Annals of Clinical and Analytical Medicine
Original Research

The effect of COVID-19 pandemic period on the diagnosis and treatment process of breast cancer patients

Enes Şahin[1], Mehmet Eşref Ulutaş[2], Kazım Şahin[3], Mehmet Fatih Özsaray[1], Sertaç Ata Güler[1], Turgay Şimşek[1], Nihat Zafer Utkan[1], Nuh Zafer Cantürk[1]
[1] Department of General Surgery, Faculty of Medicine, Kocaeli University, Kocaeli
[2] Department of General Surgery, Derecik State Hospital, Hakkari
[3] Department of General Surgery, Kandira State Hospital, Kocaeli, Turkey

Abstract
Aim: The aim of this study was to determine the effect of the pandemic on breast cancer surgery.
Material and Methods: The study was conducted retrospectively. Breast cancer patients who were operated in 2020 were considered as the pandemic period group, and those operated in the previous year (2019) and the following year (2021) were considered the non-pandemic group. The study was completed by comparing the demographic, pathological and clinical data of the patients.
Results: A total of 78 patients, 31 in 2019, 16 in 2020, and 31 in 2021, were included in our study (p=0.07). Tumour sizes were 2.4 (±1.2) cm in 2019, 2.4 (±1.3) cm in 2020, and 2 (±0.6) cm in 2021 (p=0.23). The tumour was most commonly located on the left side in all years. (p=0.84) The most common tumour type in all years was invasive ductal carcinoma (p=0.62). Breast conserving surgery (BCS) and sentinel lymph node biopsy (SLNB) were performed most frequently in all years. (p=0.07) In 2019, 3.2% (n=1), in 2020, 18.8% (n=3), and in 2021, 19.4% (n=6) of the patients received neoadjuvant treatment (p=0.15). When the preoperative stages were analysed, patients were most commonly stage 1 breast cancer in all years (p=0.71).
Discussion: Our study does not support the information stated by previous studies that the pandemic decreased the rate of breast cancer diagnosis and increased the rate of advanced breast cancer cases. However, when the long-term effects of the pandemic are analysed, it will be much clearer whether these effects are present.

Keywords
COVID-19 Breast Cancer, Pandemic

DOI: 10.4328/ACAM.22252 Received: 2024-05-14 Accepted: 2024-07-02 Published Online: 2024-08-06 Printed: 2024-09-01 Ann Clin Anal Med 2024;15(9):631-634
Corresponding Author: Mehmet Eşref Ulutaş, Department of General Surgery, Derecik State Hospital, Hakkari, Turkey.
E-mail: esref_ulutas@hotmail.com P: +90 332 221 00 00
Corresponding Author ORCID ID: https://orcid.org/0000-0002-9206-4348
Other Authors ORCID ID: Enes Şahin, https://orcid.org/0000-0003-3777-8468 · Kazım Şahin, https://orcid.org/0000-0002-5485-2351
Mehmet Fatih Özsaray, https://orcid.org/0000-0001-9290-4899 · Sertaç Ata Güler, https://orcid.org/0000-0003-1616-9436 · Turgay Şimşek, https://orcid.org/0000-0002-5733-6301
Nihat Zafer Utkan, https://orcid.org/0000-0002-2133-3336 · Nuh Zafer Cantürk, https://orcid.org/0000-0002-0042-9742
This study was approved by the Ethics Committee of Kocaeli University Non-Interventional Clinical Research (Date: 2021-12-16, No: KÜGOKAEK-2021/22.12)

Introduction

COVID-19 pandemic started to show its effect in our country as of March 2020, as it affected the whole world as of December 2019. In this process, many guidelines have been published on how, when and to whom surgical procedures will be performed [1-4]. It was recommended to postpone cases other than emergency cases. It was reported that surgical interventions in patients diagnosed with COVID-19 increased morbidity and mortality [5]. In a meta-analysis, the postoperative mortality rate in COVID-19 patients was reported as 20% [6].

