Impact of COVID-19 pandemic on breast surgery and breast reconstruction in a Japanese university hospital setting.

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Short Report

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Abstract

The new coronavirus disease (COVID-19) is spreading worldwide. In Japan, the number of people infected has been increasing since March 2020. The COVID-19 pandemic has had a significant impact on hospitals, although Tokyo, Japan did not experience a collapse of the medical system. Patients were triaged and prioritized due to surgical limitations during the pandemic period. The purpose of this study was to determine how patients with breast cancer or breast reconstruction were affected by the COVID-19 pandemic at a university hospital in Tokyo. In this retrospective chart review we investigated how patients were treated, including surgical postponements during three periods: April to July 2020, August to November 2019 (after the Allergan recall), and April to July 2019. More than half of breast surgeries and breast reconstructions had to be postponed during the COVID-19 pandemic, and the number of candidates for surgery was also lower compared to the pre-pandemic periods. Triage of patients with breast cancer did not result in any adverse oncological outcomes for these patients. COVID-19 has had a major impact on breast cancer surgery and breast reconstruction, and there was substantial postponement of surgery. Due to triage and prioritization, no patients experienced disease progression in the short-term period, demonstrating that our strategy was appropriate.

Introduction

The new coronavirus disease (COVID-19) is spreading worldwide, and the World Health Organization declared it a pandemic on March 11, 2020. The COVID-19 pandemic has had a heavy impact on hospitals around the world and caused a collapse in medical care in many regions. Although Tokyo did not experience a medical collapse, major hospitals have been affected. By the end of July, there were 12691 COVID-positive patients¹ and a total of 335 deaths in Tokyo². There were no restrictions on hospital admission, and all hospital wards were free to admit patients during the COVID-19 pandemic period. However, due to surgical restrictions, a significant number of surgeries were canceled and surgical admissions were postponed. Patient-initiated suppression of medical visits further contributed to a decline in the number of patients admitted to the hospital during the pandemic period.

Tokyo Medical University Hospital is a general hospital that serves as one of the core hospitals in the region. The first confirmed COVID-19 patient was admitted to our hospital on March 30, 2020. By July 2020, 110 patients with COVID-19 had been admitted. A total of nine cases required intensive care, and four of these died. No breast or plastic surgeons were infected with COVID-19 and only a few surgeons were called in to treat COVID-19 patients, which did not affect our practice. Overall, with the exception of surgical restrictions, the impact of COVID-19 on our hospital was minimal.

On April 10, 2020, the Tokyo Metropolitan Government declared a state of emergency. In response, the hospital decided to strictly limit the number of surgical cases in accordance with the COVID surgical triage guidelines defined by the American College of Surgeons (ACS). The operating room (OR) restrictions began on April 20, 2020. Urgent surgeries were still performed, except for cases under local anesthesia.

Pre-pandemic, the Department of Breast Surgery scheduled up to six surgeries per week. Breast surgeons decided to postpone all surgeries from mid-April 2020. Since June 2020, the restrictions were relaxed following the lifting of the national emergency declaration and three operations per week were permitted. In August 2020, the OR schedule returned to normal. Surgeries under local anesthesia were not restricted during the pandemic period and the plastic surgery OR schedule was transferred to breast surgery during the pandemic period. If the OR schedule was not sufficient for breast cancer patients who urgently required surgery from an oncological standpoint, two other university-affiliated hospitals in which hospital OR use was not strictly restricted were utilized.

This study sought to determine how patients with breast cancer or breast reconstruction at Tokyo Medical University Hospital were affected by the COVID-19 pandemic.

