Original Article

Trends of Skin Cancer Incidence in Turkey: A Hospital-Based Study

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Abstract

Background: The incidence of skin cancers is increasing every year. The purpose of the study was to determine the change in the incidence of skin cancers and their subtypes over the years. **Materials and Methods:** A total of 1507 patients who applied to the Dermatology Clinic between January 1, 2010, and January 1, 2020, and were diagnosed with Squamous Cell Carcinoma (SCC), Basal Cell Carcinoma (BCC), and melanoma were included in the study. Sociodemographic characteristics of the patients, comorbidities, tumor type, tumor number, lesion size, lymph node or organ metastasis, number of recurrences, and number of previous surgeries were recorded. **Results:** A total of 1056 (52.4%) patients had BCC, 733 (36.4%) SCC, and 225 (11.2%) had melanoma. The mean age was 69.8 (±14.61) in females and 67.65 (±13.33) in males ($P < 0.001$) at the time of diagnosis. The highest rate of recurrence was detected in 39 patients (7.1%) and the earliest recurrence time (15.77 months (±14.24) was detected in SCC ($P < 0.01$, $P = 0.01$, respectively). The mean age of skin cancer was found to be significantly lower in those who had undergone organ transplantation and those who had autoimmune diseases ($P = 0.004$, $P = 0.008$, respectively). Also, organ metastases were more common ($P = 0.005$), and the mean tumor size was lower in patients with autoimmune diseases ($P = 0.008$). **Conclusion:** It was found that the frequency of SCC has increased and approached BCC over the years, and the frequency of malignant melanoma has been similar. Results support that more emphasis should be placed on skin cancer screening and prevention in high-risk groups.

Keywords: Autoimmune disease, basal cell cancer, melanoma, organ transplants, squamous cell cancer

Introduction

Skin cancers have the highest global incidence among other cancer types. Although the main risk factor for all skin cancers is exposure to ultraviolet (UV) Radiation, more than 80% can be prevented.[1]

Non-melanoma skin cancers, including squamous cell carcinoma (SCC), and basal cell carcinoma (BCC), originate from keratinocyte cells and are known as keratinocyte carcinomas.[1] BCC is a slow-growing skin tumor that rarely metastasizes, develops in sun-exposed skin,[2] and has low mortality rates. It can be locally invasive and may recur after the treatment, causing significant morbidity.

SCC, which is the second most common skin cancer after BCC, is very important in the development of cumulative sun exposure, especially in childhood and adolescence. It has been identified as an important factor for immunosuppression and tumorigenesis in recent years, including those associated with organ transplantation.[3] Also, 3.7% to 5.2% of cutaneous squamous cell carcinoma (cSCC) patients have nodal metastases and 1.5% to 2.1% die from cSCC.[4]

Melanoma, on the other hand, is among the most aggressive skin tumors known for its high mortality rate, frequent metastasis, and resistance to treatments.[5] The

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incidence of cutaneous melanoma is increasing on a global scale at a faster rate each year than other types of cancer. Recent advances in systemic drug therapies in the treatment of melanoma have significantly changed patient management and outcomes, especially in advanced disease stages.[6]

The financial effects of skin cancers on healthcare costs are significant. However, the true incidence of non-melanoma skin cancers is mostly unknown because of the lower registration rates in most countries in contrast to malignant melanoma. In the present study, the purpose was to determine the general rates of skin cancers and the changes in the incidence of subtypes over the years. It was also aimed to determine the recurrence and metastasis rates according to comorbidities, gender, and clinical characteristics.

Materials and Methods

Patients who applied to the Dermatology Clinic between January 1, 2010, and January 1, 2020, and were diagnosed with SCC, BCC, and malignant melanoma clinically and histopathologically were included in the present study. The data of 2165 patients were analyzed, 658 patients were excluded because the data were missing, and a total of 1507 patients were included in the study.

