

# Analysis of the Histopathological Profile and Surgical Margins Resulting from Resection of Nonmelanoma Skin Cancers

Anna Rita de Cascia Carvalho Barbosa, Frederico Alonso Sabino de Freitas and Marcus Vinícius Jardini Barbosa\*

School of Medicine - Centro Universitario Municipal de Franca (Uni-FACEF), Sao Jose, Brazil

**Abstract: Introduction:** Non-melanoma skin cancer is a group of malignant neoplasms composed basically by sarcomas, basal cell carcinoma and squamous cell carcinoma. Its etiology is multifactorial with specificity for each of the two types, except for exposure to ultraviolet radiation, which is a common factor between both. When detected early, it has a high cure rate, and surgical excision with safety margins being the treatment of choice in most cases. Thus, it is important to recognize the profile of the patients, as well as the histopathological characteristics of the lesions and the medical approach used to avoid recurrences. **Purpose:** This study aimed to analyze the histopathological profile and surgical margins resulting from the resection of non-melanoma skin cancers in patients treated at a plastic surgery facility in Brazil. **Methods:** The cases of squamous cell carcinoma and the histopathological types of the basal cell carcinoma were individually analyzed for compromised margins, and later divided into a low-risk group and a high-risk group. **Results:** 228 lesions were resected from 141 patients. Gender distribution was 55.3% female and 44.6% male. The most affected age group was over 70 years old. The predominant histological type was basal cell carcinoma (74.6%) followed by squamous cell carcinoma (25.4%); the most affected site was the cephalic-cervical segment (71.92%). Surgical margins were compromised in 12.3% with no significant difference between the two types of carcinoma. **Conclusion:** There was a predominance of basal cell carcinoma (nodular type) in women over 40 years old, predominantly in the cephalic-cervical region. The number of recurrences was proportionally higher in the BCC, unrelated to the presence of positive margins.

**Keywords:** Skin Neoplasms, Basal Cell Carcinoma, Squamous Cell Carcinoma, Recurrence, Margins of Excision.

## INTRODUCTION

Non-melanoma skin cancer (NMSC) is a group of malignant neoplasms composed by basal cell carcinomas (BCC) and squamous cell carcinomas (SCC) [1]. Its etiology is multifactorial with different specificities for each one, except the exposure to ultraviolet radiation, which is a common factor between them [2].

In Brazil, the NMSC is the most frequent neoplasm among men and women, corresponding to 30% of malignant tumors [3,4]. In the United States, it constitutes one third of all cancers diagnosed annually, being the most frequent malignant disease in humans throughout their lives [5].

Due to the low mortality rate, these tumors tend to be more neglected when compared to other neoplasms with a high mortality rate [6]. However, there are cases that they present a high local destructive power, promoting aesthetic and functional deformities, leading to professional and social disability [3].

According to Broetto et al. (2012) [1], and Tejada and Rodrigues (2009) [7], it is estimated that until 2019, 85,170 new cases of non-melanoma skin cancer will occur among men and 80,410 among women. When these neoplasms are diagnosed in their initial stage, they present a high rate of cure, and surgical excision with safety margins is the treatment of choice in most cases [7]. In some situations, recurrence can occur due to the type of the neoplasm or cells not detected on the surgical margin at the histopathological exam. However, in some cases its etiology remains unclear [8]. Many studies have shown a relationship with the extension and location of the lesion, surgical margins that are narrow or positive, and the histological type [9].

The histopathological examination is performed through the macro and microscopic analysis of tissue fragments removed by biopsies those can be incisional or excisional [10]. Histopathological analysis of the lesion margins, as well as the histological type of cancer, are essential information for the subsequent clinical or surgical management of the disease [11].

Therefore, it is important to recognize the profile of the patients, as well as the histopathological characteristics of the lesions and the clinical management regarding the prevention of recurrences. Thus, this study aimed to analyze the histopathological profile and the surgical margins resulting from the resection of non-melanoma skin cancers in patients treated at a plastic surgery facility; as well as to correlate the compromise of the excised surgical margins, with the histopathological subtypes and the recurrence rates of the neoplasm.

## METHODS

This study was approved by the Research Ethics Committee of the Higher Education Institution - Centro Universitario Municipal de Franca - Uni-FACEF (number 99734218.3.0000. 5384).

Medical records of 141 patients who had surgical excision of non-melanoma skin cancer between January 2007 and December 2017 in a plastic surgery facility were retrospectively evaluated.

