

The Impact of Radiotherapy on Reoperation Rates in Patients Undergoing Mastectomy and Breast Reconstruction

Li Zhang, MD^{1,2}, Kairui Jin, MD^{1,2}, Xuanyi Wang, MD^{1,2}, Zhaozhi Yang, MD^{1,2}, Junqi Wang, MD^{1,2}, Jinli Ma, MD^{1,2,3}, Xin Mei, MD^{1,2}, Xingxing Chen, PhD^{1,2}, Xiaofang Wang, PhD^{1,2}, Zhirui Zhou, PhD^{1,2}, Jurui Luo, PhD^{1,2}, Jiong Wu, MD^{2,3}, Zhimin Shao, MD^{2,3}, Zhen Zhang, MD^{1,2}, Xiaoli Yu, MD^{1,2}, and Xiaomao Guo, MD^{1,2}

¹Department of Radiation Oncology, Fudan University Shanghai Cancer Center, Shanghai, China; ²Department of Oncology, Shanghai Medical College, Fudan University, Shanghai, China; ³Department of Breast Surgery, Fudan University Shanghai Cancer Center, Shanghai, China

ABSTRACT

Objective. The aim of this study was to determine the impact of postmastectomy radiotherapy (PMRT) on reoperation rates in women with breast cancer undergoing mastectomy and breast reconstruction.

Methods. Between June 2001 and December 2015, 832 breast cancer patients treated with mastectomy and breast reconstruction with ($n = 159$) or without ($n = 673$) PMRT were analyzed retrospectively. Reoperations following breast reconstruction were categorized into the following three types: anticipated, unanticipated, and others. Multivariable logistic regression models were used to evaluate the impact of PMRT on overall and unanticipated reoperations according to different breast reconstruction types after adjusting for relevant covariates.

Results. With a median follow-up of 58.5 months, a total of 1298 operations were performed in 832 breast cancer patients. The rates of overall and unanticipated reoperations were 46.2% and 7.7%, respectively. Multivariable analysis showed that PMRT was not associated with overall reoperations in either implant-based reconstruction patients (odds ratio [OR] 1.00, 95% confidence interval [CI] 0.43–2.37, $p = 0.995$) or autologous reconstruction

patients (OR 0.85, 95% CI 0.52–1.40, $p = 0.533$); however, the impact of PMRT on unanticipated reoperations differed by reconstruction type. In patients who received implant-based reconstructions, PMRT was associated with a 3.05-fold (95% CI 1.20–7.75, $p = 0.019$) higher odds of unanticipated reoperations, while there was no difference in patients who underwent autologous reconstruction (OR 1.17, 95% CI 0.51–2.66, $p = 0.713$). Delayed reconstruction or delayed–immediate reconstructions were associated with an increased risk of both overall and unanticipated reoperations in both reconstruction cohorts.

Conclusions. PMRT appears to be associated with an increased risk of unanticipated reoperations among patients receiving implant-based reconstruction, but not among those receiving autologous reconstruction. The risk of reoperation should be taken into consideration when selecting the appropriate breast reconstruction type when PMRT is planned.

Mastectomy remains the primary surgical treatment for more than one-third of women in the US with early-stage breast cancer.¹ Along with tumor control, mastectomy can also cause severe psychosocial and physical trauma, especially for young women, due to loss of the breast. Breast reconstruction is an option for women who undergo mastectomy as the primary surgery, and can restore the breast mound by transplanting autologous tissue or an implant. Eltahir et al.² demonstrated that successful breast reconstruction following mastectomy could greatly improve different aspects of quality of life for women, including psychosocial, sexual, and physical factors. In women undergoing mastectomy in the US, the rate of breast reconstruction increased from 46% in 1998 to 63%

Li Zhang and Kairui Jin contributed equally to this work.

