

Recurrence Rate of Basal Cell Carcinoma After Surgical Excision: Clinical and Dermatoscopic Evaluation

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ABSTRACT

Background: Basal cell carcinoma (BCC) recurrence is extremely infrequently documented after complete surgical excision. There are well-studied risk factors for this undesirable consequence like localized erythema, induration, or ulceration at the site of surgical excision of the initial lesion of BCCs.

Material and Methods: According to the histopathology report, all patients whose primary BCCs were removed with free surgical margins between January 2018 and December 2021 were included in the current study. The patient's age, sex, sun exposure, tumor site, size, clinical diagnosis, histopathological variant of primary lesion, least free margin distance of the original lesion and recurrence time were all noted in the medical records that were obtained.

Result: Sixty patients including 30 males and 30 females, among them, 56.7% lived in rural areas, compared to 43.3% who came from urban. Furthermore, 45% of patients were housewives and the majority of patients were illiterate (70%). 20% of patients had hypertension, diabetes mellitus and ischemic heart disease. 15% had hypertension, diabetes mellitus, 10% only had hypertension, 31.7% had no disease and 25% of participants experienced bleeding, 36.7% had ulcers and only 6.7% experienced itching. Regarding previous therapy for BCC before surgical excision, 15% of patients received 5FU and peeling solution for each of them. Only 8.3% of patients used cryotherapy, 10% of patients used cautery, 5% of patients received CO2 laser, only one patient (1.7%) had BCC previously treated before surgical excision and recurred.

Conclusion: All recurrent BCCs were surgically removed with margins less than 4 mm. The preferred surgical treatment for basal cell carcinoma is with sparing margins more than 4 mm which may be individualized to the patients in order to lower recurrence rates.

Keywords: Basal cell carcinoma, Excision, Recurrence .

معدل تكرار سرطان الخلايا القاعدية بعد الاستئصال الجراحي: التقييم السريري وبنظور الجلد

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الخلاصة

الخلفية: نادراً ما يتم توثيق تكرار سرطان الخلايا القاعدية بعد الاستئصال الجراحي الكامل. هناك عدد قليل من عوامل الخطر المدروسة جيداً لهذه النتيجة غير المرغوب فيها. يمكن رؤية حمامي موضعية، أو تصلب، أو تقرح في موقع الاستئصال الجراحي للآفة الأولية مع سرطانات مخفية متكررة .

المرضى والطرق: وفقاً لتقرير التشريح المرضي، تم تضمين جميع المرضى الذين تمت إزالة خلاياهم الخلوية الأساسية بهوامش جراحية مجانية وتم تشخيصهم لاحقاً بتكرار موضعي بين يناير ٢٠١٨ وديسمبر ٢٠٢١. عمر المريض، جنسه، تعرضه لأشعة الشمس، موقع الورم، حجمه، التشخيص السريري، المتغير النسيجي المرضي للآفة الأولية، أقل مسافة هامشية حرة للآفة الأصلية ووقت التكرار كلها مذكورة في السجلات الطبية التي تم الحصول عليها.

النتائج : ستون مريضاً منهم ٣٠ ذكراً و ٣٠ أنثى، ٥٦.٧% منهم يعيشون في الريف، مقابل ٤٣.٣% يأتون من الحضر. علاوة على ذلك، كان ٤٥% من المرضى ربوات و أغلبية المرضى أميون (٧٠%). وكان ٢٠% من المرضى يعانون من ارتفاع ضغط الدم والسكري وأمراض القلب الإقفارية. كان ١٥% منهم مصابين بارتفاع ضغط الدم والسكري، و ١٠% فقط مصابون بارتفاع ضغط الدم، و ٣١.٧% ليس لديهم أي مرض، و ٢٥% من المشاركين تعرضوا للنزيف، و ٣٦.٧% لديهم تقرحات، و ٦.٧% فقط تعرضوا للحكة. فيما يتعلق بالعلاج السابق لـ BCC قبل الاستئصال الجراحي، تلقى ١٥% من المرضى ٥ FU ومحلول تقشير لكل منهم. فقط ٨.٣% من المرضى استخدموا العلاج بالتبريد، و ١٠% من المرضى استخدموا الكي، و ٥% من المرضى تلقوا ليزر ثاني أكسيد الكربون، ومريض واحد فقط (١.٧%) عولج سابقاً قبل الاستئصال الجراحي وتكرر ظهوره.

