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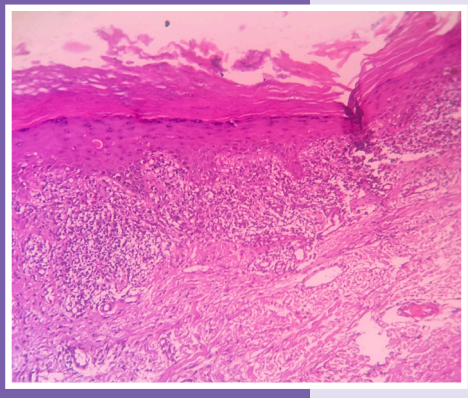

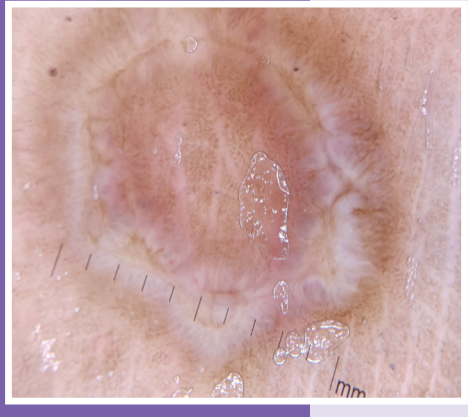

ORIGINAL ARTICLES

- **Frequency of Skin Cancer Patients**
  Ferhat Ferhatoğlu, Zeynep Altan Ferhatoğlu; Istanbul, Turkey
- **Mucocutaneous Manifestations of HIV**
  Defne Özkoca, Nazlı Caf, Ayşe Nilhan Atsü, Tuğba Kevser Uzunçakmak, Zekayi Kutlubay; Istanbul, Turkey
- **Skin Cancer and Sun Knowledge Level**
  Esma Arslan, Havva Hilal Ayvaz Çelik, Osman Cinkara, Sabriye Ercan, Fahriye Esra Başyiğit Gönendi, Cem Çetin; Isparta, Turkey
- **Sun Protection Awareness in Society**
  Tanju Kapağan, Ferhat Ferhatoğlu, Selinay Emekli, Çağla Ecem Kılıç; Istanbul, Turkey

CASE REPORTS

- **Melanonychia - Hydroxyurea Therapy**
  Thaer Hassan Douri; Hama, Syria
- **Hand-Foot Skin Reaction by Sorafenib**
  Devansi Sarawgi, Madhumita Das, Subhasmita Baisya, Sumit Sen; Kolkata, India
- **Itchy Border Around Unstable Vitiligo Patch**
  Shreya Poddar, Sumit Sen, Devansi Sarawgi; West Bengal, India
- **Secukinumab in Hidradenitis Suppurativa**
  Devansi Sarawgi, Gobinda Chatterjee, Olympia Rudra, Pramit Nandy, Aniruddha Mandal; Kolkata, India

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TABLES

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Journal of the Turkish Academy of Dermatology

CONTENTS

ORIGINAL ARTICLES

77 Frequency, Demographic and Clinicopathological Characteristics of Skin Cancer Patients Treated and Followed Up in the Medical Oncology Outpatient Clinic
Ferhat Ferhatoğlu, Zeynep Altan Ferhatoğlu; Istanbul, Turkey

82 The Mucocutaneous Manifestations in Patients Infected with the Human Immunodeficiency Virus
Defne Özkoca, Nazlı Caf, Ayşe Nilhan Atsü, Tuğba Kevser Uzunçakmak, Zekayi Kutlubay; Istanbul, Turkey

86 Skin Cancer and Sun Knowledge Level and Dermatoscopic Examination Results of Outdoor and Indoor Athletes: A Cross-sectional Research
Esma Arslan, Havva Hilal Ayvaz Çelik, Osman Cinkara, Sabriye Ercan, Fahriye Esra Başyiğit Gönendi, Cem Çetin; Isparta, Turkey

94 Risk Factors for Cutaneous Melanomas and Level of Awareness in Society
Tanju Kapağan, Ferhat Ferhatoğlu, Selinay Emekli, Çağla Ecem Kılıç; Istanbul, Turkey

CASE REPORTS

101 Multiple Melanonychia During Hydroxyurea Therapy
Thaer Hassan Douri; Hama, Syria

104 Hand-Foot Skin Reaction by Sorafenib
Devansi Sarawgi, Madhumita Das, Subhasmita Baisya, Sumit Sen; Kolkata, India

108 Itchy Papules Bordering Vitiligo Patches in a Child
Shreya Poddar, Sumit Sen, Devansi Sarawgi; West Bengal, India

111 Secukinumab - A New Ray of Hope for the Management of Refractory Hidradenitis Suppurativa
Devansi Sarawgi, Gobinda Chatterjee, Olympia Rudra, Pramit Nandy, Aniruddha Mandal; Kolkata, India

INDEX

2022 Referee Index
2022 Author Index
2022 Subject Index

ORIGINAL ARTICLE

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Frequency, Demographic and Clinicopathological Characteristics of Skin Cancer Patients Treated and Followed Up in the Medical Oncology Outpatient Clinic

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ABSTRACT

Background: Patients with skin cancer apply to medical oncology outpatient clinics for follow-up after the completion of local treatments or in case of progression despite locoregional treatments (surgical and/or radiotherapy). In this study, we aimed to determine the demographic and clinicopathological characteristics of patients with skin cancer who were followed up and treated in the medical oncology outpatient clinic, as well as to determine their ratio compared to other cancers.

Materials and Methods: Age, gender and demographic information of the patients diagnosed between C00 and C80 according to International Classification of Diseases-10, followed in University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Medical Oncology Clinic between April 2021 and April 2022.

Results: The ratio of skin cancer patients to all cancer patients was 1.55%. The most common skin cancer subgroup presenting to the medical oncology outpatient clinic was cutaneous melanoma (10, 0.65%), followed by cutaneous Kaposi's sarcoma (9, 0.58%), squamous cell carcinoma (4, 0.26%), and basal cell carcinoma (1, 0.06%).

Conclusion: We have determined that the number of skin cancer patients and its rate among other organ cancers is quite low. We found that patients with a diagnosis of skin cancer were referred from various centers other than dermatology.

Keywords: Cutaneous malign melanom, Kaposi sarcoma, Squamous cell carcinoma, Basal cell carcinoma

Introduction

According to the 2020 data of world cancer statistics, the incidence of new cancer is 18.1 million and is expected to be 28.4 million in 2040 [1]. When calculating the rate of skin cancers, it is generally seen that keratinocyte carcinomas [basal cell carcinoma (BCC) and squamous cell carcinoma (SCC)] are excluded from the list due to their low mortality rate and coexistence with many cancers [2]. In epidemiological studies, BCC is seen in 0.5-1/100 of the entire population in North America and Europe [3]. This indicates that more than 2 million people are diagnosed with BCC in North America alone [4]. Among all cancers except BCC, the incidence of cutaneous melanoma is 1.7%, non-melanoma skin cancer 6.2%, and Kaposi sarcoma 0.2%. When diagnosed at its earliest stage, all (100%) people with melanoma will survive their disease for one year or more, compared with more than 1 in 2 (53%) people when the disease is diagnosed at the stage IV. Survival for most non-melanoma

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skin cancers is excellent. The 5-year relative survival for BCC is 100% and the 5-year relative survival for SCC is slightly less at 95% [1].

Patients with skin cancer apply to medical oncology outpatient clinics for follow-up after the completion of local treatments or in case of progression despite locoregional treatments (surgical and/or radiotherapy). City hospitals have the potential to refer patients with skin cancer from other clinics, especially dermatology and plastic surgery, to the medical oncology outpatient clinic, due to the opportunity of many disciplines to coexist. In this study, we aimed to determine the demographic and clinicopathological characteristics of patients with skin cancer who were followed up and treated in the medical oncology outpatient clinic, as well as to determine their ratio compared to other cancers.

Materials and Methods

Age, gender and demographic information of the patients diagnosed between C00 and C80 according to International Classification of Diseases-10, followed in University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Medical Oncology Clinic between April 2021 and April 2022, were obtained from the hospital registry system following the approval of the University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Non-interventional Clinical Research Ethics Committee (decision number: KAEK/2022.07.222, date: 07.07.2022).

Patients with diagnosis codes C43, C44 and C46, with full demographic, clinicopathological and therapeutic information and who applied to the medical oncology outpatient clinic at least twice, were considered as followed-up skin cancer cases and were evaluated in 4 subgroups as cutaneous melanoma, BCC, SCC and Kaposi's sarcoma (KS). In addition, the disease stage and referral clinical information of these patients were recorded according to the American Joint Committee on Cancer tumor-node-metastasis system.

Statistical Analysis

SPSS 20.0 program was used for statistical analysis of the obtained data. The conformity of the data to the normal distribution was tested with the Kolmogorov-Smirnov test. The analysis of normally distributed parametric data was done using the Student's t-test, and the analysis of non-normally distributed data was performed using the Mann-Whitney U test. Parametric data obtained were expressed as mean ± standard deviation values. Analysis of categorical variables was evaluated using the chi-square test. Pearson correlation analysis was used to compare numerical data, and Spearmen correlation analysis was used to compare categorical data.

Results

In the last year, 1,533 cancer patients followed in the medical oncology outpatient clinic were identified. The 3 most common cancers were breast (20.8%), lung (18.3%) and colon (15.9%) cancers, respectively (Table 1). The ratio of skin cancer patients to all cancer patients was 1.55%. The most common skin cancer subgroup presenting to the medical oncology outpatient clinic was cutaneous melanoma (10, 0.65%), followed by cutaneous KS (9, 0.58%), SCC (4, 0.26%), and BCC (1, 0.06%) (Figure 1). The median age was 55.6 in cutaneous melanoma patients, 53.5 in Kaposi sarcoma patients, and 55 in SCC patients. The age of the patient with BCC was 74 years old. For cutaneous melanoma patients, the most frequent referral centers were dermatology (30%) and plastic surgery (30%) (Table 2). 66.6% of Kaposi sarcoma patients were in the advanced cutaneous disease stage. Infectious disease was the clinic that most frequently referred to KS (44.4%). The referral rate from dermatology and radiation oncology was 22.2% (Table 3). Of the four SCC patients, 2 were stage 4, 1 was stage 3, and 1 was stage 1. Each of the SCC patients was referred from different clinics (Table 4). The BCC patient was at local high risk and was referred for eye diseases (Table 5).

Discussion

In this study, we examined the frequency, clinical characteristics and referral centers of skin cancer patients followed in the Medical

Table 1. Distribution of newly diagnosed cancer patients in one year

Cancer diagnosis	N	%
Endocrine neoplasms	11	0.71
Head and neck cancer	38	2.47
Brain tumors	36	2.34
Basal cell skin cancer	1	0.06
Squamous cell skin cancer	4	0.26
Other gynecologic neoplasms	85	5.54
Soft tissue sarcomas	44	2.87
Hepatobiliary cancers	41	2.67
Kaposi sarcoma	9	0.58
Lung cancers	281	18.3
Colon and rectum cancer	244	15.9
Cutaneous malign melanoma	10	0.65
Breast cancer	320	20.8
Bladder and urinary track cancers	27	1.76
Mesothelioma	4	0.26
Gastric cancer	125	8.15
Ovary cancer	78	5.08
Esophageal cancer	37	2.51
Pancreas cancer	54	3.52
Prostate cancer	41	2.77
Testicular cancers	20	1.30
Kidney cancer	23	1.50
Total	1,533	100

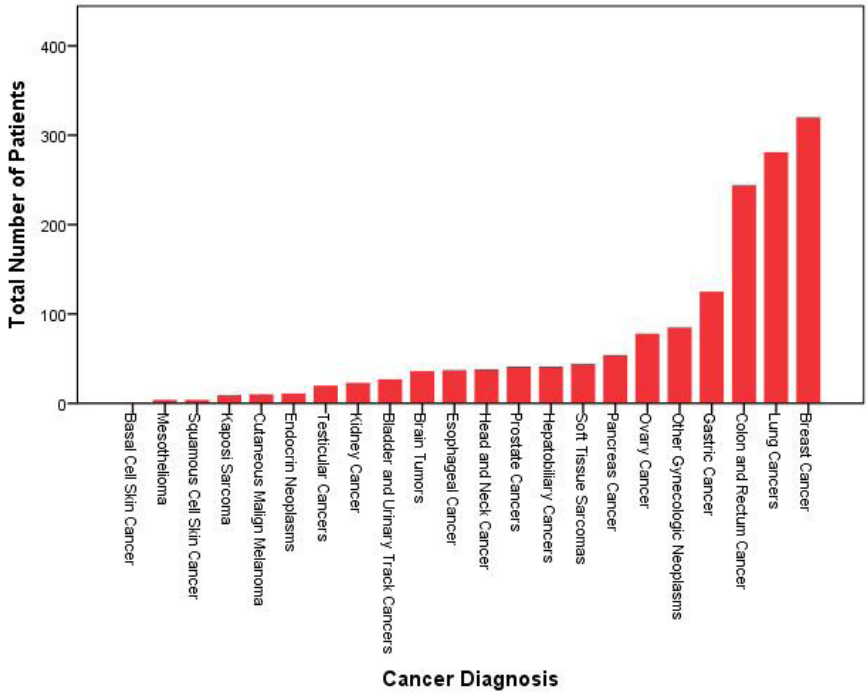

Figure 1. The rate of patients diagnosed with skin cancer within a year is quite low compared to other cancer diagnoses

Table 2. Clinical features of patients with cutaneous malign melanom

Cutaneous malign melanom	Gender (F/M)	Age	Stage at diagnosis	Referring clinic
Patient 1	F	70	IIA	Eye disorders
Patient 2	F	68	IV	Pulmonary medicine
Patient 3	F	62	IV	Dermatology
Patient 4	M	48	IV	Dermatology
Patient 5	F	60	IV	Dermatology
Patient 6	M	44	IV	Plastic surgery
Patient 7	M	44	IV	Plastic surgery
Patient 8	F	60	IV	Neurosurgery
Patient 9	M	55	IV	General surgery
Patient 10	F	45	III	Plastic surgery

F: Female, M: Male

Table 3. Clinical features of patients with Kaposi

Kaposi sarcoma	Gender (F/M)	Age	Stage at diagnosis	Referring clinic
Patient 1	M	81	Advance cutaneous disease	Radiation oncology
Patient 2	M	58	Advance cutaneous disease	Infectious disease
Patient 3	M	61	Advance cutaneous disease	Infectious disease
Patient 4	M	66	Limited cutaneous disease	Dermatology
Patient 5	F	58	Advance cutaneous disease	Dermatology
Patient 6	M	33	Advance nodal disease	Infectious disease
Patient 7	M	21	Advance nodal disease	Internal medicine
Patient 8	M	81	Advance cutaneous disease	Radiation oncology
Patient 9	M	23	Advance cutaneous disease	Infectious disease

F: Female, M: Male

Table 4. Clinical features of patients with squamous cell skin cancer

Squamous cell skin cancer	Gender (F/M)	Age	Stage at diagnosis	Referring clinic
Patient 1	M	68	I	Plastic surgery
Patient 2	M	66	IV	Internal medicine
Patient 3	M	41	III	Radiation oncology
Patient 4	F	45	IV	Neurosurgery

F: Female, M: Male

Table 5. Clinical features of patient with basal cell skin cancer

Basal cell skin cancer	Gender (F/M)	Age	Stage at diagnosis	Referring clinic
Patient 1	F	74	Local high risk	Eye disease

F: Female, M: Male

Oncology outpatient clinic among all cancer patients. We have determined that the number of skin cancer patients and its rate among other organ cancers is quite low. We found that patients with a diagnosis of skin cancer were referred from various centers other than dermatology.