As in the whole world, a series of measures were taken in our country. In hospitals, surgeries other than emergency and cancer surgeries were stopped. Polyclinics were organised to examine a limited number of patients. The work of radiology units was restricted. Hospital ward and intensive care occupancy rates across the country increased significantly in favour of COVID-19 disease. During this period, both the restriction of elective health services provided by hospitals and the fear of patients getting COVID-19 disease caused delays in the diagnosis and treatment of some diseases. It is thought that one of these may be breast cancer.

Breast cancer ranks first among the cancer types seen in women. It is the cause of 10.3 per cent of cancer-related deaths. Within the scope of the national health screening programme for breast cancer in Turkey, mammography is performed every two years in female patients aged 40-70 years. Disruption in the screening programme may cause delays in the diagnosis and treatment processes of newly diagnosed breast cancer patients. It is thought that patients are diagnosed at more advanced stages for these reasons. Again, disruption of surgical and oncological treatments may also cause delays in the treatment of diagnosed breast cancer patients and the progression of cancer stages.

The aim of this study is to compare the demographic, clinical, radiological data, biopsy results, and clinical and pathological stages of patients operated for breast cancer during the pandemic and non-pandemic periods and thus to examine the effect of COVID-19 pandemic on breast cancer surgery.

Material and Methods

Trial Design

This retrospective study was conducted in Kocaeli University Faculty of Medicine, Department of General Surgery. Written informed consent was obtained from all participants. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Participants and Eligibility Criteria

Breast cancer surgery cases performed in our clinic were retrospectively reviewed and patient files were accessed. The date of the first COVID-19 case in our country is 11 March 2020. For this reason, breast cancer patients diagnosed and operated in 2020 after this date were determined as the pandemic period group. Patients treated in the previous year (2019) and the following year (2021) were considered non-pandemic periods.

No elective surgical procedures could not be performed in our clinic between 16 March 2020 and 11 May 2020, and gradual normalisation was achieved in the following period. In our centre, preoperative PCR test was routinely performed from patients to be operated during the pandemic period. All patients included in the study consisted of patients in whom COVID-19 infection was ruled out by PCR test or computerised thorax tomography. Patients with incomplete data were not included in the study.

Inclusion criteria: patients who underwent surgery for breast cancer on the specified dates, patients over 18 years of age.

Exclusion criteria: Patients under 18 years of age, patients operated for breast cancer outside the specified dates, patients diagnosed with COVID-19, patients with incomplete data.

Outcomes

Demographic data such as age, gender, mammography, ultrasonography, magnetic resonance imaging, positron emission tomography, biopsy and pathology results, whether they received neoadjuvant chemotherapy, preoperative and postoperative stages were recorded. The data of the patients for these three years were compared.

Statistical Analysis

At the beginning of the statistical analysis, Kolmogorov-Smirnov and Shapiro-Wilk normality tests were performed. If normality could not be achieved even in one of the groups, non-parametric methods were used. Then, Mann-Whitney U test was used to compare the variables obtained by measurement between the groups. Chi-square and Fisher Extract tests were used to analyse associations or differences between groups for categorical variables. Analysis of variance (ANOVA) was performed for multiple group comparisons. Bonferroni and Tamhane- T2 tests were used according to whether the variances were homogeneous or not, respectively. Comparative results between groups and other demographic characteristics were presented with the ratio of qualitative variables. Quantitative variables were presented as mean (standard deviation). Statistical Package for Social Sciences (SPSS), version 22.0 (SPSS Inc., Chicago, IL, USA) was used for the analysis and $p < 0.05$ was accepted as the limit of statistical significance.

Ethical Approval

This study was approved by Kocaeli University Non-Interventional Clinical Research Ethics Committee (Date: 2021-12-16, No: KÜGOKAEK-2021/22.12).