All of the patients were operated at an outpatient level, by a single team, using a surgical excision margin of 3-6 mm for basal cell carcinoma (BCC), depending on the clinical type, extension and topography of the lesion. In cases when squamous cell carcinoma (SCC) was suspected or confirmed, a 10 mm surgical excision margin was used.

\*Address correspondence to this author at the School of Medicine - Centro Universitario Municipal de Franca (Uni-FACEF), Sao Jose, Brazil; Email: drmbarbosa@gmail.com

Inclusion criteria were all patients with diagnosis of BCC and/or SCC thru previous biopsy, and those who presented a complete outpatient follow-up up to two years after surgery. The exclusion criteria were observative approach after primary resection with positive margins, and secondary cases referred for increase surgical margins.

The histopathological types of BCC were individually analyzed regarding the positivity of the margins, and later they were divided into two groups:

-Low risk group – nodular and superficial subtypes.

-High risk group – sclerodermiform, ulcerated/infiltrative, micronodular and metatypical subtypes.

The topographic regions of the lesions were divided into segments: cephalic/cervical, limbs, trunk and pubis. The cephalic segment was further divided into two areas, according to regions with higher potential for aesthetic/functional deformities after neoplasm resection:

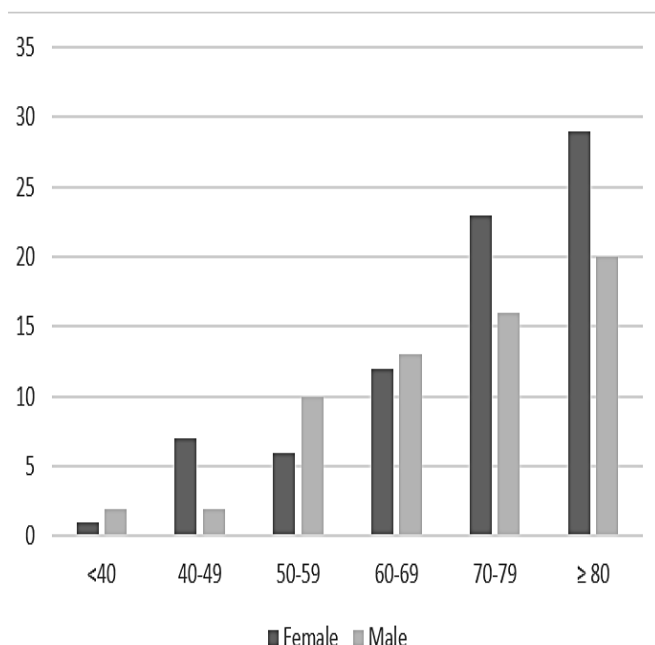
- Area 1: nasal, periorbital, auricular pavilion and lips.

- Area 2: frontal, temporal, scalp and malar.

Statistical analysis was performed with the software StatCalc®. Pearson's chi-square test was applied to assay the association of the main variables (histological type BCC/SCC, histological subtype of BCC, topography and presence of recurrences) with the impairment of surgical margins. The 5% ( $p < 0.05$ ) of significance level was considered.

## RESULTS

A total of 228 lesions were resected in 141 patients. From the total, 55.3% (n=78) patients were female and 44.6% (n=63) were male. Considering the age group, the most frequent was over 70 years old, with 62.4% (n=88) (Figure 1).



**Figure 1.** Distribution of patients according to age group in both genders.

The most frequent clinical/histological type was basal cell carcinoma (BCC) in 74.6% of the patients (n=170). Considering the squamous cell carcinoma (SCC) this histological type was presented in 25.4% (n=58) of the patients. The cephalic/cervical segment was the most affected site in both type of the neoplasms which corresponded to 71.92% (n=164) (Table 1).

Place	Nº of injuries	%
Cephalic/Cervical	164	71,92
Members	40	17,54
Trunk	23	10,08
Pubis	1	0,43
<b>Total</b>	<b>228</b>	<b>100</b>

**Table 1:** Distribution of patients according to the location of the lesions.

All of the resected neoplasms were submitted to histopathological examination for diagnostic and histologic type confirmation. The histological subtypes of the lesions diagnosed as BCC (n=170) were divided according to the aggressiveness into low-risk group (52.9%), who included the superficial and nodular types; and high-risk group (47.1%), who included the sclerodermiform, ulcerated, micronodular and metatypical type (Table 2).

Histological Subtypes of Basal Cell Carcinoma	n (%)
Superficial	40 (23.5)
Sclerodermiform	24 (14.1)
Ulcerated/infiltrative	48 (28.2)
Nodular	50 (29.4)
Micronodular	5 (3.0)
Metatypical	3 (1.8)
<b>TOTAL</b>	<b>170 (100)</b>

**Table 2:** Classification of the histological subtype of BCC (n=170).

According to the histological exam, from the 228 resected neoplasms, the histopathological examination revealed that 28 (12.3%) lesions presented compromised margins. Comparing the compromised surgical margins among the histological types, no significant difference was observed (Table 3).