الاستنتاج : اكتشفنا أن جميع الخلايا السرطانية المخفية المتكررة التي تم فحصها كانت بها أورام أصلية تمت إزالتها جراحياً بهوامش أقل من ٤ ملم. يجب أن يتم تخصيص العلاج المفضل لسرطان الخلايا القاعدية ذو الهوامش الإيجابية للمرضى من أجل خفض معدلات تكرار المرض.

الكلمات المفتاحية : تكرار ، قطع ، سرطان الخلايا القاعدية .

INTRODUCTION

The most prevalent non-melanoma skin cancer is basal cell carcinoma (BCC), which is an incredibly common disease worldwide¹⁻³. BCC behaves as a locally damaging tumor despite having essentially no ability to spread, ultimately leading to functional and cosmetic deficits as well as a considerable economic burden¹. Eighty five percent of BCC cases are found on the skin of the head and neck; sun exposure is the leading risk factor for these cases. Furthermore, radiotherapy and immunosuppression are some other risk factors².

Increased UV radiation from the ozone layer's depletion, more people exercising outdoors, and changes in dress codes may all contribute to the BCC prevalence's ongoing rise^{3,4}. The disease primarily affects people with white skin color, and the male to female ratio is 3:2.3. There are several different forms of BCC: morpheiform, infiltrative, micro-nodular, superficial, pigmented, ulcerative, and nodular in appearance⁵. Traditionally, basal cell carcinomas are removed with 3–4 mm tumor-free margins with primary surgical repair⁶. However, in many cases, the removal of an important amount of normal tissue occurs when BCCs with 4 mm borders are excised³. It is crucial to reduce the amount of normal tissue loss in order to have the optimum functional and cosmetic effects. A clinical safety margin of 5 to 10 mm is advised for high risk BCCs, such as recurrent BCC or morpheiform-like BCC, because incomplete excision is linked to a high probability of recurrence⁷. According to a study, 96% of tumors were successfully removed surgically without recurrence, by a free margin of 4 mm, visible to the naked eye⁷. The aim of this study was to evaluate the recurrence rate of BCC after surgical excision with the grossly intact margin of 4 mm.

PATIENTS AND METHODS

A retrospective study was conducted at Erbil Dermatology Teaching Center in Erbil City, Kurdistan Region-Iraq with ethical approval from higher committee of college of Medicine. In our study, collection of 60 Basal cell carcinoma patients was done, where their information got from data base of the center. We included those patients with BCC, in which the diagnosis was established through history taking, clinical examination and dermatoscopic reports without any exclusions criteria only those unfit for surgery, followed by surgical excision and the histological reports confirming diagnosis of BCC. The study cases collected during the period from January 2018 to December 2021. From the patient's archival records, the demographic information and anamnesis have been obtained. Records included: patient age, sex, duration of BCC, tumor site, histological subtype of BCC, and method of wound closure after the excision (primary closure, second intention, skin flap, and full or split thickness skin graft). All of these patients been invited to the center for clinical and dermatoscopic evaluation for recurrence of BCC at the site of previous surgical excision with 6 months intervals, during period of 2 years.

Statistical Package for Social Sciences version 28 (SPSS Inc., an IBM Company, Chicago, Illinois, USA) was used to enter and analyze the data. A statistical significance level (≤ 0.05) was used to compare the inferential results between the participants with different variables, and descriptive analyses were expressed as frequencies and percentages. The Pearson Chi square analysis was then used to further examine the data.

