

ORIGINAL ARTICLE

The new normal for breast cancer surgery during COVID-19 pandemic: An international survey conducted by SENATURK

Nuh Zafer Canturk^{1,3}, Sertac Ata Guler^{1,3}, Mehmet Ali Kocdor^{2,3}, Turgay Simsek^{1,3}

¹Kocaeli University Medical Faculty, Dept.of General Surgery, Kocaeli, Turkey. ²Dokuz Eylul University Medical Faculty, Dept. of General Surgery, Izmir, Turkey. ³SENATURK Turkish Senology Society, Istanbul, Turkey.

Summary

Purpose: The COVID-19 pandemic has changed the way many health institutions approach their workload. Physicians managing patients with cancer now have to deal not only with the disease but also the restrictions and limitations imposed because of the global pandemic. We aimed to determine how surgical preferences in breast cancer management were affected globally using a questionnaire-based survey.

Methods: Under the auspices of the Turkish Senology Society (SENATURK) we asked 122 surgeons from 27 countries to reply to a 26-question survey designed to measure the impact of COVID-19 on their surgical practice when treating patients with breast cancer.

Results: The characteristics of participant surgeons were statistically similar when comparing the participants' an-

swers from Turkey and other countries. From the responses given to our questionnaire, it was understood that breast cancer surgery decreased by 25% ($p < 0.05$) in institutions all over the world, including Turkey, but there was no change in the approach technique to the axilla.

Conclusions: Globally breast surgeons have adapted to the new normal due to the COVID-19 pandemic. Many surgical approaches and some follow up protocols have been changed, although the degree of change has varied from country to country. In addition, the availability of multidisciplinary case conferences has been reduced in some centers which may affect the quality of services provided to patients.

Key words: breast cancer, COVID-19, pandemic, breast surgery

Introduction

During the initial phase of the COVID-19 pandemic, health services around the world struggled to deal with the demand for limited resources so that routine services were often suspended or severely curtailed to different degrees [1-7]. The pandemic resulted in unprecedented challenges for patients, health care workers and health care systems [8,9]. Thus, reorganization of health practice in central health care institutions, secondary health services and health care workers was obligatory [10]. Many disciplines in surgical oncology had to update guidelines and/or renew them to adjust to the "new normal" [11-13].

Some hospitals became pandemic hospitals, either partially or totally. COVID-19 patients in many countries were treated using resources reallocated from the management of chronic disorders and cancer [14]. In addition, many health professional contracted COVID-19 themselves, or were required to work in environments where there was a high risk of exposure [14,15]. Evidence from health care workers dealing with other infectious diseases had reported that these staff workers suffered from psychological distress and higher job stress because of the risk of infection [16-18]. The rate of COVID-19 infection among Chinese patients

with oncological disorders was almost 2% in China [19,20]. In addition, COVID-19 may be more severe and lethal among cancer patients [20, 21]. All of these factors have also affected the diagnosis and treatment of breast cancer. Patients' appointments were delayed and physicians changed their normal practice in an attempt to minimize potential risks to their patients, colleagues and themselves from the SAR-Cov-2 virus.

It might not be too far fetched to suggest that classical treatment methods and surgical preferences accepted as a standard by breast surgeons have been permanently changed by the pandemic. In response to this "new normal" various recommendations, usually based on expert opinion rather than scientific data because of the limited time for research, and guidelines have been published. There has also been a number of surveys published, which have attempted to investigate how local or

regional results for breast cancer management changed [16,20].

The present study, performed under the auspices of the Turkish Senology Society (SEN-ATURK) aimed to assess the global effect on breast cancer surgical management of the COVID 19 pandemic. Global data was also compared with survey data obtained from Turkish breast cancer surgical services.

Methods

The survey was performed using a 26-question, structured questionnaire about changes in breast cancer management during the COVID-19 pandemic. It was a cross sectional, web-based survey among breast cancer surgeons, distributed using Google Forms from April 15 to May 30, 2020. The questionnaire in English was distributed to our global network of breast cancer surgeons who were invited to complete it. Questions

Table 1. Characteristics of participants' institutions, including a comparison of Turkey with other countries. Data are presented as n (%)

