IMPACT OF THE COVID-19 PANDEMIC ON SKIN CANCER DIAGNOSIS: A SINGLE-CENTER STUDY

COVID-19 PANDEMISININ DERI KANSERI TANISINA ETKİSİ

Tülay ZENGİNKİNET [1]✉, Zeynep Çağla OLGUN[1], Irem GÜVENDİR BAKKALOĞLU[2], Şeyma ÖZKANLI[1], Bengü ÇOBANOĞLU ŞİMŞEK[1]

1. Istanbul Medeniyet University Prof. Dr. Suleyman Yalcin City Hospital, Department of Pathology
2. Health Sciences University, Umraniye Training and Research Hospital, Department of Pathology

ORCID: 0000-0003-3056-2074, 0000-0002-5046-7536, 0000-0002-2558-786X, 0000-0002-3357-1059, 0000-0002-2639-2017
E-mail: tzenginkinet@gmail.com

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Abstract

Objectives: The COVID-19 pandemic has had a profound impact on healthcare workers worldwide, including in dermatology and pathology. Under these conditions, admitted patient numbers, excision/biopsy numbers, and malignant/benign ratios were influenced. This study aimed to analyze the differences in the diagnoses of the radically excised skin tumors or skin biopsies. **Methods:** A cross-sectional study was performed between September 2018 and August 2021. Of the 11,501 total cases, 7602 were established during the non-COVID-19 period (September 2018- March 2020) and 3899 cases were established during the COVID-19 period (March 2020-August 2021). Malignant cases were classified as squamous cell carcinoma (SCC), basal cell carcinoma (BCC), and malignant melanoma (MM). **Results:** During the non-COVID-19 period, 592 (7.8%) out of 7602 cases were malignant; in the COVID-19 period, 439 (11.3%) out of 3899 cases were malignant. However, the total percentages of malignant cases were significantly increased during the COVID-19 period when compared with non-COVID-19 period ($p < .001$) despite the reduction in the case numbers. When the pre- and post-pandemic periods were compared, a statistically significant difference was found between the number of cases diagnosed with both SCC and BCC (both $p < .001$). However, for MM, there was no significance ($p = .656$). **Conclusions:** Even in pandemics conditions clinicians and pathologists, who are interested in dermatological lesions, should be aware and sensitive about dermatological malignancies. It is also important to raise awareness of the public with more sensitive health policies because any delay during the diagnosis and treatment period may cause fatal consequences or permanent damages for the patients.

Keywords: Dermatopathology, COVID-19, Malignant melanoma, Basal cell carcinoma, Squamous cell carcinoma

Özet

Amaç: COVID-19 salgını, dermatoloji ve patoloji dahil olmak üzere dünya çapındaki sağlık çalışanları üzerinde derin bir etkiye sahip olmuştur. Bu koşullar altında, başvuran hasta sayıları, eksizyon/biyopsi sayıları ve malign/benign oranları etkilenmiştir. Bu çalışma, radikal olarak eksize edilen deri tümörleri veya deri biyopsilerinin tanılarındaki farklılıkları analiz etmeyi amaçlamıştır. **Materyal ve Metod:** Eylül 2018 ile Ağustos 2021 arasında kesitsel olarak yapıldı. Toplam 11.501 vakanın 7602'si COVID-19 olmayan dönemde (Eylül 2018- Mart 2020) ve 3899 vaka COVID-19 döneminde (Mart 2020-Ağustos 2021) belirlendi. Malign vakalar skuamöz hücreli karsinom (SCC), bazal hücreli Karsinom (BCC) ve malign melanom (MM) olarak sınıflandırıldı. **Bulgular:** COVID-19 dışı dönemde 7602 vakanın 592'si (%7,8) malign idi; COVID-19 döneminde 3899 vakanın 439'u (%11,3) malign idi. Bununla birlikte, vaka sayılarındaki azalmaya rağmen, toplam malign vaka yüzdeleri COVID-19 döneminde, COVID-19 olmayan döneme kıyasla önemli ölçüde arttı ($p <.001$). Pandemi öncesi ve sonrası dönemler karşılaştırıldığında, hem SCC hem de BCC tanılı vaka sayıları arasında istatistiksel olarak anlamlı fark bulundu (her ikisi de $p <.001$). Ancak MM için anlamlılık yoktu ($p =.656$). **Sonuç:** Pandemi koşullarında bile dermatolojik lezyonlarla ilgilenen klinisyen ve patologların dermatolojik maligniteler konusunda bilinçli ve duyarlı olmaları gerekmektedir. Teşhis ve tedavi sürecindeki herhangi bir gecikme, hastalarda ölümcül sonuçlara veya kalıcı hasarlara neden olabileceğinden, daha duyarlı sağlık politikaları ile toplumun bilinçlendirilmesi de önemlidir.