According to GLOBOCAN 2020 data, the 4 most common cancers worldwide are breast, prostate, lung and colon cancers, respectively [1]. According to data from global studies, cancer incidences in Turkey are similar to those in the world [1]. In our center, the first 3 cancers were breast, lung and colon cancers, respectively. It was remarkable that prostate cancer was at a lower rate in our clinic.

We found that the rate of cutaneous melanoma patients among 1-year total cancer patients is very rare, with 0.65%, and the vast majority (80%) were referred to our center in the metastatic stage (stage 4). Lideikaitė et al. [5] reported the rate of stage 4 patients as 10.59% in primary invasive melanoma patients in a study. Rockberg et al. [6]. In a study from Sweden that included 3,554 patients with cutaneous malignant melanoma, the majority of patients (92%) were in the localized stage (stages I and II), with only 1.3% in stage 4.

While follow-up after surgical excision is recommended for stage I and IIA cutaneous melanoma patients, in the case of high-risk-lymph node-negative (stage IIB and IIC) and lymph node metastases, adjuvant treatment options are specified in the algorithms and guidelines. Breslow thickness, presence of ulcer in the primary tumor, size of sentinel lymph node metastasis and BRAF mutation are determinants of adjuvant therapy in locoregional disease [7]. For these reasons, every patient deserves a medical oncology evaluation with up-to-date guidelines after excision. It would be appropriate to refer every patient who underwent surgical intervention and diagnosed with cutaneous melanoma to medical oncology clinics.

Acquired immunodeficiency syndrome (AIDS) disease -related KS is being studied as a separate group, with KS being seen 20,000 times more frequently in patients with AIDS than in the general population [8]. It has been reported in recent years that the frequency of KS decreased with antiretroviral therapy [1]. Because of this association, we think that the most common clinic referencing patients with KS to medical oncology is infectious diseases.

SCC and BCC were the least common skin cancers. Although consultations were made from various clinics, none of them were referred from dermatology. Possible reasons for this may be a small number of applications to dermatology clinics, difficulty in reaching the dermatology clinic, or not seeking consultation of medical oncology due to early-stage disease. Although keratinocyte carcinomas are the most common cancers in the world, we found the rate in our clinic much lower than expected. For this reason, it is important to detect and correct possible malfunctions.

Study Limitations

We cannot generalize our study due to the fact that it is a single center and due to the evaluation of patient applications in the last year. Therefore, low sample size and short time interval may cause selection bias.

Conclusion

The results of our study showed that the rate of patients with cutaneous malignancies followed in medical oncology is low compared to the rest of the world. In particular, patients with early-stage melanoma and keratinocyte-derived carcinoma have the potential to be problematic in their referral processes. Multicenter and large-scale population studies are needed to validate our study.

Ethics

Ethics Committee Approval: This study was approved by the University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Non-interventional Clinical Research Ethics Committee (decision number: KAEK/2022.07.222, date: 07.07.2022).

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Surgical and Medical Practices: F.F., Concept: F.F., Z.A.F., Design: Z.A.F., Data Collection or Processing: F.F., Analysis or Interpretation: F.F., Literature Search: Z.A.F., Writing: Z.A.F.

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The Mucocutaneous Manifestations in Patients Infected with the Human Immunodeficiency Virus

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ABSTRACT

Background: A clinical spectrum of mucocutaneous manifestations may be seen in patients infected with human immunodeficiency virus (HIV); these manifestations are of clinical importance. The aim of this study is to determine the prevalence of the mucocutaneous manifestations in our patient population, as well as to signify the role of dermatologists in diagnosing the disease in the light of common mucocutaneous manifestations.

Materials and Methods: This is a retrospective study that included HIV infected patients who have visited the outpatient clinic of Istanbul University-Cerrahpasa, Cerrahpasa Faculty of Medicine, Department of Dermatology and Venerology.

Results: A total of 57 patients were included in this study. Seborrheic dermatitis and pruritus were the most common cutaneous manifestations that were observed in our patient population. Herpetic ulcers, viral warts, hair loss and folliculitis were also common. The common mucosal manifestations were periodontitis, candidiasis, xerostomia and aphthous ulcers.

Conclusion: Dermatologists have a pivotal role in the diagnosis and follow-up of the HIV infected patients since the mucocutaneous manifestations can not only guide through the diagnosis but also may give information about the immune status of the patient.

Keywords: Cutaneous, HIV, Mucosal, STD

Introduction

The human immunodeficiency virus (HIV) is a virus that infects the CD4 T-lymphocytes. A clinical spectrum of mucocutaneous manifestations may be seen in patients infected with HIV; these manifestations are of clinical importance since some of these manifestations may be specific to the disease, whereas, some of these manifestations may be non-specific but still point towards infection with a more aggressive disease course. Treatment resistant viral, fungal and bacterial infections; chronic inflammatory skin diseases such as seborrheic dermatitis, psoriasis, ichytiosis, eosinophilic folliculitis; acquired immunodeficiency syndrome (AIDS) papular eruption; drug eruptions; Kaposi sarcoma; and human papilloma virus (HPV)-related neoplasia may be seen in patients infected with HIV [1]. Aphthous ulcers and oropharyngeal candidiasis may point towards acute seroconversion; oral hairy leukoplakia, Kaposi sarcoma, necrotising gingivitis and candidiasis may help diagnose undiagnosed patients. Candidiasis and hairy leukoplakia are seen in AIDS; periodontitis, Kaposi sarcoma, long-lasting herpetic infections, major aphthous ulcers, candidiasis and hairy leukoplakia are seen

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with increased immunosuppression [2]. Furthermore, HIV infected patients may have coexisting sexually transmitted diseases (STD) [3].

The mucocutaneous manifestations seen in patients infected with HIV may not only help diagnose the undiagnosed patients, but also help physicians guide through the stage of immunosuppression. The aim of this study is to determine the prevalence of the mucocutaneous manifestations in our patient population, as well as to signify the role of dermatologists in diagnosing the disease in the light of common mucocutaneous manifestations. A secondary aim of this study is to determine the prevalence of coexisting STDs in patients infected with HIV.

Materials and Methods

This is a retrospective study which has included HIV infected patients who have visited the outpatient clinic of Istanbul University-Cerrahpasa, Cerrahpasa Faculty Medicine, Department of Dermatology and Venerology between January 2019 and January 2021. The age, gender, HIV infection duration, cutaneous manifestations, oropharyngeal mucosal manifestations, genital mucosal manifestations and coexisting STDs of each patient were noted from the patient files.

The approval of Istanbul Kent University Medical Sciences Faculty Ethics Committee has been taken before the initiation of this study (approval number: E-21837838-050-17761, date: 31.10.2022)

Results

A total of 57 patients were included in this study. Seven (12%) of the patients were female, 50 (88%) were male. The mean age of the patients was 34 years and the mean duration of HIV-infectedness was 22.3 months.

The most commonly seen cutaneous manifestations were seborrheic dermatitis (29.8%) and pruritus (29.8%). Other common cutaneous manifestations were chronic herpetic ulcers (19.3%), diffuse hair loss (15.8%), xerosis (15.8%), viral warts (15.8%), bacterial or fungal folluculitis (15.8%) herpes zoster infection (14%), sarcoptes scabies infection (14%), drug eruption (10%), nail pigmentation (9%), atopic dermatitis (5%), Kaposi sarcoma (5%), molluscum contagiosum infection (3%), psoriasis (2%) and telengiectasias (located on trunk or neck) (2%). None of the patients had varicella zoster infection, eosinophilic folliculitis, bacillary angiomatosis, cutaneous tuberculosis, deep fungal infections, lymphadenopathy, vasculitis or cutaneous lymphoma.

The most common oropharyngeal mucosal manifestation was periodontitis (46%); candidiasis (30%), xerostomia (28%) and aphthous ulcers (25%) were also common. Oral hairy leukoplakia was seen in only two patients (2%) and black hairy tongue was seen only in 1 patient (1.8%). None of the patients had mucosal pigmentation or orificial tuberculosis infection.

The most commonly seen genital mucosal manifestations were condyloma accuminata (18%) and anal condyloma (12%); both due to HPV infection. Syphilitic chancre or scar of a chancre were present in 14% of the patients, while none of the patients had condyloma lata (secondary syphilis). A history of gonorrhea infection has been reported by 10% of the patients. Five percent of the patients had active genital herpes simplex virus infection and 2% had the implicated papules of molluscum contagiosum. Five percent of the patients had perianal abcess. None of the patients had chancroid or lymphadenopathies.

The most common coexisting STD was HPV, the other common STDs were syphilis, gonorrhea, herpes simplex virus infection and molluscum contagiosum, in decreasing order.

Figure 1 summarizes the mucocutaneous manifestations observed in the HIV infected patients.

Discussion

Seborrheic dermatitis and pruritus were the most common cutaneous manifestations that were observed in our patient population. Herpetic ulcers, viral warts, hair loss and folliculitis were also common. The common mucosal manifestations were periodontitis, candidiasis, xerostomia and aphthous ulcers.

Several studies have investigated the mucocutaneous manifestations of HIV infections previously, including studies from Turkey. Altuntaş Aydin et al. [4] reported that at least one dermatological pathology was observed in 36.2% of the HIV infected patients; and the most common pathologies were oropharyngeal candidiasis, herpes zoster, dermatophyte infections, hyperpigmentation and folliculitis. Similar to Altuntaş Aydin et al. [4] we have also observed oropharyngeal candidiasis in almost one third of our patients. Herpes zoster, hyperpigmentation and folluculitis were also common.

Sivaz et al. [5] reported that the most common mucocutaneous manifestation in the HIV infected patients was seborrheic dermatitis. Although it was the most common cutaneous manifestation in our patient population, periodontitis and candidiasis were more commonly seen than seborrheic dermatitis in our patient population.

Oral mucosal manifestations have been reported in up to 50% of the HIV-infected patients and in up to 80% of the patients with AIDS. Periodontitis has a prevalence ranging from 27% to 76% in patients infected with HIV; oral candidiasis has a prevalence ranging from 17% to 75%. Similar to the literature, periodontitis and candidiasis were the most commonly observed oropharyngeal mucosal pathologies in our patient population. Xerostomia was also common in our patient population, which has been reported to have a prevalence of 39% in the literature. Aphthous ulcers were seen in the quarter of our patients although its frequency ranges

Figure 1. The mucocutaneous manifestations of HIV infected patient

from 5% to 10 % in the literature. Oral Kaposi sarcoma is seen in the 6% of HIV infected patients and its distinctive for guiding the undiagnosed patients towards diagnosis; yet none of our patients had oral Kaposi sarcoma [6].

A study from Morocco reported that fungal infections, HPV infections, herpes zoster infection, xerosis and oral candidiasis were common in HIV-infected patients. These were also common in our patient population. Furthermore, the authors concluded that Seborrheic dermatitis was significantly associated with the AIDS stage [7]. Another study reported that more than half of the newly-diagnosed patients had a skin manifestation and the common manifestations were pruritic papular eruption, seborrheic dermatitis, Kaposi sarcoma, xerosis, drug reactions, candidiasis, herpes zoster and scabies. Furthermore, they also reported that decreased CD4 lymphocyte counts were associated with dermatophyte infections, oral candidiasis, Kaposi sarcoma, seborrheic dermatitis and xerosis [8].

STDs may co-exist with each other or enhance the transmission of one another due to the disruption of the cutaneous barrier in the genital area [9]. Lee et al. [10] investigated the prevalence of other STDs in HIV infected patients: 41.3% had a history of STD before the diagnosis of HIV, 36.1% had been diagnosed with another STD at the time of diagnosis with HIV and 8.9% have been diagnosed with another STD after being diagnosed with HIV. The most common STD to co-exist with HIV was syphilis [10]. On the contrary, Flagg et al. [11] showed that the rate of transmission of bacterial STD was lower in HIV infected patients. In our patient population, HPV infections were the most common co-existing STD; syphilis was the second most common. Chancroid and chlamydia infections were not observed in out patient population; gonorrhea was seen in only 10%. HPV infection has been reported to be common and treatment resistant in HIV infected patients [12]. Multiple genotypes of HPV can be detected in patients infected with HIV [13].

Conclusion

Mucocutaneous manifestations are common in HIV-infected patients. Although their prevalences vary in different studies; seborrheic dermatitis, xerosis, candidiasis, periodontitis, dermatophyte infections and herpes zoster are commonly seen in HIV infected individuals. Furthermore, seborrheic dermatitis has been found to be correlated with increasing immunosupression. Furthermore, the presence of one STD increases the risk of having a second STD. Thus, dermatologists have a pivotal role in the diagnosis and follow-up of the HIV infected patients since the mucocutaneous manifestations can not only guide through the diagnosis but also may give information about the immune status of the patient.

Ethics

Ethics Committee Approval: The approval of Istanbul Kent University Medical Sciences Faculty Ethics Committee has been taken before the initiation of this study (approval number: E-21837838-050-17761, date: 31.10.2022)

Informed Consent: Retrospective study.

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Authorship Contributions

Surgical and Medical Practices: D.Ö., Concept: D.Ö., A.N.A., Z.K., Design: D.Ö., A.N.A., T.K.U., Z.K., Data Collection or Processing: D.Ö., N.C., T.K.U., Analysis or Interpretation: D.Ö., N.C., T.K.U., Literature Search: D.Ö., N.C., T.K.U., Writing: D.Ö., N.C.

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Skin Cancer and Sun Knowledge Level and Dermatoscopic Examination Results of Outdoor and Indoor Athletes: A Cross-sectional Research

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ABSTRACT

Background: Adult athletes' knowledge of skin cancer, the effects of sun rays and sun protection, and their dermatological exposure levels are not known clearly. Particularly, athletes who train outdoors are exposed to sunlight for long periods. This study aimed to determine the knowledge level of adult licensed athletes over 18 years old about sun and skin cancer and to evaluate skin findings by dermatoscopic examination.

Materials and Methods: Adult licensed athletes between the ages of 18-45 in our province were included in the study. Participants' demographic data, sports disciplines, training, and license periods were recorded. Afterward, the "Skin Cancer and Sun Knowledge Scale" was applied to the participants. Volunteers among the participants who filled out the scale were included in the dermatoscopic examination.

Results: Two hundred licensed athletes [126 (63%) male, 74 (37%) female] were included in the study. The mean age of the athletes was 21.44±0.29 years, mean height 174.80±0.66 cm, mean weight 67.86±0.87 kg, mean body mass index 22.07±0.19 kg/m^2, mean training duration 8.66±0.37 hours/week and mean license duration 7.71±0.26 years. Of the participating athletes, 111 (55.5%) train indoors and 89 (44.5%) outdoors. The mean score of all athletes "Skin Cancer and Sun Knowledge Scale" was 13.34±0.22. The indoor athletes' mean score was significantly higher (13.85±0.28 vs 12.72±0.34; p=0.018). Of 40 athletes (indoor athletes n=23; outdoor athletes n=17) who were examined with dermatoscopy, 92.5% (n=37) had melanocytic skin findings, 55% (n=22) had inflammatory skin findings, and 40% (n=16) had non-inflammatory skin findings. In terms of dermatoscopic examination findings, there was no difference between athletes training indoors and outdoors (p>0.05).

Conclusion: It was determined that the level of knowledge of adult athletes in our city about sun and skin cancer is very low. There is a need to increase the knowledge level of all athletes, especially outdoor athletes, about the harmful effects of the sun.

Keywords: Athlete, Skin cancer, Sun, Knowledge, Dermatoscopic examination

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Introduction

Sun rays have various positive and negative effects on human health. Among the positive effects of the sun on human health are the synthesis of vitamin D and its contribution to the prevention and treatment of diseases such as psoriasis, eczema, multiple sclerosis, hypertension, diabetes mellitus, and coronary artery disease [1]. In addition to the positive effects of sun rays, there are also negative effects on the skin, especially the development of skin cancer [2].