Characteristics	Others (except Turkey)	Africa	Asia	North America	Balkans	Non-Balkan Europe	Turkey	Total	p
Impact of COVID-19									0.131
None or Mild	22 (21.5)	6 (33.3)	2 (12.5)	0	6 (17.6)	8 (28.6)	0	22	
Moderately or Severe	80 (79.5)	12 (66.7)	14 (87.5)	6 (100)	28 (82.4)	20 (71.4)	20 (100)	100	
Impact of COVID-19 on institutions									0.001
None or mild	76 (74.5)	14 (77.8)	14 (87.5)	2 (33.3)	28 (82.4)	18 (64.3)	6 (30.0)	82	
Moderately or severe	26 (25.5)	4 (22.2)	2 (12.5)	4 (66.7)	6 (17.6)	10 (35.7)	14 (70.0)	40	
Characteristics of institutions									0.001
Non-academic	44 (43.1)	8 (44.4)	12 (75.0)	0	18 (52.9)	6 (21.4)	6 (30.0)	50	
Academic	58 (56.9)	10 (55.6)	4 (25.0)	6 (100)	16 (47.1)	22 (78.6)	14 (70.0)	72	
Number of breast cancer operations per week before outbreak									0.013
Less than 7 new cases	36 (35.3)	2 (11.1)	12 (75.0)	0	20 (58.8)	2 (7.1)	16 (80.0)	52	
More than 7 new cases	66 (64.7)	16 (88.9)	4 (25.0)	6 (100)	14 (41.2)	26 (92.9)	4 (20.0)	70	
Number of cases diagnosed per week									0.01
Less than 7 new cases	40 (39.2)	4 (22.2)	6 (37.5)	2 (33.3)	12 (35.3)	16 (57.1)	4 (20.0)	44	
More than 7 new cases	62 (60.8)	14 (77.8)	10 (62.5)	4 (66.7)	22 (64.7)	12 (42.9)	16 (80.0)	78	
Reduction in diagnosed breast cancer case at your hospital following outbreak									0.021
<10%	26 (25.0)	4 (22.2)	4 (25.0)	2 (33.3)	10 (29.4)	6 (21.4)	4 (20.0)	30	
10-25%	14 (13.5)	0	2 (12.5)	0	2 (5.9)	10 (35.7)	0	14	
25-50%	32 (30.8)	8 (44.4)	4 (25.0)	0	10 (29.4)	10 (35.7)	2 (10.0)	34	
>50%	32 (30.7)	6 (33.3)	6 (37.5)	4 (66.7)	12 (35.3)	2 (7.1)	12 (70.0)	44	

included demographic information about the surgeons and their workplace and preferences for breast cancer management during the pandemic. Each surgeon who completed the survey gave written agreement to participate and for permission to use their answers. Ethical approval was granted by the Turkish Ministry of Health for COVID-19 research (2020-06-11T09_17_40).

Statistics

All statistical analyses were performed using the SPSS, version 20.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as counts and percentages. Comparisons of categorical variables between groups were performed using Fisher's Exact Chi-square test, Yates' Chi-square test and Monte Carlo Chi-square test. A two-tailed $p < 0.05$ was considered statistically significant.

Results

In total, 122 of 148 breast surgeons from 27 countries on four continents returned completed questionnaires. Of these 116 (95.1%) were general surgeons and the remainder (4.9%) were plastic surgeons.

Surgeons who responded were based around the globe as follow: 82 (67.2%) from Europe, 18 (14.75%) from Africa, 16 (13.1%) from Asia and 6 (4.9%) from North America. Surgeons from Europe were 34 from Balkan region, 28 from central Europe and 20 from Turkey.

There was no significant difference in terms of academic degree, experience of breast surgery and roles during the study period ($p > 0.05$). However,

Table 2. Characteristics of participant surgeons, including a comparison of Turkey with other countries. Data are presented as n (%)