Anahtar kelimeler: Dermatopatoloji, COVID-19, malign melanom, bazal hücreli karsinom, skuamöz hücreli karsinom

1. INTRODUCTION

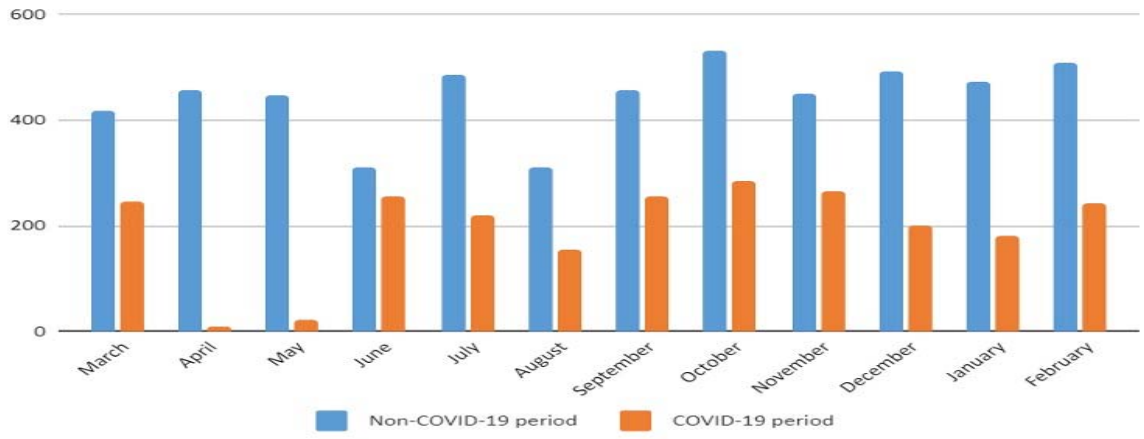
SARS-CoV-2 virus infection (COVID-19) was first observed in China in the last months of 2019. In the following months, the infection spread all over the world. In March 2020, the World Health Organization announced the existence of a pandemic1, one that has caused major health challenges so far. On March 11, 2020 the first case appeared in Turkey. In Turkey, the lockdowns started in March and continued intermittently over a period of one and a half years. The COVID-19 pandemic has had a profound impact on healthcare workers worldwide, including in dermatology and pathology. There have been several challenges for healthcare workers, such as an increased workload in both COVID-19 clinics and their departments.

Skin disorders are among the most prevalent human diseases; they affect 30–70% of individuals.2 Cutaneous lesions can be divided into three groups: benign, premalignant, and malignant. Malignant dermatological lesions can be divided into two main categories: melanocytic and keratinocytic cancers.

Despite the low metastatic potential of keratinocytic tumors, melanocytic tumors are one of the most aggressive skin tumors; because they can metastasize and have a high mortality at an advanced stage. Therefore, early diagnosis and not delaying the diagnosis period are of vital importance.

Given the continuing priority on limiting the spread of COVID-19, face-to-face outpatient appointments were mostly temporarily canceled. Furthermore, there remained a cohort of patients who had been awaiting an urgent dermatology consultation, who likely could not wait for the period of isolation to end. Under these conditions, admitted patient numbers, excision/biopsy numbers, and malignant/benign ratios were influenced as expected. This study aimed to analyze the differences in the diagnoses of the radically excised skin tumors or skin biopsies in the dermatopathology unit in our hospital, during and before the pandemic.

Figure 1: Comparison of number of the cases due to non-COVID-19 and COVID-19 period



MATERIAL AND METHOD

2.1. Study design and participants

A cross-sectional study was conducted by analyzing the diagnostic data obtained from the Dermatopathology unit of our hospital between September 2018 (18 months before the COVID-19 pandemic measures were taken in Turkey) and August 2021 (18 months after the COVID-19 pandemic measures were taken). Pathological samples came to our pathology department mainly from dermatology and plastic surgery, and rarely from general surgery department. Two study periods were determined for comparison. The period of September 2018-February 2020 was defined as the pre-pandemic period since the first proven case in Turkey emerged on March 11, and COVID-19 measures were started to be taken after this date. The period from March 2020 to August 2021 was defined as the pandemic period. All data were collected from the hospital database. After the data were collected, the number of cases, histopathological diagnosis type and frequency were analyzed. Malignant cases were classified as SCC, BCC and MM.

