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Anxiety and Fear of Breast Cancer Patients During and After the COVID-19 Era

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Abstract. *Background/Aim: Coronavirus-19 (COVID-19) pandemic had a huge impact on medical resource allocation. While it is clear that the surgery refusal rate of patients with breast cancer (BC) was higher during the pandemic, long-term effect of COVID-19 pandemic on hospital admission in the post-pandemic period has not been fully evaluated. This study aimed to estimate how patients' behavior changed following the pandemic and whether the cross-infection risk is still influencing patients' decision-making process. Patients and Methods: Between the 16th of January and 18th of March 2020, between 19th of March 2020 and the 20th of March 2020, and between 19th of March 2023 and the 20th of March 2023, 266 patients were enrolled and divided into PRE-COVID-19, COVID-19, and POST-COVID-19 groups, respectively. A total of 137 patients with a suspected breast lesion (SBL) were divided into 3 groups: PRE-COVID-19-SBL, COVID-19-SBL, and POST-COVID-19-SBL groups. In addition, 129 BC patients were divided into PRE-COVID-19-BC, COVID-19-BC and POST-COVID-19-BC groups. Patient characteristics including age, marital status, SBL/BC diameter, personal and family history of BC, clinical stage and molecular subtype were recorded. Procedure refusal (PR) and Surgical refusal (SR) were also recorded with their reason. Results: BC and SBL analysis showed no difference in pre-treatment characteristics (p>0.05). While higher rate of PR and SR rates were reported in COVID-19-SBL and COVID-19-BC groups when compared with PRE-COVID-19 (p=0.003, p=0.013, respectively) and POST-COVID-19 (p=0.005, p=0.004, respectively) groups, no statistical difference was found between PRE-COVID-19 and POST-COVID-19 subanalysis. Conclusion: Thanks to preventive measures, COVID-19 does not currently seem to affect the decision-making process of patients with BC.*

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Coronavirus 2019 (COVID-19) disease emerged in late 2019 in Wuhan province and was declared by the WHO as a pandemic in March 2020 (1). Currently, COVID-19 has been confirmed in more than 760 million cases with nearly 7 million deaths worldwide (2). During the first outbreaks, to reduce human-to-human transmission, fatality rate, and health care facility burden, social distancing, lockdown policies, and temporary measures were designed and applied in many countries (3-5).

In that period, resource reallocation led to the creation of hospitals partially or totally dedicated to COVID-19 patients with a detrimental effect on elective, semi-elective or urgent treatments (6). In order to prevent immediate and long-term effects of the pandemic, physicians designed temporary measures to maintain an acceptable level of care in non-COVID-19 patients (7-9). While vaccination campaigns, new treatments, and the rise of milder COVID-19 variants changed

the clinical presentation of the disease and reduced COVID-19 hospital burden, frail patients, as oncological patients, experienced the detrimental effect of resources reallocation and high cross-infection risk in health care facilities, sometimes even avoiding hospital admission (10-12).

Breast cancer (BC) is the leading diagnosis worldwide among oncological disease with more than 2.3 million diagnoses per year (13). Similar to other non-COVID-19 diseases, during the first wave, a 20% mean reduction of BC surgical procedures was calculated due to resources reallocation and patients' refusal (14, 15). In fact, in our previous analysis we reported how COVID-19 imposed (14, 15). In fact, in our previous analysis we reported how COVID-19 imposed a higher rate of surgical treatment refusal in the highest peak of the pandemic, specifically due to the risk of COVID-19 cross-infection (12). However, while social distancing and lockdown measures were lifted in many countries and non-COVID-19 activity is comparable to the period prior to the pandemic, long-term effects of the pandemic on hospital admission in post-pandemic period has not been fully evaluated.

Therefore, the aim of the present study was to evaluate how BC patients' behavior changed after the pandemic and if the cross-infection risk is still influencing patients' decision-making process regarding their oncological treatment.

