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Analysis of Surgically Treated Cutaneous Malignancies in a Tertiary Dermatology Center During a Six-Year Period

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Abstract

Background: Cutaneous malignancies are common in dermatologic practice. Due to their relation to sun exposure the characteristics of these malignancies can differ in various geographic locations. This study intends to determine the characteristics of surgically treated cutaneous malignancies and various surgical modalities that have been applied.

Methods: This was a retrospective study of patients with cutaneous malignancies who underwent surgery over a six-year period. Data regarding the general information, type of malignancy, location, surgical margin involvement and specific surgical modalities were recorded and analyzed.

Results: A total of 432 patients were included. Basal cell carcinoma was the most common malignancy (82.8%) followed by squamous cell carcinoma (13.4%). Lentigo maligna, keratoacanthoma, basosquamous carcinoma, sebaceous carcinoma and Bowen's disease accounted for the minority of cases. Patients' mean age was 65.7 years and the most common location was the nose and cheeks. The mean diameter was 2.97 cm. Excision was performed with safe margins. Incomplete excision was seen in 14% of basal cell and 15% of squamous cell carcinoma cases. The most common type of defect closure was a simple closure (43.9%).

Conclusion: Basal cell carcinoma is the most common type of cutaneous malignancy. Surgery yields a satisfactory response as treatment for this cutaneous malignancy.

Keywords: Epidemiology, Surgery, Cutaneous malignancies

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Introduction

Malignant cutaneous neoplasms are very common in dermatologic practice. Basal cell carcinoma (BCC) is the most common, followed by squamous cell carcinoma (SCC). There is a significant variation in frequency based on phototype and geographic location.[1,2] Lentigo maligna (LM) is an irregular

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pigmented lesion on sun damaged skin.[3] Keratoacanthoma (KA), a rapidly enlarging papule, is sometimes a variant of SCC and sometimes benign.[4] Sebaceous carcinoma is an adenocarcinoma of sebaceous origin.[5]

Exposure to ultraviolet radiation is clearly the main risk factor for cutaneous malignancy.[2] However, there are also other factors associated with this risk.[6,7]

Surgical and destructive modalities are the mainstay of treatment for cutaneous malignancies. Primary closure, various cutaneous flaps and grafts are used to close the primary defect.

A review of the literature showed a plethora of studies from different locations such as Western Europe, Singapore, Greece and Australia regarding the frequency of skin cancer. Data from the Middle East, particularly Iran, are scarce.

A similar study in Greece found equal age and sex characteristics between surgically treated BCC and SCC, but significant differences regarding location and size. The local flap was the mainly used method for closure of the defects in this study.[8]

We performed a six-year study to determine the frequency of different types and demographics of cutaneous malignancies and evaluate surgical treatment given in a tertiary hospital.

Materials and Methods

This descriptive cross-sectional study was performed on 432 patients with cutaneous malignancies that underwent definite surgery between 1386-1391 in the dermatology department of Faghihi Hospital, the only tertiary public dermatosurgery center in Southern Iran.

Patients

The patient included in this study fulfilled the inclusion criteria which was first presentation of a cutaneous malignancy confirmed by histopathology and surgical intervention. Different types of cutaneous malignancies were diagnosed based on standard criteria by a pathologist.

Data collection

Data were collected from patient charts, pathologic reports and surgical notes. Afterwards, demographic data and skin cancer characteristics were extracted.

Data analysis

The following data were analyzed for each skin cancer: patent's age, sex, clinical size, type and location of skin cancer, the surgical treatment used, its clinical efficacy according to status of surgical margins in the pathology report and surgical closure methods.

We characterized the sites of BCC and SCC according to the risk of recurrence as: high risk (eyelids, eyebrows, periorbital, nose, lips, chin, mandible, periauricular, postauricular), medium risk (cheek, forehead, neck, scalp, genital areas, hands and feet) and low risk areas (trunk, extremities).

Statistical analysis

The SPSS statistical package was used for analysis. We used the t-test and Mann-Whitney test for independent samples for all parametric and nonparametric analyses, respectively. The chi-square test was used for qualitative variables. In all statistical tests $P<0.05$ was defined as significant.

Results

This study included 432 patients during a six-year period that underwent surgery due to skin cancer. There were 36.3% female and 64.6% male patients. The mean age of the patients was 65.7 years with a minimum age of 20 and maximum age of 93 years in both groups. The mean age for females was 65.1 years and the mean age for males was 64.9 years. The mean, minimum and maximum ages of patients with the most common types of skin cancers are shown in Table 1 and 2. There was no significant difference between males and females in mean ages ($P=0.89$).