Patients And Methods

This study was a retrospective chart review and approved by the Institutional Review Board of the University. We investigated the treatment of breast cancer patients during the following periods:

- 1) April to July 2020 (the period when OR use under general anesthesia was restricted).
- 2) August to November 2019 (the period after Allergan recall, mentioned later).
- 3) April to July 2019 (one year prior to the survey period in [1])

During the above periods, patients diagnosed with breast cancer or referred after diagnosis to an outpatient breast clinic, patients referred from outpatient breast clinics to outpatient plastic surgery clinics for breast reconstruction, and patients waiting for breast reconstruction (autologous tissue reconstruction, implant reconstruction, and nipple-areola reconstruction) in an outpatient plastic surgery clinic were included. From the medical records we obtained the number of patients with breast cancer and breast reconstruction, number of surgeries and surgical procedures, number of postponed surgeries and reasons, and number of reconstructive procedures changed.

Triage and prioritization of breast surgery during covid-19 pandemic

Triage and prioritization were performed according to the recommendations of ACS, the American Society of Breast Surgeons (ASBrS), and Japanese Breast Cancer Society [3, 4, 5]. Patients with breast cancer were divided into the following three categories: (1) High priority (requiring urgent treatment), (2) Middle priority (treatment delay could cause inferior outcomes, and (3) Low priority (immediate treatment not required and can be deferred until after the pandemic). The detailed triage and prioritization was shown in Table 1.

Triage and prioritization of reconstructive treatment during covid-19 pandemic

Triage and prioritization were performed in accordance with the recommendations of ACS and ASPS [3,6]. Only tissue expander insertions were allowed for immediate reconstruction. If the patient requests autologous tissue reconstruction, we advised immediate two-stage breast reconstruction. All cases of implant replacement, autologous replacement (as a second operation in two-stage reconstruction), and delayed reconstruction were canceled, although this policy was eliminated after the restrictions on OR use were relaxed. However, implant replacement was considered for patients whose surgeries had previously been cancelled due to Allergan recall. Nipple-areolar complex (NAC) reconstruction under local anesthesia continued.

Results

A summary of the results is shown in Figure 1, Figure 2, and Table 2.

During the pandemic period (April to July 2020)

Breast cancer and breast reconstruction patients

A total of 56 patients were diagnosed as candidates for breast cancer surgery during this period. Seventeen breast cancer surgeries planned between April 1 and 17th were not affected by the restriction on OR use. Therefore, 39 patients were triaged during the pandemic period.

Forty-one breast reconstruction surgeries were planned during this period. An additional 17 patients were in the process of breast reconstruction, but these patients did not have a surgery scheduled during this period.

Postponed surgeries during the pandemic period

Primary breast cancer surgery was postponed in 26 cases. There were 19 middle-priority patients and 7 low-priority patients. All postponed middle-priority patients received neoadjuvant endocrine treatment (oral tamoxifen or aromatase inhibitors) while awaiting re-scheduling. Surgeries were performed later in the pandemic period using surgical slots from plastic surgery. The duration of neoadjuvant endocrine therapy was relatively short (<1-3 months). All surgeries in the low-priority group were postponed once and performed at a later date.

We postponed 22 out of 41 breast reconstruction surgeries. The detailed reconstructive procedures are shown in Table 1. Of these, 13 were postponed at the surgeon's request, while nine were postponed at the patient's request. Most of the patients' requests for postponements were due to fears of being infected with COVID-19 in the hospital. Two of the postponed reconstructive cases were operated on at other affiliated hospitals. In one of the postponed cases, the breast reconstruction itself had to be canceled. In this case, the previous reconstructive surgery was canceled due to the Allergan recall, and the rescheduled surgery was canceled again due to the COVID-19 pandemic.

Surgery performed during the pandemic period

Surgery was performed in 56 cases during the COVID-19 pandemic period; a total mastectomy in 9 cases, partial mastectomy in 29 cases, breast reconstruction in 11 cases, and others (hematoma evacuations and axillary lymph node dissections) in 7 cases. Two immediate one-stage breast reconstructions, eleven immediate two-stage breast reconstructions, and six NAC reconstructions were performed.