Patients and Methods

Study design. A monocentric retrospective study was designed. Primary endpoints of the study were the evaluation of refusal rate among patients with BC in three different study periods (pre-COVID-19; COVID-19 period, and post-COVID-19). The three different timeframes were determined as follows: Pre-COVID-19 period from 18th of January 2020 until 18th of February 2020; COVID-19 period from 18th of February 2020 until 20th of March 2020; Post-COVID-19 period from 18th of February 2023 until 20th of March 2023. February 18, 2020 was set as the cut-off day, when the first Italian non-imported case of COVID-19 was registered. Post-COVID-19 was set in 2023 as social distancing measures were partially maintained through the first half of 2022 in Italy (16). The institutional review board of Policlinico Tor Vergata waived the need for a formal approval because of the retrospective descriptive design.

Population. Primary inclusion criteria were patients admitted to the Policlinico Tor Vergata outpatient Breast center facilities during the study period. Prior to their first visit, all our patients routinely sign an informed consent for clinical practice data analysis. Study groups were divided into suspected breast lesion (SBL) group and BC group.

SBL group inclusion criteria were complete imaging evaluation of the breast according to age and a diagnosis of Breast-Imaging Reporting and Data System (BI-RADS) 4 lesion requiring core needle biopsy (CNB) or vacuum assisted biopsy (VAB), or any benign breast lesion amenable for treatment with CNB/VAB after re-evaluation by our Breast Expert Radiologists (17, 18). In our clinical practice, when indicated, our patients went through an 8-gauge VAB to reduce the need for further treatment in case of benign lesions (19-21).

BC group inclusion criteria were complete imaging evaluation of the breast according to age and a non-metastatic breast cancer (Tis-T4; N0-3; M0) requiring surgery after multidisciplinary discussion, prior to or after systemic treatment.

Data collection. Historical information was gathered from the patient records of both cohorts, encompassing age, personal and familial breast cancer (BC) history, and marital status, a factor proven to influence patients' choice-making and surgical refusal (22-24). We maintain a practice of employing 8-gauge VAB, when appropriate, to lessen the requirement for additional treatment in instances of benign lesions (19-21).

During the COVID-19 crisis, telephonic interviews were conducted with all patients to assess information relevant to infection risk, as mandated by our health facilities. We thoroughly examined mammographic (MMG), ultrasound (US), and magnetic resonance (MR) images on a Picture Archiving and Communication System (PACS) workstation (Carestream, Genova, Italy). Two experienced radiologists independently reviewed these images without prior knowledge of the case details.

Within the suspected breast lesion (SBL) study group, each lesion was classified according to BI-RADS vocabulary and its maximum recorded diameter. Procedure refusal (PR) rate of CNB/VAB was noted from our medical records. Patients have the right to refuse CNB/VAB either during an outpatient visit by signing a document or over the phone, followed by an email confirmation.

As per our institutional guidelines, patients who declined two separate appointments were subsequently added to a waitlist. The imaging data was utilized to determine the clinical stage, following the American Joint Committee on Cancer (AJCC) 2018 guidelines for TMN categorization. Due to the small sample size, clinical stages were treated as a binary variable, either early breast cancer (EBC) or locally advanced breast cancer (LABC), in accordance with NCCN guidelines (25).

For the BC group, data derived from preoperative biopsy (CNB/VAB) or fine needle aspiration cytology (FNAC) was compiled. Additionally, administration of neoadjuvant chemotherapy was included as a variable within the BC group.

For patients who underwent CNB/VAB, pathological examination data, such as the expression of estrogen receptor (ER), progesterone receptor (PR), and protein Ki67 expression, were represented as a percentage of positive cells in specimens examined through immunohistochemistry. The overexpression of the human epidermal growth factor receptor (Her2) gene (HER2 SCORE) was determined using either IHC or FISH, following the 2018 ASCO/CAP guidelines.

Owing to the small sample size, clinical intrinsic subgroups were treated as a binary variables: luminal (LUM) and non-luminal (NLUM). Surgery refusal (SR) rates were assessed in a similar manner as previously described for procedure refusal rates.