Skin cancers are the most common type of cancer in the world [3]. While one out of every three cancer diagnoses in the world is skin cancer, it ranks fifth among the most common cancers in Turkey [4]. Considering the epidemiology of skin cancers, it is seen that sun-induced ultraviolet (UV) rays play an important role [5]. It has been reported that the increase in the incidence of skin cancer in the last 20 years is associated with cumulative sun exposure time [6]. Long-term sun exposure, history of sunburn in childhood, Fitzpatrick skin type I-II, red, blond or light brown hair color, blue or green eye color, presence of multiple large nevi and spots, presence of family history of skin cancer for skin cancer counted among the risk factors [7].

Skin cancer screening is a visual, non-invasive screening examination. Only 25% of Americans report having a skin cancer screening examination by a healthcare professional. It has been reported that there is a potential to save 10.2 life years when standardized for every 1,000 people screened when an annual examination is performed [8]. Early diagnosis of cancer cases, especially with screening in risky groups, can contribute to reducing the financial and moral burden of the disease with the chance of early treatment.

Routine exposure of outdoor athletes to UV rays during training and competitions poses a risk for skin cancer. Despite this, athletes do not prefer to apply sunscreen for the fact that it affects their athletic performance, forget to apply it, or hope to tan. In addition, equipment such as sun protective clothing, sunglasses, and hats are not widely used because they are prohibited as per the rules or because they affect the performance of the athlete by restricting their movement [9].

Adult athletes' knowledge of skin cancer, the effects of sun rays and sun protection, and their dermatological exposure levels are not known clearly. The present study aimed to determine the knowledge level of adult licensed athletes over the age of 18 about sun and skin cancer and to evaluate skin findings by dermatoscopic examination. We hypothesize that the level of skin cancer and sun knowledge of the athletes is not sufficient and skin findings related to sun exposure will be more common in dermatoscopic screening in outdoor athletes.

Materials and Methods

The study was approved by the Suleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee with the decision dated 13/2/2020 and decision numbered 32. Athletes were informed about the study. Participants signed the informed consent form. Adult athletes between the ages of 18-45 who do sports under license in our city, which is located at 37.76444° North Parallel and 30.55222° East Meridian coordinates, were included in the study. Descriptive data of the participants, sports disciplines, training, and license periods were recorded. Afterward, the 'Skin Cancer and Sun Knowledge Scale' was applied to the participants face-to-face or online.

Skin Cancer and Sun Knowledge Scale: It is a 25-item scale developed by Day et al. [10] in 2014. The scale includes 15 true-false and 10 multiple-choice questions and has a single-factor structure. Correct choices correspond to 1-point, wrong choices correspond to 0-points. A score between 0 and 25 can be obtained from the scale; It can be interpreted that as the total score increases, the level of knowledge also increases. Scale, sun protection sub-scale (items 1, 4-7, 16-22), tanning sub-scale (items 2-12), skin cancer risk factors sub-scale (items 13-15, 23), Skin Cancer Prevention Sub-Scale (items 15, 24) and the symptoms of skin cancer subscale (item 25). Turkish validity and reliability study of the scale was conducted by Haney et al. [11].

Volunteers among the participants who filled out the scale were included in the dermatoscopic examination by randomization. The dermatoscopic examination is a non-invasive technique used in the evaluation of pigmented (melanocytic and non-melanocytic) skin lesions and various fields of dermatology, including inflammatory disorders, infectious diseases, and hair and nail abnormalities. A digital dermatoscopy is a device that allows magnifications as high as 1000 times and simplifies the process of image storage, analysis, and retrieval [12]. In this context, the athletes who were taken for dermatoscopic examination in the study were examined by a dermatologist with a digital dermatoscopy (PhotoFinder ATBM System with Trichoscale pro, Germany, 2019) and their skin findings were recorded.

Statistical Analysis

SPSS v.22 package program was used for statistical analysis. The Shapiro-Wilk test was used to determine whether the data provided a normal distribution. Since the data were not normally distributed, the Mann-Whitney U test and chi-square test with Monte Carlo correction were used for different analyses. To determine the variables affecting the Skin Cancer and Sun Knowledge Scale score, the forward stepwise method was used in the multiple linear regression model. P-value <0.05 was considered statistically significant. Data are presented as frequency (n), percent (%), and mean $\pm$ standard error.

Results

Skin Cancer and Sun Knowledge Level: To determine the level of skin cancer and sun knowledge, 200 licensed athletes, 126 (63%) male, and 74 (37%) female, were included in the study. The mean age of the athletes is 21.44±0.29 years, mean height 174.80±0.66 cm, mean body weight 67.86±0.87 kg, mean body mass index (BMI) 22.07±0.19 kg/m^2, mean training duration 8.66±0.37 hours/week and mean license duration 7.71±0.26 years. Of the participating athletes, 111 (55.5%; male n=54, female n=57) reported that they trained indoors, and 89 (44.5%; male n=72, female n=17) outdoor training (Table 1).

While 46% (n=92) of all participants reported that they did not have a sunburn in the last 1 year, 30% (n=60) once, 17.5% (n=35) twice, 6.5% (n=13) declared that they had sunburn 3 times or more. In indoor athletes, these rates are respectively; 45.9% (n=51), 26.1% (n=29), 21.6% (n=24), and 6.3% (n=7). These rates in outdoor athletes are respectively; 46.1% (n=41), 34.8% (n=31), 12.4% (n=11), and 6.7% (n=6). There was no difference between the groups (p=0.543).

While there was no history of sunburn in childhood in 44.5% (n=89) of all participants, 15% (n=30) had it once, 12.5% (n=25) twice, and 28% (n=56) reported that they had sunburn 3 times or more. In indoor athletes, these rates are respectively; It was calculated as 40.5% (n=45), 15.3% (n=17), 13.5% (n=15), and 30.6% (n=34). These rates in outdoor athletes are respectively; 49.4% (n=44), 14.6% (n=13), 11.2% (n=10), and 24.7% (n=22). In this context, no difference was found between the groups (p=0.232).

Table 1. Demographic features of the participants

	All (n=200)	Indoor (n=111)	Outdoor (n=89)	p-value
Gender (female/male)	37%/63%	51.4%[a]/48.6%[a]	19.1%[b]/80.9%[b]	0.0001*
Age (year)	21.44±0.29	21.24±0.32	21.69±0.52	0.989
Height (cm)	174.80±0.66	173.72±0.93	176.15±0.94	0.063
Weight (kg)	67.86±0.87	66.89±1.25	69.06±1.18	0.068
BMI (kg/m^2)	22.07±0.19	22.00±0.27	22.17±0.28	0.414
Training time (hour/week)	8.66±0.37	8.78±0.53	8.51±0.51	0.883
License duration (year)	7.71±0.26	8.29±0.41	6.97±0.31	0.014*
Economic status (n, %)				0.154
High	n=46, 23%	n=21, 18.9%	n=25, 28.1%	
Moderate	n=133, 66.5%	n=80, 72.1%	n=53, 59.6%	
Low	n=21, 10.5%	n=10, 9.0%	n=11, 12.3%	
Hair color (n, %)				0.031*
Red	n=2, 1.0%	n=1, 0.9%	n=1, 1.1%	
Blonde	n=16, 8.0%	n=11, 9.9%	n=5, 5.6%	
Light brown	n=37, 18.5%	n=20, 18.0%	n=17, 19.1%	
Brown	n=63, 31.5%	n=43, 38.8%[a]	n=20, 22.5%[b]	
Dark brown/Black	n=82, 41.0%	n=36, 32.4%[a]	n=46, 51.7%[b]	
Eye color (n, %)				0.315
Blue	n=4, 2.0%	n=1, 0.9%	n=3, 3.4%	
Green	n=19, 9.5%	n=12, 10.8%	n=7, 7.9%	
Hazel	n=18, 9.0%	n=11, 9.9%	n=7, 7.9%	
Brown	n=136, 68.0%	n=78, 70.3%	n=58, 65.1%	
Black	n=23, 11.5%	n=9, 8.1%	n=14, 15.7%	
Skin color (n, %)				0.111
Freckled-light	n=4, 2.0%	n=4, 3.6%	n=0, 0%	
Light	n=62, 31%	n=40, 36.1%	n=22, 24.7%	
Light brown	n=70, 35.0%	n=33, 29.7%	n=37, 41.6%	
Brown	n=10, 5.0%	n=6, 5.4%	n=4, 4.5%	
Dark	n=54, 27.0%	n=28, 25.2%	n=26, 29.2%	

Chi-square test and Mann-Whitney U test were used. *p-value is significant at the 0.05 level. [a-b]A difference was determined between the fields with different letter representation, BMI: Body mass index

While 5% (n=10) of all participants had a dermatological disease (acne, allergy, eczema, fungal infection, etc.), the rate of dermatological malignancy in the family history was determined as 1% (n=2). In indoor athletes, these rates are respectively; 4.5% (n=5) and 0.9% (n=1). These rates in outdoor athletes are respectively; it was determined as 5.6% (n=5) and 1.1% (n=1). There was no difference between the groups in terms of a dermatological disease (p=0.754) and a family history of dermatological malignancy (p=0.999).

The distribution of skin types according to the Fitzpatrick classification of the participants is presented in Table 2. There was no difference between the groups in terms of skin type (p=0.312).

The Skin Cancer and Sun Knowledge Scale score of all athletes were determined as 13.34±0.22. The scale score of indoor athletes was determined as 13.85±0.28, and that of outdoor athletes as 12.72±0.34, and the score of indoor athletes was found to be statistically significantly higher (p=0.018). When the subscale scores of the Skin Cancer and Sun Knowledge Scale were examined, the sun protection sub-scale was found to be statistically significant (p=0.011), while no statistically significant difference was found in the other subscales (p>0.05) (Table 3).

In the regression analysis model, the Akaike information criterion value was calculated as 442,406, the intercept coefficient was calculated as 9.274 and the p-value was 0.0001. Thus, female gender, age, economic status, and license duration variables remained in the model (Table 4). While the increase in age and economic status increased the Skin Cancer and Sun Knowledge Scale score, the increase in the license period decreased the scale score. Scale scores of female athletes were significantly higher than male athletes. On the other hand, the effect of indoor or outdoor training on the Skin Cancer and Sun Knowledge Scale score was not determined.

Dermatoscopic Examination Findings

A total of 40 athletes, 45.2% male, and 54.8% female, with a mean age of 23.10±0.94 years, participated in the dermatoscopic examination. While 23 of them were indoor athletes (21.1% male, 78.9% female; mean age 21.09±0.61 years), 17 of them were outdoor

Table 2. Distribution of skin types of participants according to the Fitzpatrick classification

	Skin type	All (n=200)	Indoor (n=111)	Outdoor (n=89)	p-value
I	Always burns easily, absolutely no tanning	n=12, 6%	n=10, 9%	n=2, 2.2%	0.312
II	Usually burns easily and tans very little	n=39, 19.5%	n=22, 19.8%	n=17, 19.1%	
III	Burns, but turns tan over time	n=50, 25%	n=30, 27.1%	n=20, 22.5%	
IV	Burns very little, tans easily	n=52, 26%	n=25, 22.5%	n=27, 30.4%	
V	Tans quickly and does not get sunburned	n=42, 21%	n=21, 18.9%	n=21, 23.6%	
VI	Sunburn does not occur, but allergies can occur	n=5, 2.5%	n=3, 2.7%	n=2, 2.2%	

The chi-square test was used

Table 3. Skin Cancer and Sun Knowledge Scale and subscale scores

	All (n=200)	Indoor (n=111)	Outdoor (n=89)	p-value
Skin Cancer and Sun Knowledge Scale	13.34±0.22	13.85±0.28	12.72±0.34	0.018*
Sun protection subscale	6.28±0.12	6.55±0.16	5.93±0.19	0.011*
Tanning subscale	6.39±0.15	6.62±0.19	6.10±0.24	0.087
Skin cancer risk factors subscale	2.57±0.07	2.59±0.10	2.54±0.11	0.752
Skin cancer prevention subscale	1.07±0.04	1.05±0.05	1.09±0.05	0.633
Symptoms of skin cancer subscale	0.41±0.03	0.45±0.05	0.36±0.05	0.194

Mann-Whitney U test was used. *The p-value is significant at the 0.05 level

Table 4. Variables affecting the Skin Cancer and Sun Knowledge Scale score

	Regression coefficients	Significance	Importance
Female	4,768	0.001	0.441
Age	0.221	0.012	0.225
Economic status	1,533	0.028	0.173
License duration	1,132	0.035	0.160

Multiple linear regression model was used. The p-value was considered significant at the 0.05 level

athletes (83.3% male, 16.7% female; mean age was 25.82±1.88 years). According to the Fitzpatrick classification, skin types of indoor athletes who examined with dermatoscopy were 4.3% Type I, 65.3% Type II and 30.4% Type III. The distribution among outdoor athletes was 11.8% Type I, 41.2% Type II and 47% Type III, respectively.

When the descriptive characteristics of the athletes included in the dermatoscopic examination were grouped according to their indoor or outdoor training status, a difference was determined in terms of gender (p=0.001), BMI (p=0.014) and eye color (p=0.021). Age (p=0.062), license period (p=0.346), weekly training time (p=0.367), Skin Cancer and Sun Knowledge Scale score (p=0.078), skin type (p=0.338), economic status (p=0.095), hair color (p=0.120), skin color (p=0.863), history of sunburn in the last 1 year (p=0.117), history of sunburn in childhood (p=0.691), presence of known dermatological disease (p=0.387) and family history of dermatological malignancy (p=1,000) were not different.

The athletes who participated in the dermatoscopic examination were asked about their use of sunscreen. 70% (n=28; indoor athletes: n=17, 73.9%; outdoor athletes: n=11, 64.7%) of these athletes used sunscreen only swimming in the sea, 20% (n=8; indoor athletes: n=4, 17.4%; outdoor athletes: n=4, 23.5%) when going out in summer, and 10% (n=4; indoor athletes: n=2, 8.7%; outdoor athletes: n=2, 11.8%) as they remember. There was no difference between the groups in terms of sunscreen use (p=0.884).

Of 40 athletes who were examined with dermatoscopy, melanocytic skin findings were found in 92.5% (n=37), inflammatory skin findings were found in 55% (n=22) and non-inflammatory skin findings were found in 40% (n=16). In terms of dermatoscopic examination findings, there was no difference between the indoor and outdoor athletes (p>0.05), (Table 5).

The distribution regions of the skin findings detected in the dermatoscopic examination of the body were presented in Table 6. There was no difference between the groups (p>0.05).