Oncological outcome of the triaged breast cancer patients

Triage of patients with breast cancer did not result in any adverse oncological outcomes for the patients. No disease progression was observed in any postponed middle-priority patients in the short-term period.

During the period after Allergan announced a recall in July 2019 (August to November 2019)

Results are shown in Table 2.

A statement regarding significant numbers of Breast Implant-Associated Anaplastic Large Cell Lymphomas was issued by Allergan on July 2019. In Japan, the Allergan product was the only approved implant at that time.

There were 6 cases postponed due to the Allergan recall. One patient changed to autologous tissue reconstruction, four were waiting for implant replacement surgery, and one reconstruction was cancelled at the patient's request. COVID-19 clearly had a greater impact on more patients than Allergan recall in terms of postponed surgeries. However, the impact of COVID-19 was only short-term because the infection subsided and restrictions were lifted.

One year period prior to covid-19 pandemic (April to July 2019)

The results are shown in Table 2. There were no postponed cases during this period.

Discussion

There have been few studies that described triage methods and reported patient turnover during the COVID crisis, and none of these closely compared the number of surgeries and surgical procedures with those performed before the pandemic [7,8,9]. The triage objectives were to prevent infection of medical personnel, to allocate medical resources appropriately, and to avoid affecting the patient's prognosis. The oncological prognosis of our patients was not affected; therefore, our response was extremely successful. However, differences in race, wealth, and insurance availability vary across countries. Thus, care must be taken when adapting our triage to regions outside of Japan, as triage needs to be flexible and varied to avoid treatment disparities [10,11,12].

Patients in the middle-priority group were the most difficult to manage. All patients in this group received neoadjuvant endocrine therapy, an alternative treatment option during surgery deferral [13,14]. It has been shown to increase response rates and improve surgical outcomes for hormone receptor-bearing breast cancer [15,16,17]. Such therapy is underutilized but was an option even before the COVID-19 pandemic. Benefits of this treatment include the ability to assess endocrine sensitivity and the possibility of avoiding chemotherapy in some patients [4,14,18]. We administered this treatment during 19 cases of surgical postponement, and this triage was successful with no progression of the disease in the short-term period.

This middle priority group also included a patient that requested immediate breast reconstruction. Breast reconstruction plays an important role in the cosmetic aspect of breast cancer surgery; however, during the COVID-19 pandemic, it was difficult to prioritize this procedure. During this pandemic, it was reported that avoidance of immediate breast reconstruction was preferable, because immediate reconstruction is associated with more complications and subsequent reoperation than simple mastectomies [19,20]. Autologous tissue reconstruction is particularly time-consuming and therefore was discouraged. According to an opinion survey of 503 breast cancer specialists in Brazil, 63.4% recommended immediate reconstruction, but only 3.4% recommended autologous tissue reconstruction [21]. Some reports indicate that breast reconstruction during COVID is limited to immediate TE insertion and SBI replacement only [7,8]. Avoiding autologous tissue reconstruction reduces the surgical time and hospital stay, and awake surgery has also been reported as a method to reduce surgical time [22].

Reconstruction makes breast cancer different from the treatment of other malignancies. Thus, it makes the treatment of breast cancer during a pandemic is more complex. After OR restrictions were relaxed, a close collaboration between breast surgeons and plastic surgeons allowed for the gradual resumption of tissue expander insertion. In July 2020, we were able to perform two primary first-stage autologous tissue reconstructions. The number of NAC reconstructions under local anesthesia also decreased compared to the usual number, due to these surgeries not being planned during the pandemic period.

The limitation of this study is that it is the result of a single hospital in Tokyo, where the spread of COVID-19 is relatively low by global standards. As well, medical collapse did not occur in Tokyo, and medical resources were not significantly affected, except for the use of operating rooms.

It is of utmost importance to strike a balance between appropriate treatment, the patient's request, and the limitations of social and hospital conditions to make treatment decisions. We may need to perform a variety of simulations to prepare for unknown pandemics that may occur in the future [23].

