Turk J Med Sci
35 (2005) 245-250

CLINICAL INVESTIGATION

An Overview of Keratinocyte Carcinoma and Prospective Study on the Accuracy of the Surgeon's Diagnosis of Keratinocyte Carcinoma

Nesrin TAN BAŞER, Nurten YAVUZ, Ahmet TERZİOĞLU, Gürcan ASLAN
Ankara Training and Research Hospital, Department of Plastic and Reconstructive Surgery, Cebeci, Ankara - Turkey

Received: January 17, 2005

Abstract: This article concerning the rate of accurate diagnosis of keratinocyte carcinoma is reported by experienced surgeons. Keratinocyte carcinoma (KC) has been recently used in order to define basal cell carcinoma and squamous cell carcinoma. Although an histopathologic analysis is standard for diagnosis, clinical diagnosis is still important for the choice of proper treatment.

In this prospective study, 204 lesions were excised following clinical pre-diagnosis of keratinocyte carcinoma. The lesions were excised from the proper surgical limit for clinical diagnosis and sent for histopathologic examination. We have seen that we frequently confuse BCC s and SCC s with actinic keratosis. According to these results, we found that our accurate diagnosis rate was 82% for BCC and 78.8% for SCC. When compared with the results in the literature, our accurate diagnosis rate is high. We believe that the gross examination of the lesion should be assessed with details such as age of the patient, sex, profession, and commencement and development of the lesion, as these factors are very useful in achieving a high rate of accuracy in the definitive diagnosis.

We consider that accurate clinical pre-diagnosis is very important in the pigmented lesions, since the surgeon will define the excision margin in accordance with this. In the case of wrong pre-diagnosis of benign tumor, the residue tumor risk will increase. These lesions must be assessed by experienced doctors before excision.

Key Words: Malignant skin tumor, basal cell carcinoma, squamous cell carcinoma, keratinocyte carcinoma, clinical diagnosis

Introduction

Although the term non-melanoma skin cancer has frequently been used for basal cell carcinoma (BCC) and squamous cell carcinoma (SCC), there are other types of nonmelanoma skin cancers, such as the adnexal tumors and sarcomas whose cell types, behavior and epidemiologic characteristics are different. Therefore, the term keratinocyte carcinoma (KC) has recently been used in order to define BCC and SCC (1). 90% of all skin cancers include keratinocyte carcinoma. BCC and SCC account for approximately 80% and 20% of keratinocyte carcinoma respectively (1,2).

Since the mortality rate caused by keratinocyte carcinoma is low, it is not considered significant (3). However, deformities are caused by the excision of large lesions, since 80% of them frequently occur on the face and the morbidity rate increases. Thus, in order to diagnose those lesions in the early period and prevent residue tumor, the excision must be made with sufficient surgical margin, and therefore the clinical diagnosis is very important.

In our study, we have determined the accuracy of our pre-diagnosis, the sex distribution, average age and location in the patients on whom we operated with the pre-diagnosis of keratinocyte carcinoma and who attended our clinic during a 3 year period.

We compared our results with the publications in the Index Medicus.

Material and Methods

This study includes the patients whom we operated on under local anesthesia with the clinical diagnosis of keratinocyte carcinoma. This prospective study comprises the period from January 2000 to December 2003. Any lesion that had a prior biopsy was excluded. Each patient was assessed by a senior author. When the diagnosis was made, the questions of the age of the patient, sex, location of the diagnosis and how long the lesion had existed were investigated and the patients evaluated according to the gross examination results of the lesion. A clinical diagnosis in this context was then made. The lesions were excised within the proper surgical limit according to the clinical diagnosis and sent for histopathologic examination (Table 1).

Histopathological diagnosis was compared with the clinical diagnosis and the accurate diagnosis rates were found. The lesions which were incorrectly diagnosed were evaluated and reasons why they were confused with such tumors were discussed. In addition, the sex and age distributions of the lesions were determined in accordance with this histopathological diagnosis, and the topographical distribution was defined.

The lesions were grouped as benign, pre-malignant and malignant in accordance with the histopathological diagnosis and they were compared with the clinical diagnosis. The accurate and wrong diagnosis rates were determined (Table 2,3). Then, the age and sex distributions of keratinocyte carcinoma diagnoses were defined (Figure 1,2). Finally, the tables showing the locations of keratinocyte carcinomas were established (Table 4).

Table1. Patient distribution.

Lesions number	Patient number
1	170
2	4
3	1
10	1
13	1
Total: 204	177

Table 2. Histopathological versus clinical diagnosis in BCC.