	Others (except Turkey)	Africa	Asia	North America	Balkans	Central Europe	Turkey	Total	<i>p</i>
Surgeons									n.s (0.065)
Academician	56 (54.9)	12 (66.7)	2 (12.5)	6 (100.0)	18 (52.9)	18 (64.3)	14 (70.0)	70	
Non-academician	46 (45.1)	6 (33.3)	14 (87.5)	0	16 (47.1)	10 (35.7)	6 (30.0)	52	
Surgeons									n.s (0.362)
Less than 10 years of experience	16 (15.7)	0	2 (12.5)	0	12 (35.3)	2 (7.1)	4 (20.0)	20	
More than 10 years of experience	86 (84.3)	18 (100.0)	14 (87.5)	6 (100.0)	22 (64.7)	26 (92.9)	16 (80.0)	102	
Surgeons works for									0.007
State Hospitals	70 (68.6)	16 (88.9)	12 (75.0)	0	18 (53.0)	24 (85.7)	14 (70.0)	84	
Private Hospitals or Private Office	32 (31.4)	2 (11.1)	4 (25)	6 (100.0)	16 (47.0)	4 (14.3)	6 (30.0)	38	
What are the self- protection methods during breast surgery?									0.045
No precautions	24 (15.39)	8 (33.3)	0	0	6 (11.5)	10 (22.7)	4 (12.5)	28	
Routinely ask PCR test to patients before surgery	48 (30.3)	2 (8.3)	10 (33.3)	2 (25.0)	18 (34.6)	16 (36.4)	10 (31.2)	58	
No surgery for positive patients	38 (24.0)	4 (16.7)	10 (33.3)	2 (25.0)	10 (19.2)	12 (27.3)	10 (31.2)	48	
No COVID-19 patients were hospitalized	38 (24.0)	8 (33.3)	10 (33.3)	0	14 (26.9)	6 (13.6)	4 (12.5)	42	
No surgery performed and others	10 (6.4)	2 (8.3)	0	4 (50.0)	4 (7.7)	0	4 (12.5)	14	
Surgeons' role at COVID-19 outbreak									n.s (0.59)
Had duty	56 (54.9)	14 (77.8)	6 (37.5)	2 (33.3)	24 (70.6)	10 (35.7)	12 (60.0)	68	
No	46 (45.1)	4 (22.2)	10 (62.5)	4 (66.7)	10 (29.4)	18 (64.3)	8 (40.0)	54	

the impact of COVID-19 on the practice of breast surgery was significantly different between Turkish respondents and surgeons based in other countries (Tables 1 and 2). When the reduction in proportion of breast cancer case numbers diagnosed each week was compared from respondents outside Turkey, most reported a reduction of more than 25% which was a significantly larger reduction than reported from Turkey ($p < 0.05$) (Table 1).

Over two thirds (67.3%) of participants reported that they preferred to perform minimally invasive diagnostic biopsies without delay for palpable BIRADS 3 lesions but 15.2% of them preferred to delay all types of diagnostic biopsies. In contrast, Turkish surgeons who responded to the survey mostly delayed all types of surgery. The COVID-19 pandemic affected the diagnostic surgical procedures of palpable BIRADS 4-5 lesions as follows: 65.3% of surgeons did not change their preferences and did not make any difference to practice. However, 8.2% of them now asked for minimally invasive biopsy. For non-palpable BIRADS 4-5 lesions, classical guided excisional biopsy was used by 17.2%. Most respondents (60.3%) did not change routine practice during the pandemic. Only 36.2% of respondents reported that routine periodic multidisciplinary meetings were occurring as normal. Almost 7% of participants stated that they had reduced their multidisciplinary breast conferences and face-to-face consultations. More than one fifth (22.4%) reported that these kinds of meetings had ceased completely (Table 3).

Almost a quarter (24.6%) of respondents indicated that neoadjuvant treatments including endocrine therapy were recommended for early breast cancer instead of surgery although 60.7% did not change their practice. The remainder reported that they avoided neoadjuvant treatments and preferred surgery. Around two fifths (39.3%) of surgeons did not change their level 2 oncoplastic practice. A similar proportion (37.8%) reported a cessation of complex breast reduction techniques and almost one third of participants said that they delayed immediate contralateral symmetrization until the situation due to the pandemic had improved.

While 37.7% of surgeons did not change their reconstruction practice, 26.2% preferred to delay prophylactic nipple sparing mastectomy (NSM) and skin sparing mastectomy (SSM) until the pandemic conditions had improved. Only 4.9% preferred immediate reconstruction with permanent implant while 9.8% recommended delayed reconstruction with implant.

In 72.1% of centers daily intraoperative pathological practice remained the same, despite the pandemic conditions. In contrast, fewer intraop-

erative frozen section assessments and less intraoperative communication between surgeons and pathologists was reported and more large resections or mastectomies were performed which may have been less radical under pre-pandemic conditions.

Most respondents ($n=110$, 90.2%) reported no change in their axillary evaluations. Of those that reported changing axillary evaluation, these respondents reported favoring ALND, SLNB and SLNB preceded by lymphoscintigraphy equally.

