Numerous etiological factors contribute to its development (from the genetics to sun exposure).

To present the demographic characteristics and distribution of basal cell carcinoma and to evaluate the topography of lesions and their correlations with gender, age, location, size and recurrence rate.

This retrospective study included 1734 patients with 1884 lesions, treated at the Clinic of Plastic and Reconstructive Surgery at the Clinical Center Niš, from January 2012 to December 2016. The following parameters were evaluated: age, gender, location, size, histologic type, margin of excision and recurrence rate.

Out of the total of 1884 tumors, there were 1621 primary and 263 recurrent cases. High risk localizations included 82.8% of primary and 68.4% of recurrent tumors. With respect to gender, primary tumors were present in 56% of men and 44% of women, while recurrent tumors were present in 41.8% of men and 58.2% of women. Concerning the tumor size, 85.3% of primary and 72.6% of recurrent tumors had a maximum of 2 cm in diameter, whereas 14.7% of primary and 27.4% of recurrent tumors had a diameter of over 2 cm.

Complete excision represents a key surgical treatment of basal cell skin cancer. The obtained algorithm can be a useful guide for the monitoring and surgical treatment of basal cell skin cancer. *Acta Medica Medianae* 2017;56(3):137-142.

Key words: basal cell carcinoma, recurrence

University of Niš, Faculty of Medicine, Niš, Serbia¹
Clinic of Plastic and Reconstructive Surgery, Clinical Center Niš, Niš, Serbia²
Pharmaceutical company „Pharma Swiss“, Niš, Serbia³
Dental practice „Your dentist“, Aleksinac, Serbia⁴

Contact: Goran Stevanović
Clinic of Plastic and Reconstructive Surgery,
Clinical Center Niš, Serbia
Bul. dr Zorana Đinđića 48, 18 000 Niš, Serbia
e-mail: gste66@yahoo.com

Introduction

Basal cell carcinoma is one of the most frequent skin tumors (1, 2). The incidence of BCC is increasing. In 2014 in the USA, more than 3.5 million new cases of nonmelanoma skin cancer were registered, while the number of women under 40 years of age with BCC has doubled over the last 30 years (3).

Regardless of a low mortality, the prevalence is high and significant in terms of health care

costs. Although BCCs rarely cause death, they destroy the surrounding and underlying structures and they should be removed as soon as possible. Therefore, early detection of BCC is very important. BCC typically develops “de novo” on the normal skin and can have highly variable clinical and dermoscopic characteristics as a result of numerous combinations of histopathological characteristics. This means that clinical diagnosis is not always easy to make. Surgical excision is the treatment of choice with BCC (4, 5).

In the USA, Mohs micrographic surgery (MMS) is indicated in all recurrent BCCs, except for the superficial ones in low-risk regions. With primary tumors, it is indicated for all aggressive tumors (except for those below 0.5 cm in low-risk areas); for all nodular tumors in areas with high and moderate risk and those above 2 cm in low-risk areas; as well as for all superficial tumors in high-risk areas and for those above 0.6 cm in moderate-risk areas (6).

From 1995 until 2009, the use of MMS in the USA increased by 400% and one in four types of skin cancer was treated in this way (6). In Serbia, the use of MMS is limited due to financial reasons and surgical excision is performed instead. Treat-

ment costs depend on the manner of treatment (outpatient or hospital) (7). Monitoring of the detailed data about BCC and its treatment in routine clinical practice is important for the estimation of prognosis and treatment quality improvement (2, 8). The data can be obtained only from a clinical database.

The aim of this research was to estimate the algorithm of localization, gender, size and side-effects of skin BCC recurrence.

Material and methods

The analyzed patients were operated for BCC at the Clinic of Plastic and Reconstructive Surgery, Clinical Center Niš, from January 2012 to December 2016. The tumor cases were analyzed with respect to gender, age, location, size and recurrence of the lesion.

With regard to location, the tumors were classified as high, moderate and low-risk tumors,

in accordance with the Huang and Boyce classification (9). With respect to size, the tumors were classified as those above and under 2 cm.

Monitoring

Patients with BCC were monitored for 3, 6 and 12 months after surgery. The information about the recurrences were entered into the database.

Results

The analysis included 1884 changes in 1734 patients. Out of the total of 1884 tumors, 1621 were primary and 263 were recurrent tumors. Among the patients with primary BCC, 56% were male and 44% were female, while among the patients with recurrences, 41.8% were male and 58.2% were female.

General characteristics of samples are shown

Table 1. Sample characteristics

Characteristics	Total	Primary	Recurrent
Number of changes	1884	1621 (86,04%)	263 (13,96%)
Number of patients	1734	1509 (87,02%)	225 (12,98%)
Gender			
Male		971 (56%)	94 (41,8%)
Female		763 (44%)	131(58,2%)
Average age	68,7 yrs.	68,6 yrs.	67,5 yrs.
Male		69,7 yrs.	68,7 yrs.
Female		69,3 yrs.	65,2 yrs.

in Table 1.