RESULTS

Table 1 revealed that, half (50%) (n=30) of the cases were female as compared with male cases. Among them 56.7% (n=34) of patients were living in rural areas, compared to 43.3% (n=26) who came from urban areas. Furthermore, 45% (n=27) of patients were housewives, followed by 31.7% (n=19) were farmers and 11.7% (n=7) were government employee. The majority (70%) (n=42) of patients were illiterate, and just 8.3% (n=5) of participants had graduated from higher education institutions. On the other hand, 53.3% (n=32) of them showed good levels of socioeconomic status. About 30% (n=18) of the patients had history of BCC running in their families, compared to 70% (n=42) who had a definite family history; and 48.3% (n=29) of participants were smokers.

Table 1: General characteristics of participants

Variables		Frequency (n=60)	Percent
Gender	Male	30	50%
	Female	30	50%
Residence	Urban	26	43.3%
	Rural	34	56.7%
Occupation	Private employee	3	5%
	Farmer	19	31.7%
	Government employee	7	11.7%
	Peshmerga	4	6.7%
	Housewife	27	45%
Level of education	Illiterate	42	70%
	primary school	6	10%
	secondary school	7	11.7%
	University education	5	8.3%
Socio-economic status	Good	32	53.3%
	Low	28	46.7%
Family history of BCC among first degree relatives		18	30%
Smoking history		29	48.3%
Total		60	100%

Table 2 expressed that, 20% (n=12) of patients had comorbidities of hypertension, diabetes mellitus and ischemic heart disease together. About 15% (n=9) had both hypertension and diabetes mellitus, while 10% (n=6) had only hypertension. Regarding the BCC tumor itself, some patients (25%) (n=15) experienced bleeding from the tumor spontaneously or during trivial trauma, 36.7% (n=22) had ulcerated tumors and only 6.7% (n=4) experienced itching of the BCC lesion.

Table 2: Comorbidities and symptoms of BCC cases

Variables		Frequency (n=60)	Percent
Comorbidities	No comorbidities	19	31.7%
	Hypertension	6	10%
	diabetes mellitus	8	13.3%
	hypertension and diabetes mellitus	9	15%
	hypertension and ischemic heart disease	2	3.3%
	Hypertension and asthma	1	1.7%
	diabetes mellitus and ischemic heart disease	3	5%
Associated symptoms of BCC lesions	hypertension, diabetes mellitus and ischemic heart disease	12	20%
	Bleeding	15	25%
	Ulceration	22	36.7%
	Itching	4	6.7%

Regarding previous therapy for BCC before surgical excision, 15% (n=9) of patients received 5FU cream or peeling solutions. Only 8.3% (n=5) of the patients used cryotherapy as liquid nitrogen, 10% (n=6) of patients used electro-cauterization, 5% (n=3) of patients received CO₂ laser and only one patient (1.7%) had BCC previously treated by surgical excision and recurred. table 3

Table 3: Treatment modalities received by patients before surgical excision of BCC

Treatment modality	Number of patients (n=60)	percent
5FU	9	15%
Peeling solution	9	15%
Cryotherapy	5	8.3%
Cautery	6	10%
Co2 laser	3	5%
Surgery	1	1.7%

A section in table 4 shows sizes of the BCC lesions: the most frequent size (30%) (n=18) of BCC was 1x1.5 cm. The smallest size of BCC was 0.5x0.7 cm and was found in 5% (n=3) of the cases. The largest size of the tumor was 2.0x3.0 cm and was identified in 5% (n=3) of the patients.

Evaluation of localization of BCCs revealed that the largest amount (21.7%) (n=13) of tumors were on nasal tip, (13.3%) (n=8) of tumors were on nasal bridge, 10% (n=6) of them had tumor on right lower eyelid and forehead, 8.3% (n=5) of cases had left nasal sidewall tumor, and only 1.7% (n=1) of them had alar crease and chest tumor for each.

The vast majority (90%) (n=54) of the patients had type III and IV Fitzpatrick type of the skin as shown in Table 4.

