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Cross-sectional Study

Analysing the trends in breast surgery practice during COVID-19 pandemic: A comparative study with the Pre-COVID era

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ABSTRACT

Background: The emergence of coronavirus disease 2019 (COVID-19) pandemic has crippled the healthcare systems all over the world. Cancer treatment is indispensable and disruption in its provision can lead to unanticipated consequences. No local data exists that has quantified the impact of COVID-19 pandemic on breast cancer surgery in a lower middle-income country (LMIC), therefore, the present retrospective comparative cohort study is directed to determine the trends in breast surgery operative volumes and its outcomes at our institution in Pakistan.

Materials and methods: Data was collected retrospectively from Pre-COVID-19 and COVID-19 era to determine impact of the current pandemic on breast cancer management practices and outcomes.

Results: Cohort results showed a decline in the number of surgeries during COVID-19 era. A total 149 cases were operated during study period vs. 231 during same Pre-COVID-19 i.e. a 35.5% drop in cancer surgeries. In early COVID-19 time frame, only 4 patients had breast reconstruction, 12 out of 149 (8.05%) surgical candidates were identified having positive COVID-19 status preoperatively and one ASA class 3 patient caught COVID-19 post-surgery and succumbed to virus.

Conclusion: Pandemic has a negative effect on cancer management in a LMIC with compromised access and care of cancer patients.

1. Introduction

The intractable outbreak of coronavirus disease 2019 (COVID-19) pandemic has made drastic changes in the world of work. Besides a continuous threat to public health, the economic and social rearrangements threatens the long term subsistence and well-being of millions of people. The beta coronavirus or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the infecting pathogen accountable for this fatal ongoing pandemic, had made its first attack in Wuhan, China on 17th November 2019 [1,2]. Since then, it has spread globally claiming 4,666,334 lives and infecting 226,844,344 individuals from all across the globe by 17 September 2021 [3]. The outbreak of COVID-19 has been running a course of rise and fall with new variants and up till now, the world has faced four spells of this contagion with each spell being more severe in intensity and causing more causalities from the preceding one [4].

Pakistan a lower-middle-income nation has a restricted amount of budget to spend on healthcare and coupled with a finite supply of resources is constantly grappling with the third wave of COVID-19 by taking unprecedented measures to counter the deleterious reverberations of its crisis and to prevent itself from being caught in a dreadful situation faced by its neighboring countries like India and Iran [5,6]. As per the government’s official portal, Pakistan has recorded 1,223,841 cases and 27,206 deaths due to COVID-19 by 19 September 2021. Therefore, the government has imported substantial doses of various vaccines effective against COVID-19 in order to curb the perilous spread of this contagion and successfully administered 72,986,511 doses of it in a population of over 212 million people [7].

Since the outset of this disease, the healthcare organizations all over the world have incorporated necessary changes in their system to provide unprejudiced essential health services to every patient and particularly to those battling cancer amidst the current unfurling health crises
as data has clearly underscored the fact that cancer patients can easily become victims of SARS-CoV-2 virus infection and are more prone to develop serious complications as compared to general population [8,9]. As a result, American Society of Breast Surgeons (ASBrS), the National Accreditation Program for Breast Centers (NAPBC), the National Comprehensive Care Network (NCCN), European Society for Medical Oncology (ESMO) and other oncology institutions devised a structured framework on the management approach of breast cancer cases in parallel to conserving resources for utilizing them in the ensuing public health crises spawned by COVID-19 [10,11]. In our previously published work, we concluded that timely implementation of these health policies and multidisciplinary participation in our institution maintained infectivity and fatality at a lowest possible rate among breast cancer cases despite of high constraints to health resources [12].

However, not enough research has explored the change in the breast surgery operative volume brought on by the rapidly evolving nature of the ongoing pandemic. Hence, we conducted a study to assess the consequences of COVID-19 outbreak on the surgical management of breast cancer patients in our institution by comparing the volume of breast surgeries performed and its outcomes before the global pandemic era versus those operated during the unravelling pandemic. We hope that this study will be a contribution from a developing country to the management policies of breast surgery clinical practice and will add to the body of literature.

2. Materials and Methods

A retrospective comparative cohort study was performed in the Section of Breast Surgery at tertiary care cancer unit. Ethical approval was granted by the Institution’s Research Ethics Committee (reference number: 2020-5418-14043) before the initiation of the research project and was carried out according to the principles of the Helsinki Declaration [13]. Informed consent is not required due to the observational nature of the research. The study has been registered with German Clinical Trials Register (DRKS) (Registration ID: DRKS00026114, https://www.drks.de/drks_web/navigate.do?navigationId=trial. HTML&TRIAL_ID=DRKS00026114) and fulfilled the reporting guidelines of STROCSS criteria [14].