Cases with soft-tissue lesions and skin metastasis of internal organ malignancies were excluded. According to this criteria, 11,847 cases were

included and 3524 cases were excluded.

2.2. Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows, version 22.0 from Chicago, IL, USA. The association analysis was assessed using Pearson's chi-square. For all analyses, two-tail $p \leq .05$ were considered statistically significant.

2.3. Ethical approval

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to

3. RESULTS

Of the 11,501 total cases, 7602 were established during the non-COVID-19 period and 3899 cases were established during the COVID-19 period. On a monthly basis, during the non-COVID-19 period there were 422 cases, however this dropped to 217 cases during the COVID-19 period (Figure 1). The mean age was 47.6 years during the non-COVID-19 period, and for the COVID-19 period the mean age was 46.5. As for gender, 4271 (56.1%) of the patients were female and 3331 (43.8%) patients were male during the non-COVID-19 period, and 1959 (50.2%) of the patients were female and 1940 (49,8%) patients were male during the COVID-19 period. The female/male ratio was 1.3 during the non-COVID-19 period, however this ratio dropped to 1.02 in the COVID-19 period.

During the non-COVID-19 period, 592 (7.8%) out of 7602 cases were malignant; in the COVID-19 period, 439 (11.3%) out of 3899 cases were malignant (Figure 2). On a monthly basis, during the non-COVID-19 period, there were 33 malignant cases, however this dropped to 24 malignant cases during the COVID-19 period. However, the total percentages of malignant cases were significantly increased during the COVID-19 period when compared with non-COVID-19 period ($p < .001$) despite the reduction in the case numbers.

Among all the evaluated patients, fifty-one (0.6%) cases were diagnosed as malignant melanoma (MM), 409 (5.4%) cases were diagnosed as basal cell carcinoma (BCC), and 132 (1.7%) cases were diagnosed as squamous cell carcinoma (SCC) in the non-COVID-19 period. Twenty-nine (0.7%) cases were diagnosed as malignant melanoma, 283 (7,3%) cases were diagnosed as BCC, and 127 (3,3%) cases were diagnosed as SCC in the COVID-19 period (Figure 3). Despite the serious reductions in the number of patients during the COVID-19 period, among all cases, the percentages of BCC and SCC were increased. When the pre- and post-pandemic periods were compared, a statistically significant difference was found between the number of cases diagnosed with both SCC and BCC (both $p < .001$). However, for MM, there was no significance ($p = .656$).

Time between first diagnosis and radical excision was another evaluated factor. In the non-COVID-19 period, the mean time between biopsy and excision was 2.2 months, however during the COVID-19 pandemic, this time interval dropped to 2 months.

Figure 2: Comparison of number of the malignant and benign cases due to non-COVID-19 and COVID-19 period