Compromised margins			
Histological Type	Yes n (%)	No n (%)	Total n (%)
<b>Basal Cell Carcinoma (BCC)*</b>			
Surface	3 (10.72)	37 (18.5)	<b>40 (17.55)</b>
Sclerodermiform	2 (7.15)	22 (11)	<b>24 (10.5)</b>
Ulcering/infiltrative	5 (17.85)	43 (21.5)	<b>48 (21.06)</b>
Nodular	5 (17.85)	45 (22.5)	<b>50 (21.93)</b>
Micronodular	3 (10.72)	2 (1)	<b>5 (2.2)</b>
Metatypic	0 (0)	3 (1.5)	<b>3 (1.32)</b>
<b>Spinocellular Carcinoma (SCC)*</b>			
	10 (35.71)	48 (24)	<b>58 (25.44)</b>
<b>Total</b>	<b>28 (12.28)</b>	<b>20(87.72)</b>	<b>228 (100)</b>

\* $p < 0.1825$

**Table 3:** Association between the histological type (BCC/SCC) and the occurrence of compromised margins in the 228 resected lesions.

The histological subtypes of the 170 BCC resected with compromised margins were shown in Table 4, and despite the low frequency, the micronodular subtype was the one with the most compromised margins ( $p < 0.0169$ ).

Compromised margins			
Histological subtype of BCC	Yes n (%)	No n (%)	Total n (%)
Superficial	3 (16.6)	37 (24.35)	40 (23.5)
Sclerodermiform	2 (11.2)	22 (14.47)	24 (11.2)
Ulcerated/infiltrative	5 (27.8)	43 (28.3)	48 (28.2)
Nodular	5 (27.8)	45 (29.5)	50 (29.4)
Micronodular*	3 (16.6)	2 (1.32)	5 (2.95)
Metatypic	0 (0)	3 (1.97)	3 (1.75)
<b>Total</b>	<b>18 (10.60)</b>	<b>152 (89.4)</b>	<b>170 (100)</b>

\* $p < 0.0169$

**Table 4:** Association between the histological subtypes of basal cell carcinoma (BCC) and the occurrence of compromised margins in the 170 lesions.

The topography of the lesions was divided into different areas. The relationship between these areas with other regions, regarding the margins of the resections, was demonstrated in table 5.

Compromised margins			
Topographic Regions	Yes n (%)	No n (%)	Total n (%)
Área 1	6 (21.4)	23 (11.5)	29 (12.7)
Área 2	11 (39.3)	91 (45.5)	102 (44.7)
Área 3	5 (17.9)	13 (6.5)	18 (7.9)
Área 4	3 (10.7)	41 (20.5)	44 (19.3)
Área 5	3 (10.7)	32 (16)	35 (15.4)
<b>Total</b>	<b>28 (12.3)</b>	<b>200 (87.7)</b>	<b>228 (100)</b>

Área 1. Scalp, temporal and frontal  
 Área 2. Nasal, periorbital, auricular e perioral  
 Área 3. Malar area  
 Área 4. Upper and Lower Limbs  
 Área 5. Cervical, trunk and pubis

**Table 5:** Association between topography and the occurrence of positive margins in 228 resected lesions.

All of the 28 lesions with positive margins, even without clinical or macroscopic manifestation, had a new surgical intervention in order to increase both the lateral and deep margins. The follow-up period was 24 months after the primary resection, including those patients who had a complementary surgical procedure for increase surgical margins. Clinical recurrence was presented in 15 (6.6%) of the resected lesions; from these lesions, 12 (80%) presented free margins at the time of primary resection.

Considering the overall recurrence rate, there were no significant difference between high and low risk groups of the histological subtypes of BCC and SCC (Table 6).

Histological Type	Recurrence		
	Yes n (%)	No n (%)	Total n (%)
Basal Cell Carcinoma (high risk) <sup>a</sup>	6 (7.5)	74 (92.5)	80 (6.6)
Basal Cell Carcinoma (low risk) <sup>b</sup>	4 (4.4)	86 (95.6)	90 (93.4)
Spino-cellular Carcinoma	5 (8.6)	53 (91.4)	58 (25.4)
<b>Total</b>	<b>15 (6.6)</b>	<b>213 (87.7)</b>	<b>228 (100)</b>

<sup>a</sup>Scleroatrophic, ulcerated, micronodular and metatypical.