Since it was determined in the regression analysis results that the variables of the female gender, age, economic status, and license duration affected the Skin Cancer and Sun Knowledge Scale score, the dermatoscopic examination findings were also examined according to the subgroups divided into two, which were formed

Table 5. Dermatoscopic examination findings

	All (n=40)	**Indoor (n=23)**	**Outdoor (n=17)**	**p-value**
Melanocytic skin findings	n=37, 92.5%	n=21, 91.3%	n=16, 94.1%	1,000
Junctional nevi	n=18, 48.6%	n=12, 57.1%	n=6, 37.5%	
Compound nevi	n=13, 35.1%	n=6, 28.6%	n=7, 43.8%	
Dysplastic nevi	n=10, 27.0%	n=5, 23.8%	n=5, 31.3%	
Dermal nevi	n=6, 16.2%	n=4, 19.0%	n=2, 12.5%	
Conjenital nevi	n=2, 5.4%	n=1, 4.8%	n=1, 6.3%	
Blue nevi	n=1, 2.7%	n=1, 4.8%	n=0, 0%	
Inflammatory skin findings	n=22, 55%	n =14, 60.9%	n=8, 47.1%	0.523
Acne vulgaris	n=11, 50%	n=8, 57.1%	n=3, 37.5%	
Rosacea	n=6, 27.3%	n=3, 21.4%	n=3, 37.5%	
Keratosis pilaris	n=5, 22.7%	n=1, 7.1%	n=4, 50%	
Eczema	n=2, 9.1%	n=1, 7.1%	n=1, 12.5%	
Folliculitis	n=2, 9.1%	n=1, 7.1%	n=1, 12.5%	
Psoriasis	n=1, 4.5%	n=1, 7.1%	n=0, 0%	
Non-inflammatory skin findings	n=16, 40%	n=9, 39.1%	n=7, 41.2%	1,000
Freckling	n=5, 31.3%	n=3, 33.3%	n=2, 28.6%	
Stria	n=3, 18.8%	n=1, 11.1%	n=2, 28.6%	
Cafe-au-lait	n=2, 12.5%	n=2, 22.2%	n=0, 0%	
Pityriasis versicolor	n=2, 12.5%	n=0, 0%	n=2, 28.6%	
Actinic keratosis	n=1, 6.2 %	n=0, 0%	n=1, 14.2%	
Telogen effluvium	n=1, 6.2%	n=1, 11.1%	n=0, 0%	
Dermatofibroma	n=1, 6.2%	n=1, 11.1%	n=0, 0%	
Epidermal nevus	n=1, 6.2%	n=1, 11.1%	n=0, 0%	

The chi-square test was used. n is larger than the number of samples

Table 6. Distribution regions of skin findings in the body				
	All (n=40)	**Indoor (n=23)**	**Outdoor (n=17)**	**p-value**
Melanocytic skin findings				0.897
Trunk	n=16, 43.2%	n=9, 42.9%	n=7, 43.8%	
Back	n=15, 40.5%	n=10, 47.6%	n=5, 31.3%	
Face	n=12, 32.4%	n=8, 38.1%	n=4, 25%	
Upper extremity	n=8, 21.6%	n=4, 19.0%	n=4, 25%	
Lower extremity	n=1, 2.7%	n=1, 4.8%	n=0, 0%	
Inflammatory skin findings				0.792
Face	n=16, 72.7%	n=11, 78.6%	n=5, 62.5%	
Back	n=10, 45.5%	n=6, 42.9%	n=4, 50.0%	
Upper extremity	n=6, 27.3%	n=3, 21.4%	n=3, 37.5%	
Lower extremity	n=4, 18.2%	n=2, 14.3%	n=2, 25.0%	
Non-inflammatory skin findings				0.742
Trunk	n=5, 31.3%	n=2, 22.2%	n=3, 42.9%	
Face	n=5, 31.3%	n=4, 44.4%	n=2, 28.6%	
Back	n=5, 31.3%	n=4, 44.4%	n=1, 14.3%	
Scalp	n=3, 18.8%	n=2, 22.2%	n=1, 14.3%	
Lower extremity	n=2, 12.5%	n=2, 22.2%	n=0, 0%	
The chi-square test was used. n is larger than the number of samples				

by considering the median values of these variables in the data set. There was no difference in terms of dermatoscopic examination findings according to gender, age, license period, economic status, or scale score subgroups (p>0.05).

Discussion

In our study, the Skin Cancer and Sun Knowledge Scale score of indoor athletes were found to be statistically significantly higher. It was observed that the variables of the female gender, age, economic status, and license period affected the Skin Cancer and Sun Knowledge Scale score. In terms of dermatoscopic examination findings, there was no difference between indoor and outdoor athletes.

Population-based studies had shown that the younger population lacks knowledge about sun protection behaviors and signs of skin cancer [11]. Kartal and Karakaş [4], using the Skin Cancer and Sun Knowledge Scale, found the average knowledge level score of seasonal agricultural workers women to be 10.38. In our study, the average score of all athletes participating in the Skin Cancer and Sun Knowledge Scale was determined as 13.34.

In a study by Hobbs et al. [9], on 343 university athletes, they found that only 20.7% of the participants knew that spending time outdoors increases the risk of skin cancer. They reported that the individuals participating in their study did not have basic knowledge about skin cancer and sun protection, and interpreted these results as a finding consistent with previous research with university students [9]. In our study, the fact that the participants gave almost half the wrong answers to the questions on the knowledge scale made us think that there are deficiencies in skin cancer and sun knowledge in line with the literature.

In our study, 20% of the athletes who participated in the survey were included in the dermatoscopic examination. Bagatti et al. [8] found that individuals participating in their study had not received any health care for their skin in the last 6 months, and most of them had no intention of having their skin examined in the future. De Castro-Maqueda et al. [13] reported that 83.3% of elite water sports athletes did not have a medical skin examination and 87.5% did not self-examine their skin. In a study of Spanish cyclists by Doncel Molinero et al. [14], it was found that 61% of the participants did not examine their skin regularly. In another study, it was stated that 94.5% of university beach handball players did not examine their skin in the last 1 year [15]. These data suggest that there is a need to increase the level of awareness of people about the benefits that can be achieved with dermatoscopic examination and to expand routine controls.

Del Boz et al. [16] found skin cancer in 10.7% of golfers and actinic keratosis in 40% of golfers in a study they conducted with golf players and employees at golf courses in the south of Spain. No skin cancer was diagnosed in the indoor workers of the same facility, and the rate of actinic keratosis was only 1.7% [16]. In our study, while melanocytic skin findings were found in 92.5% of the athletes, inflammatory skin findings were found in 55%, and

non-inflammatory skin findings were detected in 40% of the athletes who were examined by dermatoscopic examination, no difference was found between the indoor and outdoor athletes. The fact that the mean age of the athletes in our study was lower than the mean age (51.9 years) of the participants in Del Boz et al.'s [16] study is an important variable that may cause a difference in the duration of sun exposure and therefore the appearance of lesions.

In a review by Gilaberte et al. [17], they emphasized that sunscreen use was reported as insufficient in various studies with athletes. Although sunscreen is the most commonly used form of photoprotection among elite water athletes from 30 countries, aged 16-30, 22.5% of the participants never used sunscreen, and 31.1% did not reapply it after 2 hours [13]. In the De Castro-Maqueda et al. [15] study, about half of the beach handball players never applied sunscreen during training or competition. In our study, 70% of the athletes who participated in the dermatoscopic examination used sunscreen only swimming in the sea, 20% when going out in summer, and 10% as they remember.

Study Limitations

The limitations of the study were the cross-sectional design of the study and the fact that the lesions that could develop in case of increased cumulative sun exposure in later ages could not be detected due to the young age of the participants.

Conclusion

In light of the data, we obtained from our study, it was determined that the level of knowledge of the athletes in the adult age group about sun and skin cancer is low. There is a need to increase the knowledge level of all athletes, especially outdoor athletes, about the harmful effects of the sun.

It may be beneficial to provide training to increase the level of knowledge of the athletes, to explain the preventive measures, to question the sun exposure of the athletes during routine examinations by being aware of the risks related to skin cancer, and to guide them for advanced dermatological examination in case of suspicious lesions.

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Ethics

Ethics Committee Approval: The study was approved by the Suleyman Demirel University Faculty of Medicine Clinical Research Ethics Committee with the decision dated 13.02.2020 and decision numbered 32.

Informed Consent: Participants signed the informed consent form.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.A., H.H.A.Ç., Concept: E.A., H.H.A.Ç., S.E., C.Ç., Design: E.A., H.H.A.Ç., S.E., C.Ç., Data Collection or Processing: E.A., H.H.A.Ç., O.C., F.E.B.G., Analysis or Interpretation: E.A., O.C., S.E., Literature Search: E.A., O.C., S.E., Writing: E.A., H.H.A.Ç., S.E., C.Ç.

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Risk Factors for Cutaneous Melanomas and Level of Awareness in Society

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ABSTRACT

Background: Skin cancers have become a significant public health problem and increasing over the years. Two crucial risk factors for skin cancers are; phenotypic traits and sun-induced ultraviolet exposure. The risk of disease can be significantly reduced with sun protection. This study aimed to determine the knowledge levels of sun protection and sun avoidance behaviors of healthcare professionals and other professionals who have not yet been diagnosed with any cutaneous cancer.

Materials and Methods: Between February and August 2022, the participants without a diagnosis of malignancy were evaluated. Demographic and clinical characteristics of patients related to skin cancer, including age and gender, were recorded. The questionnaire was applied to each participant, including the level of knowledge about sun protection and sun protection habits.

Results: The mean age was 37 years. Of the participants, 116 were healthcare workers, and 392 were other professionals. The knowledge of sun protection among healthcare workers was given by doctors significantly higher than in others. However, other professions obtained sun protection information primarily through media communication tools ($p<0.0001$). The knowledge of using sunscreen half an hour before going out in the sun was higher in healthcare workers ($p=0.009$). Also, knowledge of reapplying sunscreen after swimming was higher among healthcare workers ($p=0.009$). We determined that sunscreen use and sunscreen >30 sun protection factor were higher in healthcare workers ($p<0.0001$, $p=0.001$, respectively). It is noteworthy that there was an insufficient number of nevus screening in both groups.

Conclusion: Although the level of knowledge of individuals about taking protective measures against sun exposure is high, it was observed that individuals' attitudes and behaviors related to sun protection were insufficient. Campaigns to encourage the public to protect themselves from the sun within a general health program through doctor-supported social media tools may contribute to the elimination of the deficiencies we have identified.

Keywords: Sun exposure, Melanoma, Cancer, Ultraviolet light, Sunscreen

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Introduction

Cutaneous melanoma is the world's 17th most common cancer type as of 2020 [1]. In recent years, there has been a marked increase in the incidence of the disease [2,3]. According to Surveillance, Epidemiology, and End Results data, the median age at which the disease is diagnosed is 65. Between 2000 and 2017, the annual incidence in people ≥65 years has increased by approximately 60% from 50.1 per 100,000 (100,000) people to 80. There was no significant change in the disease incidence in the younger group [4,5]. Patients with malignant melanoma are also at increased risk for second primary melanoma [6] and the occurrence of additional invasive melanoma is associated with increased mortality [7]. Two major risk factors are associated with cutaneous melanoma: The first is the person's phenotypic traits. Having red or blond hair, light eye color, and common freckles are associated with an increased risk for melanoma [8]. Congenital melanocytic nevi, atypical nevi (asymmetric, irregular borders, multiple colors, and diameter >5 mm), and common nevi are other important phenotypic features associated with increased melanoma risk [9]. The second important, and also modifiable, major risk factor is sunlight-induced ultraviolet (UV) [10]. Since UV-B light from the sun (wavelength: 280-320 nm) can penetrate the skin more than UV-A (320-400 nm), the potential for DNA damage is much higher. However, depending on the location and season, UV-A is exposed 20-40 times more frequently than UV-B [11]. Therefore, the primary prevention of skin cancers is possible by reducing UV exposure through sun protection behaviors. Sunscreen is considered an essential adjunct to other forms of protection against UV rays from the sun and an important component of public health campaigns to prevent skin cancer. This study aimed to screen health professionals and other professionals who have not yet been diagnosed with any cutaneous cancer in terms of malignant melanoma risk and investigate their awareness levels.

Materials and Methods

Between February and August 2022, individuals without a diagnosis of malignancy who applied to the Internal Medicine Outpatient Clinic of Basaksehir Cam and Sakura City Hospital, a tertiary care center, were evaluated. Individuals ≥18 years, who could understand and fully answer the survey questions, and who had no history of cancer, including melanoma, were included in the study. Individuals under 18 years and those restricted from going out due to health problems were not included in the study. Cross-sectional demographic information of the patients, including age and gender, was recorded. Educational status, histories associated with childhood sunburns, and family histories associated with malignancy were obtained. Hair, eyes, skin colors, and freckles on any part of their body were investigated by physical examination. All participants were asked 21 questions about the contents of the surveys, and the details are given below in the form of sub-headings, respectively.

This study was approved by University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Ethics Committee (file no: 2022.01.33, date: 01.02.2022). The ethical committee had agreed to the retrospective analysis of routinely collected clinical data without prior informed consent of patients. The data sets used and/or analyzed during the present study are available from the corresponding author on reasonable request.

The Knowledge Level of the Participants About Sun Protection

Firstly, the participants were asked survey questions measuring information about sun protection;

- Q: Do you know how to protect yourself from the sun?

A: Yes/No

- Q: If yes, from whom did you get the recommendations?

A: Relatives/Media (Internet, newspaper, magazine, TV etc.)/Doctors

- Q: Do you know that you should not go out in the sun between 10:00-14:00?

A: Yes/No

- Q: Did you know that you have to apply sunscreen 30 minutes before going out in the sun?

A: Yes/No

- Q: Did you know that you have to reapply sunscreen every 2-4 hours?

A: Yes/No

- Q: Do you know that you need to reapply sunscreen after swimming in the sea or pool?

A: Yes/No

- Q: Do you know that you need to reapply sunscreen after extreme sports activities?

A: Yes/No

- Q: Do you know how much sunscreen you should apply?

A: Yes/No

- Q: Did you know you have to put on a hat before going out in the sun?

A: Yes/No

- Q: Did you know you have to wear sunglasses before going out in the sun?

A: Yes/No

- Q: Did you know you have to wear tight-fitting clothes before going out in the sun?

A: Yes/No

Sun Avoidance Behaviors of the Participants

After the evaluation of the knowledge level, survey questions were asked to the participants about sun protection behaviors;

- Q: How often do you avoid the sun?

A: Never/Rarely/Sometimes/Often/Always

- Q: How often do you apply sunscreen before going out in the sun?

A: Never/Rarely/Sometimes/Often/Always

- Q: What is the sun protection factor (SPF) of the sunscreen you apply?

A: No protection/2-12 SPF/12-30 SPF/ >30 SPF

- Q: Would you reapply sunscreen?

A: Yes/No

- Q: If yes, how often do you apply sunscreen?

A: Never/Every 6 hours/Every 2-4 hours/Every 1-2 hours

- Q: On which parts of your body do you apply sunscreen?

A: Any part of the body/face-arms-legs/all over the body

- Q: Do you wear a hat before going out in the sun?

A: Yes/No

- Q: Do you wear clothes that cover your body before going out in the sun?

A: Yes/No

- Q: Do you wear sunglasses before going out in the sun?

A: Yes/No

- Q: How often do you sunbathe in summer?

A: Every day/Several times a week/Several time a month/Never

- Q: Have you ever used an indoor tanning bed?

A: Yes/No

- Q: Have you ever had a nevus screening?

A: Yes/No

Statistical Analysis

Statistical analysis of the results was calculated with the SPSS v 20.0 program. The data conformity to the normal distribution was tested with the Kolmogorov-Smirnov test. Participants were evaluated in two subgroups as health workers and other professions. Parametric data obtained were expressed as mean ± standard deviation values. Analysis of categorical variables in both subgroups was evaluated using the chi-square test. A p-value below 0.05 was considered statistically significant.

Results

History and Phenotypic Features of the Participants

A total of 508 adults, 337 women, and 171 men, were included in this study. The mean age of all cohorts was 37. One hundred sixteen were health professionals, and 392 were other professions. 68.5% of the participants were university graduates, 17.5% were high school graduates, and 14% were primary school graduates. For the family history, 76.6% had no cancer history, 21.9% had a history of solid or hematological malignancy, and 1.6% had a history of malignant melanoma. In terms of phenotypic hair color, 61.2% of them were brown, 31.9% were black, 6.1% were yellow, and 0.8% were red. Considering the eye color, 63.8% of them were brown, 16.9% were hazel, 8.3% were green, 6.7% were black, and 4.3% were blue. According to the Fitzpatrick skin type scale, 3.1% of the individuals had type 1, 34% had type 2, 52.9% had type 3, and 9.8% had type 4 skin phenotype. Freckling was present in 18.9% of the individuals, while 81.1% did not have freckles. When questioned regarding childhood bullous sunburns, it was learned that 76.6% of the individuals had never had it, 14.2% had it once, and 9.3% had it more than once. The details of the age, gender, occupation, educational status, and phenotypic characteristics of the patients are given in Table 1.

