



Physicians' perception about the impact of breast reconstruction on patient prognosis: a survey in Japan

Rena Yamakado¹ · Makoto Ishitobi¹ · Naoto Kondo² · Chikako Yamauchi³ · Shinsuke Sasada⁴ · Hiroko Nogi⁵ · Miho Saiga⁶ · Akiko Ogiya⁷ · Kazutaka Narui⁸ · Hirohito Seki⁹ · Naomi Nagura¹⁰ · Ayaka Shimo^{11,12} · Teruhisa Sakurai¹³ · Naoki Niikura¹⁴ · Hiroki Mori¹⁵ · Tadahiko Shien¹⁶ · Collaborative Study Group of Scientific Research of the Japanese Breast Cancer Society

Received: 4 September 2022 / Accepted: 9 December 2022 / Published online: 17 December 2022
© The Author(s), under exclusive licence to The Japanese Breast Cancer Society 2022

Abstract

Background One barrier to the widespread use of breast reconstruction (BR) is physicians' perception that BR adversely affects breast cancer prognosis. However, there is limited information regarding physicians' understanding of the impact of BR on patient prognosis and which physicians have misunderstandings about BR.

Methods We conducted an e-mail survey regarding the impact of BR on the prognosis of patients with breast cancer among members of the Japanese Breast Cancer Society.

Results Of 369 respondents, 99 (27%) said that they believe BR affects patient prognosis. Female respondents and those who treat fewer new breast cancer patients per year were more likely to state that they believe BR affects patient prognosis ($P=0.006$ and 0.007). Respondents who believed that BR affects patient prognosis underestimated 5-year overall survival rates in patients who receive BR and subsequently have local or regional recurrence in different sites.

Conclusion Our survey demonstrated that a quarter of respondents believe that BR affects patient prognosis and underestimate survival rates in patients who receive BR and have subsequent local or regional recurrence. Because of the lack of evidence regarding the impact of BR on patient prognosis, educating physicians by providing accurate knowledge regarding BR and patient prognosis is highly recommended.

Keywords Breast cancer · Breast reconstruction · Recurrence · Prognosis · Questionnaire

✉ Makoto Ishitobi
m-ishitobi@med.mie-u.ac.jp

¹ Department of Breast Surgery, Mie University School of Medicine, 2-174 Edobashi, Tsu, Mie 514-8507, Japan

² Department of Breast Surgery, Nagoya City University Graduate School of Medical Sciences, Nagoya, Japan

³ Department of Radiation Oncology, Shiga General Hospital, Shiga, Japan

⁴ Department of Surgical Oncology, Research Institute for Radiation Biology and Medicine, Hiroshima University, Hiroshima, Japan

⁵ Department of Breast and Endocrine Surgery, Jikei University School of Medicine, Tokyo, Japan

⁶ Department of Plastic and Reconstructive Surgery, Okayama University Hospital, Okayama, Japan

⁷ Department of Breast Surgical Oncology, Cancer Institute Hospital, Japanese Foundation for Cancer Research, Tokyo, Japan

⁸ Department of Breast and Thyroid Surgery, Medical Center, Yokohama City University, Yokohama, Kanagawa, Japan

⁹ Department of Breast Surgery, Saitama Medical Center, Saitama, Japan

¹⁰ Department of Breast Surgical Oncology, St. Luke's International Hospital, Tokyo, Japan

¹¹ Department of Breast and Endocrine Surgery, St. Marianna University School of Medicine, Kanagawa, Japan

¹² Department of Breast and Endocrine Surgery, Kawasaki Municipal Tama Hospital, Kanagawa, Japan

¹³ Sakurai Breast Clinic, Wakayama, Japan

¹⁴ Department of Breast Oncology, Tokai University School of Medicine, Kanagawa, Japan

¹⁵ Department of Plastic and Reconstructive Surgery, Tokyo Medical and Dental University, Tokyo, Japan

¹⁶ Department of Breast and Endocrine Surgery, Okayama University Hospital, Okayama, Japan

Introduction

In Japan, there are over 90,000 new cases of breast cancer each year. Among these, approximately half of women receive mastectomy [1]. A better cosmetic outcome is associated with a better quality of life in women who undergo mastectomy and breast reconstruction (BR) [2]. In Japan, implant-based BR has been covered by the national health insurance since 2013. However, among patients with breast cancer who receive mastectomy, the frequency of immediate BR is not high. In 2018, there were 48,233 patients who received mastectomy for primary breast cancer in Japan; among them, only 8,512 (18%) patients received BR [1, 3]. In contrast, the 2018 post-mastectomy BR rate in South Korea, another Asian country, was 53% [4].