Clinical diagnosis	Lesion number	%
BCC	171	
Histopathological diagnosis		
Benign		
Nevus	1	0.38
Ulcer	2	1.16
Dermatofibroma	1	0.38
Chondrosyringoma	1	0.38
Seborrheic keratosis	3	1.75
Pilosebaseous unit	1	0.38
Inflamation	2	1.16
Molluscum contagiosum	1	0.38
Keratoacanthoma	1	0.38
Premalignant		
Aktinic keratosis	10	5.84
Carcinoma insitu	1	0.38
Malignant		
BCC	141	82.4
SCC	6	3.5

Table 3. Histopathological versus clinical diagnosis in SCC.

Clinical pre-diagnosis	Lesions number	%
SCC	33	
Histopathological diagnosis		
Benign		
Pilar tumor	1	3.03
Epithelial Hyperplasia	2	6
Premalignant		
Aktinic Keratosis	3	9.09
Malignant		
SCC	26	78.8
BCC	-	-
MM	1	3.03

Table 4. Topographic distribution of the keratinocyte carcinoma.

Location	BCC	SCC
Scalp	18	
Frontal zone	10	
Temporal zone	7	
Periorbital zone	15	1
Nasal zone	52	4
Periauriculer zone	8	1
Buccal zone	13	1
Perioral zone	4	15
Mentum	1	6
Neck	1	
Upper arm	10	1
Trunk	1	1
Lower arm	1	2
TOTAL	141(%81.5)	32(%18.5)

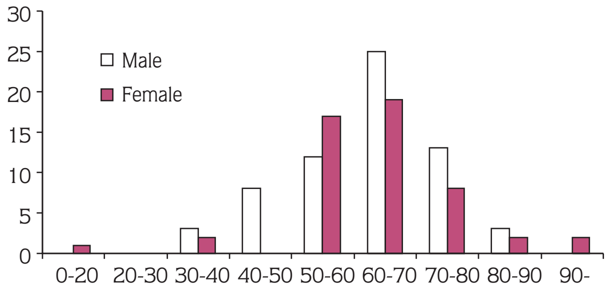

Figure 1. BCC; Age-Sex distribution graphics.

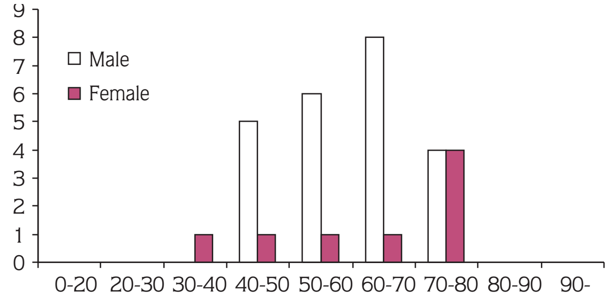

Figure 2. SCC; Age-Sex distribution graphics.

Results

Clinic and Histopathological Diagnosis

During the 3 years, 204 lesions were excised from 177 patients in accordance with the above-mentioned protocol (Table 1). 171 lesions were operated on with a BCC clinical diagnosis and 33 lesions were operated on with a SCC clinical diagnosis. When the results were assessed after the histopathological diagnosis, 6 of the lesions which were excised with BCC pre-diagnosis were diagnosed as SCC (Table 2). It was observed that 26 of the lesions excised with the SCC clinical diagnosis were diagnosed histopathologically as SCC (Table 3).

According to these results, we established that our accurate diagnosis rate was 82% for BCC and 78.8% for SCC.

It was observed that BCC is mostly confused with actinic keratosis clinically at the rate of 5.84% and this is followed by the wrong clinical diagnosis of SCC at the rate of 3.5%. Histopathologically, in the patients with SCC diagnosis, the wrong clinical diagnosis of BCC does not occur but SCC is mostly confused with actinic keratosis at the rate of 9%.

In accordance with the obtained histopathological diagnosis, we observed that 81.4% of the patients with keratinocyte carcinoma were BCC and 18.6% were SCC.

Topographic Distribution of the Lesions

When the anatomic distribution of these lesions was examined in accordance with the histopathological diagnosis, it was observed that 95.6% of the keratinocyte carcinoma were localized in the head-neck region. The head-neck region was separated into 10 zones in accordance with these locations. Topographic distribution was made by considering those zones (Table 4). It was observed that BCC was most frequently located in the nasal zone and this was followed by the scalp zone.