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X. Yu, MD
e-mail: stephanieyxl@hotmail.com

X. Guo, MD
e-mail: guoxm1800@163.com

in 2007.³ Breast reconstruction has been less popular in China than in the US, but there has also been a steady increase in the number of patients undergoing reconstruction in the past decade.⁴

Despite the advantages of breast reconstruction, several treatment-related factors should be considered in terms of the reoperation rate. After the initial breast reconstruction surgery, patients usually need to receive additional surgeries, whether as an anticipated part of the reconstruction process or associated with complications or other reasons. A Canadian population-based study showed that 88% of patients underwent at least one reoperation following the initial breast reconstruction surgery, and one of every ten patients had three or more unanticipated major reoperations.⁵ Reoperations following breast reconstruction decrease patient satisfaction, reduce the patient's quality of life, and increase the burden on the healthcare system.⁶

Postmastectomy radiotherapy (PMRT) has been demonstrated to decrease both local recurrence and breast cancer-related mortality in women with node-positive diseases.⁷ In the context of breast reconstruction, the optimal integration of PMRT and breast reconstruction remains complicated. Many studies have investigated the impact of PMRT on breast reconstruction outcomes, including the risk of complications and poor cosmesis.^{8–11} However, little is known about the impact of PMRT on reoperation rates in patients with different reconstruction types. The purpose of this retrospective study was to investigate the reoperation rates following breast reconstruction and to determine the impact of PMRT on overall reoperation rates and unanticipated reoperation rates in patients who had undergone diverse types of breast reconstruction.

MATERIALS AND METHODS

Patient Population

Between June 2001 and December 2015, women aged 18–65 years who underwent mastectomy and breast reconstruction with or without PMRT at Fudan University Shanghai Cancer Center were identified retrospectively. A review of the data for this study was approved by the Ethical Committee and Institutional Review Board of Fudan University Shanghai Cancer Center. Breast reconstructions were performed with autologous tissues, an implant, or a combination of autologous tissue and an implant. According to the timing of the reconstruction surgery, breast reconstructions were grouped into immediate, delayed, and delayed–immediate reconstructions. The delayed–immediate reconstruction was a two-stage reconstruction that initially involved the implantation of a tissue expander, which was later exchanged for a

permanent implant or autologous tissue. Patients who underwent prophylactic mastectomy and reconstruction without cancer diagnosis received radiotherapy for local–regional recurrences or bilateral reconstruction, and those with < 1 year of follow-up were excluded. In the current analysis, we categorized both implant reconstruction and autologous plus implant reconstruction as implant-based reconstruction.

Identification and Classification of Reoperations

Reoperations following breast reconstruction were identified from electronic medical records and/or telephone follow-up. Overall reoperation was defined as all operations that were performed after the initial breast reconstruction surgery. For patients receiving delayed–immediate reconstruction, all surgeries after the placement of the tissue expanders were recorded as reoperations.

Reoperations were categorized into the following three types: (1) anticipated reoperations, defined as expected and planned components of the reconstruction process, including replacing a temporary expander with a permanent implant and nipple reconstruction; (2) unanticipated reoperations, defined as operations performed to treat complications associated with breast reconstruction in the breast or at the donor site, or to take out temporary expanders/implants/autologous tissue because of reconstruction failure or ipsilateral or contralateral revision or balancing operations; and (3) other reoperations, defined as operations unrelated to breast reconstruction, such as contralateral breast cancer removal, other secondary primary cancer surgeries, other benign disease surgeries, and operations to treat recurrences.

For patients who underwent more than one reoperation, each reoperation was recorded and classified.

Statistical Analyses

Patient baseline characteristics and treatment information between the PMRT and no PMRT groups were analyzed using Chi square tests. For all analyses, we considered the patient as the analytic unit. Multivariable analysis was performed using logistic regression to test the impact of radiotherapy and other factors on the overall reoperation rates and unanticipated reoperation rates in the entire cohort and in the patients stratified by reconstruction type (in the autologous reconstruction cohort and the implant-based reconstruction cohort, respectively). The other factors included age (< 40 vs. \geq 40 years), body mass index (BMI; kg/m^2 , < 24 vs. \geq 24), menopause status, prior breast radiotherapy history, reconstruction types (autologous vs. implant-based reconstruction), reconstruction timing (immediate vs. delayed vs. delayed–immediate

reconstruction), and systemic therapy. Smoking and diabetes status were excluded in the multivariable analysis because of the low numbers of patients who smoked and had diabetes in our cohort. All analyses were performed using SPSS 20.0 (IBM Corporation, Armonk, NY, USA). A p value < 0.05 was considered statistically significant.