Tumor location

The largest number of tumors were located on the head and neck area – 71.2% primaries and 87.9% recurrences. Primary tumors were predominantly located in the nose area (21.2%). Recurrent tumors were also predominantly located in the nose area (36.9%) (Figure 1).

In terms of risk, 56.7% of primary and 69.6 % of recurrent tumors occurred in the high-risk locations (Table 2).

Tumor size

Out of the total number, 85.3% of primary BCCs and 72.6% of recurrent BCCs had a maximum diameter of up to 2 cm (Table 3). The dia-

Table 2. Tumor location

Risk	Location	Primary	Recurrent
High	nose	344 (21,2%)	97 (36,9%)
	perioral	133 (8,2%)	8 (3%)
	temporal	84 (5,2%)	3 (1,1%)
	periorbital	234 (14,4%)	20 (7,6%)
	ears and preauricular	109 (6,7%)	50 (19%)
	chin	1 (0,1%)	2 (0,8%)
Medium	frontal	135 (8,3%)	2 (0,8%)
	scalp	16 (1%)	33 (12,6%)
	buccal	76 (4,7%)	12 (4,6%)
	neck	23 (1,4%)	4 (1,5%)
Low	upper extremities	32 (2%)	8 (3%)
	lower extremities	97 (6%)	8 (3%)
	chest	337 (20,8%)	16 (6,1%)



Figure 1. BCC of the nose

Table 3. Tumor size

Size	Primary	Recurrent
≤ 2cm	1383 (85,3%)	191 (72,6%)
> 2cm	238 (14,7%)	72 (27,4%)



Figure 2. BCC of the temporal region, 9 cm in size

meter of over 2 cm was found in 14.7% of primary and 27.4% of recurrent tumors (Figure 2).

Gender and tumor size

Further analyses were conducted in order to determine the demographic factors that could have a statistically significant influence on the disease. T-test for independent samples was done in which tumor size was a dependent variable and gender was a grouping variable. Since a t-test can be done only on continuous variables, the surface of every tumor was calculated independently and this information was used instead of the information about dimensions, in the format height_x

_length. The analysis showed that t-statistics was not significant ($p=0.691$) and that average tumor surface in men was 267.14 mm^2 , and in women 243.72 mm^2 .

It should be taken into account that the significance of the test was affected by the extremely high standard deviation values (SD in men was 510.11 and in women $SD=73$), suggesting considerable differences in tumor size in our patient sample. It can be confirmed by the results of descriptive statistics showing that the minimum tumor size for the whole sample was 2 mm^2 and the greatest recorded was 8500 mm^2 .

Gender and the location of basal cell carcinoma

A comparison of the location of basal cell carcinoma in men and women was done using the χ^2 test (Chi-square test). The test results showed that there was no statistically significant difference between men and women based on this criterion (Pearson Chi Square =4.513, $df=3$, $p=0.211$). Equal distribution of basal cell carcinomas was observed in both genders – the most frequent were those affecting the facial area, and the least frequent were the lesions in the area of the extremities. The only difference observed was that in men there was a slightly higher number of tumors in the back area compared to the abdomen and the front of the chest, while the situation was the reverse in women. However, this difference was not statistically significant.

Gender and recurrence

Gender was a statistically significant factor here as well, because Chi Square Pearson =0.133, $df=1$ was not significant at the level of 0.05 ($p=0.715$). The result is in accordance with the expectations, because a smaller number of recurrent tumors was detected in both men and women.

Age and recurrence

T-test for independent samples was done in order to confirm whether the group of patients with recurrence was statistically significantly different from the patients with no recurrence. The results showed that the difference was statistically significant at the level 0.05 ($t=-2$, $p=0.046$). Looking at the descriptive statistics which preceded this analysis, it can be seen that the average age of patients with recurrence was 73.76 years, while the age of patients without recurrences was 67.99 years, which meant that recurrences were significantly more frequent in older patients.

Age and tumor location

One-way ANOVA was done in order to determine whether there was a connection between the age variable and tumor location variable

based on the four categories (face, front part of the chest with abdomen, back and extremities). This analysis was also statistically significant because $F=2.84$ was significant at the level 0.05 ($p=0.037$). The following table shows that the patients with facial tumor had the highest average

age, followed by those with tumors on the extremities, patients with tumors on the back, while the lowest average value was observed in patients with tumors located on the frontal area of the chest and abdomen. (Table 4)

Table 4. Correlation between age and tumor location

Tumor location	Arithmetic mean	Bottom age limit	Top age limit
Face	69.04	20	92
Frontal area of the chest and the abdomen	64.00	28	87
Back	65.65	34	81
Extremities	66.64	46	87
Total	68.22	20	92

Age and tumor size

Finally, the association between age and tumor size was tested. Pearson correlation was calculated for these two variables and $r=-0.026$ was obtained. However, this correlation was not statistically significant ($p=0.591$), which means that there was no statistically significant association between these two variables.

Discussion

A discrete prevalence in men in this study is different than the usually reported higher frequency in women in the previous studies, although a high frequency in men has also been reported (10-13). The average age of 68.7 years (minimum 30 and maximum 98 years) was similar to the studies published earlier (10, 12, 13).