Results

A total of 78 patients, 31 in 2019, 16 in 2020, and 31 in 2021, were included in our study. (p=0.07) All patients were female. The mean age of the patients operated in 2019 was 55.1 (±12.1), 57.3 (±11.9) in 2020, and 54.1 (±10.2) in 2021 (p=0.66) (Table 1).

Tumour sizes were 2.4 (±1.2) cm in 2019, 2.4 (±1.3) cm in 2020, and 2 (±0.6) cm in 2021. (p=0.23) The tumour was most commonly located on the left side with 58.1% in 2019, 62.5% in 2020, and 51.6% in 2021 (p=0.84) (Table 1).

When pathological diagnoses were examined, the most common tumour type was invasive ductal carcinoma in all years. (p=0.62) When the surgical procedures performed were examined, breast conserving surgery (BCS) and sentinel lymph node biopsy (SLNB) were performed most frequently in all years. (p=0.07) 3.2% (n=1) of patients in 2019, 18.8% (n=3) of

patients in 2020, and 19.4% (n=6) of patients in 2021 received neoadjuvant treatment (p=0.15) (Table 1).

When preoperative staging was analysed, the most common stage 1 breast cancer was seen in all years (p=0.71), followed by stages 2A and 2B. When the postoperative stages were analysed, the most common breast cancer cases were stage 2A in 2019, stage 2A in 2020, and stage 1 in 2021 (p=0.88) (Table 2).

Discussion

The COVID-19 pandemic seriously affected elective surgeries and cancer surgery almost all over the world. In this time period, issues such as postponing elective surgeries and prioritising options such as neoadjuvant treatment for malignancies came to the agenda. It was a matter of curiosity how malignancies of organs such as breast and colon, where screening was used effectively, were affected by this pandemic. The most important reason for this was seen to be the fact that patients applied to screening tools less frequently due to fear of contamination and the disruptions in the screening programmes of hospitals.

Table 1. Demographic, clinical and pathological data

	2019	2020	2021	p
Age	55.1 (±12.1)	57.3 (±11.9)	54.1 (±10.2)	0.66
Gender (Femala / Male)	31 / 0	16 / 0	31 / 0	-
Tumour Size (cm)	2.4 (±1.2)	2.4 (±1.3)	2 (±0.6)	0.23
Tumour Location				0.84
Right	13 (%41.9)	6 (%37.5)	15 (%48.4)	
Left	18 (%58.1)	10 (%62.5)	16 (%51.6)	
Neoadjuvant Treatment	1 (%3.2)	3 (%18.8)	6 (%19.4)	0.15
Tumour Type				0.62
İnvasive ductal carcinoma	29 (%93.5)	14 (%87.6)	29 (%93.5)	
İnvasive lobular carcinoma	1 (%3.2)	2 (%12.5)	2 (%6.5)	
İnvasive medullary carcinoma	1 (%3.2)	0	0	
Surgical Procedure				0.07
Mastectomy and SLNB	3 (%9.7)	2 (%12.5)	4 (%12.9)	
MRM	2 (%6.5)	1 (%6.3)	2 (%6.5)	
BCS and ALND	2 (%6.5)	1 (%6.3)	11 (%35.5)	
BCS and SLNB	24 (%77.4)	12 (%75.1)	14 (45.1)	

SLNB: sentinal lymph node biopsy, MRM: modified radical mastectomy, ALND: axillary lymph node dissection, BCS: breast conserving surgery

Table 2. Stages of patients

Stage				
Preoperative Stage				0.71
Stage 1	16 (% 51.6)	8 (%50)	18 (%58.1)	
Stage 2A	11 (% 35.5)	6 (%37.5)	6 (%19.4)	
Stage 2B	4 (% 12.9)	1 (%6.3)	5 (%16.1)	
Stage 3A	0	1 (%6.3)	1 (%3.2)	
Stage 3B	0	0	1 (%3.2)	
Postoperative Stage				0.88
Stage 1	11 (%35.5)	6 (%37.5)	12 (%38.7)	
Stage 2A	13 (%41.9)	8 (%50)	10 (%32.3)	
Stage 2B	6 (%19.4)	1 (%6.3)	7 (%22.6)	
Stage 3A	1 (%3.2)	1 (%6.3)	1 (%3.2)	
Stage 3B	0	0	1 (%3.2)	

