

Evaluation of Skin Cancers in a 7-year Plastic Surgery Archive (2014-2020)

● Gaye Toplu¹, ● Dinçer Altınel², ● Merdan Serin³

¹Private Clinic, Department of Plastic Surgery, İstanbul, Turkey

²University of Health Sciences Turkey, İstanbul Training and Research Hospital, Clinic of Plastic Surgery, İstanbul, Turkey

³İstanbul Medeniyet University, Göztepe Training and Research Hospital, Clinic of Plastic Surgery, İstanbul, Turkey

ABSTRACT

Introduction: Skin cancer is one of the most important health problems in our age. In this study, we determined the prevalence of skin cancer in the region by evaluating the reports of skin cancer patients diagnosed at our center.

Methods: This is a retrospective study of patients diagnosed with malignant skin cancer by biopsy between January 2014 and December 2020 for 7 years in a single center. The year, age, gender, tumor types, localization surgical treatments and recurrences of these reports were examined.

Results: A total of 852 patients were retrospectively analyzed. Four hundred and ninety-seven were men and 355 were women. The average age was 67.0 years (9 y - 98 y). Six hundred and twenty-seven were evaluated as basal cell carcinoma, 133 as squamous cell carcinoma, and 25 as melanoma. 84.8% (n=774) of the tumors were located in the head and neck region (most frequently in the nose region). All our patients were treated with appropriate surgical treatments (wide excision primary surgical repair, surgical repairs with flaps and grafts) and the patients were followed up for at least 1 year. Recurrence was observed in 71 of 852 patients after surgical excision and they were re-excised.

Conclusion: In our study; we have found that our region in general had a similar incidence of malignant skin tumors compared with the other studies. The localization, surgical treatment and follow-up results were also similar. This study will shed light on the characteristics, behaviors, preventive measures, diagnosis and treatment of skin cancers.

Keywords: Skin cancer, epidemiology, plastic surgery

Introduction

Today, skin cancer continues to be one of the important health problems, as it is with most cancers. Skin cancer is the most common cancer among all cancer types. In order of frequency of malignant tumors of the skin are basal cell carcinoma (BCC), squamous cell carcinoma (SCC), malignant melanoma (MM) and skin appendage tumors (1-3).

BCC and SCC, which are non-melanocytic tumors, constitute 90% of skin malignant tumors. The mortality rate was 0.1%. BCC has a lower metastasis and mortality rate than SCC. Most are caused by ultraviolet B (UVB) and due to genetic anomalies. Apart from this, smoking, human papilloma virus, radiotherapy, chronic ulceration and burn, xeroderma pigmentosum, suppression of the immune system, chemicals such as arsenic - vinyl chloride, polycyclic aromatic hydrocarbons and alkylating agents are also carcinogens effective in their emergence (4,5). MM is the 7th most common type of cancer in the United States of America (USA). In the etiology of MM; UVB, genetic and environmental factors play a role.

Tumors of the skin appendage include hair follicle tumors, sebaceous tumors, apocrine tumors, eccrine tumors and complex adnexal tumors. Although cases show autosomal dominant tumor suppressor gene mutation, generally no specific etiological agent has been found (6-8).

Basal and squamous cell cancers are easily diagnosed and often treated with excision when diagnosed early. The definitive diagnosis of malignant skin tumors is made by punch biopsy, incisional biopsy, or excisional biopsy. Tumor excision margins differ according to localization and pathological type. Defects formed after tumor excision are repaired using surgical techniques such as primary repair, graft repair, or flap repair. Lymph node dissection can be performed depending on the tumor location, pathological examination, the involvement of the lymph nodes and factors related to the patient. Postoperative radiotherapy can be applied in patients with perineural invasion, lymph node involvement, nodal extracapsular invasion, positive surgical margins in SCC, some patients with positive margins of BCC and some frequently recurring malignant skin tumors.



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Address for Correspondence: Merdan Serin MD, İstanbul Medeniyet University, Göztepe Training and Research Hospital, Clinic of Plastic Surgery, İstanbul, Turkey

Phone: +90 506 703 55 15 **E-mail:** merdanserin@gmail.com **ORCID ID:** orcid.org/0000-0002-1257-0591

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The current article contributes to the epidemiology of skin cancers in our region, by determining the epidemiological characteristics, age, sex, location and histopathological types of patients with malignant skin tumors treated in our clinic, and by retrospectively evaluating the operation and recurrence rates.