Table 4: Morphological description of BCC tumors

Variables	Categories	Frequency	Percent
Size of tumor	0.5x0.7cm	3	5%
	0.7x1.0cm	7	11.7%
	1.0x1.0cm	7	11.7%
	0.7x1.4cm	1	1.7%
	0.7x1.5cm	1	1.7%
	1.0x1.5cm	18	30%
	1.5x1.5cm	1	1.7%
	1.5x1.8cm	3	5%
	1.0x2.0cm	8	13.3%
	1.5x2.0cm	5	8.3%
	1.5x2.5cm	3	5%
	2.0x3.0cm	3	5%
Site of tumor	left cheek	4	6.7%
	Chest	1	1.7%
	nasal bridge	8	13.3%
	left lower eyelid	2	3.3%
	right lower eyelid	6	10%
	right cheek	2	3.3%
	left nasal sidewall	5	8.3%
	nasal tip	13	21.7%
	Forehead	6	10%
	right auricle of ear	2	3.3%
	alar crease	1	1.7%
	right ala of nose	2	3.3%
	Scalp	3	5%
	left auricle of ear	2	3.3%
right nasal sidewall	3	5%	
Fitzpatrick skin type of the patients	II	6	10%
	III	27	45%
	IV	27	45%

In table 5 shows the revealed signs of sun damage were analyzed: the majority (73.3%) (n=44) of BCC patients had AK, the vast majority (95%) (n=57) had elastosis and the 90% (n=54) had skin atrophy. Furthermore, 91.7% (n=55) of cases had telangiectasia, 90% (n=54) of patients had coarse facial wrinkles, 45% (n=27) had coarse neck wrinkles, half (50%) (n=30) of patients had freckles, and the majority (70%) (n=42) of patients had bruising.

Table 5: Prevalence of skin damage signs on the skin of BCC patients (n=60)

Associated skin damage	Frequency	Percent
AK	44	73.3%
Skin elastosis	57	95%
Skin atrophy	54	90%
Telangiectasia	55	91.7%
Face coarse wrinkles	54	90%
Neck coarse wrinkles	27	45%
Freckles	30	50%
Bruising	42	70%

Table 6 shows the histopathological appearance of BCCs: more than half (51.7%) (n=31) of participants had ulcerated type tumors, followed by 28.3% (n=17) who had pigmented type tumors, and only 1.7% (n=1) of cases had morpheaform type tumors. The majority of patients (61.7%) (n=37) had nodular tumors, of which 18.3% (n=11) had pigmented sort and 16.7% (n=10) had nodular-ulcerative type tumors.

Table 6: Clinical and histopathological types of BCC

Variables	Categories	Frequency (n=60)	Percent
Clinical types	Nodular	37	61.7%
	Pigmented	11	18.3%
	Superficial	1	1.7%
	Morpheaform	1	1.7%
	Nodulo-ulcerative	10	16.7%
Histopathology type	Superficial	3	5%
	Pigmented	17	28.3%
	Ulcerated	31	51.7%
	Morpheaform	1	1.7%
	Nodulocystic	8	13.3%

Table 7 revealed dermatoscopy of the BCC lesions reveals the following findings: 38.3% (n=23) of them had micro-abrasions, most (68.3%) (n=41) of patients faced ulceration, 46.7% (n=28) of them went through multiple blue-grey globules followed by 43.3% (n=26) of cases had large blue-grey ovoid nest, most (61.7%) (n=37) of them diagnosed with small telangiectasia, the vast majority (98.3%) (n=59) of participants had arborizing B.V, more than half (58.3%) (n=35) of them associated with pig network, 71.7% (n=43) of them reported that they had spoke-wheel areas as well as majority (86.7%) (n=52) had dots, 83.3% (n=50) globules of cases used globules, 71.7% (n=43) of them interacted with leaf like objects finally most (66.7%) (n=40) of patients had white structure less.