During the COVID-19 pandemic, a significant number of breast cancer and breast reconstruction surgeries had to be postponed. The triage and prioritization we performed resulted in no patients having disease progression in short term period, demonstrating that our strategy was appropriate.

Declarations

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Competing Interests:

The authors declare no competing interests regarding this paper.

References

1. Updates on COVID-19 in Tokyo, Tokyo metropolitan government
<https://stopcovid19.metro.tokyo.lg.jp/> Last accessed September 21, 2020.
2. Bureau of social welfare and public health, Tokyo metropolitan government
<https://www.fukushihoken.metro.tokyo.lg.jp/iryo/kansen/shibou.html> Last accessed September 21, 2020.
3. American College of Surgeons. COVID-19 guidelines for triage of breast cancer patients. 2020.
<https://www.facs.org/covid-19/clinical-guidance/elective-case/breast-cancer> Last accessed September 21, 2020..
4. Dietz JR, Moran MS, Isakoff SJ, Kurtzman SH, Willey SC, Burstein HJ, et al. Recommendations for prioritization, treatment, and triage of breast cancer patients during the COVID-19 pandemic the COVID-19 pandemic breast cancer consortium. *Breast Cancer Res Treat* 2020;181(3):487-97. doi:10.1007/s10549-020-05644-z
5. Japanese Breast cancer Society, The guidance for triage of breast cancer treatment in COVID -19.
<http://jbcs.gr.jp/member/wp-content/uploads/2020/06/triage20200624.pdf> Last accessed September 21, 2020.
6. American Society of Plastic Surgeons. Statement on breast reconstruction in the face of COVID-19 pandemic. 2020. <https://www.plasticsurgery.org/documents/medical-professionals/COVID19-Breast-Reconstruction-Statement.pdf>. Last accessed September 21, 2020.
7. Specht M, Sobtiet N, Rosado N, Tomczyk E, Abbate O, Ellis D, et al. High-Efficiency Same-Day Approach to Breast Reconstruction During the COVID-19 Crisis. *Breast Cancer Res Treat* 2020; 182(3):679-88. doi: 10.1007/s10549-020-05739-7.
8. Lisa A, Battistini A, Giannasi S, Veronesi A, Bandi V, Maione L, et al. Breast Reconstruction in a Coronavirus Disease 2019 Hub. *Plast Reconstr Surg Glob Open* 2020;8(7):e3043. doi:10.1097/GOX.0000000000003043
9. MacInnes EG, Piper J, Tait C, Waterworth A, Achuthan R, Hogan B, et al. Breast Cancer Surgery During the COVID-19 Pandemic Peak in the UK: Operative Outcomes. *Cureus* 2020;12(7): e9280. doi:10.7759/cureus.9280