Studies have investigated various barriers to BR [5]. One of these is physicians' perception that BR adversely affects breast cancer prognosis owing to BR masking local recurrence or delaying adjuvant chemotherapy and radiotherapy [6–12]. Despite the absence of randomized prospective trial data, several meta-analyses and systemic reviews using retrospective data have demonstrated that BR does not affect local recurrence rates, disease-free survival, or overall survival in comparison with mastectomy alone [13–15]. However, it has been reported that many physicians have this misunderstanding about BR. It is of clinical importance to identify physicians' perception about the impact of BR on patient prognosis and which physicians have misunderstandings about BR. However, limited information is reported on these issues.

We conducted an e-mail survey regarding the impact of BR on the prognosis of patients with breast cancer among members of the Japanese Breast Cancer Society. The objective of this study was to clarify the beliefs regarding BR among physicians engaged in breast cancer treatment in Japan.

Patients and methods

The Japanese Breast Cancer Society Scientific Committee reviewed and approved this study. A questionnaire regarding the impact of BR on the prognosis of patients with breast cancer was sent via e-mail to members of the Japanese Breast Cancer Society on 1 December 2021. Two reminders were sent on 20 December 2021 and 25 January 2022; the survey was closed on 25 February 2022.

The questionnaire was divided into three parts. Respondents were asked (1) their background, (2) whether they felt that BR affects the prognosis of patients with breast cancer, and (3) their estimation of patient prognosis

(5-year overall survival rate) according to the site of local or regional recurrence (see Appendix for more details regarding the questionnaire, modified from Clemons et al. [16]).

Statistical analysis was conducted using Fisher's exact test or the Mann–Whitney *U* test. Multivariate analyses were conducted using a logistic regression model. All statistical tests and *p* values were two sided, and *P* values < 0.05 were considered significant. All statistical analyses were performed using EZR version 1.5.5 (The R Project for Statistical Computing, Vienna, Austria) [17].

Results

Of 6,583 questionnaires, 369 (6%) were returned and were available for analysis. Demographic information about respondents is summarized in Table 1. Respondents were asked whether they believed that BR affects patient prognosis (Fig. 1); 27, 59, and 14% responded yes, no, and abstained or said they did not know, respectively. The associations of answers with respondents' characteristics are shown in Table 2. Female respondents were more likely to answer yes to the question than men ($P=0.006$). Respondents who felt that BR affects patient prognosis saw fewer new breast cancer cases per year than those who did not ($P=0.007$). Logistic regression analyses showed that both factors (gender and number of breast cancer cases per year) were significantly associated with the belief that BR affects patient prognosis ($P=0.05$ and 0.04).

We evaluated the relationship of responses and respondents' estimation of 5-year overall survival rates among patients with local or regional recurrence. Significant differences between responses and the estimations were seen for the following sites: ipsilateral breast after breast-conserving surgery and ipsilateral axillary lymph node (estrogen receptor-positive and human epidermal growth factor receptor 2 [HER2]-negative tumors), skin of chest wall (isolated, after mastectomy) (estrogen receptor-positive and HER2-positive tumors) (Table 3). Respondents who felt that BR affects patient prognosis estimated worse prognosis at all sites than those who did not.

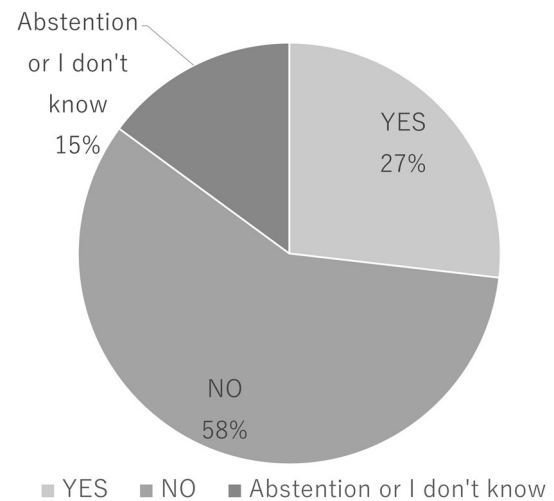
Discussion

In our study, approximately one-quarter (27%) of respondents felt that BR affects patient prognosis. Physicians' perception that BR affects patient prognosis could stem from the assumption that BR interferes with the detection of local recurrence or the introduction of adjuvant chemotherapy or radiotherapy, although a large amount of data from meta-analyses and systematic reviews show that BR