No changes to radiological evaluation algorithms for breast cancer cases were reported in 83.6% of centers during the early phase of the pandemic. Neither did the pandemic lead to postponement of adjuvant treatments following breast cancer surgery.

Most (59.0%) of surgeons decreased the number of follow-up visits in the early postoperative period, if patients had no obvious problem, and 34.4% performed telemedicine visit or others remote consultation during this period. When asked about follow-up clinics, adjustments because of the pandemic were reported as increased follow-up interval (18%), delay of appointment until a decrease in case numbers was evident (29.5%) or consultation using telemedicine/internet/telephone (34.3%).

Respondents were asked about measures for self-protection from the infection. The most commonly reported response (86.6%) was to perform a COVID-19 PCR test for every patient before surgery. Elective breast surgery was then cancelled in patients tested positive (47.4%) or in those who were clinically suspicious for COVID-19 (39.2%). More than a fifth (22.8%) of respondents reported taking no additional self-protective measures even when their patients had not been tested for SARS-Cov-2. In contrast, 6.5% of participants did not operate, even in emergency cancer cases, until there was an evident decrease in the case numbers. Comparison of preferred self-protective measures reported by Turkish surgeons and those from other countries was significantly different ($p < 0.05$) (Table 2).

Discussion

Globally, breast cancer is the most common cancer in women [22]. The COVID-19 pandemic has created enormous pressure on healthcare systems worldwide, even in developed countries. The redirection of healthcare resources into the fight against COVID-19 has meant that in most countries there are fewer health care resources available for other health concerns, such as oncological disorders including breast cancer [20]. However,

Table 3. Global approach to the process of breast cancer diagnosis, treatment and follow up during the COVID-19 pandemic including a comparison of Turkey with other countries. Data are presented as n (%)

	Others (Except Turkey)	Africa	Asia	North America	Balkans	Central Europe	Turkey	Total	p
Diagnostic procedure to palpable BIRADS 3 lesions									<0.001
Excisional biopsy performed	8 (7.8)	0	2 (12.5)	0	0	6 (21.4)	4 (20.0)	12	
Excisional biopsy delayed	10 (9.8)	4 (22.2)	2 (12.5)	4 (66.7)	0	0	2 (10.0)	12	
FNAB/core biopsy preferred	68 (66.7)	10 (55.6)	12 (75.0)	2 (33.3)	26 (76.5)	18 (64.3)	4 (20.0)	72	
All kind of biopsy delayed + other	16 (15.7)	4 (22.2)	0	0	8 (23.5)	4 (14.3)	10 (50.0)	26	
Diagnostic procedure to palpable BIRADS 4-5 lesions									n.s (0.24)
Not at all	24 (23.5)	0	6 (37.5)	0	4 (11.8)	14 (50.0)	4 (20.0)	28	
Excisional biopsy delayed	6 (5.9)	0	0	0	6 (17.6)	0	2 (10.0)	8	
FNAB/core biopsy preferred	6 (5.9)	0	2 (12.5)	0	4 (11.8)	0	4 (20.0)	10	
All kind of biopsy not done + other	66 (64.7)	18 (100.0)	8 (50.0)	6 (100.0)	20 (58.8)	14 (50.0)	10 (50.0)	76	
Diagnostic procedure to non-palpable BIRADS 4-5 lesions									0.014
Guided excisional biopsy done	18 (17.6)	0	4 (25.0)	2 (33.3)	4 (11.8)	8 (28.6)	2 (10.0)	20	
Core biopsy preferred	16 (15.7)	4 (22.2)	4 (25.0)	0	6 (17.6)	2 (7.1)	4 (20.0)	20	
Guided excisional biopsy not preferred	2 (1.9)	0	0	0	2 (5.9)	0	4 (20.0)	6	
Not at all	66 (64.7)	14 (77.8)	8 (50.0)	4 (66.7)	22 (64.7)	18 (64.3)	10 (50.0)	76	
Multidisciplinary Breast Meeting									<0.001
Routinely continued	38 (37.2)	4 (22.2)	10 (62.5)	0	12 (35.3)	12 (42.9)	4 (20.0)	42	
Changed to online	32 (31.3)	2 (11.1)	2 (12.5)	6 (100.0)	8 (23.5)	14 (50.0)	8 (40.0)	40	
All kind of meeting cancelled	2 (1.9)	0	0	0	2 (5.9)	0	6 (30.0)	8	
One to one consultation + other	30 (29.4)	12 (66.7)	4 (25.0)	0	12 (35.3)	2 (7.1)	2 (10.0)	32	
Up front surgery was preferred instead of neoadjuvant									<0.001
Luminal B (+)	42	6 (23.1)	4 (14.3)	4 (33.3)	16 (38.1)	12 (33.3)	6 (15.8)	48	
T1c HER2 (+)	38	8 (30.8)	8 (28.6)	6 (50.0)	8 (19.0)	8 (22.2)	12 (31.6)	50	
T3 tumors with no subtype	16	0	4 (14.3)	2 (16.7)	6 (14.3)	4 (11.1)	14 (36.8)	30	
Early stage with high tumor to breast ratio	26	8 (30.8)	8 (28.6)	0	8 (19.0)	2 (5.6)	4 (10.5)	30	
Suboptimal cosmeses due to tumor localization	22	4 (15.4)	4 (14.3)	0	4 (9.5)	10 (27.8)	2 (5.3)	24	