One of the review studies in the literature on this subject reported a decrease in the volume of breast screening programmes and the number of newly diagnosed breast cancer patients [7]. This effect was also reported in many other systematic reviews on the impact of the pandemic on cancer health services. In one of them, it was reported that there were significant decreases in the rate of cancer screening and cancer diagnosis and an increase in advanced cancers [8]. In another review, it was found that the delay and disruption attributed to the pandemic was significant (up to 79%) for all cancers [9]. In a study conducted in our country, it was reported that the number of patients decreased during the pandemic and there was a significant increase in the number of stage IV patients [10]. In our study, the number of breast cancer surgeries decreased by half during the pandemic period compared to other years. However, this decrease was not statistically significant. (p=0.07) The reason for this may be both the late or non-admission of patients to hospitals due to fear of infection and the disruptions in elective surgeries and cancer surgeries due to the pandemic burden in hospitals. The increase in breast cancer stage reported in other studies could not be demonstrated in our study. There was no significant difference in preoperative and postoperative stages between the three years. Stages 1 and 2A were the most common breast cancer stages in all years. Vanni et al. reported that there was no difference in tumour size between the pandemic period and before the pandemic. In this study, tumour diameter was found to be 12 mm (6-80 mm) in the pandemic period and 13 mm (4-90 mm) in the pre-pandemic group [11]. In our study, no significant difference was observed between the groups in terms of tumour diameter, which supports this information.

Syed et al. reported that breast cancer cases were predominantly on the right side (58.2%) before the pandemic, while cancer was seen equally on both sides (50%) after the pandemic. [12] In our study, left-sided breast cancer cases were more common in all years.

Vanni et al. reported that ductal carcinoma was the most common type of cancer both before (76%) and during (63%) the pandemic. In our study, invasive ductal carcinoma was the most common type of cancer in all years. In the same study, the rate of neoadjuvant treatment recipients was reported to be 9.3% both during and after the pandemic [11]. In our study, the number of neoadjuvant treatment recipients increased each year compared to the previous year, but no statistically significant difference was found.

In one of the previous studies, it was reported that there was no difference in the rates of mastectomy and breast-conserving surgery performed during the pandemic period and the pre-pandemic period. In the same study, the rate of ALND performed during the pandemic period was found to be 28.6%, which was significantly higher than the previous period (20%) [12]. In our study, no significant difference was found between the groups in terms of surgical procedures performed.

Conclusion

Our study does not support the information stated by previous studies that the pandemic decreased the rate of breast cancer diagnosis and increased the number of advanced breast cancer cases. However, when the long-term effects of the pandemic

are examined, it will be much clearer whether these effects are present. In order to balance these negative effects of the pandemic, it is of great importance to continue cancer screening, especially in isolated departments where COVID-19 transmission measures are taken more intensively in each centre.

The most important limitation of the study is that it is retrospective and the number of cases is low.

Limitation

The most important limitations of the study are that it is retrospective and the number of cases is small.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and Human Rights Statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or compareable ethical standards.

Funding: *None*

Conflict of Interest

The authors declare that there is no conflict of interest.

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How to cite this article:
Enes Şahin, Mehmet Eşref Ulutaş, Kazım Şahin, Mehmet Fatih Özsaray, Sertaç Ata Güler, Turgay Şimşek, Nihat Zafer Utkan, Nuh Zafer Cantürk*. The effect of COVID-19 pandemic period on the diagnosis and treatment process of breast cancer patients. Ann Clin Anal Med 2024;15(9):631-634*

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