When the topographic distribution of SCC was examined, it was observed that the perioral zone was the most frequently affected zone, especially the lower lip at the rate of 46% and this was followed by the nasal zone (Table 4).

Age and Sex

51% of 141 patients with BCC diagnosis were men and 49% were women (Figure 1). 74% of 32 patients with SCC diagnosis were men and 26% were women (Figure 2).

When the age distribution was examined, it was observed that BCC mostly peaked between the ages of 60 and 70 and it occurred more among the 50 and 80 years than others (Figure 1).

It was also observed that SCC peaked among the 60-70 age range and in men. As the SCC was clearly observed in the 40-70 age range in men, the incidence in the 70-80 age range of both sexes became equal (Figure 2).

Discussion

The main objective of this study is to determine the accuracy rate of a clinical diagnosis made by a senior author. Even if the histopathological examination becomes the reference for the definite diagnosis, the clinical diagnosis is important for planning suitable treatment. The surgical excision in keratinocyte carcinoma is made for both diagnosis and treatment purposes in the patient group included in the study. Since the excision limit is determined in accordance with this pre-diagnosis, the clinical diagnosis has great importance for avoiding residue lesion.

The clinical diagnosis of keratinocyte carcinomas may sometimes be difficult. The principle indicators for diagnosis are the morphology, color and structure of the skin. Information such as the profession of the patient, the region that he/she lives and the periods of the lesion's existence obtained from the patient's history are useful for definitive diagnosis.

BCC grows slowly, and in general, it causes an ulcer, being asymptomatic until it bleeds. It occurs frequently on the zones which are subjected to direct sunshine such as the face and extremities. While the lesions have round, oval, papule or nodule shapes in the early periods, central ulceration frequently occurs in the late period. Its color may be bright, translucent or matt from pink to red. It is hard at palpation. Due to the typical appearance of BCC, its clinical diagnosis is easy (1-4). Telangiectasis, atrophy, drying or irregular pigmentation may occur on the surrounding tissue. It may be confused with actinic keratosis because of these characteristics. Some BCCs may be pigmented or nodular. They are frequently confused with malignant melanomas. Sometimes, BCC may be observed as an irregular, thin, fluffy atrophic plate. Bowen's disease (observed as a red drying plate) should be considered in the definitive diagnosis. Ulcerated BCCs may also be confused with SCCs (4, 5).

SCC are frequently observed on the zones which are subjected to direct sunshine such as face, ear, back of the hand. The wrinkling, drying, telangiectasis and irregular pigmentation may be observed on the neighboring skin as in actinic keratosis. The developing risk of SCC increases on the basis of sinus tract, radio dermatitis zone, burn scar, and venous damage which become chronic and ulcerated. SCC usually develops more rapidly than BCC. It is typically erythematous, indurated, papular, plate or nodule types (1, 2, 6).

When we examined the BCC clinical pre-diagnosis defined by considering those criteria (Table 2), we have seen that we frequently confuse BCCs with actinic keratosis at the rate of 5.8%, and this is followed by wrong pre-diagnosis of SCC at the rate of 3.5%. Our accurate diagnosis rate in BCC has been found to be 82.3%.

When the SCC clinical pre-diagnoses were examined (Table 3), we observed that we frequently faultily diagnose actinic keratosis at the rate at 9.09% and this is followed by the wrong diagnosis of epithelial hyperplasia with 6%. Our accurate diagnosis rate in SCC has been found to be 78.8%.

The obtained results have been compared with other studies in the literature.

Bolognia et al. stated in 1990 that their accurate diagnosis rate in BCC was 43% and in SCC 14% (7). Hallock et al. also reported in 1998 that the accurate diagnosis rate in BCC was 54% and in SCC 25% in their study over 5 years. They have stated that they frequently confused SCC with Bowen's disease and actinic keratosis at a rate of 41% and this was followed by wrong pre-diagnosis of BCC at the rate of 23%. The reasons they gave for these wrong diagnosis rates were that they had not been educated sufficiently on the clinical pathology during their internship period and there were no similar terms for these tumors as described in their text books. They also pointed out that BCC, which spreads on the surface, was confused with Bowen's disease in the definitive diagnosis (2).

Har-Shai et al., stated in their study in 2001 that their accurate diagnosis rate of BCC was 66.8% and of SCC 41.7% (8). In the study of Har-Shai et al., the wrong clinical, diagnosis in BCC has been frequently made as actinic keratosis (7.5%) as in our study. This has been followed by Bowen's disease with 6.1% and SCC with 5.7%. The accurate diagnosis rate in SCC was 41.7%. They have also confused it with BCC in 43%, followed by actinic keratosis in 11.1% of cases.