Continued on the next page

	Others (Except Turkey)	Africa	Asia	North America	Balkans	Central Europe	Turkey	Total	p
Indications for Neoadjuvant treatment for early cases									0.029
Not at all	62	14 (77.8)	8 (50.0)	2 (33.3)	20 (58.8)	18 (64.3)	12 (60.0)	74	
More mastectomies to avoid NadjTx	4	2 (11.1)	0	0	0	2 (7.1)	4 (20.0)	8	
More NadjTx	28	2 (11.1)	6 (37.5)	4 (66.7)	12 (35.3)	4 (14.3)	2 (10.0)	30	
Other	8	0	2 (12.5)	0	2 (5.9)	4 (14.3)	2 (10.0)	10	
Level 2 oncoplastic surgery indications									0.001
Not at all	42	10 (38.5)	8 (44.4)	0	10 (26.3)	14 (43.8)	6 (21.4)	48	
Delay in immediate contralateral simetrization	20	4 (15.4)	2 (11.1)	2 (33.3)	6 (15.8)	6 (18.8)	14 (50.0)	34	
Not to perform complex procedures	38	8 (30.8)	6 (33.3)	2 (33.3)	18 (47.4)	4 (12.5)	8 (28.6)	46	
Other	20	4 (15.4)	2 (11.1)	2 (33.3)	4 (10.5)	8 (25.0)	0	20	
Changes of reconstruction choice									n.s (0.052)
Not at all	36	6 (33.3)	8 (50.0)	0	12 (35.3)	10 (35.7)	10 (50.0)	46	
Immediate reconstruction with permanent implant	4	0	0	0	0	4 (14.3)	2 (10.0)	6	
Delayed reconstruction with permanent implant	12	4 (22.2)	2 (12.5)	0	4 (11.8)	2 (7.1)	0	12	
Delayed autologous tissue reconstruction	8	0	0	2 (33.3)	2 (5.9)	4 (14.3)	0	8	
Delayed prophylactic NSM/ SSM	24	4 (22.2)	2 (12.5)	2 (33.3)	14 (41.2)	2 (7.1)	8 (40.0)	32	
Other	18	4 (22.2)	4 (25.0)	2 (33.3)	2 (5.9)	6 (21.4)	0	18	
How pathological practice changed									n.s (0.65)
Not at all	74	14 (77.8)	12 (75.0)	2 (33.3)	20 (58.8)	26 (92.9)	14 (70.0)	88	
Less frozen section assessment	12	0	2 (12.5)	2 (33.3)	6 (17.6)	2 (7.1)	2 (10.0)	14	
Less intraoperative surgeon pathologist collaboration	8	2 (11.1)	0	0	6 (17.6)	0	10 (8.2)	18	
Increased larger surgical margin or mastectomy for avoiding intraopera- tive assessment and others	8	2 (11.1)	2 (12.5)	2 (33.3)	2 (5.9)	0	2 (10.0)	10	
Is there any change for axillary evaluation?									n.s (0.56)
No	92	18 (100.0)	16 (100.0)	6 (100.0)	26 (76.5)	26 (92.9)	18 (90.0)	110	
Yes	10	0	0	0	8 (23.5)	2 (7.1)	2 (10.0)	12	