Statistical analysis. For statistical analysis, all data was inputted into an EXCEL datasheet (Microsoft, Washington, DC, USA). Known factors that may influence patients' decision-making were incorporated into the analysis. Means and ranges were calculated for continuous variables, and *t*-test was employed to identify significant differences between the means of the two groups' confounding variables.

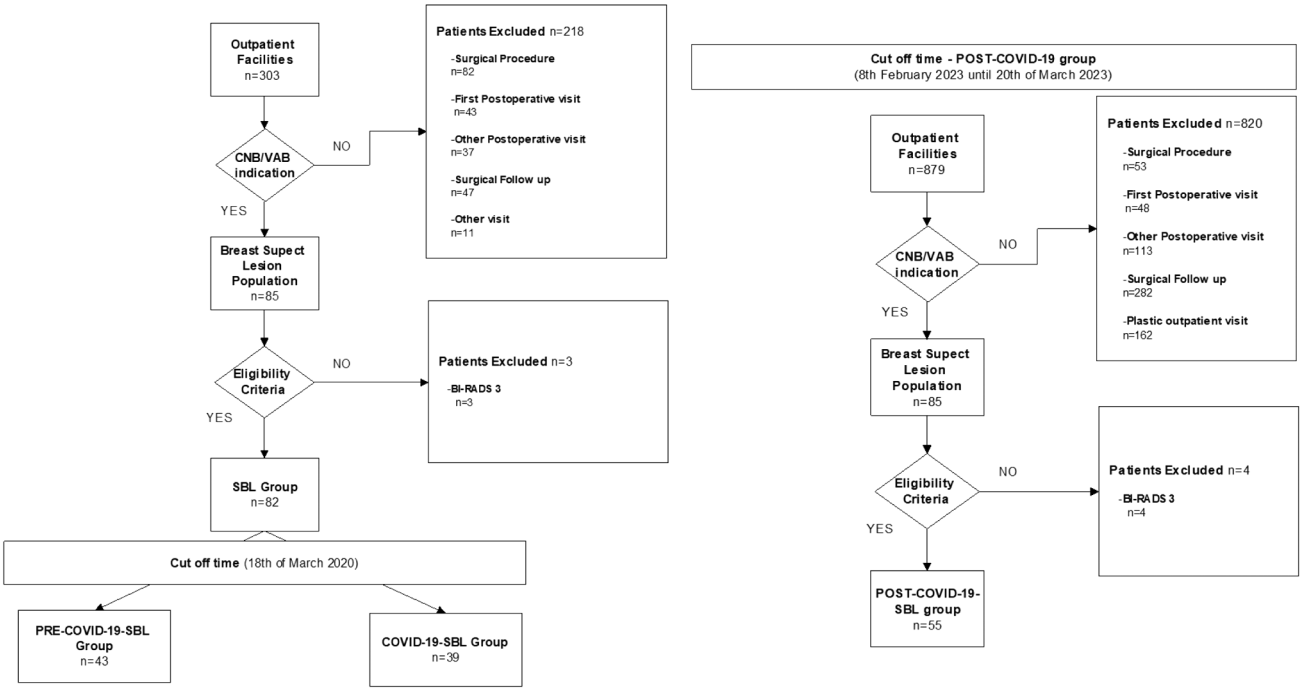

Figure 1. *Suspect breast lesion (SBL) study population. CNB: Core needle biopsy; VAB: vacuum assisted biopsy; BI-RADS: Breast-Imaging Reporting and Data System.*

Categorical data was recoded numerically and as percentages. The Fisher's exact test and the Monte Carlo test were used for analysis, with variables of interest (PR and SR) assigned values of either 0 when patients refused procedures or surgery or 1 when accepted. The influence of COVID-19 on these variables was assessed using Fisher's exact test in combination with Monte Carlo analysis. Variables with assigned p-values <0.05 were deemed statistically significant. The statistical analysis was conducted using the SPSS statistical package version 23.0 (SPSS Inc., Chicago, IL, USA).