The most common type of skin cancer in the both genders was BCC which comprised 358 (82.8%) cases; the second most common type

Table 1. Mean age of patients according to tumor types.

Type/sex	Male mean age (years)	Female mean age (years)
BCC	60.7	60.5
SCC	65	59
LM	60	60.5
Basosquamous	76	78
KA	75	70.5

BCC: Basal cell carcinoma; SCC: Squamous cell carcinoma; LM: Lentigo maligna; KA: Keratoacanthoma

was SCC in 58 (13.4%) cases. Basal cell carcinoma was six times more frequent than SCC. The male to female ratios were 2:1 in the BCC group and 3: 1 in the SCC group.

Skin cancer was most commonly observed on the nose and cheeks, followed by the scalp and lower eyelids. Table 3 shows the anatomical distribution of skin cancers by type.

Lesion size of the largest diameter of all cancer types ranged from 1 cm to 8 cm with a mean size of 3.28 cm in the female group and 2.77 cm in males. The mean size in both groups was 2.97 cm. We observed a significant difference in lesion size between genders (P=0.021).

The average age of BCC patients was 60.5 years in the female group and 60.7 years in the male group. There was no significant difference between the ages of the patients according to gender (P=0.97). The maximum age in the patients with BCC was 93 years for males and 92 years for females; the minimum age was 28 years for males and 32 years for females. Basal cell carcinoma mostly occurred on the nose (112 cases) and cheeks (70 cases) followed by the scalp (37 cases) and forehead (24 cases). The average diameter of the BCC lesions was 2.98 cm.

The mean age of SCC patients was 65 years in males and 59 in females. Squamous cell carcinoma in situ occurred in 3 patients, 2 males and 1 female. The maximum and the minimum ages of the SCC cases are shown in Table 4. In the majority of SCC cases, the scalp was the most common location (12 cases) followed by the temple with 9 cases, cheeks and nose (8 cases each). The average lesion size was 1 cm. The minimum lesion size was 2.9 cm and maximum size was 8 cm.

Table 2. Minimum and maximum ages of patients according to skin cancer types.

Type of malignancy	Male min/max age (years)	Female min/max age (years)
SCC	23/86	23/93
BCC	28/93	32/92
KA	68/82	62/74
LM	55/70	45/66
Basosquamous	51	81
Sebaceous carcinoma	83	79
Bowen disease	74	

SCC: Squamous cell carcinoma; BCC: Basal cell carcinoma; LM: Lentigo maligna; KA: Keratoacanthoma

There were 61% of BCC cases located in the high risk areas for recurrence, 38% were medium risk and 1% were in low risk areas. In the SCC group, 45% were located in high risk areas, 47% in medium risk areas, and 8% were in low risk areas.

In the BCC group, 32 (8.9%) patients had a total of 2-4 multiple tumors at the time of presentation with an equal male to female ratio.

In the SCC group 6 (10.3%; 4 males and 2 females) had 2 - 3 multiple tumors on the facial area. Both BCC and SCC were present in 4 (0.9%; 2 males and 2 females) patients.

Overall, 8 (4 males and 4 females) cases of LM were included in this study, 4 tumors occurred on the lower eyelids and 4 were located on the cheeks. There were 5 (4 males and 1 female) cases of KA diagnosed. The most common locations were the cheeks followed by the nose. There was just one case of Bowen's disease located on the leg. Basosquamous carcinoma was located on the nose and the lower eye lid in 1 case. There were 2 (1 male and 1 female) cases of sebaceous carcinoma located on the scalp and cheeks that were included.

The tumors were sent as frozen sample sections to the laboratory for evaluation of margin involvement by a pathologist following surgical removal with safe margins of 3-5 mm for BCC and 5 mm for SCC, KA, basosquamous carcinoma, sebaceous carcinoma and LM.

In the frozen sample sections of the BCC group, 31 (8.6%) had margin involvement by the tumor, 14 (3.9%) had depth involvement and 6

Table 3. The number of BCC and SCC by anatomical location.

Location	BCC (N)	SCC (N)
Cheek	70	8
Lower lid	23	1
Scalp	37	12
Forehead	24	5
Nose	112	8
Back	2	5
Upper lip	14	1
Lower lip	1	8
Nasolabial fold	8	9
Temple	17	1
Posterior auricular	14	0
Ear	4	0
Neck	8	0
Lateral cantus	10	0
Medial cantus	3	0
Helix	4	0

(1%) had both margin and depth involvement. In the SCC group, 3 (5.1%) had margin involvement, 6 (10%) depth involvement and 1 (1.7%) had both depth and margin involvement. The only patient with basosquamous carcinoma had margin involvement in the frozen sample section.