The Knowledge Level of the Participants about Sun Protection

After the participants included in the study were divided into two groups as, healthcare professionals and other professionals, they were asked questions regarding sun exposure and preventive measures. To the question “From whom did you get the recommendations”, healthcare professionals stated that they learned from the doctor at a statistically significant rate compared to individuals in other professions (46.7% vs 25.7%; $p<0.0001^{*}$). On the other hand, when the same question was asked to individuals from other professions, they also stated that they learned mostly from the media, which was statistically significant (50.8% vs 30.5%; $p<0.0001^{*}$). There was no statistically significant difference between the two groups in terms of those who answered “yes” to the question “Did you know that you have to apply sunscreen 30 minutes before going out in the sun?” found high (9.6% vs 1.9%; p=0.009). While there was no statistically significant difference between those who answered “yes” to the question “Do you know that you need to reapply sunscreen after swimming in the sea or pool?” in both groups, those who answered “no” were found to be higher in healthcare than other professionals (20.2% vs 9.5%; p=0.009). There was no statistically significant difference between the two groups in terms of other questions asked (p>0.05). The details of the participants’ knowledge levels on sun protection are given in Table 2.

Participants’ Sun Avoidance Behaviors

Health workers and other professionals were asked about their habits related to sunscreen use. The answers to the question “How often do you apply sunscreen before going out in the sun” were “Never, rarely, sometimes, often, always” The “often” response was found to be higher in healthcare workers, which was statistically

Table 1. History and phenotypic features of the participants			
History and phenotypic features		**n=508**	**%**
Age		37±12	13-80
Gender	Male	171	33.66
	Female	337	66.33
Occupation	Health worker	116	22.8%
	Other professions	392	77.2%
Education	Elementary school	71	14.0%
	High school	89	17.5%
	Graduate school or university	348	68.5%
Family history	None	389	76.6%
	Other than skin cancer	111	21.9%
	Melanoma	8	1.6%
Hair color	Brown	311	61.2%
	Black	162	31.9%
	Yellow	31	6.1%
	Red	4	0.8%
Eye color	Brown	324	63.8%
	Hazel	86	16.9%
	Green	42	8.3%
	Black	34	6.7%
	Blue	22	4.3%
Fitzpatrick skin type	1	16	3.1%
	2	173	34%
	3	269	52.9%
	4	50	9.8%
Freckle	Presence	96	18.9%
	Absence	412	81.1%
Bullous sunburn in childhood	None	389	76.6%
	Once	72	14.2%
	Many	47	9.3%

significant (23.3% vs 11%; <0.0001). In individuals belonging to other professions, the "sometimes" response was found to be higher, which was statistically significant (30.6% vs 18.1%; p<0.0001). The answers to the question "What is the SPF of the sunscreen you apply" were "no protection, 2-12 SPF, 12-30 SPF, >30 SPF". A statistically significant ">30 SPF" response was found to be higher in healthcare workers (62.1% vs 42.1%; p=0.001). The "no protection" response was found to be higher in the group of other professions, which was statistically significant (41.3% vs 24.1%; p=0.001). The answers to the question "If yes, how often do you apply sunscreen?" were "never, every 6 hours, every 2-4 hours, every 1-2 hours". The response of "every 2-4 hours" was statistically significantly higher in healthcare workers (12.1% vs 8.7%; p=0.047). The answers to the question "How often do you sunbathe in summer" were answered, "every day, several times a week, several times a month, never." A statistically significant "several times a month" response was found to be higher in healthcare workers (56.9% vs 36.2%; p=0.001). In individuals belonging to other professions, the answers to "several times a week and never" were found to be higher, respectively [(28.1% vs 18.1%; p=0.001) and (26.5% vs 19%; p=0.001)]. There was no statistically significant difference between the two groups regarding other questions asked (p>0.05). The habits of healthcare workers and other professionals related to the use of sunscreen are given in Table 3 with details.

Table 2. The knowledge level of the participants about sun protection

		Other profession		Health worker		P
		n	%	n	%	
Do you know how to protect yourself from the sun?	Yes	332	84.7%	106	91.4%	0.066
	No	60	15.3%	10	8.6%	
If yes, from whom did you get the recommendations?	Relatives	78	23.6%	24	22.9%	<0.0001*
	Media**	168	50.8%	32	30.5%	
	Doctor	85	25.7%	49	46.7%	
Do you know that you should not go out in the sun between 10:00-14:00?	Yes	316	95.2%	105	99.1%	0.072
	No	16	4.8%	1	0.9%	
Did you know that you have to apply sunscreen 30 minutes before going out in the sun?	Yes	300	90.4%	104	98.1%	0.009*
	No	32	9.6%	2	1.9%	
Did you know that you have to reapply sunscreen every 2-4 hours?	Yes	268	80.7%	92	86.8%	0.155
	No	64	19.3%	14	13.2%	
Do you know that you need to reapply sunscreen after swimming in the sea or pool?	Yes	313	79.8%	105	90.5%	0.021*
	No	79	20.2%	11	9.5%	
Do you know that you need to reapply sunscreen after extreme sports activities?	Yes	295	88.9%	97	91.5%	0.438
	No	37	11.1%	9	8.5%	
Do you know how much sunscreen you should apply?	Yes	268	80.7%	89	84.0%	0.455
	No	64	19.3%	17	16.0%	
Did you know you have to put on a hat before going out in the sun?	Yes	305	77.8%	98	84.5%	0.182
	No	87	22.2%	18	15.5%	
Did you know you have to wear sunglasses before going out in the sun?	Yes	313	94.3%	99	93.4%	0.738
	No	19	5.7%	7	6.6%	
Did you know you have to wear tight-fitting clothes before going out in the sun?	Yes	170	51.2%	60	56.6%	0.332
	No	162	48.8%	46	43.4%	

*Statistically significant, **Internet, newspaper, magazine and television etc.

Discussion

This study aims to evaluate healthcare professionals' and other professionals' awareness levels and habits regarding sun protection. In our survey, more than 80% of healthcare professionals and other professionals stated that they have knowledge about sun protection. We noticed that the knowledge levels were similar in both groups, except for using sunscreen. From the point of the source of information, it was seen that health professionals received more information from doctors in terms of exposure to sunlight and possible risks. On the other hand, individuals from other professions accessed this information mainly through social media tools such as the internet, newspapers, magazines, and television, in accordance with the literature [12-14]. The awareness level of using sunscreen 30 minutes before sun exposure and after swimming was higher than expected in healthcare workers [15]. Our study showed that health workers' knowledge level is higher than other professionals. As a remarkable finding, our study revealed that the recommendation of the information by the doctor was associated with a higher level of sun protection knowledge.

When we evaluated sun protection habits, the frequency of using sunscreen before going out in the sun was found to be proportionally higher in healthcare workers. To the question, "How often do you apply sunscreen before going out in the sun?" the answers "sometimes" and "newer" were mainly received from other professionals, in line with the literature [16]. Although the frequency of use of sunscreens with high SPF levels was proportionally high among healthcare workers, both healthcare professionals and other professionals mostly preferred sunscreen with an SPF rating of 30 and above, in line with the information in the literature [17].

Table 3. Participants' sun avoidance behaviors

Count		Other profession		Health worker		
		Column n %	Count	Column n %		
How often do you avoid the sun?	Never	24	6.1%	4	3.4%	0.648
	Rarely	49	12.5%	11	9.5%	
	Sometimes	151	38.5%	49	42.2%	
	Often	125	31.9%	38	32.8%	
	Always	43	11.0%	14	12.1%	
How often do you apply sunscreen before going out in the sun?	Never	107	27.3%	20	17.2%	<0.0001*
	Rarely	87	22.2%	31	26.7%	
	Sometimes	120	30.6%	21	18.1%	
	Often	43	11.0%	27	23.3%	
	Always	35	8.9%	17	14.7%	
What is the SPF of the sunscreen you apply?	No protection	162	41.3%	28	24.1%	0.001*
	2-12 SPF**	6	1.5%	0	0.0%	
	12-30 SPF	59	15.1%	16	13.8%	
	>30 SPF	165	42.1%	72	62.1%	
Would you reapply sunscreen?	Yes	298	76.0%	80	69.0%	0.126
	No	94	24.0%	36	31.0%	
If yes, how often do you apply sunscreen?	Never	298	76.0%	80	69.0%	0.047*
	Every 6 hours	59	15.1%	19	16.4%	
	Every 2-4 hours	34	8.7%	14	12.1%	
	Every 1-2 hours	1	0.3%	3	2.6%	
On which parts of your body do you apply sunscreen?	Any part of the body	58	14.8%	13	11.2%	0.537
	Face-arms-legs	162	41.4%	48	41.4%	
	All over the body	171	43.7%	55	47.4%	
Do you wear a hat before going out in the sun?	Yes	27	8.1%	8	7.5%	0.847
	No	305	91.9%	98	92.5%	
Do you wear clothes that cover your body before going out in the sun?	Yes	162	48.8%	46	43.4%	0.332
	No	170	51.2%	60	56.6%	
Do you wear sunglasses before going out in the sun?	Yes	19	5.7%	7	6.6%	0.738
	No	313	94.3%	99	93.4%	
How often do you sunbathe in summer?	Every day	36	9.2%	7	6.0%	0.001*
	Several times a week	110	28.1%	21	18.1%	
	Several time a month	142	36.2%	66	56.9%	
	Never	104	26.5%	22	19.0%	
Do you use artificial bronzer?	Yes	333	84.9%	106	91.4%	0.76
	No	59	15.1%	10	8.6%	
Have you ever had a nevus screening?	Yes	380	96.9%	110	94.8%	0.280
	No	12	3.1%	6	5.2%	

*Statistically significant, **SPF: Sun protection factor

Additionally, it was observed that the frequency of re-application of sunscreen at certain periods was higher in healthcare workers. This leads us to conclude that, indirectly, individuals from other professions do not have sufficient knowledge about the use of sunscreens [18]. Regarding sunbathing frequency, we observed that health workers sunbathed more frequently, either several times a month or never. On the contrary, individuals from other professions sunbathe either several times a week or several times a month. Based on this, we assume that healthcare professionals avoid the sun more than other professionals. Despite the high level of knowledge of the participants, we observed that avoiding the sun, frequency of sunscreen use, and wearing clothes that cover the body were insufficient in both groups. In particular, the use of hats and sunglasses was relatively high. However, it is noteworthy that there was a deficient number of nevus screening in both groups.

Study Limitations

The major limitations are that the study was conducted in a single center, a tertiary healthcare institution. Also, it had a cross-sectional design, and the survey was conducted in the spring and summer seasons when the sun exposure increased. Large-scale epidemiological studies spanning a whole year may contribute to the elimination of these biases.

Conclusions

Although the level of knowledge of individuals about taking protective measures against sun exposure is high, it was observed that individuals' attitudes and behaviors related to sun protection were insufficient. Campaigns to encourage the public to protect themselves from the sun within a general health program through doctor-supported social media tools may contribute to the elimination of the deficiencies we have identified.

Ethics

Ethics Committee Approval: This study was approved by University of Health Sciences Turkey, Basaksehir Cam and Sakura City Hospital Ethics Committee (file no: 2022.01.33, date: 01.02.2022).

Informed Consent: Retrospective study.

Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: T.K., F.F., S.E., Ç.E.K., Design: T.K., F.F., Data Collection or Processing: .E., Ç.E.K., Analysis or Interpretation: T.K., F.F., Literature Search: T.K., F.F., Writing: T.K., F.F., S.E., Ç.E.K.

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CASE REPORT

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Multiple Melanonychia During Hydroxyurea Therapy

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ABSTRACT

Hydroxyurea (HU) is an antimetabolite agent. It is commonly used in the treatment of various hematologic disorders. I described a case of multiple melanonychia during HU therapy.

Keywords: Hydroxyurea, Primary thrombocytosis, Melanonychia

Introduction

Melanonychia was described with many drugs, especially chemotherapeutic agents. We described a case of multiple melanonychia during hydroxyurea (HU) therapy for essential thrombocythemia.

Case Report

A 60-year-old female had primary thrombocytosis treated with HU for 10 months 3 tab/day. she presented with nail hyperpigmentation began after 4 months of treatment with HU. Physical exam revealed longitudinal melanonychia, diffuse melanonychia in all 10 toe nails, and in 4 finger nails (Figure 1-4). Written informed consent was obtained from the patient.

Discussion

HU is an anti-neoplastic, it decreases the production of deoxyribonucleotides by inhibition of the enzyme ribonucleotide reductase. The drug usually used in the treatment of various hematologic disorders, e.g., chronic myelogenous leukemia, polycythemia vera, sickle cell anemia and occasionally, at lower doses, for severe psoriasis vulgaris [1]. It is usually a well-tolerated.

HU have systemic and cutaneous side effects. Cutaneous side effects occur in 10% to 35% of patients receiving chronic HU therapy [2]. They include: stomatitis, alopecia, facial erythema, hyperpigmentation, actinic keratosis lesions, and multiple skin carcinomas they recently known as HU-associated non-

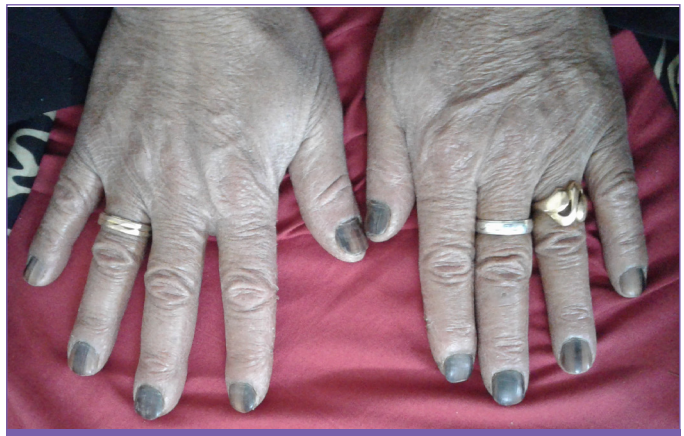

Figure 1. Diffuse melanonychia in all 10 toe nails

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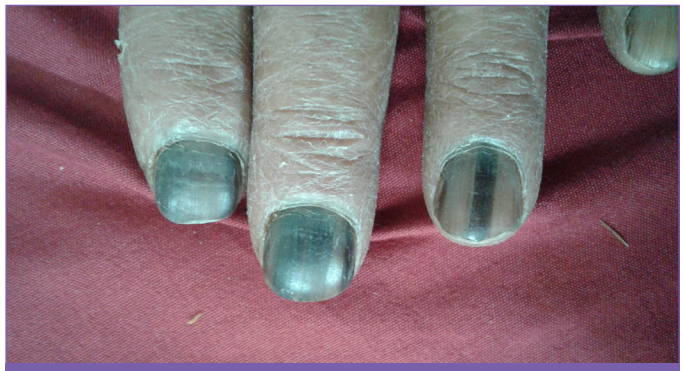

Figure 2. Diffuse and longitudinal melanonychia (close up)

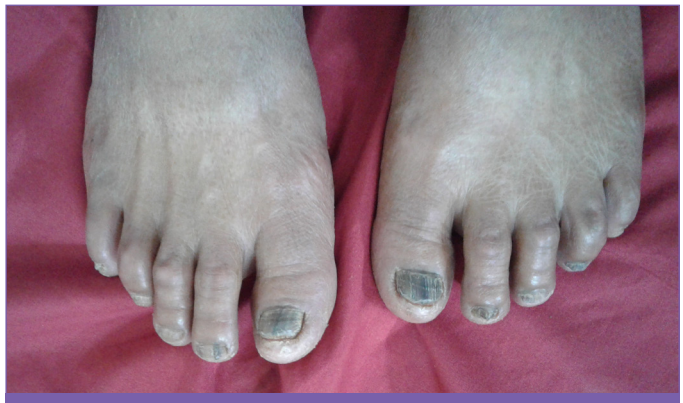

Figure 3. Melanonychia in in 4 finger nails

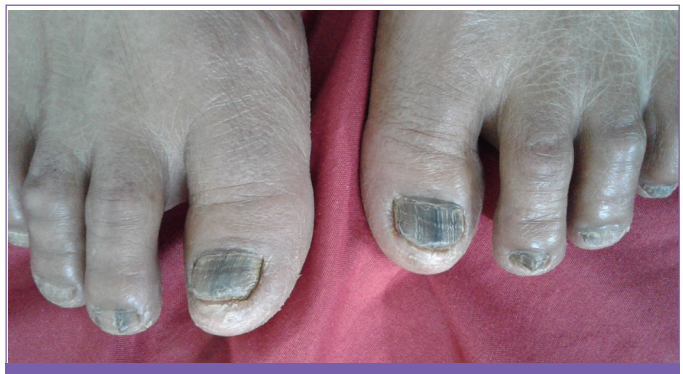

Figure 4. Melanonychia in 4 finger nails (close up)

melanoma skin cancers, or the recently described HU-associated squamous dysplasia may develop [2]. Daoud et al. [3] added a new unique under name "HU dermopathy". It included: Lichenoid papules, telangiectasia, and poikilodermatous lesions on the dorsal hands and digits [3].