Results

SBL group. A total of 303 admissions to the outpatient facility were considered for enrollment between 18th January 2020 until 20th of March 2020. Between the pre-COVID-19 and COVID-19 period, a total of 218 were excluded from the analysis: 82 patients underwent surgical procedures, 43 first postoperative visit, 37 further postoperative visit, 47 surgical follow up, 11 were scheduled to another visit, and 3 patients were excluded on account of the enrollment criteria. Therefore, a total of 43 patients were included in the PRE-COVID-19-SBL group and 39 in the COVID-19-SBL group. A total of 879 admissions to the outpatient facility were registered from 18th February 2023 until 20th of March 2023. In the post-COVID-19 period, a total 820 patients were excluded from the analysis: 53 patients underwent surgical procedures, 48 first postoperative visit, 113 further postoperative visit, 282 surgical follow up, 162 were scheduled for plastic surgery in the outpatients unit. Moreover, 4 patients were excluded based on the inclusion criteria. Therefore, a total of 55 patients were included in the POST-COVID-19-SBL group. Figure 1 describes the distribution of the SBL Study Group.

Among PRE-COVID-19, COVID-19 and POST-COVID-19 groups, no statistically significant differences were recorded regarding demographic variables such as age, diameter of SBL, personal and family history of BC. Table I summarizes the findings showing homogeneity in both groups regarding these potential confounding factors. BI-RADS grouping showed no statistically significant differences between the three different periods of analysis (p=0.452) (Table II). Nonetheless, while statistically significant differences were found in the PR rate between the PRE-COVID-19 and COVID-19 periods (p=0.003), between the COVID-19 and POST-COVID-19 periods (p=0.0005), and between groups (p=0.0003), no statistically significant difference was found between PRE-COVID-19 and POST-COVID-19 period (p=0.715) (Table III).

PR reasons were recorded in PRE-COVID-19, COVID-19, and POST-COVID-19 periods. In the PRE-COVID-19-SBL group, two patients (50%) sought for a second opinion and subsequently decided to undergo biopsies in another facility, one patient (25%) decided not to undergo CNB/VAB, and one additional case had no recorded reason. Differential

Table I. *Demographic data and possible confounding factors in the suspect breast lesion (SBL) population.*

	PRE-COVID-19-SBL (n=43)	COVID-19-SBL (n=39)	POST-COVID-19-SBL (n=55)	*p*-Value
Age yr (min-max)	57.6 (45.87-80.33)	59.5 (39.23-77.57)	57.8 (45.74-82.55)	0.867
Diameter cm (min-max)	1.2 (0.6-3.0)	1.3 (0.7-3.3)	1.56 (0.8-4.3)	0.675
Family history of BC (%)				
Yes	10 (23.26%)	8 (20.51%)	13 (23.63%)	0.931
No	33 (76.74%)	31 (79.49%)	42 (76.36%)	
Personal history of BC (%)				
Yes	1 (2.38%)	0 (0%)	3 (5.45%)	0.664
No	42 (97.62%)	39 (100%)	52 (94.54%)	
Marital Status (%)				
Yes	35 (85.37%)	36 (92.31%)	48 (87.27%)	0.341
No	8 (14.63%)	3 (7.69%)	7 (12.72%)	

Continuous data are expressed as means and ranges (within brackets). Categorical data are expressed as percentages (within brackets). *p*-Values were calculated using student's *t*-test and Fisher's exact test or Montecarlo Test. BC: Breast cancer.