Among the patients who were included in the study, 838 were diagnosed with BCC, 552 with SCC, 175 with melanoma, and 64 with more than one skin cancer. The age and year of diagnosis, gender, number of lesions, size of the lesion, diabetes, hypertension, hematological malignancy, organ transplantation, solid organ malignancy, autoimmune disease, additional diseases such as inflammatory disease, immunosuppressive drug use history, smoking, and alcohol use, family history of skin cancer, number of recurrences, lymph node or organ metastases, and number of previous surgeries of the patients included in the study were recorded from the patient files and by calling the patients by phone. The Ethics Committee Approval was obtained before starting the study.

Statistical analysis

The SPSS 23.0 statistical package program was used in the analysis of the data. The descriptive statistics of evaluation results were given as numbers and percentages, for categorical variables, mean, standard deviation (SD), and minimum (min) to maximum (max) values for the variables. The conformity of the data to the normal distribution was examined with the one-sample Kolmogorov–Smirnov test. The comparisons of the measurement data of two independent groups were made with the Mann–Whitney *U* test because the normal distribution condition was not met, and the comparisons of three or more independent groups were made with the Kruskal–Wallis test. The Chi-square test was used to analyze the differences between categorical rates and the statistical significance level was taken as $P < 0.05$.

Results

A total of 1507 patients were included in the study [896 (59.5%) males and 611 (40.5%) females]. Considering the distribution of skin cancer numbers (i.e., number of tumors) in the patients, 1056 (52.4%) had BCC, 733 (36.4%) had SCC, and 225 (11.2%) had melanoma. The mean age was 69.8 (±14.61) in women and 67.65 (±13.33) in men at the time of diagnosis. Significantly older age was detected in women ($P < 0.001$). The sociodemographic characteristics and comorbidities of the patients are summarized in Table 1 and the comparison of the rate, location, size, recurrence, and metastasis rates of skin cancer subtypes according to gender are summarized in Table 2.

The mean age at the diagnosis of skin cancer of the patients was 67.55 (±13.65) in BCC, 72.05 (±13.06) in SCC, and 64.23 (± 15) in malignant melanoma (MM), respectively. The mean age was found to be lower in melanoma patients at diagnosis ($P < 0.01$).

The highest number of recurrences was detected in 39 patients (7.1%) and the earliest recurrence time was 15.77 ± 14.24 months in SCC patients ($P < 0.01$, $P = 0.01$, respectively).

The size was found to be significantly larger in lesions in the lower extremities ($P < 0.01$).

The size of the lesions on the upper extremity and face was significantly higher in women ($P = 0.041$, $P = 0.002$). According to the mean number of surgeries, the highest mean number of surgeries was detected in BCC [1.21 (±0.44) for BCC, 1.14 (±0.37) for SCC, and 1.17 (±0.4) for MM, respectively, $P < 0.01$].

When the mean age at diagnosis of skin cancer was evaluated according to gender, BCC was similar in both genders, and SCC and MM were significantly higher in females ($P < 0.0001$, $P = 0.016$). When the mean lesion size was considered, it was found to be significantly higher in males ($P < 0.0001$). The rate of localization in the scalp and organ metastases was significantly higher in men ($P < 0.0001$, $P < 0.0001$). The mean age at diagnosis of skin cancer was 66.91 (±14.61) years in patients with lymph node metastasis, and 63.57 (±13.3) years in those with organ metastases. The mean age at diagnosis was found to be lower in patients who had lymph node and organ metastases ($P = 0.046$ and <0.0001, respectively).