Others side effect are ichthyosis, acral erythema, palmoplantar keratoderma, leukocytoclastic vasculitis, and leg ulcers. More rarely, a dermatomyositis-like eruption, melanonychia aggressive melanonychia are an uncommon side effect of HU.

Melanonychia is diffuse or longitudinal hyperpigmentation of the nail. It may be develop in one nail or be aggressive in multiple nail. It develops in about 4.3% of the patients receiving HU therapy [4] The onset of the melanonychia varies from 4 weeks to 5 years after initiation of the HU [5]. In our patient it began after 4 months of theray.

The pathogenesis of melanoychia is not clear [4]. The number of melanocytes in the skin and nail are fixed but their activity is variable. HU causes melanocytes so it increased melanin pigmentation of the nail matrix epithelium and nail plate without an icrease in the number of melanocytes [6]. Although dercreasing the dose or discontinuing the use of hydroxycarbamide could eliminante with time [6]. Murray et al. [7] described melanonychia associated with the use of hydroxycarbamide for essential thrombocythemia in Chilean patient. Of a patient population of 27.7 (26%) developed melanonychia over a period of 2-7 years, and was not dose dependent [7].

Our patient resembles Chilean patients. She lives in a rural area and has skin type IV according Fitzpatrick scale, and Syria also has a high levels of ultraviolet (UV) radiation. The high UV radiation levels may also explain why the melanonychia was more common in the hands than in the feet.

Melanonychia is side effect of HU therapy especially in sunny area, and we always must be exclude subunguale melanoma. Sometimes biopsy is necessary especially in longitudinal melanonychia of a single nail unit melanonychia is side effect of HU therapy especially in sunny area, and we always must be exclude subungual malignant melanoma. Sometime biopsy is necessary.

Ethics

Informed Consent: Written informed consent was obtained from the patient.

Peer-review: Internally peer-reviewed.

Conflict of Interest: No conflict of interest was declared by the authors.

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CASE REPORT

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Hand-Foot Skin Reaction by Sorafenib

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ABSTRACT

Hand-foot skin reaction (HFSR) is a dose dependent adverse drug reaction of chemotherapeutic drugs like sorafenib, sunitinib etc. It usually presents as painful erythematous lesions over pressure bearing and trauma prone areas of the body, with varying degree of dysesthesia, callosity and blistering. Sorafenib is a multi-kinase inhibitor which is used as a anticancer agent in the treatment of inoperable hepatocellular carcinoma, advanced renal cell carcinoma etc. It is usually well-tolerated but development of HFSR can hamper its long-term usage. HFSR can be debilitating to the patient hence prompt diagnosis is essential for its management. However due to limited usage of sorafenib in our country, existing knowledge about the presentation of HFSR in Indian population is sparse and is mostly based on case reported from western countries. Here we report a case of HFSR occurring in a known patient of gastrointestinal stromal tumor following sorafenib therapy.

Keywords: Sorafenib, Hand-foot skin reaction, Adverse drug reaction

Introduction

Hand-foot skin reaction (HFSR) is a dose dependent adverse cutaneous reaction of chemotherapeutic agents like Sorafenib, Sunitinib etc [1]. Localized involvement of pressure bearing parts and trauma prone areas of body like heels, finger pads, ball of great toe is a key feature of HFSR. Various forms of presentation include dysesthesia, painful erythematous plaques with varying degree of blistering, callosities, macular hyperpigmentation [2]. It should not be confused with Hand-Foot Syndrome caused by drugs like capecitabine, cytarabine which manifest as diffuse redness and swelling of palmoplantar region [1].

Sorafenib is a multi-kinase inhibitor which is food and drug administration approved for the treatment of inoperable hepatocellular carcinoma, advanced renal cell carcinoma and radioactive iodine resistant thyroid carcinoma [3]. Off-labelled uses include gastrointestinal stromal tumour (GIST), angiosarcoma [4]. It is relatively well-tolerated though development of moderate to severe HFSR can hamper its long-term use in some patients [3]. Limited number of cases of HFSR due to sorafenib have been reported from India till date. Here we report one such case of HFSR occurring in a patient of GIST on sorafenib therapy.

Case Report

A 48-year-old man presented to our our out patient department with complaint of tingling sensation along with painful eruption on his palms and soles for last 3 weeks. He was a known case of GIST. Four years back, he underwent oesophago-gastric anastomosis and was started on imatinib. He experienced no significant adverse reaction while on imatinib therapy. However, due to recurrence of tumour at anastomosis site, he was switched to tab sorafenib 400

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mg twice daily last month. Within 10 days of initiating sorafenib, he was distressed to find painful hyperpigmented lesions with some blisters on his hands and feet. He promptly consulted his oncologist regarding the same who then referred him to our department for opinion. On examination, tender erythematous plaques were found over the knuckles and around the base of the thumbs. Yellowish hyperkeratotic callous-like lesions were seen on the under-surface of the right great toe and heels (Figure 1). No other muco-cutaneous sites were involved. Routine blood investigations were within normal limits. On histopathological examination, marked hyperkeratosis, ectatic blood vessels in papillary dermis and perivascular lymphomononuclear infiltration were seen (Figure 2). Temporal association of oral sorafenib intake with appearance of clinical features, along with histopathological findings led us to the diagnosis of sorafenib induced HFSR. Severity of HFSR in our patient was grade 2, according to National Cancer Institute common terminology criteria for adverse event grading system. With score of 7 on Naranjo adverse drug reaction probability scale, association between sorafenib and HFSR in our case was found to be 'probable'. Patient was advised to discontinue sorafenib therapy and was prescribed emollient cream and mometasone ointment once daily application. After 3 weeks, subjective improvement was reported by the patient and his lesions regressed considerably (Figure 3). Informed consent was taken from the patient for possible case report publication.

Discussion

Sorafenib is a novel small molecule which is widely used as an anticancer agent. It directly prevents proliferation of cancer cells by inhibiting Raf/MEK/ERK pathway and also blocks tumour blood supply by targeting vascular endothelial growth factor receptor (VEGFR)-2, VEGFR-3 and platelet-derived growth factors receptors (PDGFR) [2]. Dermatological side-effects like acne, hair loss, flushing, HFSR, desquamation etc is seen in approximately 90% patients [5]. In one case series, HFSR was reported in 78% of patients receiving sorafenib. Among them, 11% had grade 1 HFSR while grade 2 and 3 were found in 33% each [6]. Risk factors of HFSR include female gender, tumour type, liver metastasis, normal pre-treatment white cell count etc. [7]. HFSR usually develop within first six weeks of initiating treatment [3]. In one study, mean duration of onset

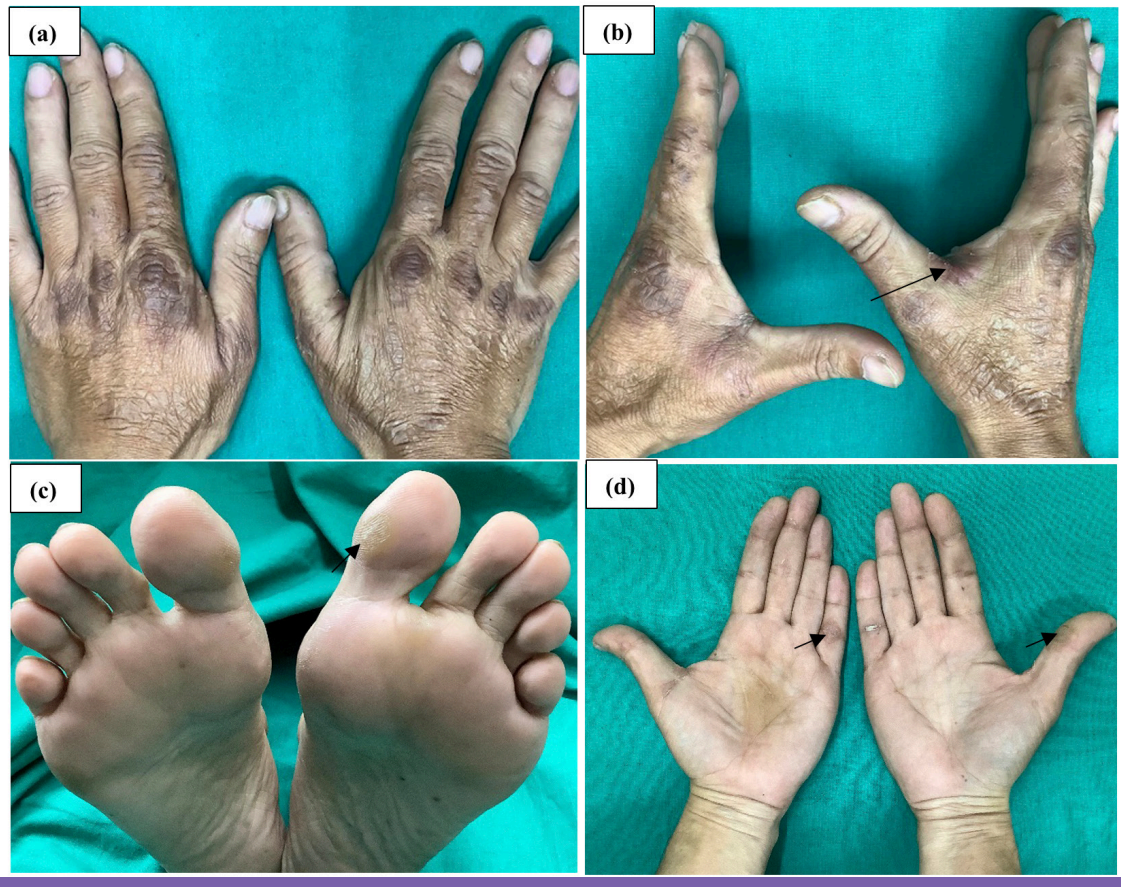

Figure 1. Erythematous plaques over the knuckles (a), and around base of the thumb (b). Callosity on the great toe (c) and hand (d)

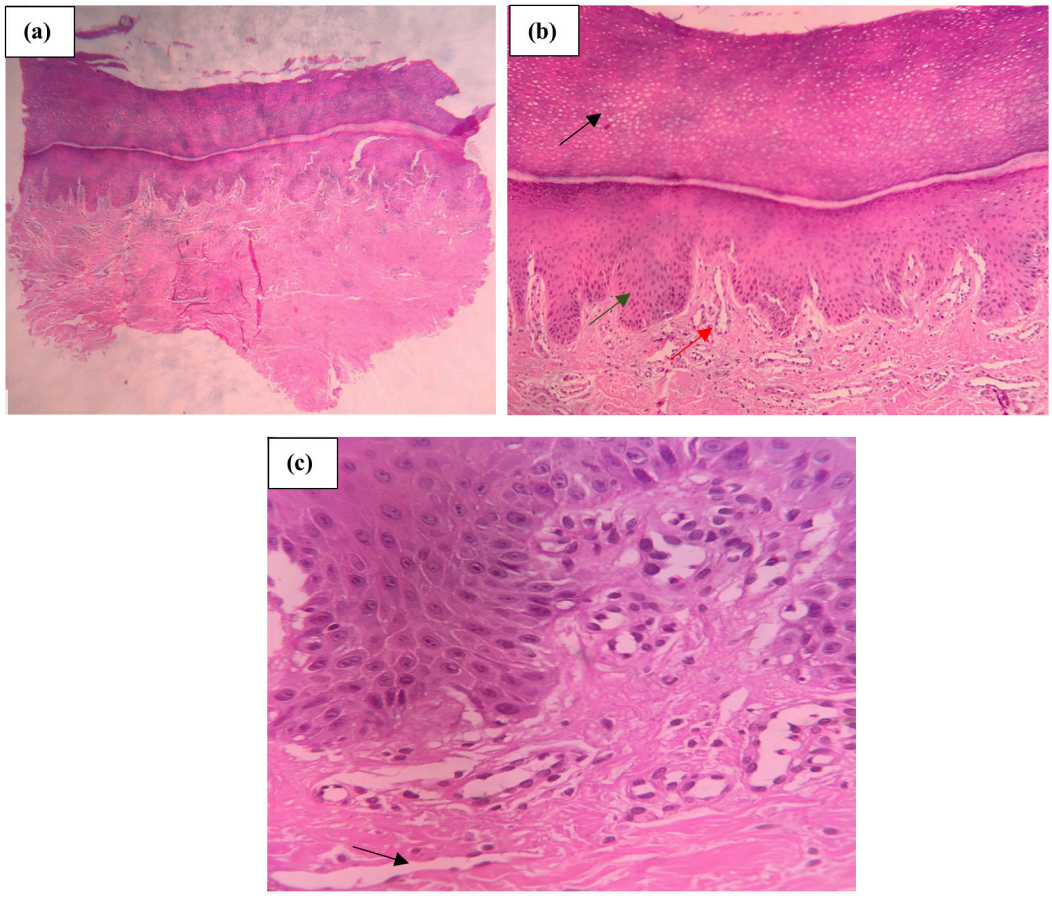

Figure 2. Biopsy revealed marked orthokeratosis [black arrow in (b)], acanthosis [green arrow in (b)], numerous dilated blood vessels [red arrow in (b) and black arrow in (c)] along with mild perivascular lymphocytic in hematoxylin and eosin stain

was found to be around 15 days [6]. Presenting feature includes symmetrical erythematous lesions on acral sites, sometimes with excoriations and blistering. Differential diagnosis include hand-foot syndrome, graft-versus-host disease, porphyria cutanea tarda and contact dermatitis [2]. In hand-foot syndrome diffuse involvement is usually seen and palms are more frequently involved than soles while in hand-foot skin reaction, localized lesions on pressure and/or trauma prone sites are present and soles are involved more often than palms [7]. Pathogenesis is not well known. One explaination of localized pattern of involvement is impaired vascular repair process due to inhibition of VEGFR and PDGFR thereby making blood vessels on pressure and trauma prone sites more vulnerable to sorafenib leakage and toxicity [2]. Direct cytotoxic effect of sorafenib in eccrine gland is another proposed theory [5]. Two cases with lesions identical to HFSR on sites other than palmoplantar region like elbows, old scar etc. were reported and its author hypothesised sorafenib induced HFSR to be a Koebner phenomenon [1]. Lesions are typically painful and may even be debilitating, thereby warranting dose reduction or cessation of therapy [3]. Most frequently, sorafenib at the standard dose (400 mg BD) is most commonly found to trigger HFSR, however in one case report, sorafenib at even low dose (200 mg BD) led to development of HFSR [8]. Due to its profound effect on the quality of life, patients should be counselled regarding the possibility of HFSR development before initiating the known culprit chemotherapeutic agents [7].