10. Obeng-Gyasi S, Oppong B, Paskett ED, Lustberg M. Purposeful surgical delay and the coronavirus pandemic: how will black breast cancer patients fare?. *Breast Cancer Res Treat* 2020;182(3): 527-530. doi:10.1007/s10549-020-05740-0
11. Belkacemi Y, Grellier N, Ghith S, Debbi K, Coraggio G, Bounedjar A, et al. A review of the international early recommendations for departments organization and cancer management priorities during the global COVID-19 pandemic: applicability in low- and middle-income countries. *Eur J Cancer* 2020;135: 130-46. doi: 10.1016/j.ejca.2020.05.015
12. Anwar SL, Harahap WA, Aryandono T. Perspectives on how to navigate cancer surgery in the breast, head and neck, skin, and soft tissue tumor in limited-resource countries during COVID-19 pandemic. *Int J Surg* 2020;79:206-12. doi:10.1016/j.ijsu.2020.05.072
13. Gradishar WJ, Anderson BO, Abraham J, Aft R, Agnese D, Allison KH, et al. Breast Cancer, Version 3.2020, NCCN Clinical Practice Guidelines in Oncology. *J Natl Compr Canc Netw* 2020;18(4):452-78. doi:10.6004/jnccn.2020.0016
14. Spring LM, Gupta A, Reynolds KL, Gadd MA, Ellisen LW, Isakoff SJ, et al. Neoadjuvant Endocrine Therapy for Estrogen Receptor-Positive Breast Cancer: A Systematic Review and Meta-analysis. *JAMA Oncol* 2016;2(11):1477-86. doi:10.1001/jamaoncol.2016.1897
15. Alba E, Calvo L, Albanell J, De la Haba JR, Arcusa Lanza A, Chacon JI, et al. Chemotherapy (CT) and hormonotherapy (HT) as neoadjuvant treatment in luminal breast cancer patients: results from the GEICAM/2006-03, a multicenter, randomized, phase-II study. *Ann Oncol* 2012;23(12):3069-74. doi:10.1093/annonc/mds132
16. Semiglazov VF, Semiglazov VV, Dashyan GA, Ziltsova EK, Ivanov VG, Bozhok AA, et al. Phase 2 randomized trial of primary endocrine therapy versus chemotherapy in postmenopausal patients with estrogen receptor-positive breast cancer. *Cancer* 2007;110(2):244-54. doi:10.1002/cncr.22789
17. Eiermann W, Paepke S, Appfelstaedt J, Llombart-Cussac A, Eremin J, Vinholes J, et al. Preoperative treatment of postmenopausal breast cancer patients with letrozole: A randomized double-blind multicenter study. *Ann Oncol* 2001;12(11):1527-32. doi:10.1023/a:1013128213451
18. Ellis MJ, Suman VJ, Hoog J, Goncalves R, Sanati S, Creighton CJ, et al. Ki67 Proliferation Index as a Tool for Chemotherapy Decisions During and After Neoadjuvant Aromatase Inhibitor Treatment of Breast Cancer: Results From the American College of Surgeons Oncology Group Z1031 Trial (Alliance). *J Clin Oncol* 2017;35(10):1061-1069. doi:10.1200/JCO.2016.69.4406
19. Chetta MD, Schoenbrunner AR, Lee CN. Postmastectomy Breast Reconstruction in the Time of the Novel Coronavirus Disease 2019 (COVID-19) Pandemic. *Plast Reconstr Surg Glob Open* 2020;8(6):e2967. doi:10.1097/GOX.0000000000002967

20. Al-Hilli Z, Thomsen KM, Habermann EB, Jakub JW, Boughey JC. Reoperation for complications after lumpectomy and mastectomy for breast cancer from the 2012 National Surgical Quality Improvement Program (ACS-NSQIP). *Ann Surg Oncol* 2015;22(Suppl 3):S459–69.doi:10.1245/s10434-015-4741-7

21. Cavalcante FP, Novita GG, Millen EC, Zerwes FP, Oliveira VM, Sousa ALL, et al. Management of early breast cancer during the COVID-19 pandemic in Brazil. *Breast Cancer Res Treat* 2020;1-11. doi:10.1007/s10549-020-05877-y

22. Vanni G, Pellicciaro M, Materazzo M, Dauri M, D’angelillo RM, Buonomo C, et al. Awake breast cancer surgery: strategy in the beginning of COVID-19 emergency. *Breast Cancer* 2020; 1-8.doi:10.1007/s12282-020-01137-5

23. Ahmed M . Optimizing breast cancer surgery during the COVID-19 pandemic. *Breast Cancer* 2020. doi:10.1007/s12282-020-01160-6

Tables

Due to technical limitations, full-text HTML conversion of the Tables could not be completed. However, they can be downloaded and accessed as a Supplementary Files.

Figures

Figure 1

Number of breast cancer surgeries planned/postponed.

Figure 2

Number of breast reconstruction surgeries planned/postponed. TE: tissue expander, SBI: silicone breast implant

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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