A total of 800 medical record files were reviewed including all breast cases who registered for the first time in hospital having Breast cancer, survivors, patients receiving systemic treatment for Stage IV disease and visited breast clinic for follow up/response assessment or evaluation for survivors, patients receiving systemic treatment for Stage IV disease and multidisciplinary participation in our institution maintained infec
tivity and fatality at a lowest possible rate among breast cancer cases despite of high constraints to health resources [12].

As evident from Table 1, data analysis revealed statistically signifi
cant differences in the baseline characteristics of two study cohorts except for the mean age at diagnosis of (p = 0.885). Most of the patients were diagnosed with Invasive Ductal Carcinoma (IDC) upon histological examination representing 80.1% of cases in Group A and 77.9% of cases in Group B (p < 0.001). Relatively, Grade 2 disease was noticed in large proportion of study population of Group A than in patients of Group B [124 (53.8%) vs. 76 (51.0%), p = 0.004]. In Group A, half of the patients 143 (61.9%) were observed with Luminal Type as compared to Group B (43.6%) cases (p < 0.004). In Group A, half of the patients 149 (39.21%) patients had their surgery done within 72 h pre-operatively. Patients who were found positive during this test, their surgery was re-scheduled as soon as the COVID-19 RT-PCR test came out negative after 14 days (Fig. 1).

Table 2 outlines the types of surgical intervention performed and management outcomes of the study population which demonstrated no major difference in the waiting time for surgery between Group A and Group B patients (p = 0.487) except for those patients who tested positive on pre-operative COVID-19 RT-PCR test 12/149 (8.05%).
Therefore, their surgeries were performed between 14 days and 35 days as per WHO guidelines once they turned negative for COVID-19 virus. Fortunately, all of these infected patients were asymptomatic, isolated at home and were continuously monitored by the telehealth facilities of the hospital which connected them to their primary consultant and infectious disease specialist. In early 6 weeks of pandemic, only 10 cancer surgeries were performed while 04 patients who were hormone receptor positive scheduled for surgeries were cancelled and started on hormonal treatment to delay surgical intervention for at least 8 weeks giving a cancellation rate of 28.6%. Study results also identified that a large number of patients in the study were subjected to breast mastectomy which consisted of 154 (66.7%) cases in Group A and 104 (69.8%) cases in Group B. Likewise, more breast reconstruction surgeries were carried out in Group A than in Group B (7.8% vs. 2.7%, \( p < 0.013 \)). A decline in sentinel lymph node biopsy was recorded during COVID-19 pandemic (157 (67.9%) vs. 108 (72.5%), \( p < 0.013 \)). Post-operative hospital stay was minimised in patients of Group B in order to reduce nosocomial spread of COVID-19 virus (1.4 days vs. less than one day, \( p < 0.001 \)). Despite it, one patient contracted the virus during its postoperative stay and expired \([1/149 (0.67\%)]\). She was an ASA class 3 a 69 year old woman with multiple comorbid illnesses including hypertension, diabetes and severe COPD, operated under local anaesthesia for a breast conserving procedure.

The number of postoperative complications were consistent between the two time periods (mean 4.0, \( p < 0.001 \)) which included haematoma, seroma formation, wound infection and flap necrosis. All of these patients were managed as outpatients and none of them required re-admission in hospital. In addition, no major change in the waiting time for postoperative oncological consultation was detected between the two study groups (mean 2.0 days, \( p < 0.001 \)). Waiting time for adjuvant chemotherapy (mean 7.0 days, \( p = 0.484 \)) as well as waiting time for radiotherapy (mean 7.0 days, \( p = 0.484 \)) did not differ between Group A and Group B.

### 4. Discussion

This is the first study reporting impact of SARS-CoV-2 virus on surgical care of breast cancer patients during this pandemic era overall from a lower middle-income country. This virus has remained inciting panic for Pakistan, being a lower middle-income country (LMIC) with limited health care budget and fragile health care system. Not only were there challenges due to the pandemic but also the health care system had to deal the myths and false beliefs associated with COVID-19 country wide which contribute to a negative impact on the outcome \([12]\). Our
study showed that the overall number of breast cancer surgeries had declined when comparing to Pre-COVID-19 era with compromised cancer care.

During this exceptional situation to avoid delays in surgical care of breast cancer patients, multi-disciplinary teams including breast surgeons have been working continuously to modify the management of breast cancer patients, guidelines have been formulated and followed to avoid unforeseen complications among breast cancer patients [12].

The first wave of COVID-19 occurred from March to July 2020 hence based on institutional guidelines, cancer surgery was offered to a limited group of breast cancer cases; it was a time when the COVID-19 infection rate was high (279,146 reported cases) with an ongoing under suspicion. A study from Italy showed reduced surgical procedures during pandemic with marked decrease in reconstructive procedures similar to our study results (p < \(0.001\)) \([16]\).