<sup>b</sup>Superficial and nodular.

**Table 6:** Association between the histological type and the number of recurrences in the 228 resected lesions.

From the three lesions that presented recurrence, even after a new intervention due to the positive margins, were of the subtype BCC micronodular. There was no statistical significance between the presence or absence of positive margins and recurrence rate during the follow-up period (Table 7).

Recurrence	Positive margins		
	Yes n (%)	No n (%)	Total n (%)
<b>Yes</b>	3 (10.7)	12 (6)	15 (6.6)
<b>No</b>	25 (89.2)	188 (94)	213 (93.4)
<b>Total</b>	<b>28 (12.3)</b>	<b>200 (87.7)</b>	<b>228 (100)</b>

**Table 7:** Association between recurrences and positive margins of the 228 resected neoplasms.

## DISCUSSION

Non-melanoma skin cancer (NMSC) has its highest prevalence in individuals over 60 years-old, and the main risk factors are related to genetic susceptibility, with high-risk in individuals who present phototypes I and II, and the exposure to ultraviolet radiation [12, 13]. This epidemiologic aspect was observed in the present study because most patients presented equal or more than 60 years-old, with a large number of patients around 80 years-old. It also could be related to the population's longer life expectancy, better access to information and health services, or due to the low mortality rate of the NMSC [12, 13].

When gender is considered, most studies showed a greater prevalence in males. This occurs due to the greater exposure of men to ultraviolet radiation because of their professional and social history. It is also important to stress that men are more resistant to use sunscreen [5, 10]. However, similarly as described by Neto et al. (2020) [4], the present study showed a predominance of females (55% of the cases), which can be explained by the greater integration of women in the labor market in activities previously considered for males [11].

Non-melanoma skin cancers are the most frequent neoplasm, mainly in tropical countries such as Brazil, and basal cell carcinoma (BCC) presents the highest incidence [14]. In the present study, this type of skin cancer occurred in 74.5% of the patients, and among its histology,

the nodular type was the most prevalent, as well as described by Bariani et al. (2006) [12] and Broetto et al. (2012) [1]. Considering the squamous cell carcinoma (SCC), it is possible to see that many authors described that this histological type is responsible for approximately 25% of NMSC [13], and a similar prevalence was found in the present study (25.44%).

The lesions with compromised margins occurred in 12.3% of the entire sample (n=28/228). This percentage is similar to the previously described studies, which showed a rate from 4% to 17% [10,12]. Considering the histological classification of the BCC, the most frequent type to present a high risk of positive margins was the micronodular type (n=18). This fact probably occurred because of the (nasal) location and greater aggressiveness of this histological type [13,15]. All patients whose neoplasms presented positive margins (n=28) had a new surgical intervention, however 3 (10.7%) of them presented recurrence.

Verissimo and Barbosa (2009) reported a rate of 0.9% at the 17th postoperative month of BCC resection [13]. The recurrence rate of an excised neoplasm with compromised margin varies from 19% to 67% when compared to those with free margins (1% to 31%) [8]. In the present study, 6% (n=12) of the resected primary neoplasms with free margins at the histological exam, presented recurrence along the follow-up period. Therefore, when the recurrence rate was compared according to the presence of positive margins, did not show a significant difference. This fact reinforces the necessity of histopathological examination and outpatient follow-up, especially in the most aggressive histological types (invasive, micro nodular and metatypic) of BCC, in those who presented narrow margins and in cases of SCC [15].

Due to the peculiar anatomical conditions of the nose, this region is more susceptible to present compromised margins, considering the possibility of aesthetic-functional sequelae in large resections [11,13]. However, although the sample of the present study reveals a predominance of tumors in the nasal region, there was no relationship with the presence of compromised margins, with no statistically significant difference.

Although the occurrence of metastasis in NMSC is rare, it is more frequent in SCC. Considering the BCC, the rate of metastasis ranges from 0.00285 to 0.1%. Then, the histopathological analysis of resect lesions (with its margins) and the follow-up of the patients are extremely important for the disease control [12]. However, the present study did not show any case of metastasis or death due to the disease along the follow-up period.

Thus, it was observed that the analysis of the epidemiological profile of the NMSC is important not only because of the aspects highlighted above but also because it is a disease whose prevention is possible through awareness campaigns for the use of sunscreens [3]. This is a good resource that can be distributed in the public network to populations whose sun exposure is more frequent, or to those who have already had previous injury.

## CONCLUSION

There was a predominance of basal cell carcinoma (nodular type) in women over 40 years old, mainly in the

cephalic-cervical region. The number of recurrences was proportionally higher in the BCC, unrelated to the presence of compromised margins.