Table 1 Physician's background ($N=369$)

Variable	Number (%)
Specialty	
Breast surgeon	317 (86)
Medical oncologist	10 (3)
Radiation oncologist	10 (3)
Plastic surgeon	9 (2)
Diagnostic radiologist	5 (1)
Basic medicine	1 (0)
Other	17 (5)
Gender	
Male	225 (61)
Female	142 (38)
Abstention	2 (1)
Hospital practice setting	
Teaching hospital	102 (28)
Cancer center	30 (8)
Other	237 (64)
Years in practice	
< 10	55 (15)
10~20	131 (36)
≥ 20	183 (50)
No. of new breast cancer cases per year	
< 25	47 (13)
25~50	90 (24)
50~100	114 (31)
≥ 100	111 (30)
other	7 (2)
No. of new locoregional recurrence cases per year	
< 5	241 (65)
5~10	68 (18)
10~15	31 (8)
15~20	8 (2)
≥ 20	10 (3)
Other	11 (3)

following mastectomy does not affect patient prognosis [13–15]. Moreover, several studies have demonstrated that there are no differences in prognosis between breast-conserving surgery with and without BR [18, 19]. Previous studies have reported that 20–75% of physicians thought that BR can mask and delay the detection of local recurrence [6–12]. Takahashi et al. conducted a questionnaire survey on BR among physicians certified by the Japanese Breast Cancer Society in 2001 and obtained responses from 635 physicians [9]. In total, 47.4% of respondents thought BR can mask local recurrence and were less likely to refer their patients for BR [9]. Coroneos et al. studied physicians' perceptions toward BR according to subspecialty and reported that oncologists were more likely to believe that BR can mask local recurrence and delay

**Fig. 1** Responses to the question, "Generally, do you believe that breast reconstruction at the time of the initial surgery affects patient prognosis?"

adjuvant chemotherapy and radiotherapy, compared with surgeons (30% vs. 14%, $P < 0.001$) [11]. Contrary to the study results of Coroneos et al. [11], we found no difference in respondents' perceptions that BR affects patient prognosis according to subspecialty; this is probably owing to the small proportion of respondents with subspecialties other than breast surgery.

A concern that BR can mask local recurrence might be theoretically incorrect in most mastectomy cases. A recent systematic review reported that among patients who received skin- or nipple-sparing mastectomy, 96–100% of local recurrence was located within the skin or subcutaneous tissue [20]. Skin and subcutaneous tissue are located over the reconstructed breast in cases of both autologous and implant-based reconstruction; BR does not mask local recurrence in such cases.

In our study, female respondents were more likely to have a concern that BR affects patient prognosis. Previous studies have reported that female physicians were more likely to refer their patients for BR than male doctors, which is contrary to our results [10, 21]. A possible reason is the different proportions of female respondents between our study and previous works, with many more women participating in our research (38%) than in previous studies (6% [10] and 14.4% [21]). This low proportion of female respondents is similar to another study conducted in Japan (3.8%) [9]. Because the proportion of women was extremely low in these studies, there is a possibility that female physicians' perceptions about BR were not accurately reflected in the study results. In Japan, the number of female physicians is increasing and in 2020, the proportion of female physicians was 23% [22]. We believe that our results reflect the current situation in Japan more accurately than previous studies.

Table 2 Association of respondents' belief that breast reconstruction affects or does not affect recurrence with respondents' background