When compared with the other results in the literature, we found that our accurate diagnosis rate of 82% for BCC and 78% for SCC is high. We believe that the gross examination of the lesion should be assessed with the details such as the age of the patient, sex, profession, commencement and development of the lesion as they are very useful in the definitive diagnosis for obtaining these high rates.

80% of keratinocyte carcinomas include BCC and 20% include SCC. In accordance with the pathologic diagnosis, 81.4% of keratinocyte carcinomas were BCC and 18.6% were SCC in our study. The BCC / SCC rate is supported by other studies in the literature as 3/1 and 4/1 (1-5). Ceylan et al. have reported the appearance rate of BCC as 73.4% and of SCC as 26.6% in their study (9). In Australia, Stapler et al. have given the rate of BCC/SCC as 4/1 in 1985 and as 2.5/1 in 1995 (10).

Many host and environmental factors contribute to the risk of developing KC. Skin colour is a major risk factor for KC. One of the important factors in the development of keratinocyte carcinoma is exposure to ultraviolet light. The relationship between being exposed to direct sunlight and development of skin cancer has been known since 1894 when Paul-Gerson Unmam defined the pre-cancerous histological changes on the skins of sailors (11). While being exposed to ultraviolet light cumulatively during the lifetime is a risk factor for SCC, exposure to ultraviolet light intermittently for a long time is important for malignant melanoma. However its accuracy is not proved. Even if it is known that the sunlight plays a role in the development of BCC, the pattern importance of exposure is not indicated (12,13).

It is observed that the incidence of KC changes due to the geographic region (3,9,14,15).

When we look at the frequency of occurrence of skin cancer in Turkey and the statistics of the Data Processing Department of the Ministry of Health, it is seen that it is usually not placed into subdivisions, but is termed skin cancer. In accordance with the data, it is observed that skin cancer incidence is in the 5^{th} rank, with 211/100000 in men and 4th rank with 210/100000 in women. In a study which was executed in Australia, it was stated that KC was the most frequently observed cancer and its incidence for BCC was 788/100.000 and for SCC, 166/100.000 (10). In the study which was executed in the Netherlands (16), keratinocyte carcinoma incidence increased in men from 42/100.000 to 52/100.000 between 1975 and 1985 and in women from 24/100.000 to 38/100.000. In a publication which was issued in Finland (17), the SCC incidence in men was reported as 9/100.000 and in women as 87/100.000. In the U.S.A., the incidence (17) for BCC was 41/100.000 and for SCC was 41.1/100.000.

When all these incidences are examined together, the keratinocyte carcinoma incidence is significantly lower in the Northern European countries such as England, Finland and Netherlands, than Turkey (10,16,17). Considering the geographic settlement, it is known that Turkey has more sunlight than those countries.

The keratinocyte carcinoma is localized on the head, neck and hand zones which are frequently exposed to sunlight. The possibility of occurrence is high in men who are exposed to sunlight for a long time such as farmers and sailors, and increases in parallel to age. It was reported that it occurred at the rate of 20% on the zones which are not exposed to sunlight (1-3).

In a study which was published in Pennsylvania, 56% of BCC and 60% of SCC are localized on the head-neck zone. In another study which was executed in Finland (16), it was reported that 77% of BCC and 75% of SCC were localized on the head-neck zone. Ceylan et al. from İzmir (9) have indicated that 96.9% of BCC and 94.8% of SCC were located in the head-neck zone. In the publications from Australia (10), it is stated that the keratinocyte carcinoma is the most common tumor and is observed at the rate of 96% in the head-neck zone. We also examined the topographic distribution of the lesions in our study. It was found that 97.8% of BCC and 87.5% of SCC are localized on the head-neck zone.

When we examine the age-sex distribution of KC, the significant increase in BCC occurred in both men and women between 60 and 70 years in our series. In SCC, while there is a significant increase in men between 60 and 70 years, it is more frequently observed in women between 70 and 80 years. In accordance with our study, when the BCC was observed in 51% of men and 49% of women, the SCC was observed in 74% of men and 26% of women. While it is observed that BCC occurred equally in both men and women, SCC was significantly higher in men.

Her-Shai et al. (3) have stated in their study that the occurrence ratio of male to female was 3/2 in BCC and 3/2 in SCC. Ceylan et al. (9) have reported in their study that the Male/Female ratio for SCC was 2.86 and that SCC was observed in men more frequently than women while BCC occurred equally in both men and women.