Although the total incidence of skin cancer has increased in recent years, this has not been at statistically significant levels. The comparison of skin cancer subtype rates between 2010–2014 and 2015–2019 is summarized in

Table 1: Sociodemographic characteristics and comorbidities in skin cancers

Patient variables	Total	BCC	SCC	Malignant melanoma
Gender, *n*(%)				
Female	611 (40.5)	477 (45.2)	236 (32.2)	96 (42.9)
Male	896 (59.5)	579 (54.8)	497 (67.8)	129 (57.1)
Age range, *n* (%)				
0-20	1 (0.1)	1 (0.1)	0	0
21-40	50 (3.3)	31 (2.9)	8 (1.1)	18 (8)
41-60	369 (24.5)	264 (25)	131 (17.8)	58 (25.8)
61-80	773 (51.3)	540 (51.2)	395 (53.8)	125 (55.6)
>80	314 (20.8)	220 (20.7)	199 (27.1)	24 (10.7)
Comorbidity, *n*(%)				
Hypertension	625 (41.5)	349 (41.6)	215 (43.4)	63 (36.0)
Diabetes	235 (15.6)	124 (14.8)	82 (16.6)	30 (17.1)
Solid organ malignancy	89 (5.9)	51 (6.1)	30 (6.1)	9 (5.1)
Inflammatory disease	72 (4.8)	46 (5.5)	17 (3.4)	7 (4.0)
Hematological malignancy	34 (2.3)	18 (2.1)	15(3.0)	5 (2.9)
Autoimmune disease	27 (1.8)			
Organ transplantation	11 (0.7)	6 (0.7)	6 (1.2)	0
Immunosuppressive drug, *n* (%)	80 (5.3)	42 (5%)	31 (6.3)	9 (5.1)
Smoking, *n* (%)	225 (42.5)	123 (41.7)	90 (46.9)	22 (36.1)
Alcohol use, *n* (%)	82 (17.5)	30 (15.4)	26 (44.8)	6 (10.3)
Multiple skin cancer, *n* (%)	64 (4.2)	58 (6.9)	45 (9.1)	7 (4.0)
Family history of skin cancer, *n* (%)	28 (8.9)	19 (9.9)	10 (10.0)	3 (7.7)

Table 3. The BCC rate was significantly lower in 2015–2019 (0.003), and there was no difference in the subtypes. The rate of SCC increased significantly between 2015 and 2019 ($P = 0.002$), but there was no difference in the subtypes. Although there was no increase in the rate of MM, a significant decrease was detected in the frequency of nodular MM in its subtypes between 2015 and 2019, and a significant increase in the acral MM subtype ($P < 0.0001$, $P < 0.0001$).

The comparison of age at diagnosis, tumor size, recurrence, and metastasis frequency in patients who had comorbidities is summarized in Table 4. The mean age at diagnosis of skin cancer was significantly lower in those who had organ transplantation and autoimmune disease ($P = 0.09$, $P = 0.008$). Also, organ metastases were more common ($P = 0.005$), and mean tumor size was lower in those who had autoimmune diseases ($P = 0.008$).

Discussion

In the present study, it was found that the frequency of BCC has decreased and the frequency of SCC has increased in recent years, while the frequency of MM has remained similar.

The incidence of non-melanoma skin cancer (NMSC) increased by 33% between 2007 and 2017.[7] Over the last decade, the incidence of BCC has increased by 5% annually in Europe.[8] In a retrospective study conducted with 2879 patients with NMSC (2062 BCC, 746 SCC, 71 BCC + SCC), reported from our country, BCC was reported to be the most common NMSC.[9] In a prospective study conducted by Ferhatosmanoğlu *et al.*,[10] a total of 7396 people were evaluated and skin cancer was detected in 200 patients, which constituted 2.7% of the study population. The number of SCC patients was close to the number of BCC patients. Similarly, some studies reported that the incidence of SCC is increasing, approaching that of BCC.[11] In the present study, when compared to the period between 2010–2014 and 2015–2019, it was observed that although BCC decreased, the rate of SCC increased, similar to the literature data. Contrary to our study, Kappelin *et al.*[12] reported that the incidence of BCC increased by 1.8% in Sweden. We think that as the life expectancy increases, the rate of SCC may have increased due to increased cumulative sun exposure and a relative decrease in the number of BCCs may have occurred. Although the limited duration of 5 years and the limited number of patients alone are not sufficient to show that the frequency of SCC has increased and approached the frequency of BCC, it stands out as supporting data.