Methods

Skin cancer patients over a 7-year period between January 2014 and December 2020 were included in this retrospective study. Patients diagnosed with malignant skin cancer by biopsy at our center were retrospectively analyzed. Patient consent was received from the patients. Before starting the study, the approval of the University of Health Sciences Turkey, Istanbul Training and Research Hospital Local Ethics Committee was obtained (approval number: 2959, date: 05.11.2021). Age, gender, tumor types, localization surgical treatments, and recurrences of these reports were analyzed. Data were entered using the Microsoft Office Excel program. Results are given as percentages and numbers.

Statistical Analysis

Descriptive analysis was performed using GraphPad Prism version 7.00 for Windows. (GraphPad Software, La Jolla California USA).

Results

A total of 852 patients were investigated retrospectively. Four hundred and ninety-seven were male and 355 were female. In total, 852 skin cancers were seen at an average age of 67.0 (9 y - 98 y) (Table 1). Eight hundred and five patients had a single lesion and 47 patients had multiple lesions, which were all BCC. There were total of 913 lesion (Table 2). Of 852 patients diagnosed with malignant skin cancer, In our study, the order of malignant tumors involving the skin was as follows; 627 of them were evaluated as BCC (most common subtype was nodular - n=370), 133 of them as SCC, 25 of them as melanoma (Table 3). 84.8% (774) of the tumors were located in the head and neck region (most commonly the nose) (Table 4). BCC was most frequently seen in nose (n=238), cheek (n=73) and periorbital (n=68) region (Table 5). SCC was most frequently seen upper extremity (n=18) and cheek (n=18) (Table 6). Melanoma was most frequently found in upper (n=6) and lower (n=8)

Table 1. Number of patients and sex distribution in each group

	Number (n)	Mean age	Range
Male	497	68	9-93
Female	355	65.5	12-98
Total	852	67	9-98

Table 2. Number of lesions in each patient

Number of lesions	Number of patients	Total number of lesions
1	805	805
2	36	72
3	9	27
4	1	4
5	1	5
	852	913

extremities (Table 7). All of our patients were treated appropriately (wide excision, primary surgical repair, surgical repair with flap and graft), and the patients were followed up for at least 1 year (Table 8). Local anesthesia was used in majority of the cases (Table 9). One hundred and sixteen patients had positive surgical margin following the initial excision and were re-excised in the following 3 weeks (Table 10). Relapse was observed during the first postoperative year in 71 patients after surgical excision and they were re-excised (Table 11).

Discussion

Malignant skin tumors are mostly seen in Caucasians. It is one of the most common tumors and its mortality rates are low compared with other malignant tumors. The incidence is the same in developed and developing countries. However, the mortality rate is higher in developing countries since early diagnosis and treatment opportunities are more limited in these countries.

If there are no predisposing factors, mostly malignant skin cancers are seen after 40 years of age. It has been reported in the publication that skin cancers are more common in men. This is compatible with our findings. In our study, the order of malignant tumors involving the skin was as follows: 627 of them were evaluated as BCC (the most common subtype "Nodular" -n=370), 133 as SCC, 25 as melanoma. In most of the other studies, it was stated that the order of frequency was similar (2,9-11).

In our study, the most common location of malignant skin tumors was found to be the head and neck region, which is compatible with previous findings. In the head and neck region, the most common tumor localization was the nose. BCC is the most common type of

Table 3. Number of lesions according to histopathological subtype

Histological type	Number (n)	Percentage (%)
Basal cell carcinoma	627	73.6
Squamous cell carcinoma	133	15.6
<i>In situ</i> SCC	30	3.5
Melanoma	25	2.9
Basosquamous carcinoma	10	1.2
Lymphoma	8	0.9
Trichoblastic carcinoma*	4	0.5
Eccrine porocarcinoma*	4	0.5
Sebaceous carcinoma*	3	0.4
Dermatofibrosarcoma protuberans	3	0.4
Atypic spitz tumor	2	0.2
Verrucose carcinoma	2	0.2
Sebaceous carcinoma <i>in situ</i> *	1	0.1
Spindle cell main mesenchymal tumors	1	0.1
Microcystic adnexal carcinoma*	1	0.1
Clear cell carcinoma metastasis	1	0.1
Carcinoma infiltration (lung metastasis)	1	0.1
Mycosis fungoides	1	0.1
Carcinosarcoma (metaplastic carcinoma)	1	0.1