Table II. *Population distribution according to BI-RADS classification and second opinion after core needle biopsy/vacuum assisted biopsy suggestion.*

	PRE-COVID-19-SBL (n=41)	COVID-19-SBL (n=37)	POST-COVID-19-SBL (n=55)	*p*-Value
BI-RADS				
4	25 (58.14%)	27 (69.24%)	38 (69.09%)	0.452
5	18 (41.86%)	12 (30.76%)	17 (30.90%)	
Second opinion				
REQUESTED	1 (9.30%)	3 (7.69%)	5 (9.09%)	0.446
Not REQUESTED	38 (90.70%)	36 (92.30%)	50 (90.90%)	

Percentages are shown within brackets. *p*-Values were calculated using Fisher's exact test. SBL: Suspect breast lesion; BI-RADS: breast imaging reporting and data system.

Table III. *Acceptance and refusal rates of core needle biopsy/ vacuum assisted biopsy (CNB/VAB) in the PRE-COVID-19-SBL and POST-COVID-19-suspect breast lesion (SBL) groups.*

	PRE-COVID-19-SBL (n=43)	COVID-19-SBL (n=39)	POST-COVID-19-SBL (n=55)	*p*-Value between groups	*p*-Value PRE-COVID-19 and COVID-19	*p*-Value COVID-19 and POST-COVID-19	*p*-Value PRE-COVID-19 and POST-COVID-19
Acceptance of CNB/VAB procedure							
Acceptance	39 (90.70%)	25 (64.10%)	51 (92.73%)	0.0003	0.003	0.0005	0.715
Refuse	4 (9.30%)	14 (35.90%)	4 (7.27%)				

p-Values were calculated using Fisher's exact test.

distribution of PR rate was observed among COVID-19-SBL group: three patients (21.42%) requested a second opinion, three (21.42%) patients mentioned COVID-19 in the refusal form and eight (54.14%) patients did not provide any reason or the data was missing. A total of four patients in the POST-COVID-19-SBL group refused procedure. Two patients (50%) sought for a second opinion and subsequently decided to undergo biopsies in another facility, one patient (25%) decided not to undergo CNB/VAB, and one additional case (25%) had no recorded reason. However, second opinion desires did not demonstrate any statistically significant difference in distribution between groups (p=0.446).

BC group. A total of 303 admissions to the outpatient facility were considered for enrollment between 18th January 2020 until 20th of March 2020. Between pre-COVID-19 and COVID-19 period, a total of 223 patients were excluded from the analysis: 85 patients underwent CNB/VAB, 43 first