Bariani et al. had 8% of positive margins by excising well differentiated BCCs, under 20 mm, with surgical margins of 3 mm, and not well differentiated BCs over 20 mm in size, with 5 mm margins (11). Nagore et al. had 24% of positive margins with the excision margins of 2 to 3 mm (14). Sherry et al. had a 3.2% rate of incomplete excisions with primary BCCs, with a minimum of 3 mm margins (13). Pichardo-Velasquez et al. had 28% incomplete excisions with high risk BCCs and 5 mm surgical margins (15). Although Fleischer et al. claimed that the experience of a surgeon did not influence the probability of incomplete excision (16), there were reports of 10.1% and 17.4% tumor recurrences in a five-year period with tumors treated with conventional surgical procedures (17). Mosterd et al. had 4.1% recurrence of primary BCCs treated with conventional surgery and

with 5-year average follow-up (18). They obtained 12.1% recurrence with recurrent tumors. Cigma et al. excised BCCs with 3 to 10 mm margins in line with their location and obtained 2.6% recurrence (19). Wetzig et al. reported 0.5% recurrence in a 5-year period for primary BCCs and 2.9% for recurrent BCCs (20). Rowe et al. reported a 5-year recurrence rate of 1% for primary and 5.6% for recurrent BCCs treated with micrography (21, 22). Some studies that included periocular BCCs excised with intraoperative histological margin analysis reported 2.15% and 9.7% recurrence rates for primary and 4.4% and 14.2% for recurrent tumors (23-25).

In terms of tumor location, similar results were obtained in other studies. Luz FB et al. also had the highest recurrence of nose tumors. Primary tumors in this study were most frequent in the chest area, and in our study in the nose area. Concerning the high-risk locations, there were 47.5% primary and 57.4% recurrent tumors in their study, while in our study there were 82.8% primary and 68.4% recurrent tumors. In terms of size, Luz FB et al. also had a greater number of tumors under 2 cm, both primary and recurrent, with 88.6% of primary and 73.2% of recurrent lesions, compared to 85.3% of primary and 72.6% of recurrent tumors in our study (26).

Conclusion

A complete excision is the key to surgical treatment of BCC. The database includes detailed information about the type of tumor, different prognostic factors and results after treatment. The obtained results can be used as a guidance in the monitoring and surgical treatment of BCC.

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doi:10.5633/amm.2017.0321**DEMOGRAFSKE KARAKTERISTIKE
BAZOCELULARNOG KARCINOMA: RETROSPEKTIVNA
STUDIJA 1884 PROMENE***Goran Stevanović^{1,2}, Irena Janković^{1,2}, Jadranka Paravina²,
Dimitrije Janković³, Milena Veličković⁴*

Univerzitet U Nišu, Medicinski fakultet, Niš, Srbija¹
Klinika za plastičnu i rekonstruktivnu hirurgiju, Klinički centar, Niš, Srbija²
Farmaceutska kompanija „Pharma Swiss“, Srbija³
Stomatološka ordinacija „Your dentist“, Aleksinac, Srbija⁴

Kontakt: Goran Stevanović
Klinika za plastičnu i rekonstruktivnu hirurgiju,
Klinički centar, Niš, Srbija
Bul. dr Zorana Đinđića 48, 18 000 Niš, Srbija
e-mail: gste66@yahoo.com

Bazocelularni karcinom je najčešći tumor kože i čini oko 75% svih tumora kože. Brojni su etiološki faktori odgovorni za njegov nastanak, od genetskih do faktora sredine, kao što je na primer izlaganje suncu.

Cilj rada bio je da prikaže demografske karakteristike i distribuciju bazocelularnog karcinoma i da proceni povezanost lokalizacije lezija sa polom, veličinom, stepenom recidiva.

Retrospektivna studija obuhvatila je 1734 bolesnika sa 1884 promene, koji su lečeni na Klinici za plastičnu i rekonstruktivnu hirurgiju Kliničkog centra u Nišu od januara 2012. do decembra 2016. godine. Ispitivani su sledeći parametri: starost, pol, lokalizacija, histološki tip, margine ekscizije i stepen recidiva.

Od ukupno 1884 promene, 1621 je bila primarna, a 263 su bile recidivi bazocelularnog karcinoma. Sa visokorizičnim lokalizacijama bilo je 82,8% primarnih promena i 68,4% recidiva. U odnosu na pol, primarnih je bilo kod 56% muškaraca i 44% žena, dok su recidivi bili češći kod žena (58,2%). Što se veličine tumora tiče, 85,3% primarnih i 72,6% recidiva imali su veličinu do 2 cm u prečniku, dok je 14,7% primarnih i 27,4% recidiva bilo veće od 2 cm u prečniku.

Kompletna ekscizija predstavlja osnovu hirurškog lečenja bazocelularnog karcinoma kože. Dobijeni rezultati mogu biti koristan vodič u lečenju i praćenju bazocelularnog karcinoma kože. *Acta Medica Medianae 2017;56(3):137-142.*

Ključne reči: bazocelularni karcinom, recidiv

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