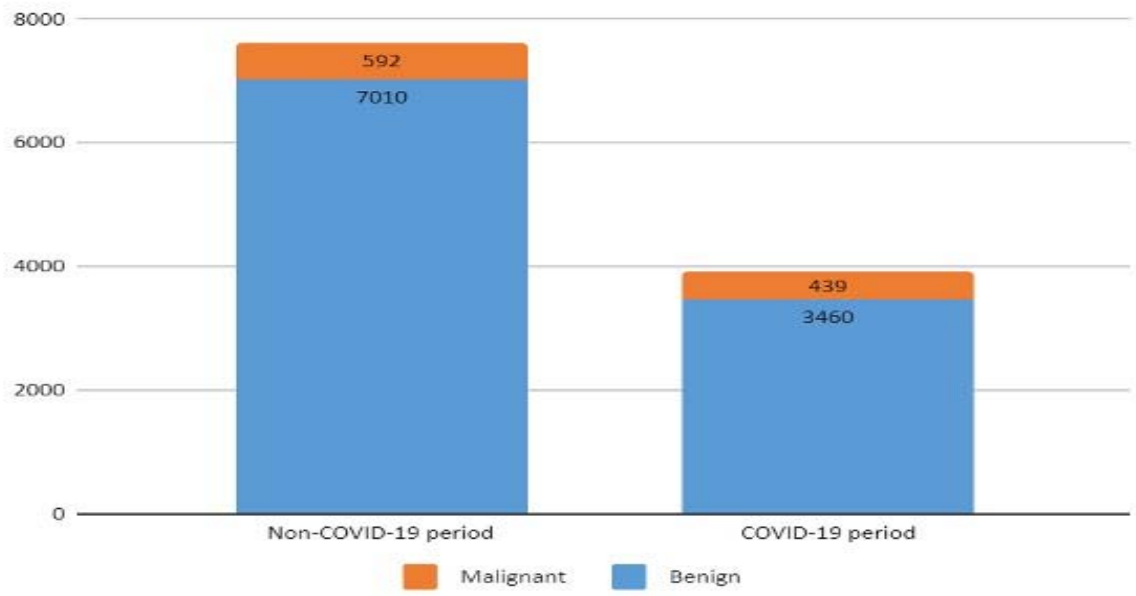
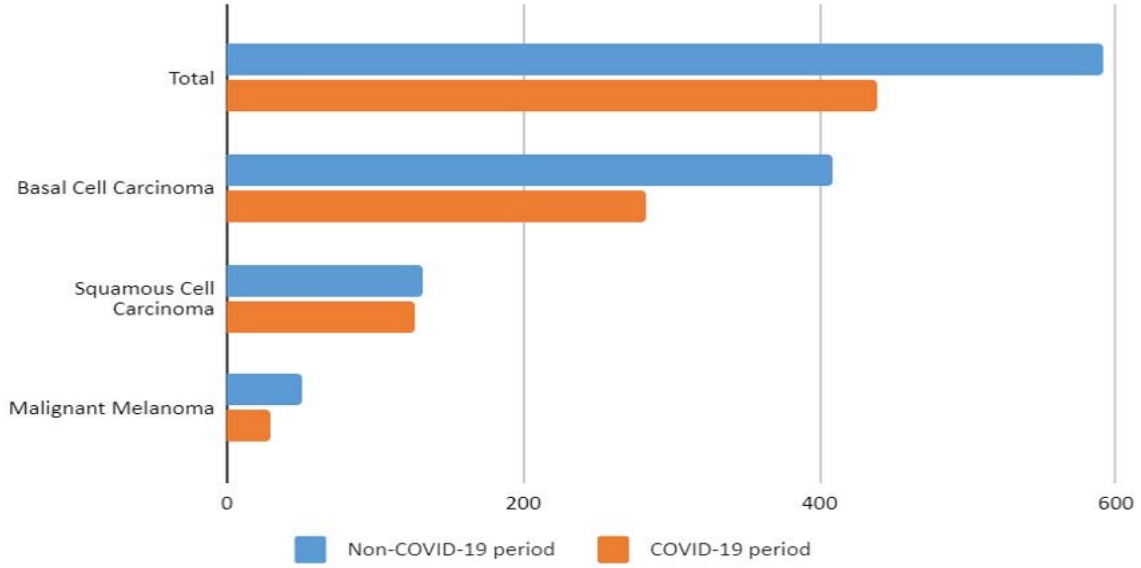


Figure 3: Comparison of number of the malignant cases due to non-COVID-19 and COVID-19 period



4. DISCUSSION

During the COVID-19 pandemic every country has established new procedures and protocols for the treatment and diagnosis and divided their national health facilities into COVID-19 and non-COVID-19 wards. This has led to extreme reductions in non-urgent medical visits, however the impact of pandemic on skin cancer care has not been well described. Dinmohamed et al. suggested a drop in skin cancer diagnosis more than other cancers, however subtype evaluations were not included.3 Ricci et al. suggested diagnostic delay for melanoma in a one institutional series from Italy.4 Asai et al. observed a drastic reduction in skin biopsies and they emphasized the large backlog of skin biopsies. In the study they also mentioned that the reduction in the case numbers disproportionately affected females and the elderly.5 Cocuz et al. also mentioned this decrease in cases and underlined the negative effect on the patients.6 In our institution we also observed the marked reduction of cases especially in the first months of COVID-19 pandemics. The number of total cases significantly decreased from 7602 during the non-COVID period to 3899 during the COVID-19 period. Specifically, there was a large-scale decrease in the second and third months of the COVID-19 period, with only 29 cases in these months and only 2 cases were diagnosed as malignant. Although it has made peaks and troughs during the COVID-19 period, after three months the number of the cases plateaued. However, in our institution we were not able to have the non-COVID-19 period numbers even after 18 months. This number also makes us think about the backlog.