SCC: Squamous cell carcinoma

Table 4. Number of lesions according to location

	Number (n)	Percentage (%)
Nose	253	27.7
Nose tip	19	2.1
Dorsum of my nose	212	23.2
Nose edge	9	1.0
Nose wing	13	1.4
Glabella	2	0.2
The forehead	50	5.5
Cheek	117	12.8
Lips	39	4.3
Upper lip	24	2.6
Lower lip	13	1.4
Commissary	2	0.2
Temporal	63	6.9
Scalp	54	5.9
Periorbital	4	0.4
Eyebrow	22	2.4
Eyelid	60	6.6
Jaw	14	1.5
Neck	22	2.4
Ear	61	6.7
Pre-auricular	14	1.5
Behind the ear	10	1.1
Auricular lobule	1	0.1
Nape	10	1.1
Nasolabial	3	0.3
Trunk	56	6.1
Supraclavicular	2	0.2
Body	12	1.3
Back	24	2.6
The sternum	5	0.5
Abdominal	8	0.9
Lumbar	2	0.2
Sacrum	2	0.2
Anal	1	0.1
Upper extremity	43	4.7
Axilla	2	0.2
Shoulder	8	0.9
Arm	6	0.7
Forearm	10	1.1
Hand	16	1.8
The elbow	1	0.1
Lower extremity	40	4.4
Inguinal	7	0.8
Hip	2	0.2
The thigh	8	0.9
Leg	11	1.2
The knee	2	0.2
Foot	10	1.1
Total	913	

Table 5. Number of BCC lesions according to location

	Number (n)	Percentage (%)
Nose	238	38.0
Glabella	2	0.3
The forehead	33	5.3
Cheek	73	11.6
Lips	19	3.0
Temporal	40	6.4
Scalp	31	4.9
Periorbital	68	10.8
Jaw	11	1.8
Neck	17	2.7
Ear	33	5.3
Nape	6	1.0
Trunk	24	3.8
Upper extremity	14	2.2
Lower extremity	8	1.3
Inguinal	10	1.6
Total	627	-

BCC: Basal cell carcinoma

Table 6. Number of SCC lesions according to location

	Number (n)	Percentage (%)
Nose	2	1.5
Glabella	0	0.0
The forehead	10	7.5
Cheek	18	13.5
Lips	16	12.0
Temporal	9	6.8
Scalp	11	8.3
Periorbital	6	4.5
Jaw	1	0.8
The neck	2	1.5
Ear	17	12.8
Nape	4	3.0
Trunk	9	6.8
Upper extremity	18	13.5
Lower extremity	9	6.8
Inguinal	1	0.8
Total	133	-

SCC: Squamous cell carcinoma

cancer in the Caucasian race and is the most common tumor of the skin. These cancers, which make up 50-75% of all skin cancers, are locally slow growing tumors that almost do not metastasize. In our study, BCC was the most common malignant skin tumor. It has been reported in the literature that the incidence of BCC increases age. In our study, the mean age of the patients diagnosed with BCC was 67 years. It has been reported that it is mostly located in the head and neck region. Shanoff et al. (12) reported that the distribution of BCCs in the body is

Table 7. Number of melanoma lesions according to localization

	Number (n)	Percentage (%)
Nose	0	0.0
Glabella	0	0.0
The forehead	1	4.0
Cheek	2	8.0
Lips	0	0.0
Temporal	1	4.0
Scalp	1	4.0
Periorbital	0	0.0
Jaw	1	4.0
Neck	0	0.0
Ear	0	0.0
Nape	0	0.0
Trunk	3	12.0
Upper extremity	6	24.0
Lower extremity	8	32.0
Inguinal	2	8.0
Total	25	-

Table 8. Types of surgical methods for defect closure

	Number (n)	Percentage (%)
Primary repair	673	79.0
Grafting	61	7.2
Local flap	69	8.1
Regional flap	49	5.8
Total	852	-

Table 9. The type of anesthesia implemented

	Number (n)	Percentage (%)
Local anesthesia	696	81.69
Local + sedation	81	9.51
General anesthesia	75	8.80
Total	852	-

93%, in the head and neck g most frequently in the nose 26%, then 18% malar, 8% eye, 8% ear, 5% infraorbital region, 5% upper lip, 5% forehead, percentage It was seen in 4 postauricular, 3% chin, 1% cheek regions.