Variable		Affect (%)	Does not affect (%)	P value
Specialty	Breast surgeon	89 (32)	187 (68)	0.6
	other	10 (26)	28 (74)	
Gender	Female	50 (41)	72 (59)	0.006
	Male	49 (26)	141 (74)	
Hospital practice setting	Teaching hospital	26 (30)	62 (70)	0.7
	Other	73 (32)	153 (68)	
Years in practice	< 10	18 (43)	24 (57)	0.1
	≥ 10	81 (30)	191 (70)	
	< 20	55 (36)	99 (64)	0.1
	≥ 20	44 (28)	116 (73)	
No. of new breast cancer cases per year	< 25	12 (39)	19 (61)	0.4
	≥ 25	84 (30)	193 (70)	
	< 50	38 (37)	66 (63)	0.2
	≥ 50	58 (28)	146 (72)	
	< 100	74 (36)	130 (64)	0.007
	≥ 100	22 (21)	82 (79)	
No. of new locoregional recurrence cases per year	< 5	63 (32)	135 (68)	0.9
	≥ 5	33 (31)	75 (69)	
	< 10	80 (31)	180 (69)	0.6
	≥ 10	16 (35)	30 (65)	
	< 15	89 (31)	200 (69)	0.4
	≥ 15	7 (41)	10 (59)	
	< 20	91 (31)	206 (69)	0.1
	≥ 20	5 (56)	4 (44)	

Table 3 Association of physicians' belief that breast reconstruction affect or does not affect recurrence with their estimation of 5-year overall survival, according to site

Status	Site	5-year survival rate	Affect (%)	Does not affect (%)	P value
Estrogen receptor-positive/HER2-negative	Ipsilateral breast after breast-conserving surgery	< 50%	5 (6)	1 (1)	0.01
		≥ 50%	75 (94)	177 (99)	
Estrogen receptor-positive/HER2-negative	Ipsilateral axillary lymph node	< 50%	14 (17)	12 (7)	0.01
		≥ 50%	70 (83)	172 (93)	
Estrogen receptor-positive/HER2-positive	Skin of chest wall (isolated, after mastectomy)	< 50%	11 (13)	8 (4)	0.02
		≥ 50%	73 (87)	173 (96)	

Only examples with significant differences are listed

HER2 human epidermal growth factor receptor 2

In our study, respondents who treated fewer new patients with breast cancer per year felt that BR affects patient prognosis. A previous study reported that physicians who treated many new patients with breast cancer tended to refer their patients for BR, which is comparable to our findings.

To our knowledge, our study is the first report regarding physicians' estimation of the prognosis in patients with local or regional recurrence after breast surgery and BR. We found that respondents who thought BR can affect patient prognosis estimated a worse 5-year overall survival in patients with

local or regional recurrence in different sites after breast surgery and BR. Our results indicated that these physicians thought BR results in worse prognosis. Interestingly, all patients estimated to have a poor prognosis had estrogen receptor-positive breast cancer. A possible explanation is that patients with estrogen receptor-negative breast cancer are estimated to have much worse prognosis regardless of whether BR is performed.

Our study has several limitations. The main limitation is the low response rate (6%), which is partly owing to

the COVID-19 pandemic. It has been suggested that the COVID-19 pandemic has resulted in survey responses that are slower than usual owing to the increased workload of physicians [23]. Next, most (86%) respondents were breast surgeons, with very few respondents from other subspecialties. Finally, we conducted multiple analyses, which could have easily produced significant differences.

In conclusion, our survey demonstrated that a quarter of respondents believe that BR affects patient prognosis and underestimate the survival rates of patients who receive BR and subsequently have local or regional recurrence in different sites. Because of a lack of evidence regarding the impact of BR on patient prognosis, educating physicians by providing accurate knowledge regarding BR and patient prognosis is highly recommended.

Appendix: Breast reconstruction and locoregional recurrence

The purpose of this questionnaire is to investigate physicians' perceptions toward the impact of breast reconstruction on the prognosis of patients with breast cancer and determine how physicians currently manage patients who present with locoregional recurrence. The results will be used to determine the need for and feasibility of a clinical trial.

Please circle the response that best applies.

- 1) Are you:
 - a) Practicing basic medicine.
 - b) Breast surgeon.
 - c) Plastic surgeon.
 - d) Medical oncologist.
 - e) Radiation oncologist.
 - f) Diagnostic radiologist.
 - g) Other; please specify.
- 2) Are you:
 - a) Female.
 - b) Male.
 - c) Abstention.
- 3) Do you practice at a:
 - a) Teaching hospital.
 - b) Cancer center.
 - c) Other.
- 4) How many years of experience do you have in treating patients with breast cancer?
 - a) < 10 years.
 - b) 10–19 years.
 - c) ≥ 20 years.
- 5) How would you best categorize your practice with respect to the number of **new** breast cancer cases you see?
 - a) < 25 per year.
 - b) 25–49 per year.
 - c) 50–99 per year.
 - d) ≥ 100 per year.
 - e) Other; please specify.
- 6) How many **new** cases of locoregional recurrence do you see, on average?
 - a) < 5 per year.
 - b) 5–9 per year.
 - c) 10–14 per year.
 - d) 15–19 per year.
 - e) ≥ 20 per year.
 - f) Other; please specify.
- 7) Generally, do you believe that breast reconstruction at the time of the initial surgery affects patient prognosis?
 - a) Yes.
 - b) No.
 - c) Abstention/i don't know.
- 8) What is your estimation of the 5-year survival rate if the patient presents with locoregional recurrence at the following sites? (Fill in by estrogen receptor/HER2 status).