HFSR is considered to be a common adverse effect of sorafenib therapy in the western world. However due to its limited usage in our country, existing knowledge of this cutaneous side effect among Indian physicians is sparse and mostly based on cases reported from western countries. Awareness regarding its clinical presentation among the dermatologists is required for proper diagnosis and timely management of this debilitating drug reaction.

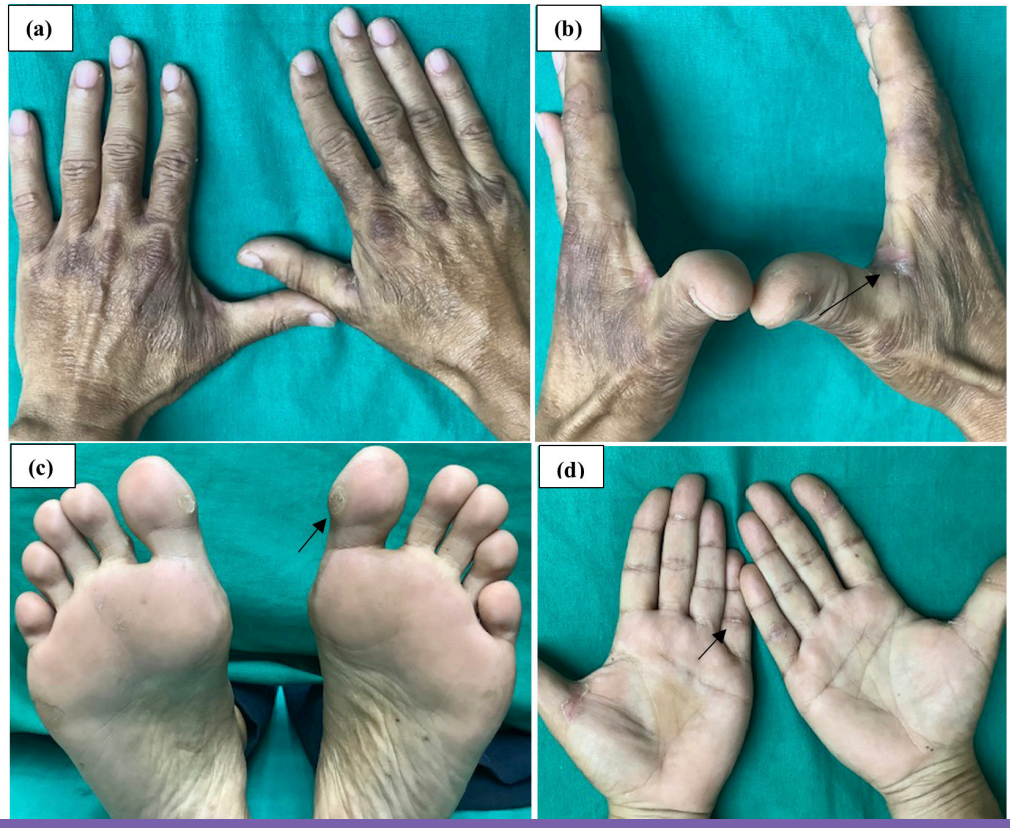

Figure 3. After 3 weeks of stopping sorafenib therapy and mometasone once daily application, decrease in erythema [shown by arrow on (b)] and reduced size of callosity [shown by arrow on (c) and (d)] was noted

Ethics

Informed Consent: Informed consent was taken from the patient for possible case report publication.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: D.S., M.D., S.B., S.S., Concept: D.S., M.D., S.B., S.S., Data Collection or Processing: D.S., M.D., S.B., Analysis or Interpretation: D.S., M.D., S.B., S.S., Literature Search: D.S., M.D., Writing: D.S., M.D., S.B., S.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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CASE REPORT

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Itchy Papules Bordering Vitiligo Patches in a Child

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ABSTRACT

Vitiligo co-exists with several dermatological conditions, but co-localization has been rarely reported. We are reporting a case of a five-year-old male child who developed an itchy, violaceous border on the photo-exposed and trauma prone unstable vitiligo patches. Dermoscopy and histopathological examination was consistent with the diagnosis of lichen planus. The presentation does not seem co-incidental to us. It opens a window into genetic and immunological research to clearly establish a connection between the two dermatoses.

Keywords: Vitiligo, Lichen planus, Pathogenesis

Introduction

The association of vitiligo with other skin conditions in the context of shared autoimmune background has been well established. Lichen planus is an entity which has been rarely documented to co-exist and co-localize with vitiligo. Both conditions being common, some call it co-incidental [1] while some have proposed an immunopathological linkage [2]. Lichen planus can occur on both vitiliginous and uninvolved skin. Our case stands out because unstable vitiligo is bordered and limited by lichen planus in a very young five-year-old male child.

Case Report

A five-year-old male child presented with complaint of asymptomatic white patches on the wrist, legs, back and periorbital region for last 1 year. There was history of development of new patch on the lower extremity following trauma one month back. Family history was unremarkable. Local cutaneous examination revealed presence of multiple, depigmented, demarcated oval and round patches of varying sizes on wrist and dorsum of foot. Single patch was noted on back and left periorbital region. There was no leucotrichia. Dermoscopy revealed complete absence of pigment network (Figure 1). A diagnosis of vitiligo vulgaris was made, autoimmune thyroid profile was sent, and patient was started on topical betamethasone lotion and tacrolimus ointment.

One month later, the patient presented with itchy, violaceous papules surrounding some vitiligo patches on wrist and dorsum of foot. Cutaneous examination revealed presence of violaceous, flat-topped, papules coalescing together to form a border on the vitiligo patch situated on dorsum of foot (Figure 2). Lesions of similar morphology bridged two small vitiligo patches on flexor aspect of wrist (Figure 3). There was a sharp demarcation between normal skin bearing papules and depigmented skin. Similar papules were also present on normal skin in lower extremity. Hair and mucosal examination were normal. A biopsy sample was taken from papule and sent for histopathological examination. HPE revealed presence of hyperkeratosis, acanthosis and prominent lymphocytic infiltrate reaching the dermo epidermal junction (Figure 4). Dermoscopy showed presence of radial white striations on an erythematous

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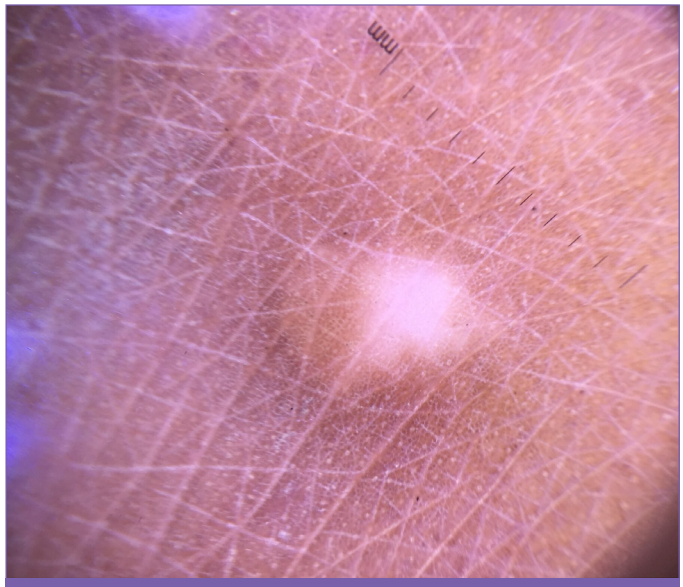

Figure 1. Complete absence of pigment network in vitiligo patch (Dermlite DL3N, 10X, Polarised mode)

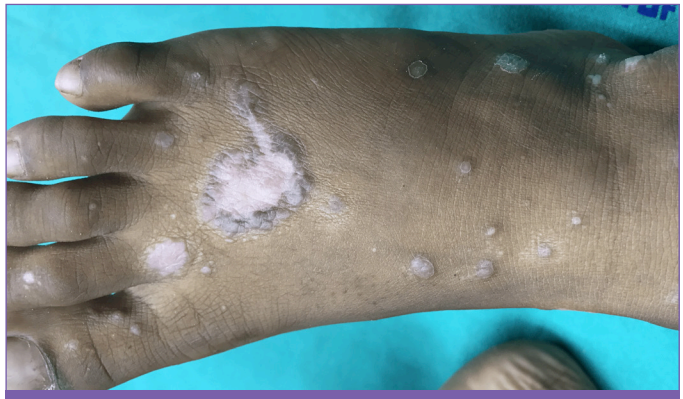

Figure 2. Violaceous papules forming a border on the vitiligo patch

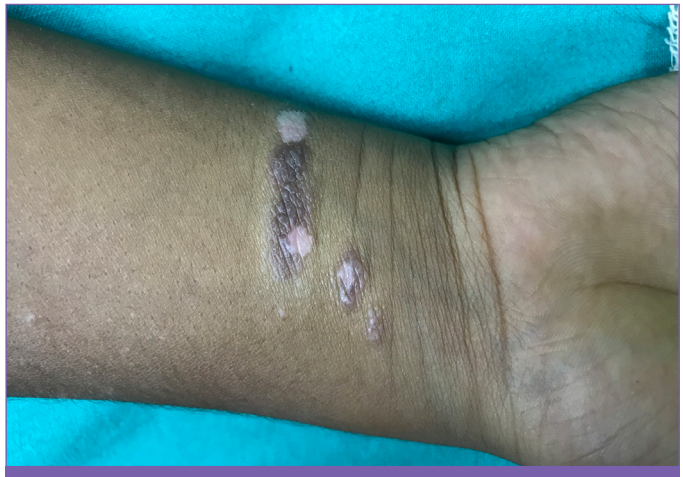

Figure 3. Violaceous papules bridging two patches on wrist

background (Figure 5). Based on clinical, dermoscopy and HPE findings, a diagnosis of lichen planus was made. Patient was prescribed oral minipulse therapy and topical mometasone once daily application on lichen planus lesions. Complete clearance of lichen planus was noted after 12 weeks of therapy with no new vitiligo patches. Autoimmune profile was within normal limits.

Informed consent was taken from the patient for possible case report publication

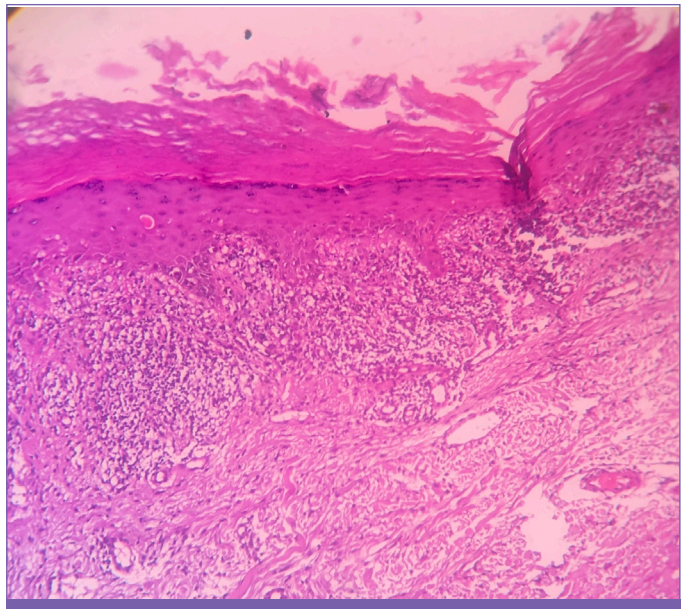

Figure 4. Hyperkeratosis, acanthosis and prominent lymphocytic infiltrate at dermo epidermal junction [H&E, 40X].

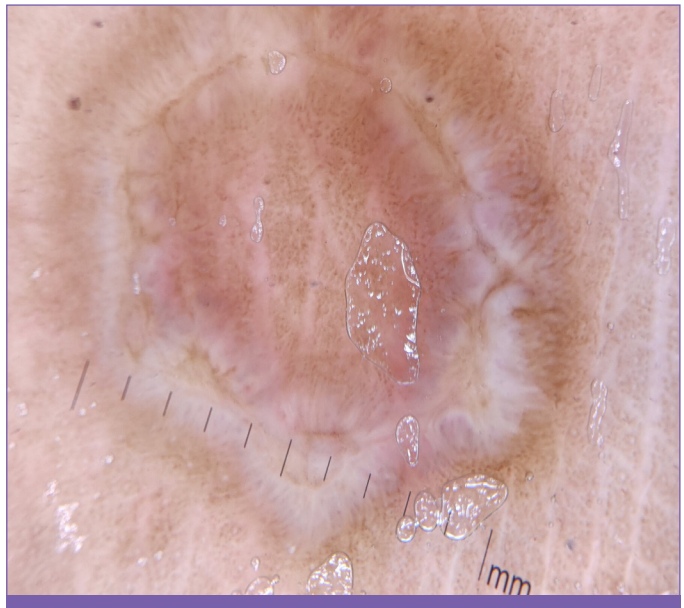

Figure 5. White striations on an erythematous background (Dermlite DL3N, 10X, Polarised mode)

Discussion

Vitiligo is a common pigmentary disorder affecting 0.5-2% of the world's population wherein autoimmunity plays a major role behind its pathogenesis. Lichen planus is also a common immunologically driven dermatosis with a near equal incidence of 1%.

Occurrence of lichen planus in vitiligo patients has been reported on vitiligo patches, non-vitiliginous skin, sun-exposed as well as photo-protected areas giving rise to various theories.

The first case was reported in 1997 in a 35-year-old woman wherein discrete papules were noted in the surrounding normal skin of some vitiliginous areas [3]. The authors proposed that it had the same significance as that of vitiligo presented with raised inflammatory borders. The second case reported in 2006 had unilateral lichen planus bordering a vitiligo patch on the lower extremity in a 56-year-old man. It was explained by relative absence of Langerhans cells in unstable vitiliginous skin. These cells play an integral role in pathogenesis of lichen planus. Langerhans cells present antigen to the helper T-cells and this causes subsequent damage to basal keratinocytes [4].

A case of familial co-localization of lichen planus on photo-exposed vitiligo patches proposes that actinic damage in vitiliginous skin may alter antigen expression on keratinocytes leading to lymphocytic infiltration [5]. It also strongly points towards a possibility of common genetic background for the two conditions.

Actinic induction of lichen planus has also been proposed by Sardana et al. [6] in a 14-year-old male patient who developed lichen planus on segmental vitiligo patch.

Another theory states koebnerisation as a common etiological trigger for development of vitiligo and lichen planus [7].

Anstey and Marks [8] in their case report have extrapolated the concept of alopecia areata suppressed by an allergic contact dermatitis on lichen planus-vitiligo. They state that two lymphocyte mediated conditions with apparently unrelated pathogenetic mechanisms can possibly influence each other.

We feel that co-existence of these two disorders at different anatomical sites could be co-incidental. However, co-localization and bordering of patch in our case points towards a common etiological trigger and links the two immuno-pathologically.

Actinic damage, koebnerisation and lack of Langerhans cells in vitiliginous skin could have played a cumulative role in the development of lichen planus in our case.

This case is unique because such presentation has never been reported in a child. Lichen planus rather than being discrete, limits itself here and coalesces to form an annular border on the unstable vitiligo patch.

It open a window to genetic and immunopathological studies to understand the ambiguous pathogenesis behind the coexistence of both conditions.

Ethics

Informed Consent: Informed consent was taken from the patient for possible case report publication.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Data Collection or Processing: S.P., S.S., D.S., Analysis or Interpretation: S.P., S.S., D.S., Literature Search: S.P., S.S., D.S., Writing: S.P., S.S., D.S.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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CASE REPORT

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Secukinumab - A New Ray of Hope for the Management of Refractory Hidradenitis Suppurativa

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ABSTRACT

Hidradenitis suppurativa (HS) is a disorder of terminal follicular epithelium with a complex and multifactorial pathogenesis. Pro-inflammatory cytokines like tumor necrosis factor alpha, interleukin (IL)-17 are found to be increased in its patient, making these molecules a potential target of therapy. Secukinumab is a human monoclonal antibody that binds to IL-17A selectively and suppresses the inflammatory process. Here, we report a case of Hurley stage 2 HS. Various treatment modalities were tried over several months but only limited response was noted. Subcutaneous secukinumab was then started and patient's response was assessed monthly, for a total of 3 months. Patient's IHS4 score decreased from 15 to 8 and her Dermatology Life Quality Index improved from 23 to 13 after 3 months of secukinumab therapy. Although, there is limited evidence of effectiveness of secukinumab in HS till date, results so far look promising and large-scale clinical trials are underway to establish its role in the management of HS.