SCC mostly develops on the damaged skin. For example, underlying sun damage, actinic keratoses, burn scars, chronic ulcers can be seen. In our study, we found that SCC was in the second place in terms of incidence following BCC, and of these 133 patients, 67% were male and 33% were female. The mean age of the patients was 72 years. Our findings are similar to the literature findings (1,2,10,11,13-16).

In the study by Freeman et al. (17), in which they investigated the localization of SCC, 79% of the lesions were seen in the head and neck region, 45% in the cheek and lip region, 13% in the nose region, and 12% in the ear region. In our study, the order of localization of SCC lesions was upper extremity, cheek, ear and lips. The most common localization of the lesions was in the head and neck region as stated in the literature (17).

Table 10. Number of positive surgical margin cases according to histological type

	Number (n)	Percentage (%)
BCC	78	67.2
SCC	15	12.9
Melanoma	7	6.0
Basosquamous carcinoma	6	5.2
Leiomyosarcoma	1	0.9
T-cell lymphoma	1	0.9
Sebaceous carcinoma	1	0.9
Dermatofibrosarcoma protuberans	1	0.9
Malignant mesenchymal tumor	1	0.9
Malign eccrine poroma	1	0.9
Trichoblastic carcinoma	1	0.9
Lentigo maligna	1	0.9
Carcinoma metastasis	1	0.9
Carcinosarcoma	1	0.9
Total	116	-

BCC: Basal cell carcinoma, SCC: Squamous cell carcinoma

Table 11. Number of relapses according to the histological type

	Number (n)	Percentage (%)
BCC	40	46.5
SCC	10	11.6
Melanoma	10	11.6
Leiomyosarcoma	1	1.2
Basosquamous carcinoma	3	3.5
T-cell lymphoma	1	1.2
Sebaceous carcinoma	1	1.2
Dermatofibrosarcoma protuberans	2	2.3
Malignant mesenchymal tumor	1	1.2
Malign eccrine poroma	1	1.2
Trichoblastic carcinoma	1	1.2
Total	71	-

BCC: Basal cell carcinoma, SCC: Squamous cell carcinoma

Among skin cancers, MM is the third most frequently reported type of skin cancer. In our study, MM was the third most common MM in 25 patients. Melanoma is common in the head and neck and extremities. It is more common on the trunk in men and on the lower extremities in women. In our study, patients diagnosed with MM were 48% female, 52% male, and the mean age was 54 years. We observed that the incidence was similar in men and women, and the most common localization was the extremities and cheek.

Skin appendage tumors are tumors with histopathological features resemble skin appendages. Most of them are benign and rarely seen in malignant character. In our study, the total number of malignant skin appendage tumors was 13. The mean age of the patients with a diagnosis of skin appendage tumor was 60.5 years. The patients were 27% female and 73% male. Skin appendage tumors are mostly located in the head and neck region, extremities. Similar to the literature, it was

observed that the lesions were located in the head and neck region in 75% of the patients in our study.

Koplin and Zarem (18) suggested an excision margin of 2 mm for lesions less than 1 cm in diameter and 3-4 mm for lesions larger than 1 cm in diameter. In our clinic, we performed excision by leaving a surgical margin of 2-5 mm in lesions smaller than 2 cm in diameter and 1 cm in lesions larger than 2 cm in diameter and recurrent lesions as the surgical margin in our patients diagnosed with BCC. We applied primary closure to 85% patients with BCC under local anesthesia, grafts and flaps were used in the remaining 15% of the patients. Because of the pathological examinations performed after the surgical treatment, it was observed that the surgical margin was positive in 12% patient diagnosed with BCC, and re-excision was applied to these lesions (18).

Brodland and Zitelli (19) argued that SCC lesions with a diameter of less than 2 cm should be excised with a surgical margin of 4 mm, and those with a diameter of more than 2 cm with a surgical margin of 6 mm. In our study, we left the surgical margin at 1 cm in our patients with SCC. We performed primary closure in 96 patients with SCC, 15 of them were grafted and 21 had repair with flaps. A 15 patients had positive surgical margins following surgery. Since SCCs can metastasize, their follow-up was performed regularly for 1 year, and preoperative and postoperative evaluations were made carefully in terms of LAP (19).