Table7: Dermatoscopic features of BCC among the sample size

Dermatoscopic feature	Frequency (n=60)	Percent
Micro-abrasions	23	38.3%
Ulceration	41	68.3%
Multiple blue-grey	28	46.7%
Large blue-grey ovoid nest	26	43.3%
Small telangiectasia	37	61.7%
Arborizing blood vessels	59	98.3%
Pigmented network	35	58.3%
Spoke wheel areas	43	71.7%
Dots	52	86.7%
Globules	50	83.3%
Leaf like	43	71.7%
White structure less	40	66.7%

Checking the patients with history of BCC surgical removal with safe margin of 3-4 mm (horizontally and vertically) been evaluated for local recurrence, 43 (71.67%) of patients checked after three years and 17 (28.34%) of patients after four years post-operatively. The results of clinical and dermatoscopy examination (not histological) of patients under follow-up showed that only 2 out of 60 cases had BCC recurrence locally at the site of surgical excision; as a result, the recurrence rate

following surgical excision was 3.3% (n=2) of patients. Both cases with recurrence were females with nodulo-ulcerative type of BCC, one on the nose with tumor size 1.0X1.5 cm and the other was on the cheek with tumor size of 1.0X1.0 cm.

DISCUSSION

A cancerous skin tumor called a cutaneous basal cell carcinoma (BCC) is mostly produced from stem cells of hair follicles^{8,9,10}. There is confirmation that BCC originates from the interfollicular and infundibulum epidermis¹¹.

Clinical suspicion and investigative techniques, particularly histological analysis, are key components in the diagnosis of BCC. With the addition of dermoscopic examination, diagnostic sensitivity and specificity have increased to 91% and 95%, respectively¹². The gold standard diagnostic method for BCC lesions is still considered to be histopathologic analysis of the excised tissue, despite improvements in clinician sensitivity for the diagnosis of BCC¹³. In addition to confirming the diagnosis, histopathology would identify BCC subtypes and provide information on the safe margins of removed tissue with confirmation of the histological type (such as micronodular, morpheoform, pigmented, or ulcerated). By distinguishing between the high-risk and low-risk morphologies of BCC using histopathology, it is possible to identify the lesions that are most likely to metastasize by looking for risk indicators such as lymphovascular invasion and perineural involvement^{14,15}.

The causes of recurrent BCC are multifaceted in nature. The focus of earlier research on BCCs has been on the risk variables that raise the likelihood of tumor local recurrence. The probability of recurrence has been linked to a number of clinical and histological characteristics in this setting, including increased tumor size, head lesions, poorly defined borders, incompletely excised lesions, and perineural invasion^{16,17}. According to previous study, surgically removed BCCs with lesions greater than 15 mm in diameter had (15%) of five-year recurrence rate. After adjusting for lesions on the scalp, nose, eyes, ears, or face, the authors concluded that larger tumor size was a significant predictor of recurrence¹⁷. A 9% risk of recurrence was associated with large BCCs (diameter more than 1.5 cm), as opposed to a 0.8% risk for smaller BCCs¹⁸. In contrast, our study's findings indicate that 4.3% of BCC lesions larger than 1.5 cm (23 lesions), measured by the greatest diameter, recurred. Our geographic location, which is distinguished by a greater index of UVR from sun exposure, may be the cause of this increased percentage of recurrence. One of the primary risk factors for BCC formation has

been identified as ultraviolet exposure¹⁹. Thus, the most frequent anatomical sites for the development of BCCs are the head and neck¹⁹. In our culture, men generally labor outside more than women, and women wear more body-covering apparel, so it is believed that men will be exposed to the sun more. However, the ratio of men to women was equal because the UVR index is relatively high, can get BCC lesions while having less exposure to the sun.

All the patients in this study were over 45 years old (up to 85 years) with mean age of 65 which is a slightly different from patients in France according to Boulinguez et al²⁰. They found that the age of those recurrent BCCs was 69 years on average (range 41–91). Morgan et al., in 2019²¹ revealed that, out of 22 recurrent BCC patients who were evaluated, two patients had the same result (mean age 64), both of the recurring BCC cases in the current study were elderly (60 and 68 years). This could be related to that older people tend to have greater immune system problems and skin degradation, both of which increase the risk of BCC.