## REFERENCES

- [1] Broetto J, Freitas JOG, Sperli AE, Soh SW, Richter CA, Toni RA. Surgical treatment of basal and spinocellular carcinomas: experience of the Plastic Surgery Services of Hospital Ipiranga. *Rev Bras Cir Plast.* 2012;27(4):527-30. <https://doi.org/10.1590/s1983-51752012000400009>
- [2] Chinem VP, Miot HA. Epidemiology of basal cell carcinoma. *An Bras Dermatol.* 2011;86(2):292-305. <https://doi.org/10.1590/s0365-05962011000200013>
- [3] Costa CS. Epidemiology of skin cancer in Brazil and evidence on its prevention. *Diagnosis and Treatment* 2012; 17(4): 206-8.
- [4] Neto AVRF, Yamamoto HG, Macedo JLS, Curado CGF, Neto JLO, Carvalho MAP, Trindade OB, Neto IPM. Epidemiological profile of skin cancer patients attended at Asa Norte Regional Hospital/DF - Brazil. *Rev Bras Cir Plast* 2020;35(3):316-21. <https://doi.org/10.5935/2177-1235.2020rbcp0056>
- [5] Kütting B, Drexler H. UV-induced skin cancer at workplace and evidence-based prevention. *Int Arch Occup Environ Health* 2010;83:843-54. <https://doi.org/10.1007/s00420-010-0532-4>
- [6] Martinez JC, Otley CC. The management of melanoma and nonmelanoma skin cancer: a review for the primary care physician. *Mayo Clin Proc* 2001; 76(12):1253-65. <https://doi.org/10.4065/76.12.1253>
- [7] Tejada VFDS, Rodrigues O. Neoplasias malignas de pele: a bibliographic review with emphasis on the surgical approach. *Vitalle* 2009; 21(1): 73-85.
- [8] Farhi D, Dupin N, Palangie A, Carlotti A, Avril MF. "Incomplete excision of basal cell carcinoma: rate and associated factors among 362 consecutive cases," *Dermatologic Surgery*, vol. 33, no. 10, pp. 1207-1214, 2007. <https://doi.org/10.1097/00042728-200710000-00008>
- [9] Kumar P, Watson S, Brain AN, Davenport PJ, McWilliam LJ, Banerjee SS, et al. Incomplete excision of basal cell carcinoma: a prospective multicentre audit. *Br J Plast Surg.* 2002; 55(8):616-22. <https://doi.org/10.1054/bjps.2002.3948>
- [10] Simoneti F, Cunha LO, Gomes CTV, Novo NF, Portella DF, Gonella HA. Epidemiological profile of patients with malignant skin tumors seen in a secondary service plastic surgery outpatient clinic in the interior of São Paulo. *Magazine of the Faculdade de Ciências Médicas de Sorocaba* 2016; 18(2): 98-102. <https://doi.org/10.5327/z1984-4840201624713>

- [11] Nigro MHMF, Brandão LSG, Rabbit APCP, Motta LM, Bastazini-Junior I. Epidemiological study of basal cell carcinoma from 2010 to 2013 in a reference hospital in dermatology in the city of Bauru, São Paulo. *Surg Cosmet Dermatol* 2015;7(3):232-5.  
<https://doi.org/10.5935/scd1984-8773.201573687>
- [12] Bariani RL, Nahas FX, Barbosa MVJ, Farah AB, Ferreira LM. Basal cell carcinoma: an updated epidemiological and therapeutically profile of an urban population. *Acta Cir Bras* 2006;21(2):66-73.  
<https://doi.org/10.1590/s0102-86502006000200003>
- [13] Verissimo P, Barbosa MVJ. Surgical treatment of nasal skin tumors in elderly. *Rev Bras Cir Plast* 2009;24(2):219-33.
- [14] Popim RC, JE Current, Marino JAG, Souza CA. Skin cancer: use of preventive measures and demographic profile of a risk group in the city of Botucatu. *Rev. Ciênc. Saúde Coletiva* 2008; 13(4):1331-6.  
<https://doi.org/10.1590/s1413-81232008000400030>
- [15] Werner B. Skin biopsy and its histological study. Why? For what? *Brazilian Annals of Dermatology* 2009; 84(4): 391-5.

---

Received on 25-11-2020

Accepted on 07-12-2020

Published on 20-12-2020

DOI: <https://doi.org/10.31907/2414-2093.2020.06.05>

© 2020 Marcus Vinícius Jardim Barbosa et al.; Licensee Green Publishers.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.