All cases that had involved margins and depth were resected with safe margins in the second step of tumor excision.

Various types of flaps and grafts were used in the remainder as shown in Table 4.

The site of donor grafts in the full thickness grafts were supraclavicular in 33 (68%) cases, pre-auricular in 10 (20%), upper arm in 3 (6.2%), upper eyelid in 1 (2%) and inguinal in 1 (2%) case. Split thickness grafts were harvested in 2 (4%) cases from the upper thighs.

Discussion

Although cutaneous malignancies are quite common, little attention has been paid to their characteristics. In recent years, due to their increasing incidence, there is need for better understanding of these malignancies.

The aim of this study was to determine the characteristics of cutaneous malignancies and evaluate the surgical modalities performed in the hospital setting. Our results showed that cutaneous malignancies were more common in males (63%)

Table 4. Different types of surgeries performed in this study.

Type of surgery	No. of cases
Simple closure	190
Shave and cautery	10
Secondary intension	62
Rotation flap	56
Graft	50
Nasolabial flap	14
Island pedicle	10
Transposition flap	3
Bilobed flap	3
A – T flap	1
Advancement flap	1
Glabella flap	1

versus females (36%). This agreed with the majority of published data[9,10] due to more outdoor activities by males. This contrasted the study by Andrade et al. where females accounted for the majority of non-melanoma skin cancers in Portugal.[11]

The most common locations of cutaneous malignancies were on the nose and cheeks followed by the scalp. This finding supported the role of sun exposure to cutaneous cancer development. The results also agreed with previous studies.[11,12] In our study most BCC lesions were located in high risk for recurrence areas (61%); SCC lesions were mostly located on medium (47%) and high (45%) risk areas.

Our results confirmed that BCC and SCC accounted for the majority of cutaneous malignancies. BCC was the most common with 75% of cases followed by SCC with 20%. Basal cell carcinoma and SCC occur most frequently in the elderly with a mean age of 60 and 65 years, respectively, according to our data.

The mean size for both BCC and SCC was 2.9 cm, which was larger than reported in Greece where only 10% of patients had a mean size more than 2 cm.[8] This could be explained by the lack of health awareness as well as tertiary health center characteristics.

Lentigo maligna, KA, basosquamous carcinoma, sebaceous carcinoma and Bowen's disease were also included and accounted for a minority of cases. Lentigo maligna was most commonly located on the lower eyelids and

cheeks. In the KA group, most were located on the cheeks.

In this study 9% of BCC patients had multiple tumors (range: 2 - 4 lesions), 10% of SCC patients had multiple SCC tumors (range; 2 – 3 lesions), and 1% had both BCC and SCC.

The purpose of treatment was tumor resection with the lowest risk of recurrence and tissue preservation.

Samples of the resected tumor were sent as frozen sections for margin evaluation in order to determine residual tumor and margin involvement before definite closure. Incomplete excision was defined as residual tumor at or within 1 mm of the lateral or deep excision margins.

In the BCC group 9% had margin involvement, 4% had depth involvement and 1% had both margin and depth involvement that required further resection which totaled 14% of patients. Of the SCC patients, margin (5%), depth (10%) and both margin and depth (1%) involvement was detected which occurred in 15% of cases. Among two cases of sebaceous carcinoma, one patient had margin involvement. Western Europe had cases with incomplete excision that ranged from 2% to 18%.[13-18] In Singapore this was 15.5% for BCC, whereas the range was 8% to 15.4% in Brazil.[19,20]

Our study results of incomplete excision did not agree with that observed in Greece where 3.2% of BCC and 5.6% of SCC had incomplete excisions.[8] This might be due to the larger tumor size observed in our study. We observed a mean size of 2.9 cm for both carcinomas compared to the study in Greece that had a mean tumor size of 1.2 cm where only 10% of their cases had tumors more than 2 cm. This implied that patients in our study presented to their doctors during the later disease stages.

Although close follow up and observation without surgery can be done for patients with incomplete excision,[21] all of the cases in our study underwent additional surgery which resulted in safe margins. In the Greece study only 42% of these patients underwent further surgery.[8]

The limitations of the current study were its retrospective nature that subjected us to incomplete data. In addition, due to the hospital setting and tertiary center, it might not be possible to attribute this data to the general population.