Keywords: Hidradenetis suppurativa, Treatment, Secukinumab, Biologics

Introduction

Hidradenitis suppurativa (HS) is a cutaneous disorder involving apocrine rich areas like axillae, anogenital region etc. Apart from physical symptoms like pain and discharge, it is associated with psychological morbidities like depression, low self-confidence etc. [1]. Thus, patients anxiously seek therapy that can offer prompt relief and long-lasting effect. Unfortunately, management of HS has often proven to be a daunting task for physicians [2].

Secukinumab is a human monoclonal antibody that selectively binds to interleukin 17A (IL-17A) molecule and prevent its receptor. Currently, it is under clinical trial for the treatment of HS [3]. Here, we present a case of severe refractory HS which was successfully treated with subcutaneous secukinumab injection.

Case Report

A 35-year-old woman presented to our out patient department with multiple painful lesions and discharging ulcer on her body for last one month. Patient reported similar eruptions, predominantly in the axilla, trunk and back, in last four years with subsequent healing with scar formation. No medical or surgical co-mordibities were present. She revealed to have been treated by many local physicians over the years without much success. On examination, tender nodules, abscess with ulcers were noted on her back and axilla along with multiple double-ended pseudo-comedones and scars all over the body (Figure 1). The routine laboratory parameters revealed raised acute phase reactants like erythrocyte sedimentation rate, CRP while pus culture showed no growth. Based on history and clinical examination, she was diagnosed as a case of HS with Hurley

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stage 2 grading. Various medications like oral doxycycline, oral dapsone, topical antibiotics, oral ciclosporin, injection adalimumab, were tried alone or in combination, over a period of eight months but much to our and patient's disappointment, response was only limited and temporary. Encouraged by few reports of successful management of HS with secukinumab, patient was started on it along with topical clindamycin. Secukinumab (300 mg) was given subcutaneously weekly for first four weeks and thereafter every four weeks. International HS Severity Score (IHS4) and Dermatology Life Quality Index (DLQI) scores were recorded to assess the clinical response and psychological improvement if any, once before and then monthly after starting secukinumab. Patient reported marked symptomatic improvement within three weeks of initiation of treatment. No new lesions appeared post two months of therapy and existing lesions reduced in size. Her IHS4 score decreased from 15 to 8 (Figure 2) and her DLQI improved from 23 to 13 after three months of secukinumab treatment.

Informed consent was taken from the patient for possible case report publication.

Discussion

HS is an inflammatory disease presenting as painful nodules and abscess. Overtime pseudo-comedones, sinus tracts, fistulae are formed and healing occurs by scarring [1]. Pathogenesis of HS is complex and multifactorial [4]. Occlusion of infundibulum with subsequent rupture of follicle is the primary event. In response, pronounced inflammation occurs and abscess develops. Immune dysregulation is a key feature [2]. At present, adalimumab is the only biological which is United States by the Food and Drug Administration approved for the treatment of HS. Though in some patients it provides substantial improvement but overall response rate is only around 60% [5]. Recent studies have reported increased IL-17 levels in HS patient. IL-17A cytokines causes neutrophils recruitment and propagation of inflammation in a positive feedback fashion. On this basis, secukinumab (IL-17A inhibitor) is being considered as a potential treatment option for HS [2].

Handful of case have been published reporting the success of secukinumab in HS [2,3,5]. In one open-label trial, 20 patients of moderate to severe HS were administered secukinumab, among which seventy percent achieved HS clinical response [predefined as at least a 50% reduction in the sum of abscesses and inflammatory nodules (AN count) and (2) no increase in draining fistula or abscess count relative to baseline] at the end of 24 weeks [6].

Although there is limited evidence of effectiveness of secukinumab in HS till date, results so far look promising and large-scale clinical trials are underway to warrant its widespread use in HS.

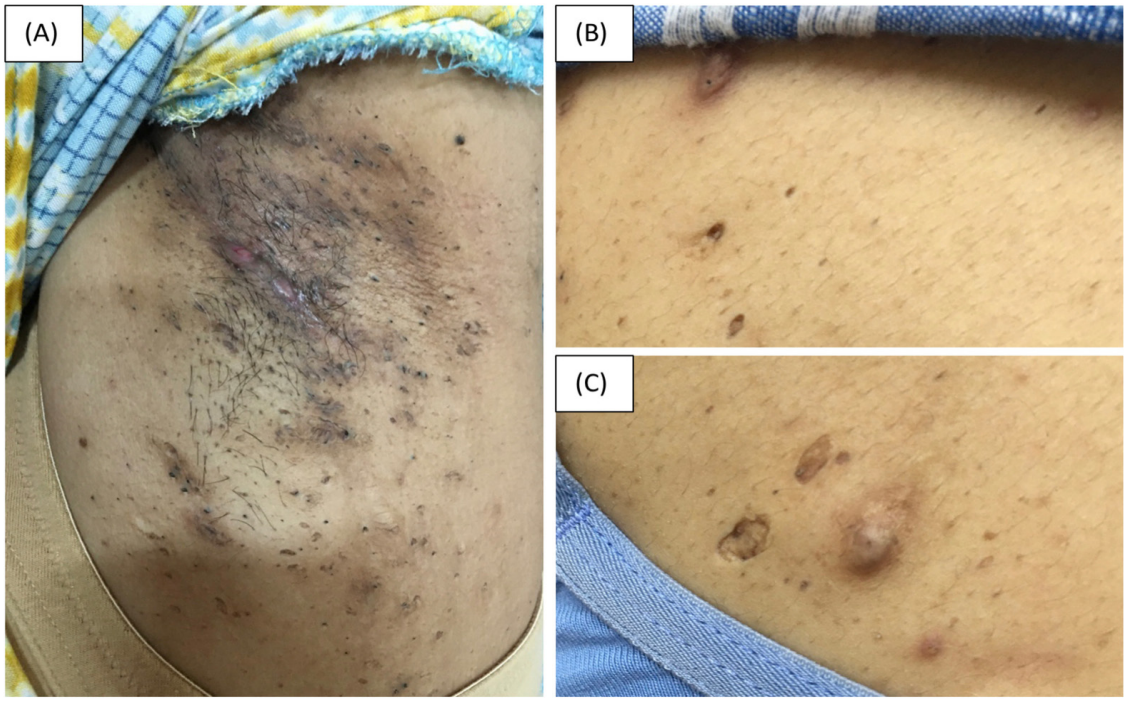

Figure 1. Before starting secukinumab therapy. Multiple ulcers and pseudo-comedomes over the right axilla (A), multiple nodules and scarring over the back (B,C)

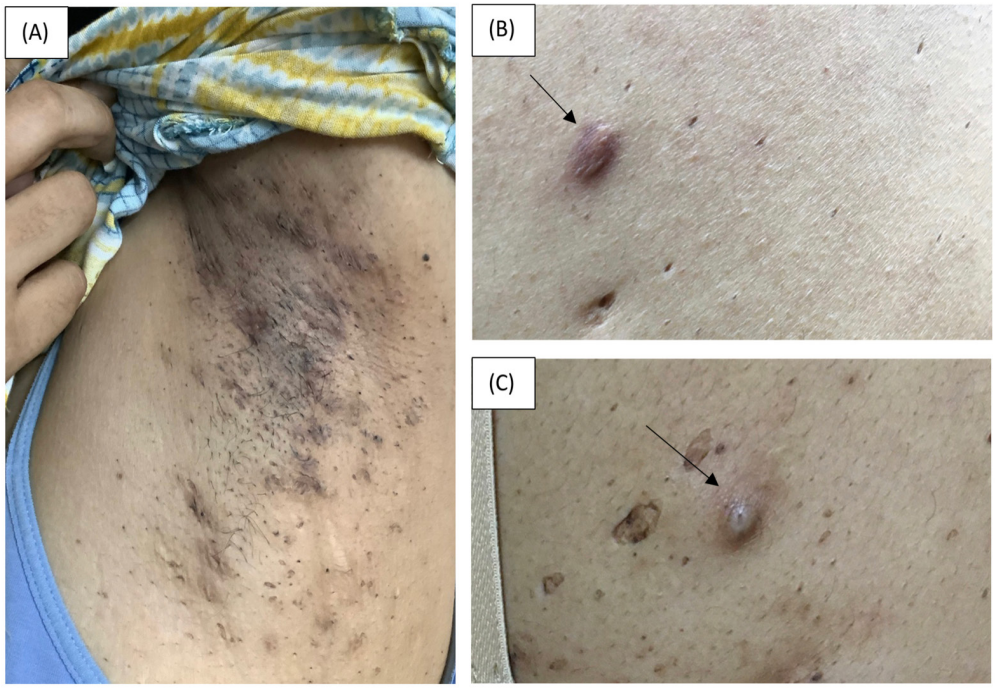

Figure 2. After 12 weeks of secukinumab therapy. Healed ulcer over the right axilla (A), flattening and reduction in size of the nodules (marked by black arrows) over the back (B,C)

Ethics

Informed Consent: Informed consent was taken from the patient for possible case report publication.

Peer-review: Internally and externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: D.S., G.C., O.R., P.N., A.M., Concept: D.S., G.C., P.N., Data Collection or Processing: D.S., G.C., O.R., A.M., Analysis or Interpretation: D.S., G.C., O.R., P.N., A.M., Literature Search: D.S., O.R., P.N., A.M., Writing: D.S., O.R., A.M.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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2022 Referee Index

Bilal Doğan
Güllü Gencebay
Gürkan Yardımcı
Mualla Polat
Muazzez Çiğdem Oba
Özge Askın
Server Serdaroğlu
Tuğba Kevser Uzunçakmak
Zekayi Kutlubay
Zeynep Altan Ferhatoğlu

2022 Author Index

Aniruddha Mandal ... 111
Arpita Hati ... 24
Ayşe Nilhan Atsü ... 82
Ayşegül Yalçınkaya İyidal ... 58
Belkız Uyar ... 46
Berna Aksoy ... 6
Burcu Tuğrul ... 41
Burhan Engin ... 1
Çağla Ecem Kılıç ... 94
Canan Kabakçı ... 6
Cem Çetin ... 86
Defne Özkoca ... 33, 62, 82
Demet Kartal ... 27
Devansi Sarawgi ... 104, 108, 111
Dursun Türkmen ... 74
Eda Öksüm Solak ... 27
Elif Afacan ... 21
Emine Müge Acar ... 41, 46
Esen Özkaya ... 13
Esma Arslan ... 86
Esra Adışen ... 21
Esra Kiratli Nalbant ... 53
Eylem Pinar Eser ... 53
Fahriye Esra Başyiğit Gönendi ... 86
Fatih Can Aba ... 27
Fatma Elif Yıldırım ... 6
Fatma Etgü ... 65
Ferhat Ferhatoğlu ... 77, 94
Funda Erduran ... 58
Funda Kemeriz ... 41
Gobinda Chatterjee ... 24, 111
Gülhan Aksoy Saraç ... 41
Havva Erdem ... 65
Havva Hilal Ayvaz Çelik ... 86
Icim Komurcugil ... 53
İnci Serdar ... 56
Kemal Özyurt ... 46
Madeline Gleave Parson ... 69
Madhumita Das ... 104
Marisa Tandy ... 69
Marwa Sami ... 31
Michael Noparstak ... 69
Mücahit Marsak ... 74
Müge Göre Karaali ... 36
Nazlı Caf ... 82
Nermin Karaosmanoglu ... 53
Nihal Altunışık ... 74
Olympia Rudra ... 111
Ömer Faruk Elmas ... 46
Osman Cinkara ... 86
Özge Aşkın ... 1
Pramit Nandy ... 111
Rafiya Fatima ... 31
Saadet Alan ... 74
Sabriye Ercan ... 86
Samet Bayazit ... 1
Selami Arslan ... 74
Selinay Emekli ... 94
Serpil Şener ... 74
Şevki Özdemir ... 36
Shayeri Banerjee ... 24
Shreya Poddar ... 108
Subhadeep Mallick ... 24
Subhasmita Baisya ... 24, 104
Sumit Sen ... 104, 108
Tanju Kapağan ... 94
Tasleem Arif ... 31
Thaer Hassan Douri ... 101
Trisha Khanna ... 69
Tuğba Kevser Üstünbaş Uzunçakmak ... 62
Tuğba Kevser Uzunçakmak ... 33, 82
Tuğba Özkök Akbulut ... 13
Yusuf Karabulut ... 50
Zehra Aşiran Serdar ... 56
Zekayi Kutlubay ... 62, 82
Zeynep Altan Ferhatoğlu ... 1, 56, 77

2022 Subject Index

Adverse drug reaction ... 104
Allergic contact dermatitis ... 13
Ankylosing spondylitis ... 50
Anogenital warts ... 58
Antimony compounds ... 53
Athlete ... 86
Basal cell carcinoma ... 77
Behçet's disease ... 50
Biologics ... 111
Callus ... 36
Cancer ... 94
Case report ... 50
Certolizumab ... 50
Circumscribed morphea ... 31
Comparison ... 46
Corn ... 36
COVID-19 ... 56, 62
COVID-19 period ... 46
Cutaneous ... 82
Cutaneous leishmaniasis ... 53
Cutaneous malign melanom ... 77
Delayed ... 13
Demographics ... 62
Dermatology ... 46
Dermatology outpatients ... 41
Dermatoscopic examination ... 86
Diagnoses ... 46
Diagnosis ... 33
Disorder of keratinization ... 24
Disseminated ... 24
DLQI ... 6
Drug resistance ... 27
Early ... 13
Eczema ... 6
Erythroderma ... 33
Etiology ... 33
Folliculotropism ... 65
Hand-foot skin reaction ... 104
Hepatitis ... 58
Hidradenitis suppurativa ... 21, 111
HIV ... 58, 82
HOMA-IR ... 36
Human papilloma virus ... 58
Hydroxyurea ... 101
Inducible ... 1
Insulin Resistance ... 36
Interleukin (IL)-17A ... 50
Intralesional therapy ... 53
Kaposi sarcoma ... 77
Knowledge ... 86
Late reactions ... 13
Leishmania ... 27
Leukocytoclastic vasculitis ... 69
Lichen planus ... 108
Localized scleroderma ... 31
Maculopapular eruption ... 56
Melanoma ... 94
Melanonychia ... 101
Metabolic syndrome ... 36
Morphea ... 31
Morphea after waxing ... 31
Mucosal ... 82
Mycosis fungoides ... 65
Neutrophilic dermatoses ... 69
Neutrophilic dermatosis of the dorsal hands ... 69
Pandemic ... 41, 62
Patch test ... 13
Pathogenesis ... 108
Pediatrics ... 21
Phototherapy ... 62
Porokeratosis ... 24
Primary thrombocytosis ... 101
Psoriasiform ... 53
Psoriasis ... 6
Pyoderma gangrenosum ... 69
Reading time ... 13
SARS-CoV-2 ... 41
Secukinumab ... 111
Serological test ... 58
Sexually transmitted infections ... 58
Skin cancer ... 86
Sorafenib ... 104
Squamous cell carcinoma ... 77
STD ... 82
Sun ... 86
Sun exposure ... 94
Sunscreen ... 94
Sweet's syndrome ... 69
Syphilis ... 58
Syringotropic ... 65
Treatment ... 1, 27, 33, 41, 111
Ulcerative colitis ... 21
Ultraviolet light ... 94
Unilateral ... 56
Urticaria ... 1
Vitiligo ... 108