When these studies are assessed generally, it is observed that the unity of advanced age and male sex is a risk for developing both BCC and SCC. It is observed that the BCC incidence is higher in men after 60 years old.

Conclusion

We consider that accurate clinical pre-diagnosis is very important in pigmented lesions. The surgeon will define the excision margin in accordance with this pre-diagnosis. In case of wrong pre-diagnosis of a benign tumor, the residue tumor risk will increase. Conversely, when the benign tumor is defined as malignant, the excision will be made unnecessarily and this may cause distortion in the aesthetic units.

Because of the reasons mentioned above, we believe that an accurate clinical diagnosis of keratinocyte carcinomas is very important and that such lesions must be assessed by experienced doctors before the excision. When the accurate clinical diagnosis is made, details such as age, sex, settlement region and geographic region which we mentioned statistically also become very important. They must be assessed together with the macroscopic examination of the lesion.

Corresponding author:

Nesrin TAN BAŞER

Koru Mah. 499. Sokak Arı Sitesi No: 46

06810 Umitköy, Ankara - Turkey

E-mail: drbaser@superonline.com

References

1. Albert MR, Weinstock K. Keratinocyte carsinoma. NA. Cancer J Clin 53:292-302, 2003.
2. Hallock GG, Lutz AD. Prospective study of the accuracy of the surgeon diagnosis in 2000 excised skin tumors. Plast Recons Surg 101:1255-61, 1998.
3. Strom S, Yamumura Y. Epidemiology of nonmelanoma skin cancer. Clin Plast Surg 24:627-36, 1997.
4. Hallock G, Debra A,Lutz RN. A prospective study of the accuracy of the surgeon diagnosis and significance of positive margins in non melanoma skin cancers. Plast Recons Surg 107:942-52, 2001.
5. Salasche SJ, Amonette RA. Morpheaform basal-cell epitheliomas: A study of subclinical extensions in a series of 51 cases. J Dermatol Surg Oncol 7: 387–394, 1981.
6. Leshin B, White WL. Malignant neoplasms of keratinocytes. Cutaneous Medicine and Surgery: An Integrated Program in Dermatology (Eds. Arndt KA, Leboit PE, Robinson JK, Wintroub BU) WB Saunders. Philadelphia 1996, pp:1378–1440.
7. Balagnia JL, Berwick M, Fine JA Complete follow up and evaluation of a skin cancer screening in Connecticut. J Am Acad Dermatol 23:1098-106, 1990.
8. Har Shai Y, Hai N, Taran A et al. Sensitivity and positive predictive valves of presurgical clinical diagnosis of excised benign and malignant skin tumors: A prospective study of 835 lesion in 778 patients. Plast Recons Surg 108:1982-90, 2001.
9. Ceylan C, Ozturk G, Alper S. Nonmelanoma skin cancers between the years of 1990 and 1999 in Izmir, Turkey. Dermographic and clinicopathological characteristics. The Journal of Dermatology 30:123-31, 2003.
10. Staples M, Marka R, Gilles G. Trends in incidence of non melanocytic skin cancer (NMSC) treated in Australia 1985-1995: Primary prevention prognosis starting to have a effect? Int J Cancer 78:144-8, 1998
11. Albert MR, Ostheimer KG. The evalution of current medical and popular attitudes toward ultraviolet ligt exposure: Part1. J Am Acad Dermatol 47:930-7, 2002.
12. Koh HK, Geller AC, Miller DR. Prevention and early detection strategies for melanoma and skin cancer. Arch Dermatol 132:436-43, 1996.
13. Blum HF. Carcinogenesis by ultraviolet light. Princteon: Princeton University Press; 959
14. Karagas MR, Greenberg ER, Spacer SK. Increase in incidence rates of basal cell and squamous cell skin cancer in NewHampshire, USA. Int J Cancer 81:555-9, 1999.
15. Sternsa RS. The mysteries of geographic variability in non melanoma skin cancer . Arch Dermatol 135:843-4, 1999.
16. Serrano H, Scotto J, Shornick G et al. Incidence of non melanoma skin cancer in New Hampshire and Vermont. J Am Acad Dermatol 24:574-9, 1991
17. Karjakinen S, Solo H, Teppo L. Basal cell and squamous cell carcinoma in Finland. Site distribution and patient survivae. Int J Dermatol 28:445-50, 1989