Please check one of the following

Ipsilateral breast-conserving surgery	(< 20%•20%–49%•50%–79%• ≥ 80 %•abstention / I don't know)
Skin of chest wall (isolated, after mastectomy)	(< 20%•20%–49%•50%–79%• ≥ 80 %•abstention / I don't know)
Skin of chest wall (isolated, after skin- or nipple-sparing mastectomy)	(< 20%•20%–49%•50%–79%• ≥ 80 %•abstention / I don't know)

Please check one of the following	
Nipple areola complex (after nipple-sparing mastectomy)	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Pectoral muscle (isolated)	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Chest wall (isolated)	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Ipsilateral axillary lymph node	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Ipsilateral supraclavicular lymph node	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Ipsilateral internal mammary lymph node	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Ipsilateral cervical lymph node	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)
Contralateral axillary lymph node	(< 20%•20%–49%•50%–79%•≥80%•abstention / I don't know)

Acknowledgements We thank the scientific committee of the Japanese Breast Cancer Society, which provided substantial cooperation in performing this questionnaire survey. We thank Analisa Avila, MPH, ELS, of Edanz (<https://jp.edanz.com/ac>) for editing a draft of this manuscript.

Funding This work was supported by a grant from the scientific committee of the Japanese Breast Cancer Society.

Declarations

Conflict of interest Tadahiko Shien has received honoraria from Al-lergan. The other authors made no disclosures.