During first wave of the patients were offered reconstructions as per guidelines to reduce operating room time, post-operative hospital stay and to avoid reconstruction associated issues with anticipated several clinic visits if they developed any post-reconstruction complications which could be associated with increased risk of hospital acquired COVID-19 infection. A study from Italy showed reduced surgical procedures during pandemic with marked decrease in reconstructive procedures similar to our study results (p < \(0.001\)) \([16]\).

As far as waiting time for surgery is concerned there was no difference between pre-COVID-19 and COVID-19 eras. Sentinel node biopsy was offered as per routine as institution was having an enough supply of Nano colloid available. Likewise, previously cited study conducted in Italian Breast Unit also reported no change in use of Sentinel lymph node biopsy before and during COVID-19 pandemic (p = 0.84) however they reported that patients who were on the operating lists during the COVID-19 pandemic.
19 pandemic had to wait slightly longer for their surgical intervention than the patients scheduled for their surgery before the COVID-19 pandemic (49.11 vs. 46.39 days) [16]. On the contrary, study from Canadian cancer center showed no major difference in surgical care as compared to Pre-COVID-19 era with improved waiting time which they associated with low impact of COVID-19 in their center and to better team based care [18].

During the pandemic time hospital had made policy to discharge stable patients as early as possible hence post-operative hospital stay was reduced in this era to reduce exposure and simultaneously to reduce workload to health care providers, patients were connected to team members via teleconsultations to monitor their health condition and to address wound related issues. Anecdotal evidence proved that patients were also satisfied as it reduced hospital encounters which is evidently a high transmission pocket [19].

In comparison to developed countries, Pakistan does not have any National Cancer Screening Program nor having a stringent General practitioner practice system, our workload is based on cases who presented with self-discovered lumps or diagnosed with breast cancer at other hospitals, only 2% of cases at our center treated after being picked on Screening. We found that fears associated with COVID-19 was the strongest reason for decline in elective cancer surgeries at our center, there were diagnosed cancer cases who deliberately missed their clinic and surgery appointments for several months and presented afterward with upgrade stage during this era. We also found a fear to get treatment in a hospital such as ours which offers COVID-19 related care in a designated area entirely separated from the main hospital, this was also the strongest reason to delay treatment. Many patients who were contacted through telecommunication sought alternative therapies like spiritual healing, herbal, or homeopathic treatment as they were waiting for pandemic to over before they sought proper cancer treatment. Prospectively collected data showed that rate of stage III disease at presentation has increased up to 38% (25–30% in pre-COVID-19 era) and stage IV by 14% as compared to our institutional figure of 7–10% every year since 2010. Pakistan has been experiencing a 4th wave currently with almost 100% infective cases of the Delta variant in Karachi, hoping to curb disease successfully without conceding further care.

There were certain limitations to our study, the first being a single center experience from a private sector and the other having a small sample size, however to the best of our knowledge this study is one of the few studies showing the impact of COVID-19 on surgical care of cancer patients from lower- and middle-income countries (LMICs). Further research should be conducted in this regard including all the public and private sector institutions to better understand the impact of prevailing pandemic on breast cancer surgery and to enhance understanding for unforeseen other future pandemics.

5. Conclusion

COVID-19 pandemic had had reverberations on the breast surgery oncologic practice at our institution with marked decline in number of surgical interventions despite of timely planning and strategizing breast cancer management. This likely resulted from fear among community and cancer patients to acquire COVID-19 infection from hospital territories leading to lesser cancer diagnosis and treatment. Later on, patients presented with an advanced cancer stage demanding more aggressive treatment. Therefore, the findings of our study warrant strengthening of current breast cancer management policies and stringent infection control measures to provide uninterrupted standardized cancer care in the ensuing and future pandemics.

Ethical approval

Ethical exemption was obtained from Institution’s Ethical Review Committee (reference number: 2020-5418-14043) which waived documentation of informed consent due to the observational nature of the study.

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Author contribution

Conceptualization, Methodology: LMV, DJ. Data curation: LMV, AJ, AN. Software, Formal analysis: NK, LMV, DJ. Investigation: LMV, DJ, TS. Writing - Original Draft: LMV, DJ. Writing - Review & Editing: All authors. Final approval of the Article: All authors. Accountability for all aspects of the work: All authors.

Registration of research studies

Name of the registry: German Clinical Trials Register (DRKS).
Unique Identifying number or registration ID: DRKS00026114.
Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.drks.de/drks_web/navigate.do?navigationId=trial.HTML&TRIAL_ID=DRKS00026114.

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Data statement

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2022.103342.

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