Regarding gender distribution, the data from the literature on BCC indicate a higher incidence in males.[13,14] Similarly, there was male predominance in our study. The male/female ratio in patients with SCC was found to be higher in our study, similar to the literature data.[15] In the study conducted by Baykal *et al.*[16] the gender distribution of patients with melanoma was almost equal; however,

Table 2: Comparison of rates, localization, size, recurrence and metastasis rates of skin cancer subtypes according to gender

Tumor variables	Total	Female	Male	*P* value
Age at diagnosis, skin cancer type, (mean ± SD)	68.52 (±13.9)	69.8 (±14.61)	67.65 (±13.33)	<0.001
BCC	67.55 (±13.65)	68.47 ± 14.22	68.17 ± 13.01	0.346
SCC	72.05 (±13.06)	76.53 ± 12.83	69.37 ± 12.64	**0.000**
MM	64.23 (±15)	67.60 ± 14.1	62.96 ± 14.9	**0.016**
BCC types				0.055
Nodular	706 (67)	311 (67.6)	395 (66.5)	
Cystic	130 (12.3)	29 (6.3)	31 (5.2)	
Pigmented	94 (8.9)	28 (6.1)	36 (0.1)	
Morphea-like	64 (6.1)	49 (10.7)	45 (7.6)	
Superficial	60 (5.7)	43 (19.3)	87 (14.6)	
SCC types				0.233
Well -differentiated	498 (67.8)	336 (67.5)	170 (72)	
Poorly differentiated	236 (32.2)	162 (32.5)	66 (28)	
Melanoma types				0.899
Nodular	117 (52)	50 (51.5)	67 (52.3)	
Superficial spreading	57(25.3)	16(16.5)	19(14.8)	
Lentigo MM	35(15.6)	8(8.2)	8(6.2)	
Acral Lentiginous	16(7.1)	23(23.7)	34(26.6)	
Residential area				**<0.0001**
Face	1472 (73.1)	616 (78.6)	856 (69.6)	
Scalp	137 (6.8)	24 (3.1)	113 (9.2)	**<0.0001**
Neck	39 (1.9)	12 (1.5)	27 (2.2)	
Upper extremity	90 (4.5)	35 (4.5)	55 (4.5)	
Lower extremity	171 (8.5)	66 (8.5)	105 (8.5)	
Body	88 (4.4)	24 (3.1)	64 (5.2)	
Nail	4 (0.2)	1 (0.1)	3 (0.2)	
Genitalia	8 (0.4)	2 (0.3)	6 (0.5)	
Localization, Mean size(±SD)				
Lower extremity	3.47 (±2.92)	3.92 ± 4.03	4.18 ± 4.67	0.863
Neck	2.31 (±2.03)	2.22 ± 1.79	2.50 ± 2.57	0.694
Scalp	2.21 (±2.26)	1.99 ± 1.89	3.27 ± 3.46	0.113
Upper extremity	2.08 (±1.75)	2.42 ± 2.03	1.55 ± 0.99	**0.041**
Body	1.97 (±1.56)	2.03 ± 1.55	1.80 ± 1.60	0.346
Face	1.36 (±1.26)	1.42 ± 1.27	1.28 ± 1.23	**0.002**
Neck	2.31 (±2.03)	2.22 ± 1.79	2.50 ± 2.57	0.694
Number of recurrences *n*(%)		27 (4.4)	46 (5.1)	0.608
Melanoma		13 (7.4)	8 (8.3)	6 (4.7)
SCC		39 (7.1)	20 (4.4)	10 (5.2)
BCC		34 (4.1)	19 (3.2)	11(2.4)
Time to recurrence (mean ± SD)		19.11 (±16.72)	23.29 (±23.4)	0.752
BCC	29.06 (±26.14)	27.64 ± 22.07	35.74 ± 33.12	0.703
Melanoma	18.62 (±15.3)	24.33 ± 18.60	15.00 ± 11.34	0.310
SCC	15.77 (±14.24)	10.20 ± 7.81	15.12 ± 12.14	0.445
Number of recurrences (Mean ± SD)		1.27 (±0.75)	1.38 (±1.22)	0.634
Lesion size, (mean ± SD)	1.69 ± 1.89	1.61 (±1.93)	1.75 (±1.86)	**<0.0001**
LN met, *n* (%)	164 (8.1)	57 (7.3)	107 (8.7)	0.253
Organ met, *n* (%)	119 (5.9)	25 (3.2)	94 (7.6)	**<0.0001**