Recurrent tumors in our study were 2/60 (3.3%) morphologically nodular subtypes of BCC, which are regarded as a low risk variety of BCC. This is mostly due to lower border of safety margins of surgical excision than 4mm.

In terms of the patho-morphological subtypes of BCC, the nodular type predominated (23.3%) in the current study, which may be regarded as an unexpected finding and varies from the majority of the prior peer studies. Vornicescu et al. in 2021 discovered 50% nodular and 50% infiltrative tumors²², Morgan et al showed 2 people with the nodular subtype versus 17 with the infiltrative subtype¹⁸.

Since most BCCs may be treated with complete surgical excision, which has low rates of recurrence and metastasis, it is still regarded as the "gold standard."^{18,23}

For low-risk lesions, the National Comprehensive Cancer Network (NCCN) advises a 4 mm safety margin. After 4 years after surgical excision, on average, we had 2 patients with local recurrence. Both cases of recurrent BCC in female patients exhibited blended tumor margins during initial excision according to histopathology.

All cases in our data that underwent primary excision of BCC had histological findings that indicated a total safe margin of 3–4 mm, with the exception of the two recurrence cases noted above in which one of the margins was merging for whom a surgical re-excision with safety margins was suggested. Among the results of current study, all cases during their primary excision of BCC, their histopathological reports showed that safe margin

totally was 3-4 mm, except for the above mentioned 2 cases of recurrence where one of the margins was blending. For all BCC subtypes, our examination of recurrence 4 years after original excision revealed no recurrence. Dermatologists may take into account the fact that local recurrence is quite unlikely with excisions within this range (3–4 mm).

CONCLUSION

In this study we concluded the majority (70%) of patients was illiterate and most of them (90%) had Fitzpatrick skin type of III-IV. The vast majority (90%-95%) had skin photo damage signs (elastosis, telangiectasia, atrophy and coarse facial wrinkles). More than half (61.7%) of patients had nodular type of BCC. In spite of the presence of skin damage and comorbidities among significant number of patients, the local recurrence rate of BCC after surgical excision with safe margin of 3-4 mm, in a period of 3-4 years postoperatively was only 3.3%. This might be a clue to the cutaneous surgeon to consider this safe margin as a good scale in the terms of preservation of the surrounding skin and with a fairly minimum recurrence rate.

REFERENCES

1. Babaye-Nazhad S, Amirnia M, Alikhah H, Khodaeyani E, Atapour N. Safety margin in excision of basal cell carcinoma. *PJBS: PJBS*. 2009;12(21):1408-14.
2. Duarte B, Vieira L, Ribeiro L, e Costa TP, João A, Varandas A, et al. Risco de Recidiva a 5 Anos Após Excisão Convencional de um Carcinoma Basocelular. *Revista da Sociedade Portuguesa de Dermatologia e Venereologia*. 2020;78(2).
3. Szewczyk MP, Pazdrowski J, Dańczak-Pazdrowska A, Golusiński P, Majchrzak E, Łuczewski Ł, et al. Analysis of selected recurrence risk factors after treatment of head and neck basal cell carcinoma. *Advances in Dermatology and Allergology/Postępy Dermatologii i Alergologii*. 2014;31(3):146-51.
4. Kyrgidis A, Vahtsevanos K, Tzellos TG, Xirou P, Kitikidou K, Antonides K, et al. Clinical, histological and demographic predictors for recurrence and second primary tumours of head and neck basal cell carcinoma. A 1062 patient-cohort study from a tertiary cancer referral hospital. *EJD*. 2010;20(3):276-82.
5. Saadoon AM, Hussein AR. The relationship between incompletely excised basal cell carcinoma and recurrence rate. *QMJ*. 2012;8(13):178-87.