The number of the malignant diagnoses during the COVID-19 period also decreased. Despite the increase in the percentages of the malignant cases, there was a 20,9% decrease in the numbers. However, all cases decreased 48,8%. We may interpret these results as most of this decreasing number of cases are expected to be benign, but still, a significant proportion of malignant patients were not diagnosed in this period, as patients were afraid to come to hospital or due to directing most of the sources and facilities to combat with COVID-19 pandemic. In our cohort mean patient age did not change significantly, although, such as Asai et al. we observed a decrease in the percentage of the female patients compared to the non-COVID-19 period lise Asai et al.

Dermatopathology, especially malignant melanoma, which is the most common subject that pathologists experience malpractice, is a difficult subject for the less experienced dermatopathologists. This situation delays the reporting time and highlights the importance of consultation. Despite the series of protective measures taken in our pathology department, such as working from home and unable to make face to face consultations, since the number of the cases were reduced our reporting time was shortened. This may not be the common experience in the world for the COVID-19 period, however being able to examine less biopsies reduced the workload of the pathology laboratory and examining proportionately fewer less important biopsies also reduced the workload of doctors in our department, so we were able to devote more time to malignant or more complex biopsy specimens. New social

distancing regulations affected face-to-face consultations, although it is useful for controlling the pandemic, to reduce this undesirable effect in our pathology department we adapted to telepathological methods. We used the zoom program and by using a microscopic photograph machine, we simultaneously shared the microscopic views. We became able to consult with the more experienced dermatopathology centers in a more effective and fast method, this also reduced our reporting time. Using telepathology by us especially in consultations helped us to diagnose the cases without delay. Telepathological methods created the opportunity for the pathologists all over the world to consult to the more experienced pathologists easily.

The number of cases after the pandemic (n=3899) has decreased by almost half compared to the number of cases before the pandemic (n=7602), however the percentage of the malignant melanoma cases was not changed significantly (before:0.06%, after:0.07%, p=0,656), for SCC and BCC the percentage of the cases even statistically significantly increased (for SCC, before: 1.7% after: 3.3% $p < .001$; for BCC, before: 5.4%, after: 7.3%, $p < .001$). Therefore, even in pandemics conditions, clinicians and pathologists who are interested in dermatological lesions, should be aware and sensitive about dermatological malignancies. It is also important to raise awareness of the public with more sensitive health policies because any delay during the diagnosis and treatment period may cause fatal consequences or permanent damages for the patients.

5. SONUÇ

The COVID-19 pandemic has been a challenge for all of the medical professionals. During the COVID-19 pandemic, a decrease in number for both benign and malignant skin biopsies was observed. The decrease was majorly from the benign lesions however there were still a significant amount of malignant cases which were not admitted to the hospital. By using the new working techniques such as telepathology we managed to handle the cases by continuing to comply with the restrictions, however the risk of delay for malignant biopsies is still an important issue. Individuals with suspected malignant lesions should be encouraged to seek medical care. Therefore, while the total fight against the pandemic continues, hospitals should make their plans appropriately for dermatopathology patients also. They should take the necessary precautions to handle the sources appropriately for physical examination, biopsy, diagnosis and treatment of these patients.

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6. KAYNAKLAR

1. World Health Organization (WHO) Coronavirus (COVID-19) Dashboard. [(accessed on 7 April 2021)]; Available online: https://covid19.who.int/
2. Hay RJ, Johns NE, Williams HC, Bolliger IW, Dellavalle RP, Margolis DJ, et al. The global burden of skin disease in 2010: an analysis of the prevalence and impact of skin conditions. J of Invest Dermatol, 2014;134(6):1527-1534.
3. Dinmohamed AG, Visser O, Verhoeven RHA, Louwman MWJ, van Nederveen FH, Willems SM, et al. Fewer cancer diagnoses during the COVID-19 epidemic in the Netherlands. The Lancet Oncol. 2020;21(6), 750-751.
4. Ricci F, Fania L, Paradisi A, Di Lella G, Pallotta S, Sobrino L, et al. Delayed melanoma diagnosis in the COVID-19 era: Increased breslow thickness in primary melanomas seen after the COVID-19 lockdown. Journal of the European Academy of Dermatology and Venereology: JEADV. 2020.
5. Yuka A, Nguyen P, Timothy PH. "Impact of the COVID-19 pandemic on skin cancer diagnosis: A population-based study." PloS one 2021;16.3:e0248492.
6. Cocuz IG, Cocuz ME, Niculescu R, Șincu MC, Tinca AC, Sabău AH, et al. The Impact of and Adaptations Due to the COVID-19 Pandemic on the Histopathological Diagnosis of Skin Pathologies, Including Non-Melanocyte and Melanoma Skin Cancers—A Single-Center Study in Romania. Medicina 2021;57(6),53