P values below 0.05 are considered statistically significant. Significant *p* values are colored in bold

there was male predominance in our study. This may be associated with the fact that men spend more time outside in our country, including childhood periods, and their clothing choices and exposure of more body surface area to the sun's rays.

The mean age at diagnosis in patients with melanoma was found to be lower than in other skin cancers in the present study. Age at diagnosis of skin cancer in women was older in the MM and SCC groups and it was close to the age of diagnosis in male BCC patients. No significant gender

Table 3: The comparison of skin cancer subtype rates between 2010-2014 and 2015-2019

Skin cancer characteristics	2010–2014	2015–2019	*P* value
Age mean, mean ± SD	68.91 ± 12.64	69.48 ± 14.56	0.072
Gender *n*(%)			0.143
Female	350 (37.2)	434 (40.4)	
Male	591 (62.8)	639 (59.6)	
BCC *n*(%)	527 (56)	529 (49.3)	**0.003**
Subtype *n*(%)			0.294
Nodule	344 (65.4)	362 (68.6)	
Cystic	36 (6.8)	24 (4.5)	
Pigmented	34 (6.5)	30 (5.7)	
Morphea	42 (8)	52 (9.8)	
Superficial	70 (3.3)	60 (11.4)	
SCC *n*(%)	309 (32.8)	424 (39.5)	**0.002**
Subtype			
Well-differentiated	189 (68.2)	226 (60.4)	0.105
Poorly differentiated	89 (31.8)	147 (39.6)	
MM *n*(%)	105 (11.2)	120 (11.2)	1.000
Subtype			**<0.0001**
Superficial	14 (13.5)	21 (17.4)	
Nodule	73 (70.2)	44 (36.4)	**<0.0001**
Acral	10 (9.6)	47 (38.8)	**<0.0001**
LMM	7 (6.7)	9 (7.4)	

P values below 0.05 are considered statistically significant. Significant *p* values are colored in bold

Table 4: Comparison of age at diagnosis, tumor size, recurrence, and metastasis frequency in patients with comorbidities

Skin cancer characteristics	HM	*P* value	SOM	*P* value	OT	*P* value	ID	*P* value	AD	*P* value
Age at diagnosis, mean ± SD	70.24 (±11.51)	0.743	69.24 (±10.83)	0.130	59.09 (±11.59)	**0.004**	69.21 ± 13.07	0.181	63.11 ± 12.96	**0.008**
Multiple skin cancer *n* (%)	4 (11.8)	0.053	4 (4.5)	0.788	1 (9.1)	0.381	1 (1.4)	0.363	2 (7.4)	0.319
Number of recurrences *n* (%)	2 (5.9)	0.679	6 (6.7)	0.439	0	1.000	2 (%2.3)	0.579	3 (8.1)	0.175
Organ met, *n* (%)	6 (11.3)	0.127	9 (6.1)	0.856	0	1.000	1 (1.1)	0.059	7 (18.9)	**0.005**
LN met, *n* (%)	4 (7.5)	1.000	11 (7.5)	0.876	0	0.621	3 (3.4)	0.111	0	0.069
Lesion size, mean ± SD	1.42 ± 1.35	0.206	1.47 ± 1.41	0.472	1.14 ± 1.70	0.383	1.50 ± 1.28	0.987	1.11 ± 1.28	**0.008**