Continued on the next page

	Others (Except Turkey)	Africa	Asia	North America	Balkans	Central Europe	Turkey	Total	p
Preference when axilla is clinically negative									0.039
ALND	92	18 (100.0)	16 (100.0)	6 (100.0)	26 (76.5)	26 (92.9)	18 (90.0)	110	
SLNB with frozen section	4	0	0	0	4 (11.8)	0	0	4	
SLNB without frozen section	0	0	0	0	0	0	2 (10.0)	2	
SLNB with lymphoscintigraphy	6	0	0	0	4 (11.8)	2 (7.1)	0	6	
Is there any change for radiological evaluation?									<0.001
No	92	18 (100.0)	16 (100.0)	2 (33.3)	28 (82.4)	28 (100.0)	10 (50.0)	102	
Yes	10	0	0	4 (66.7)	6 (17.6)	0	10 (50.0)	20	
Postponing postoperative adjuvant treatment									n.s (0.25)
No	78	14 (77.8)	14 (77.8)	2 (33.3)	30 (88.2)	18 (64.3)	14 (70.0)	92	
Yes	24	4 (22.2)	2 (12.5)	4 (66.7)	4 (11.8)	10 (35.7)	6 (30.0)	30	
How affected early postoperative follow-up									
None	8	6 (33.3)	0	0	0	2 (7.1)	0	8	
Decreased number of postoperative visits	60	10 (55.6)	14 (87.5)	2 (33.3)	26 (76.5)	8 (28.6)	12 (60.0)	72	
Telemedicine or postoperative visit and other	34	2 (11.1)	2 (12.5)	4 (66.7)	8 (23.5)	18 (64.3)	8 (40.0)	42	
How affected late postoperative follow-up									0.022
None	8	6 (33.3)	0	0	0	2 (7.1)	4 (20.0)	12	
Increased follow-up interval	18	4 (22.2)	8 (50.0)	2 (33.3)	2 (51.9)	2 (7.1)	4 (20.0)	22	
Delayed until end of outbreak if not necessary	32	6 (33.3)	4 (25.0)	0	20 (58.8)	2 (7.1)	4 (20.0)	36	
Telemedicine or postoperative visit and other and other	42	2 (11.1)	4 (25.0)	4 (66.7)	10 (29.4)	22 (78.6)	6 (30.0)	48	
Recommendation to visit oncologist at private outpatient clinics	2	0	0	0	2 (5.9)	0	2 (10.0)	4	

it is known that cancer management, including breast cancer, requires dynamic and transparent approaches that improve outcomes [22]. Thus, we are all now faced with the challenge of maintaining healthcare services at acceptable levels while also providing sufficient resource to combat the COVID-19 pandemic. The pandemic has affected the treatment of many disorders to different degrees. The prolongation of the pandemic, the emergence of new strains of the SARS-Cov-2 virus and the de-

velopment of the “new normal” show that the management of breast cancer will change permanently [14]. The present study was conducted with the aim of identifying changes in standards and quality of breast cancer surgery and to try anticipate permanent changes. Data from this survey, undertaken during the early phases of the pandemic, showed that in some cases cancer centers were repurposed into COVID-19 hospitals and at these centers at least one third of breast surgeons were directly

involved in the management of COVID-19. This had a direct effect on the capacity of these centers to provide breast cancer services, at least in the early phase of the pandemic. This decrease was due either to delaying or cancelling elective breast operations by senior surgeons or reorganization of operation theatres due to the extreme conditions experienced during uncontrolled pandemic conditions with very high case numbers.

This survey was performed to determine an international overview of breast cancer management during these unique and unprecedented circumstances. The majority of respondents were experienced academicians, working in state-affiliated large hospitals rather than in private health institutions. The survey revealed a heterogeneity of response to the situation, probably reflecting the need to make plans for service provision on the fly and in response to a situation which may be changing very rapidly, while having no precedent or evidence upon which to base these plans. Some of this disparity in the applied pandemic response will be due to pre-existing clinical and organizational differences. The demographic and professional characteristics of respondents did not differ from country to country, suggesting that differences in response identified by this survey may be due to local pandemic conditions rather than differences between the respondents themselves. Despite a number of recommendations for breast surgery services having been published after the start of the pandemic, it is evident that there is no "one size fits all" approach for breast cancer management globally. Even though a lack of possibilities and changing priorities have challenged health care workers and institutions during the pandemic, surgical societies from the USA and the UK have recommended that cancer patients still have high-priority and must take operative care [14, 16, 20, 23-26]. Despite this continuing high priority for cancer care, most of the respondents had new duties involving the management of COVID-19. There was a >25% reduction in the number of diagnosed breast cancer cases, which was reported by 60 to 80% of institutions from Turkey and other countries.