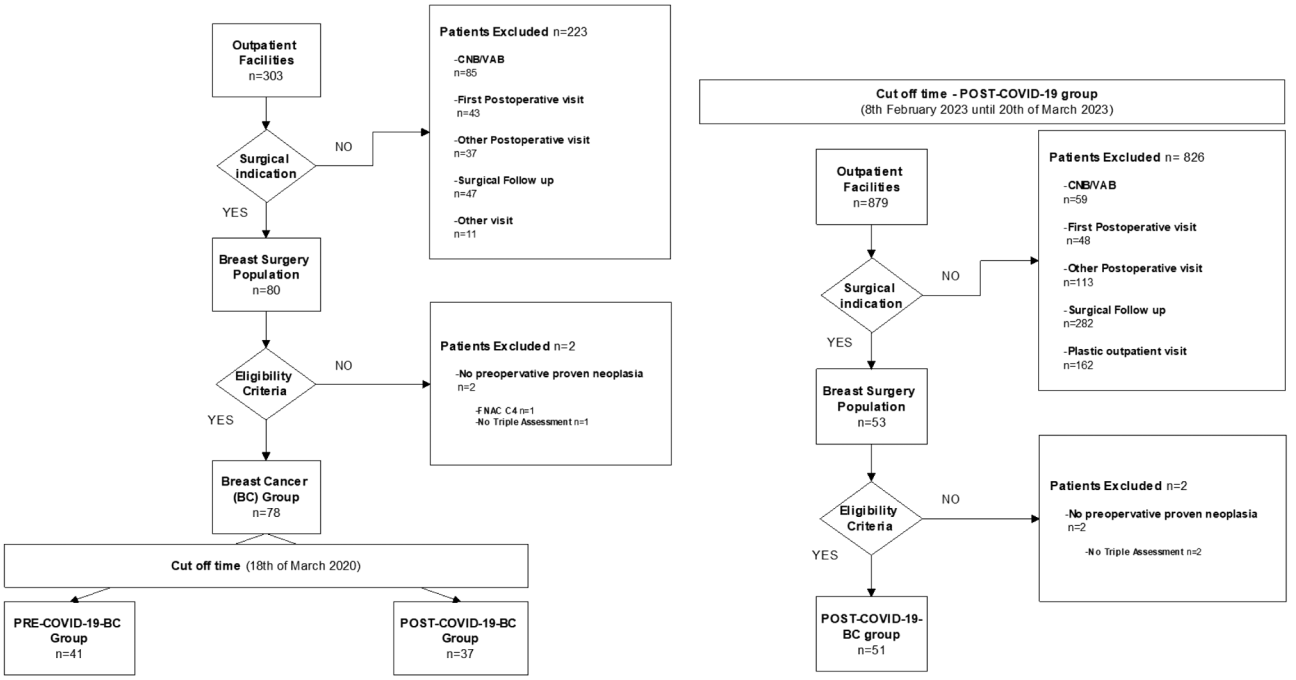

Figure 2. *Breast cancer (BC) study population. CNB: Core needle biopsy; VAB: vacuum assisted biopsy; FNAC: fine needle biopsy.*

Table IV. *Demographic data and possible confounding factors in the breast cancer (BC) population.*

	PRE-COVID-19-BC (n=41)	COVID-19-BC (n=37)	POST-COVID-19 BC (n=51)	*p*-Value
Age yr (min-max)	64.26 (45.03-86.11)	61.2 (43.44-78.54)	63.23 (44.34-76.78)	0.668
Diameter cm (min.-max)	1.98 (0.7-3.3)	2.3 (0.9-5.8)	1.2 (0.5-3.3)	0.228
Family history of BC (%)				
Yes	7 (18.91%)	11(26.83%)	14 (27.45%)	0.616
No	30 (81.09%)	30 (73.17%)	37 (72.55%)	
Personal history of BC (%)				
Yes	0 (0%)	1 (2.44%)	3 (5.88%)	0.624
No	37(100%)	40 (97.56%)	48 (94.11%)	
Marital Status (%)				
Yes	29 (78.38%)	38 (92.68%)	45 (88.23%)	0.163
No	8 (21.62%)	3 (7.32%)	6 (11.76%)	
NAC				
Yes	5 (13.51%)	4 (9.75%)	10 (18.18%)	0.403
No	32 (86.49%)	37 (90.25%)	41 (81.81%)	

Continuous data are expressed as means and ranges (within brackets). Categorical data are expressed as percentages (within brackets). *p*-Values were calculated using student's *t*-test and Fisher's exact test or Montecarlo Test. SBL: Suspect breast lesion.

postoperative visit, 37 further postoperative visit, 47 surgical follow up, 11 were scheduled to another visit, and two patients were excluded on account of the enrollment criteria. Therefore, a total of 41 patients were included in the pre-COVID-19-BC group and 37 in the COVID-19-BC group.

A total of 879 admissions to the outpatient facility were registered from 18th February 2023 until 20th of March 2023. In the post-COVID-19 period, a total 826 were excluded from the analysis: 55 patients underwent CNB/VAB, 48 first postoperative visit, 113 further postoperative visit, 282 surgical follow up, 162 were scheduled to plastic surgery outpatients unit. Therefore, a total of 51 patients were included in the POST-COVID-19-BC group. Figure 2 describes the distribution of the SBL study group.