6. Chadha V, Wright M. Small margin excision of periocular basal cell carcinomas. *BJO*. 2009;93(6):803-6.
7. Quazi SJ, Aslam N, Saleem H, Rahman J, Khan S. Surgical margin of excision in basal cell carcinoma: a systematic review of literature. *Cureus*. 2020;12(7).
8. Hasan A, Rabie A, Elhussiny M, Nasr M, Kamel MI, Hegab A, et al. Recurrent cutaneous basal cell carcinoma after surgical excision: a retrospective clinicopathological study. *Annals of Medicine and Surgery*. 2022;78:103877.
9. Liu S-S, Liu Q-Q, Huang S-Z, Zhang C, Dong X-Y, Zang S-Q. Sulfonic and phosphonic porous solids as proton conductors. *Coordination Chemistry Reviews*. 2022;451:214241.
10. Peterson SC, Eberl M, Vagnozzi AN, Belkadi A, Veniaminova NA, Verhaegen ME, et al. Basal cell carcinoma preferentially arises from stem cells within hair follicle and mechanosensory niches. *Cell stem cell*. 2015;16(4):400-12.
11. Youssef KK, Van Keymeulen A, Lapouge G, Beck B, Michaux C, Achouri Y, et al. Identification of the cell lineage at the origin of basal cell carcinoma. *Nature cell biology*. 2010;12(3):299-305.
12. Peris K, Fagnoli MC, Garbe C, Kaufmann R, Bastholt L, Seguin NB, et al. Comment on 'Diagnosis and treatment of basal cell carcinoma: European consensus-based interdisciplinary guidelines'. *EJC*. 2020;131:100-3.
13. Roozeboom M, Mosterd K, Winnepenninckx V, Nelemans P, Kelleners-Smeets N. Agreement between histological subtype on punch biopsy and surgical excision in primary basal cell carcinoma. *JEADV*. 2013;27(7):894-8.
14. 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*. 2007;33(10):1207-14.
15. Bichakjian CK, Olencki T, Aasi SZ, Alam M, Andersen JS, Berg D, et al. Basal cell skin cancer, version 1.2016, NCCN clinical practice guidelines in oncology. *JNCCN*. 2016;14(5):574-97.
16. Leibovitch I, Huilgol SC, Selva D, Richards S, Paver R. Basal cell carcinoma treated with Mohs surgery in Australia III. Perineural invasion. *JAAD*. 2005;53(3):458-63.
17. Dubin N, Kopf AW. Multivariate risk score for recurrence of cutaneous basal cell carcinomas. *Archives of dermatology*. 1983;119(5):373-7.
18. Eichenfield LF, Tom WL, Chamlin SL, Feldman SR, Hanifin JM, Simpson EL, et al. Guidelines of care for the management of atopic dermatitis: section 1. Diagnosis and assessment of atopic dermatitis. *JAAD*. 2014;70(2):338-51.
19. Zanetti R, Rosso S, Martinez C, Nieto A, Miranda A, Mercier M, et al. Comparison of risk patterns in carcinoma and melanoma of the skin in men: a multi-centre case–case–control study. *BJC*. 2006;94(5):743-51.
20. Boulinguez S, Grison-Tabone C, Lamant L, Valmary S, Viraben R, Bonnetblanc J, et al. Histological evolution of recurrent basal cell carcinoma and therapeutic implications for incompletely excised lesions. *BJD*. 2004;151(3):623-6.
21. Morgan FC, Ruiz ES, Karia PS, Besaw RJ, Neel VA, Schmults CD. Factors predictive of recurrence, metastasis, and death from primary basal cell carcinoma 2 cm or larger in diameter. *JAAD*. 2020;83(3):832-8.
22. Vornicescu C, Şenilă SC, Bejinariu NI, Vesa ŞC, Boşca AB, Chirilă DN, et al. Predictive factors for the recurrence of surgically excised basal cell carcinomas: A retrospective clinical and immunopathological pilot study. *Experimental and therapeutic medicine*. 2021;22(5):1-10.
23. Bartoš V, Pokorný D, Zacharová O, Haluska P, Doboszová J, Kullová M, et al. Recurrent basal cell carcinoma: a clinicopathological study and evaluation of histomorphological findings in primary and recurrent lesions. *Acta Dermatoven APA*. 2011;20(2).