Another interesting finding was the apparent decrease in both early and late personal postoperative visits which was largely replaced by an increase in the use of telemedicine, including internet and telephone conferencing (Table 3). It is probable that the adoption of this form of clinical follow-up may become a permanent feature of many services in many countries, given the capacity to undertake reliable remote follow-up consultation, which will be reliant on widely available and stable electronic media and internet access.

Breast cancer treatment centers were reorganized in light of the pandemic for all phases of disease management including diagnosis, surgical treatments and follow-up. One of the findings of this survey was that minimally invasive biopsy techniques were preferred in other countries for more than 60% BIRADS 3 palpable lesions but all kind of invasive diagnostic procedures were delayed for 50% of the cases in Turkey. However, all types of biopsy for the diagnosis of palpable BIRADS 4 lesions were delayed worldwide. Diagnostic biopsies for non-palpable BIRADS 4 lesions were canceled for two third of breast cancer cases in Turkey and other countries. Multidisciplinary breast meetings were not entirely abandoned, as these are key to planning the best cancer treatment under normal conditions. However, during the pandemic, use of multidisciplinary meetings changed with centers delaying or postponing meetings and widespread adoption of remote/online meetings being reported (Table 3). If it can be shown that the meeting is as practical, productive and time-efficient, regardless of format, then we may expect that remote or online meetings will continue [27].

We believe that this is one of the most important findings of this survey. Classic multidisciplinary meetings may be replaced by live video meetings as an alternative. Additional benefits of this change in practice could include the possibility of multicenter or multinational participation, which in turn may result in higher standards and quality of care. This benefit remains to be demonstrated by scientific investigation but seems to be a plausible benefit of the change in practice reported by many of our respondents worldwide.

In many countries, including Turkey, elective surgical procedures including breast surgery were delayed in an attempt to reduce the risk of transmission of the virus among health care workers and symptomatic or asymptomatic patients through decreased hospital admissions. Primary surgical treatment was mostly preferred for Luminal B (+) and T1c HER2 (+) subtypes in other countries, while Turkish surgeons preferred surgery in cases of HER 2 (+) or T3 breast tumors. This difference may be due to demographic heterogeneity among patient populations.

The decision to provide neoadjuvant treatment may allow for a safe delay before surgery. The respondents reported no difference in the process of selection of cases for neoadjuvant treatment among countries and these therapies were administered according to guidelines. It is notable that ASCO had recommended the use of neoadjuvant treatment for selected and appropriate cases, as long as there

was no risk of tumor progression, allowing delay of definitive surgical treatment in light of the scarcity of hospital resources and possible exposure to COVID-19 during this pandemic period [3].

Another important result was the trend to postpone complex procedures, such as MSM/SSM, simultaneous symmetrization or autologous or implant-based reconstruction. Procedures for axillary evaluation, standards of radiologic investigation and intraoperative pathologic examinations differed less among respondents than other parameters.

Conclusion

This survey has shown that breast surgeons in many countries of the world, including Turkey, have adapted to changing conditions due to the

COVID-19 pandemic. Key findings include a move away from face-to-face patient/physician contact and multidisciplinary case conferences have been replaced with video conferencing during this unprecedented pandemic.

Acknowledgement

This paper was edited in English by Jeremy Jones, who works in Kocaeli University Editing Office. Also, statistical analysis was performed by Prof. Dr. Canan Baydemir, who works for Kocaeli University Medical School.

Conflict of interests

The authors declare no conflict of interests.