HM = Hematological malignancy, SOM = Solid organ malignancy, OT = Organ transplantation, ID = Inflammatory disease, AD = Autoimmune disease, LN met = lymphe node metastasis

P values below 0.05 are considered statistically significant. Significant *p* values are colored in bold

differences were detected in BCC, SCC, and MM subtypes. Similar results were obtained by Ciążyńska *et al*. (the mean age for BCC was similar in males and females, while the mean age at diagnosis was older in SCC in women than in men.[17] In a study evaluating NMSCs, the mean age at diagnosis was 63.4 (±15.3) in BCCs and 70.5 (±13.4) in SCCs, and similar to our study, it was higher in patients with SCC than in patients with BCC.[15] In a study that was published in 2016, the mean age of BCC was found to be 68.83 years, similar to our study.[18] In the study of Baykal *et al*.[16] the mean age of patients diagnosed with melanoma was found to be lower than in our study (64.23 vs. 57.7 ± 19.7). In the study conducted by Azarjana *et al*.[19] the mean age at diagnosis of melanoma patients was reported as 61.3 (±15.3), 60.7 (14.7) in men, and 61.6 (±15.6) in women. In our study, the mean age at diagnosis of melanoma patients and the age at diagnosis was higher in both men and women. We believe that this may be associated with the delayed first application in our region. The belief that "if the knife touches, cancer will occur" is an important factor in the late admission of patients in our country.

Although it is reported in the literature that the most common skin cancer is SCC in immunosuppressed

patients,[20] BCC was the most common skin cancer in immunosuppressed patients in this study.

In a study in the literature, 2.6% of the patients who had BCC were found to be immunosuppressive, 35.2% of immunosuppressive cases had organ transplantation, and 55.7% had inflammatory disease.[15] In our study, although the rate of immunosuppression was higher in patients with BCC (14.5%), organ transplantation (5%), and inflammatory disease (38%) were observed less frequently as the cause of immunosuppression. High immunosuppressive status was associated with the fact that our clinic was located in a comprehensive university hospital and our consultation rates were high.

A total of 4.8% of the SCC patients were found to be immunosuppressive in the same study. Organ transplantation was present in 33.8% of immunosuppressive cases, inflammatory disease in 42.5%, and hematological malignancy in 2.5%.[15] In our study, immunosuppression rate (12.3%), and hematological malignancy (22%) were found to be higher in SCC patients, and organ transplantation rate (8.8%), and inflammatory disease (25%) were observed less frequently. In a study that evaluated patients with SCC, Actinic Keratosis, and Bowen's diagnosis, 10.3% of the patients had a history of taking immunosuppressive drugs. This rate was lower (6.3%) in our study.[21]

In the study of Barazzetti *et al*.[22] conducted with SCC patients, the most common comorbid condition was found to be hypertension, and the second most frequent was diabetes, similar to our study. High rates may be associated with a higher expected age of onset of SCC.

In a study that was conducted in our country, smoking history and alcohol use were found to be risk factors for BCC and SCC, and smoking history was found to be a risk factor for MM.[10] In another study, 45.6% of BCCs and 53.6% of SCCs had a history of smoking.[15] Approximately, half of SCC patients used cigarettes (54.3%) and alcohol (43.5%) in another study.[22] In our study, smoking rates were similar to the literature data, and alcohol use rates were found to be lower than in the literature. It is considered that this may be caused by social–cultural differences.

When the average of recurrence times was evaluated, the earliest recurrence was detected in SCC and the latest recurrence in BCC. The lesion size was found to be significantly larger in lesions in the lower extremities. It is considered that lower extremity lesions can be neglected more by patients than facial lesions and may delay the referral to a doctor. According to the average number of surgeries, the highest mean number of surgeries was found in BCC.