Table V. *Population distribution according to clinical stage, molecular subtype, and request for second opinion in the breast cancer (BC) population.*

	PRE-COVID-19-BC (n=41)	COVID-19-BC (n=37)	POST-COVID-19-BC (n=51)	*p*-Value
Clinical Presentation				
EBC	33 (80.49%)	28 (75.67%)	41 (80.39%)	0.835
LABC	8 (15.51%)	9 (24.33%)	10 (19.60%)	
Missing data	0 (0%)	0 (0%)	0 (0%)	
Molecular Subtype				
LUM	31 (75.61%)	20 (54.05%)	44 (86.27%)	0.421
NLUM	4 (9.76%)	6 (16.22%)	7 (13.72%)	
Missing data	6 (14.63%)	11 (29.73%)	0 (0%)	
Second opinion				
REQUESTED	2 (5.13%)	2 (5.40%)	4 (7.81%)	0.818
Not REQUESTED	39 (94.87%)	35 (94.60%)	47 (92.16%)	

Percentages are shown within brackets. *p*-Values were calculated using Fisher's exact test. EBC: Early breast cancer; LABC: local advanced breast cancer; LUM: luminal; NLUM: non-luminal.

Table VI. *Acceptance and refusal rate of Surgery in the PRE-COVID-19-BC and POST-COVID-19-breast cancer (BC) groups.*

	PRE-COVID-19-BC (n=41)	COVID-19 (n=37)	POST-COVID-19-BC (n=51)	*p*-Value between groups	*p*-Value PRE-COVID-19 and COVID-19	p-Value COVID-19 and POST-COVID-19	*p*-Value PRE-COVID-19 and POST-COVID-19
Surgery procedure							
Acceptance	39 (94.87%)	28 (76.68%)	49 (96.08%)	0.002	0.013	0.004	0.823
Refusal	2 (5.13%)	9 (24.32%)	2 (3.92%)				

p-Values were calculated using Fisher's exact test.

Analysis of BC confounding factors mentioned above is depicted in Table IV. Marital status, clinical stage, personal and family history of BC were randomly distributed between the three groups. Clinical presentation as LABC did not differ between the three groups, while in the post-COVID-19 population, a slightly higher rate of LABC was reported. Regarding treatment schedule, no cases of SR were reported among patients who underwent FNAC. Finally, no statistically significant differences in distribution according to molecular subtype were found between the groups (p=0.421) as displayed in Table V.

Regarding the primary aim of the study, when SRs were compared among groups, statistically significantly different distributions were found between PRE-COVID-19 and COVID-19 groups (p=0.013), COVID-19 and POST-COVID-19 (p=0.004), and between all groups (PRE-COVID-19 *vs*. COVID-19 *vs*. POST-COVID-19) (p=0.002). However, no statistically significant difference was reported between PRE-COVID-19 and POST-COVID-19 groups (p=0.823). All SR distributions are reported in Table VI. Addressing specific refusal reasons among patients, in PRE-COVID-19 group all three (4.87%) patients sought a second opinion and underwent surgery in other facilities. Similar distribution was reported in the POST-COVID-19 population where two (3.94%) patients refused surgery in our facility, in one (1.96%) case sought for a second opinion and in one (1.96%) case gave no reason. Differently, a distinct pattern was observed in the COVID-19 BC group. Out of the 9 patients in this group, two (24.32%) requested an external second opinion, while the remaining seven patients cited COVID-19 as the reason for their refusal in writing. In a similar manner to the previous group, we examined the impact of a second opinion on surgical treatment refusals or delays, but no statistically significant difference was found (p=0.818) (Table V).

Discussion

Since the outbreak in China in 2019, the COVID-19 pandemic soon became a great stressor for public health worldwide overwhelming healthcare facilities and requiring reduction of elective and semi-elective treatments to deal with the rising number of COVID-19 patients (26). In order to provide adequate and equal healthcare across the country,

several associations endorsed specific guidelines to reduce the detrimental effect of COVID-19 on non-COVID-19 patients, maintaining a steady activity focusing on high-risk patients, and reducing cross-infection among patients and healthcare workers (27). In fact, during the first waves, many patients voluntarily decided to avoid hospitals so to reduce the risk of COVID-19 infections as much as possible, as reported in our previous retrospective analysis on BC patients (12, 28). In effect, during the first waves of COVID-19, oncological patients were considered at higher risk of COVID-19 severe clinical course (29). Furthermore, even healthcare workers at low risk of COVID-19 infection experienced negative effects on their psychosocial well-being requiring psychological support during the first waves of the pandemic (28). Importantly, while short-term effects of COVID-19 on oncological treatment were largely studied, long-term effects of COVID-19 pandemic on hospital admission has not been fully evaluated, and in the present study we demonstrated how preventive measures, such as social distancing and mass vaccination, reduced the effect of COVID-19 on patients' decision-making process.