References

- Japanese Breast Cancer Society Report [Internet]. https://protect2.fireeye.com/v1?url?k=31323334-501d2dca-3136e0dd-454455534531-4ab5843a6bc1ec71&q=1&e=eb4f04aa-7dde-4cb3-855e-e73372eab2c9&u=https%3A%2F%2Fmemberpage.jbcs.gr.jp%2FC52%2Fmenu_details%2F28 (accessed 08/22/2022).
- Guyomard V, Leinster S, Wilkinson M. Systematic review of studies of patients' satisfaction with breast reconstruction after mastectomy. *Breast*. 2007;16:547–67. <https://doi.org/10.1016/j.breast.2007.04.004>.
- Ministry of health, Labour and Welfare. NDB Open Data [Internet]. <https://www.mhlw.go.jp/stf/seisakunitsuite/bunya/0000177182.html> (accessed 08/25/2022).
- Song WJ, Kang SG, Kim EK, Song SY, Lee JS, Lee JH, et al. Current status of and trends in post-mastectomy breast reconstruction in Korea. *Arch Plast Surg*. 2020;47:118–25. <https://doi.org/10.5999/aps.2019.01676>.
- Retrouvey H, Solaja O, Gagliardi AR, Webster F, Zhong T. Barriers of access to breast reconstruction: a systematic review. *Plast Reconstr Surg*. 2019;143:465e–e476. <https://doi.org/10.1097/PRS.0000000000005313>.
- Mendelson BC. A survey of general surgeon's attitudes towards breast reconstruction following mastectomy. *Aust N Z J Surg*. 1981;51:348–50. <https://doi.org/10.1111/j.1445-2197.1981.tb04962.x>.
- Spyrou GE, Titley OG, Cerqueiro J, Fatah MF. A survey of general surgeons' attitudes towards breast reconstruction after mastectomy. *Ann R Coll Surg Engl*. 1998;80:178–83.
- Lim J, Low SC, Hoe M. Breast reconstruction after mastectomy: a survey of general surgeons in Singapore. *ANZ J Surg*. 2001;71:207–11. <https://doi.org/10.1046/j.1440-1622.2001.02076.x>.
- Takahashi M, Kai I, Hisata M, Higashi Y. The association between breast surgeons' attitudes toward breast reconstruction and their reconstruction-related information-giving behaviors: a nationwide survey in Japan. *Plast Reconstr Surg*. 2006;118:1507–14. <https://doi.org/10.1097/01.prs.0000233149.36751.d2>.
- Awan BA, Samargandi OA, Aldaqal SM, Alharbi AM, Alghaithi Z. The attitude and perception of breast reconstruction by general surgeons in Saudi Arabia. *Ann Saudi Med*. 2013;33:559–65. <https://doi.org/10.5144/0256-4947.2013.559>.
- Coroneos CJ, Roth-Albin K, Rai AS, Rai AS, Voineskos SH, Brouwers MC, et al. Barriers, beliefs and practice patterns for breast cancer reconstruction: a provincial survey. *Breast*. 2017;32:60–5. <https://doi.org/10.1016/j.breast.2016.12.012>.
- Ishak A, Yahya MM, Halim AS. Breast reconstruction after mastectomy: a survey of surgeons' and patients' perceptions. *Clin Breast Cancer*. 2018;18:e1011–21. <https://doi.org/10.1016/j.clbc.2018.04.012>.
- Gieni M, Avram R, Dickson L, Farrokhyar F, Lovrics P, Faidi S, et al. Local breast cancer recurrence after mastectomy and immediate breast reconstruction for invasive cancer: a meta-analysis. *Breast*. 2012;21:230–6. <https://doi.org/10.1016/j.breast.2011.12.013>.
- Yang X, Zhu C, Gu Y. The prognosis of breast cancer patients after mastectomy and immediate breast reconstruction: a meta-analysis. *PLoS ONE*. 2015;10: e0125655. <https://doi.org/10.1371/journal.pone.0125655>.
- Zhang P, Li CZ, Wu CT, Jiao GM, Yan F, Zhu HC, et al. Comparison of immediate breast reconstruction after mastectomy and mastectomy alone for breast cancer: a meta-analysis. *Eur J Surg Oncol*. 2017;43:285–93. <https://doi.org/10.1016/j.ejso.2016.07.006>.
- Clemons M, Hamilton T, Mansi J, Lockwood G, Goss P. Management of recurrent locoregional breast cancer: oncologist survey. *Breast*. 2003;12:328–37. [https://doi.org/10.1016/s0960-9776\(03\)00107-3](https://doi.org/10.1016/s0960-9776(03)00107-3).
- Kanda Y. Investigation of the freely available easy-to-use software 'EZ' for medical statistics. *Bone Marrow Transplant*. 2013;48:452–8. <https://doi.org/10.1038/bmt.2012.244>.
- Tokui R, Ishitobi M, Kurita T, Hatano T, Maekawa M, Kusama H, et al. A comparison of the oncological outcomes after breast-conserving surgery with or without latissimus dorsi myocutaneous flap reconstruction for breast cancer. *Clin Breast Cancer*. 2022;22:e184–90. <https://doi.org/10.1016/j.clbc.2021.06.005>.
- Niinikoski L, Leidenius MHK, Vaara P, Voynov A, Heikkilä P, Mattson J, et al. Resection margins and local recurrences in breast cancer: comparison between conventional and oncoplastic breast

- conserving surgery. *Eur J Surg Oncol*. 2019;45:976–82. <https://doi.org/10.1016/j.ejso.2019.02.010>.
20. Kaidar-Person O, Poortmans P, Offersen BV, Siesling S, Sklair-Levy M, Meattini I, et al. Spatial location of local recurrences after mastectomy: a systematic review. *Breast Cancer Res Treat*. 2020;183:263–73. <https://doi.org/10.1007/s10549-020-05774-4>.
 21. Alderman AK, Hawley ST, Waljee J, Morrow M, Katz SJ. Correlates of referral practices of general surgeons to plastic surgeons for mastectomy reconstruction. *Cancer*. 2007;109:1715–20. <https://doi.org/10.1002/cncr.22598>.
 22. Ministry of health, Labour and Welfare. Cancer Incidence of Japan [Internet]. https://www.mhlw.go.jp/toukei/saikin/hw/ishi/20/dl/R02_kekka-1.pdf (accessed 08/22/2022).
 23. DeSnyder SM, Yi M, Boccardo F, Feldman S, Klimberg VS, Smith M, et al. American society of breast surgeons' practice patterns for patients at risk and affected by breast cancer-related Lymphedema. *Ann Surg Oncol*. 2021;28:5742–51. <https://doi.org/10.1245/s10434-021-10494-0>.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor (e.g. a society or other partner) holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.