In the present study, the recurrence rate was found to be 4.1% in BCC and 7.1% in SCC. Similar to this study, the overall BCC recurrence rate in the 1062 patient cohort study was reported as 4%.[23] Recurrence rates varying between 4.6% and 6.7% are reported in the literature for cSCC.[24] The recurrence rate in terms of SCC was found to be higher in the present study than in the literature. This may be related to our higher number of immunosuppressive cases when compared to other studies.

In another prospective cohort study, the overall tumor recurrence rate was reported as 3.5% in NMSC, which was quite low compared to our study.[25] This may be because of the different surgical methods employed.

There were also differences between sexes regarding tumor sites. The head and neck region was the prominent site of NMSC, this is in line with the literature.[26] In the present study, the rate of skin cancer on the scalp was found to be higher in men than in women. This may be because of direct sunlight exposure to the balding skin as a result of baldness with Androgenic Alopecia, which increases with age in men.

In the study conducted by Muzic *et al*.[15] the mean size of BCC lesions was found to be 1.0 (±0.6) cm, and that of SCC lesions was 1.1 (±0.6) cm. In the study of Ma *et al*.[27] the tumor size of melanoma patients was reported to be ≤6 mm in 20.6%, 7-12 mm in 34.2%, 13-30 mm in 32.6%, 31-42 mm in 4%, and >42 mm in 8.6%. In the present study, more advanced lesions were detected in all skin cancer types compared to the literature data. This may be because of the low level of awareness of society in terms of skin cancer.

In a study evaluating the distribution of histopathological types of skin cancers, histopathological types of BCC were found to be 43.9% nodular, 17.1% superficial, 5.9% infiltrative, and 1.6% morphea-like.[15] A higher percentage of nodular subtypes was detected in men (66.5%) and a higher rate of superficial BCC in women (28.2%).[15] In another study, nodular and morpheiform BCC occurred more frequently in women (male/female ratio 0.96, M/F ratio 0.73).[28] In this study, a higher rate of superficial BCC was detected in women, although not at a statistically significant level. More comprehensive studies are needed to uncover the relationship between BCC subtypes and gender distribution. In the same study, the majority of BCCs (83.1%) were found to be localized in the head region, as in the present study.[28]

Also, no significant gender difference was detected in the present study between poorly differentiated and well-differentiated SCC cases and MM subtypes.

It is already known that autoimmune diseases are associated with an increased risk of melanoma and NMSC.[29,30] The reason for the significantly lower mean age at diagnosis of skin cancer in patients with autoimmune diseases or organ transplantation in our study may be

the chronic inflammatory involvement of the skin or immune-modulating treatments targeting autoimmune conditions. Larger studies are needed to explain the fact that the tumor size is significantly lower in patients with autoimmune diseases, while the organ metastasis rate is significantly higher.

Conclusion

The change in the incidence of melanoma and NMSCs and their subtypes over the years has been revealed in the present study. The increased frequency of SCC between 2015 and 2019 compared to the previous 5-year period and approaching BCC supports the recent literature. Unfortunately, studies reporting the effects of gender and comorbidities on recurrence and metastasis in skin cancers are limited. In the present study, when all skin cancers were evaluated, the rate of localization on the scalp, the size of the lesion, and the rate of organ metastasis were found to be significantly higher in men, which contributes to the literature on "skin cancers-gender relationship." In the present study, the mean age at diagnosis of skin cancer was also found to be significantly lower in those with organ transplantation and those with autoimmune diseases. Also, organ metastases were more common in patients who had autoimmune diseases and the mean tumor size was lower. We think supporting the findings with a larger series of studies will make an additional contribution to the management of skin cancers.

Data availability statement

The data that support the findings of this study are available from the corresponding author.

Author contributions

Conception or design of the work: EKÇ, AF, and LBS. Data collection: EKÇ, AF, LBS, ŞE, DAA, and SY. Data analysis and interpretation: EKÇ, AF, and LBS. Critical revision of the article: EKÇ, AF, LBS, and DAA. Final approval of the version to be published: EKÇ, AF, and LBS.

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Conflicts of interest

There are no conflicts of interest.

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