In conclusion this is the first study of various demographics of cutaneous malignancies in conjunction with their surgical treatment in Iran. Due to different characteristics of various geographic locations, similar studies are needed in different countries for better understanding of cutaneous malignancies.

Conflict of interest

No conflict of interest is declared.

References

1. Chinem VP, Miot HA. Epidemiology of basal cell carcinoma. *An Bras Dermatol.* 2011; 86(2):292-305.
2. Situm M, Buljan M, Bulat V, Lugović Mihić L, Bolanca Z, Simić D. The role of UV radiation in the development of basal cell carcinoma. *Coll Antropol.* 2008;32 Suppl 2:167-70.
3. Hill DC, Gramp AA. Surgical treatment of lentigo maligna and lentigo maligna melanoma. *Australas J Dermatol.* 1999;40(1):25-30.
4. Schwartz RA. Keratoacanthoma. *J Am Acad Dermatol.* 1994;30(1):1-19; quiz 20-2.
5. Wick MR, Goellner JR, Wolfe JT 3rd, Su WP. Adnexal carcinomas of the skin. II. Extraocular sebaceous carcinomas. *Cancer.* 1985;56(5):1163-72.
6 Schmitt JV, Chinem VP, Marques ME, Miot HA. Increase in the incidence of basal cell carcinoma in a university hospital between 1999 and 2009. *An Bras Dermatol.* 2011;86(2):375-7.
7 Staples MP, Elwood M, Burton RC, Williams JL, Marks R, Giles GG. Non-melanoma skin cancer in Australia: the 2002 national survey and trends since 1985. *Med J Aust.* 2006;184(1):6-10.
8. Seretis K, Thomaidis V, Kappouzis A, Tamiolakis D, Tsamis I. Epidemiology of surgical treatment of nonmelanoma skin cancer of the head and neck in Greece. *Dermatol Surg.* 2010;36(1):15-22.
9 Weinstock MA. Death from skin cancer among the elderly: epidemiological patterns. *Arch Dermatol.* 1997;133(10):1207-9.
10 Lang, PG; Maize, JC. Basal cell carcinoma. In: Friedman, RJ; Rigel, DS; Kopf, AW; Harris, MN; Baker, D, editors. Cancer of the Skin. Philadelphia: W.B. Saunders Company; 1991.p.35-73.
11 Andrade P, Brites MM, Vieira R, Mariano A, Reis JP, Tellechea O, et al. Epidemiology of basal cell carcinomas and squamous cell carcinomas in a Department of Dermatology: a 5 year review. *An Bras Dermatol.* 2012;87(2):212-9.

12. Gallagher RP, Hill GB, Bajdik CD, Fincham S, Coldman AJ, McLean DI, et al. Sunlight exposure, pigmentary factors, and risk of nonmelanocytic skin cancer. I. Basal cell carcinoma. *Arch Dermatol.* 1995;131(2):157-63.
13. 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.
14. Telfer NR, Colver GB, Bowers PW. Guidelines for the management of basal cell carcinoma. British Association of Dermatologists. *Br J Dermatol.* 1999;141(3):415-23.
15. Thomas DJ, King AR, Peat BG. Excision margins for nonmelanotic skin cancer. *Plast Reconstr Surg.* 2003;112(1):57-63.
16. Bisson MA, Dunkin CS, Suvarna SK, Griffiths RW. Do plastic surgeons resect basal cell carcinomas too widely? A prospective study comparing surgical and histological margins. *Br J Plast Surg.* 2002; 55(4):293-7.
17. de Visscher JG, Gooris PJ, Vermey A, Roodenburg JL. Surgical margins for resection of squamous cell carcinoma of the lower lip. *Int J Oral Maxillofac Surg.* 2002;31(2):154-7.
18. Hussain M, Earley MJ. The incidence of incomplete excision in surgically treated basal cell carcinoma: a retrospective clinical audit. *Ir Med J.* 2003; 96(1):18-20.
19. Bariani RL, Nahas FX, Barbosa MV, 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.
20. Goh BK, Ang P, Wu YJ, Goh CL. Characteristics of basal cell carcinoma amongst Asians in Singapore and a comparison between completely and incompletely excised tumors. *Int J Dermatol.* 2006;45(5):561-4.
21. Motley R, Kersey P, Lawrence C; British Association of Dermatologists; British Association of Plastic Surgeons. Multiprofessional guidelines for the management of the patient with primary cutaneous squamous cell carcinoma. *Br J Plast Surg.* 2003;56(2):85-91.