Tumor depth in MM is an important criterion for the prognosis of the disease and the type of treatment to be applied. Suggested surgical excision margins; 0.3-0.5 cm in lesions *in situ*, 1 cm in lesions less than 1 mm in tumor thickness, 2 cm in lesions between 1 and 2 mm, 2 cm in lesions between 2.01-4.0 mm, 2-3 cm in lesions larger than 4 mm has were determined. We performed excision in our patients in accordance with the surgical margins stated in the literature.

Even after the surgical treatment of malignant skin tumors, recurrence can still be seen. Relapse is the recurrence of a surgically removed lesion with the same histological features at the same location within 5 years. Factors such as the surgical treatment method, the experience of the practitioner, the histological features of the lesion, its location and size may affect the recurrence rates. The relationship between malignant lesion excision margin and recurrence is important. Pascal et al. (20) examined 143 cases of basal cell cancer in which the surgical margin was evaluated at the time of excision and followed the recurrence rate for 5 years. In this study, if the distance of tumor cells from normal tissue was above 0.5 mm, the recurrence rate was 1.2%; 12% if closer than 0.5 mm; reported as 33% if at least one surgical margin is persistent. In our study, however, the relationship between surgical margin positivity and recurrence was not evaluated. Because the patients with positive surgical margins are operated again and the intact surgical margin is reached. The entire group of patients we followed up consisted of patients who had intact surgical margins. Recurrence was observed at a rate of 8.3% of the 852 patients included in our study. The recurrence rate was determined as 6.3% for BCC and 7.5% for squamous cell cancers. All patients with non-melanoma skin cancer excised should be followed up for recurrence. There are two important points in the follow-up of patients with cutaneous MM. First; detection of local, regional, or distant recurrences, and the second is the early detection of MM.

Patients with detailed anamnesis, physical examination, examination of all regional lymph nodes, and patients with a family history of MM or clinically dysplastic nevus should be offered lifelong follow-up. While early recurrences are seen in patients with large tumor thickness, recurrences can be detected in patients with low tumor thickness over a period of more than 10 years. In our study, MM was diagnosed in 25 patients. It was observed that recurrence developed in 40% of the patients. Additionally, the recurrence rate of patients diagnosed with skin attachment tumors included in our study was 25% (8,18,20).

In our study; it was concluded that the malignant skin tumor profile of our hospital and even our region and the frequency, localization, surgical treatment choices and follow-up principles seen throughout Turkey and even in the world are generally similar. Thus, this study will shed light on the characteristics, behaviors, preventive measures, and planning of additional diagnosis and treatment research of skin cancers.

Study Limitations

This study had several limitations. This was a retrospective study and the patient data were collected from a single-center. Patient standardization is imperfect and prospective randomized studies can overcome these limitations and support our findings.

Conclusion

Early diagnosis and treatment of malignant skin tumors are important both in terms of treatment efficiency and the surgical method to be used. Early diagnosis and treatment are critical for preventing the spread of lesions and reducing recurrence. The results of these studies suggest that keeping the excision margins narrow for various reasons, such as cosmetic and functional concerns, increases cancer recurrence. Regular follow-up of skin cancer patients is of great importance in the early diagnosis of new skin cancer formation and recurrence. Since UV damage is an important etiological agent in malignant tumors of the skin, particularly sun-exposed areas such as the head and neck region are at high risk of the development of these tumors. It causes functional and aesthetic deformation, sometimes mortal, especially in a psychologically and sociologically important location such as the head-neck region. Therefore, patients and healthcare professionals should be educated about skin tumors and awareness should be raised. Important steps can be taken in the early diagnosis and treatment of skin cancer by keeping national cancer registries regularly and raising awareness of people about skin cancer symptoms and treatment methods. Additionally, printed and visual images of society, especially on sun protection methods.

Ethics Committee Approval: The approval of the University of Health Sciences Turkey, Istanbul Training and Research Hospital Local Ethics Committee was obtained (approval number: 2959, date: 05.11.2021).

Informed Consent: Patient consent was received from the patients.

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