References

1. <https://www.esmo.org/guidelines/breast-cancer/breast-cancer-in-the-covid-19-era>
2. Burki TK. Cancer guidelines during the COVID-19 pandemic. *Lancet Oncol* 2020; 21: 629-30.
3. <https://www.asco.org/asco-coronavirus-information/care-individuals-cancer-during-covid-19>
4. <https://www.nccn.org/covid-19/>
5. http://www.facs.org/-/media/files/covid19/guidance_for_triage_of_nonemergent_surgical_procedures.ashx;2020
6. <http://www.rcsed.ac.uk/news-public-affairs/news/2020/march/intercollegiate-general-surgery-guidance-on-covid-19-update;2020>
7. <https://associationofbreastsurgery.org.uk/media/252026/abs-statement-270420.pdf>. (accessed 10 May 2020)
8. Kuitkov A, Weinberg DS, Edelman MJ, Horwitz EM, Uzzo RG, Fisher RI. A war on two fronts: Cancer care in the time of COVID-19. *Ann Int Med* 2020; 172:756-8.
9. Ferguson NM, Laydon D, Nedjati-Gilani G et al. Report 9: Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. Imperial College London. 16 March 2020. <https://www.imperial.ac.uk/media/imperial-college/medicine/mrc-gida/2020-03-16-COVID19-Report-9.pdf>
10. Kakodkar P, Kaka N, Baig MN. A comprehensive literature review on the clinical presentation and management of pandemic coronavirus disease 2019 (COVID-19). *Cureus* 2020; 12:e7560-77.
11. Finley C, Prtashad A, Camuso N, Daly C, Earle CC. Life-saving cancer surgeries need to be managed appropriately during the COVI-19 pandemic. *Can J Surg* 2020; 63 (2 Suppl 1):S1.
12. Coles CE, Aristei C, Bliss J et al. International guidelines on radiation therapy for breast cancer during the COVID-19 pandemic. *Clin Oncol* 2020; 32:279-81.
13. Weinkove R, McQuilten ZK, Adler J et al. Managing haematology and oncology patients during the COVID-19 pandemic: interim consensus guidance. *Med J Aust* 2020; 212:481-9.
14. Al-Shamsi HO, Alhazzani W, Alhuraji A et al. A practical approach to the management of Cancer patients during the Coronavirus disease 2019 (COVID-19). *The Oncologist* 2020;25:1-10.
15. Willan J, King AJ, Hayes S, Collins GP, Peniket A. Care of haematology patients in a COVID-19 epidemic. *Br J Haematol* 2020; 189:241-3.
16. Vanni G, Materazzo M, Santori F et al. The effect of coronavirus (COVID-19) on breast cancer teamwork: A multicentric survey. *In Vivo* 2020; 34:1685-94.
17. Goulia P, Mantas C, Dimitroula D, Mantis D, Hyphantis T. General hospital staff worries, perceived sufficiency of information and associated psychological distress during the A/H1N1 influenza pandemic. *BMC Infect Dis* 2010; 10:322.
18. Maunder RG, Lancee WJ, Rourke S et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. *Psychosom Med* 2004;66:938-42.
19. Desai A, Sachdeva S, Parekh T, Desai R. COVID-19 and cancer: lessons from a pooled meta-analysis. *J Clin Oncol* 2020; 6:557-9.
20. Gaspari ML, Gentilini OD, Lueftner D, Kuehn T, Kaidar-Person O, Poortmans P. Changes in breast cancer management during the corona virus disease 19 pandemic: An international survey of the European Breast Cancer

- Research Association of Surgical Trialists (EUBREAST). *The Breast* 2020;52:110-5.
21. Cannistra SA, Haffty BG, Ballman K. Challenges faced by medical journals during the COVID-19 pandemic. *J Clin Oncol* 2020; 38:2206-7.
 22. Huo D, Dignam J. Epidemiology of breast cancer. Kuerer HM (ed.) *Kuerer's Breast Surgical Oncology*. McGraw Hill Medical, New York, 2010, pp 41-9.
 23. Finley C, Prashad A, Camuso N et al. Guidance for management of Cancer surgery during the COVID-19 pandemic. *Can J Surg* 2020; 63 (2 Suppl1):S2-S4.
 24. Soran A, Gimbel M, Diegao E. Breast Cancer diagnosis, treatment and follow up during COVI-19 pandemic. *Eur J Breast Health* 2020;16:86-8.
 25. Dietz JR, Moran MS, Isakoff SJ et al. Recommendations for prioritization, treatment, triage of breast cancer patients during COVID-19 pandemic. COVID-19 pandemic breast cancer consortium. *Breast Cancer Res Treat* 2020;181:487-97.
 26. Cakmak GK, Ozmen V. Sars-CoV-2 (COVID-19) outbreak and breast cancer surgery in Turkey. *Eur J Breast Health* 2020;16:83-85.
 27. Guler SA, Canturk NZ. Multidisciplinary breast cancer teams and proposed standards. *Turk J Surg* 2014;20:39-41.