Even prior to the pandemic, several authors demonstrated how fear and anxiety may have an impact on patients' decision-making process. According to the SEER database, 0.64% of BC patients refused surgical treatment prior to COVID-19 pandemic (23, 24). Higher age at diagnosis, female sex, ethnicity, type of insurance, LABC (stage II and III BC), non-triple-negative breast cancer, residence areas with a low percentage of high school diplomas were associated with higher rate of SR (30). Moreover, cultural background may represent another key factor linked to surgical refusal, with western countries exhibiting lower rate of SR (Switzerland 1.3%, Canada 1.2%, and USA 0.64%) (22, 24) when compared to developing countries which exhibit higher rate due to the low level of BC awareness, mastectomy rate, and practice of traditional medicine (31, 32). Gaining insight into the reasons why patients decline treatment is essential for improving our ability to identify those who are more likely to reject surgical options and effectively address their concerns (23). In fact, according to a comprehensive retrospective study, the decision to decline surgery had a negative impact on survival, increasing the risk of mortality by 2.42 times (23).

During the highest peak of COVID-19 pandemic, our previous study demonstrated how the fear of COVID-19 contagion was an additional reason of SR by patients presenting with a new SBL or even BC (12, 28). During the pandemic, BC treatment and screening programs delays led to an increase in tumor dimensions, advanced N-staging, and increased need for adjuvant treatments in our patients (26). Temporary guidelines such as favoring awake surgery (33-35), neoadjuvant chemotherapy (36, 37), oncoplastic techniques (38, 39), and prepectoral reconstruction (40) to shorten hospitalization and surgery recovery (41) only partially reduced the harmful effect of the pandemic on patients' anxiety. However, these measures provided additional time until less virulent strains and the introduction of mass vaccination allowed a reduction in morbidity and mortality from COVID-19, allowing a return to normality in the management of the oncological population, as demonstrated by the reduction in refusal rate.

We are aware that our study has some limitations. First, the monocentric retrospective design may have influenced our data, but no prospective data could be recorded prior to the pandemic thus we decided to maintain the retrospective design even in the POST-COVID-19 population for homogeneity. Additionally, the monocentric design allowed to minimize the effect of different COVID-19 incidences on refusal rate among patients. Moreover, the study excluded patients exhibiting COVID-19-like symptoms owing to the telephone triage process prior to admission during the COVID-19 and POST-COVID-19 periods. This decision could potentially introduce a selection bias. However, the exclusion of symptomatic patients was useful for assessing the impact of COVID-19-related anxiety on patients' decision-making processes.

Despite all the limitations, our work demonstrated how nowadays the fear of COVID-19, thanks to the preventive measures against COVID-19, seems not to affect patients' decision-making process in regard to surgery and BC treatment.

Conflicts of Interest

The Authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Authors' Contributions

Study conception and design: Vanni Gianluca, Buonomo Oreste Claudio, Materazzo Marco. Acquisition of data: Pellicciaro Marco, Portarena Ilaria, Marsella Valentina; Analysis of data: Tacconi Federico, Noce Annalisa; Interpretation of data: Vanni Gianluca, Materazzo Marco, Pistolese Chiara Adriana. Article draft: Vanni Gianluca, Materazzo Marco, Caspi Jonathan; Critical revision: Pistolese Chiara Adriana, Alessandra Vittoria Granai; Buonomo Oreste Claudio. Critical Revision of Literature: Pistolese Chiara Adriana.

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