RESULTS

Patient and Treatment Characteristics

Between June 2001 and December 2015, 832 breast cancer patients treated with mastectomy and breast reconstruction were collected, among whom 159 (19.1%) patients received PMRT and 673 (80.9%) did not receive PMRT. The baseline characteristics of patients, by PMRT

receipt status, are shown in Table 1. The median patient age was 38 years (range 19–63). Patients younger than 40 years and with a BMI ≥ 24 were more common in the PMRT group than in the no PMRT group ($p = 0.014$ and $p < 0.001$, respectively). Furthermore, patients who underwent autologous reconstruction were more common in the PMRT group than in the no PMRT group ($p < 0.001$). The distribution of patients in the different reconstruction timing subgroups was also significantly different between the PMRT and no PMRT groups, with delayed–immediate reconstruction being less common in the PMRT group than in the no PMRT group ($p = 0.001$). Systemic therapy was more common in the PMRT group than in the no PMRT group ($p < 0.001$).

TABLE 1 Clinical characteristics and treatment information in patients with and without PMRT [$n = 832$]

Variable	All patients [$n = 832$]	PMRT [$n = 159$]	No PMRT [$n = 673$]	p value
Age, years				
< 40	499 (60.0)	109 (68.6)	390 (57.9)	0.014
≥ 40	333 (40.0)	50 (31.4)	283 (42.1)	
BMI, kg/m ²				
< 24	699 (84.0)	118 (74.2)	581 (86.3)	< 0.001
≥ 24	133 (16.0)	41 (25.8)	92 (13.7)	
Smoking				
Yes	3 (0.4)	1 (0.6)	2 (0.3)	1.000
No	829 (99.6)	158 (99.4)	671 (99.7)	
Diabetes				
Yes	6 (0.7)	2 (1.3)	4 (0.6)	0.713
No	826 (99.3)	157 (98.7)	669 (99.4)	
Menopause status				
Premenopausal	790 (95.0)	152 (95.6)	638 (94.8)	0.679
Postmenopausal	42 (5.0)	7 (4.4)	35 (5.2)	
Prior breast radiotherapy				
Yes	11 (1.3)	1 (0.6)	10 (1.5)	0.642
No	821 (98.7)	158 (99.4)	663 (98.5)	
Reconstruction type				
Autologous reconstruction	438 (52.6)	107 (67.3)	331 (49.2)	< 0.001
Implant-based reconstruction	394 (47.4)	53 (32.7)	342 (50.8)	
Reconstruction timing				
Immediate	617 (74.2)	122 (76.7)	495 (73.6)	0.001
Delayed	31 (3.7)	13 (8.2)	18 (2.7)	
Delayed–immediate	184 (22.1)	24 (15.1)	160 (23.8)	
Systemic therapy				
Yes	722 (87.7)	158 (99.4)	564 (84.9)	< 0.001
No	101 (12.3)	1 (0.6)	100 (15.1)	

Data are expressed as n (%)

PMRT postmastectomy radiotherapy, BMI body mass index

Reoperation Rates After the Initial Breast Reconstruction

With a median follow-up duration of 58.5 months (range 12.3–176.0), a total of 1298 operations were performed in 832 breast cancer patients. A total of 384 (46.2%) patients underwent at least one reoperation after the initial breast reconstruction; the rates of anticipated, unanticipated, and other reoperations were 34%, 7.7%, and 9.3%, respectively (Table 2). The median number of reoperations was 1 (range 1–5), and the median time from the initial breast reconstruction to the first reoperation was 7.3 months (range 0.1–120.4). Among those patients receiving unanticipated reoperations, 6.5% ($n = 54$) of patients were treated for complications associated with breast reconstruction, or underwent temporary tissue expander/implant/autologous tissue removal because of reconstruction failure, and 1.4% ($n = 12$) of patients underwent ipsilateral or contralateral revision or balancing operations (Table 2).

As shown in Table 3, in the entire cohort, the rates of overall reoperations were 42.1% in the PMRT group and 47.1% in the no PMRT group, and the rates of unanticipated reoperations were 11.9% and 6.7%, respectively. In the autologous reconstruction cohort, the rates of overall reoperations were 35.5% in the PMRT group and 35.0% in the no PMRT group, and the rates of unanticipated reoperations were 10.3% and 6.6%, respectively. In the implant-based cohort, the rates of overall reoperations were 55.8% in the PMRT group and 58.8% in the no PMRT group, while the rates of unanticipated reoperations were 15.4% and 6.7%, respectively.

Factors Associated with Overall Reoperation Rates and Unanticipated Reoperation Rates

In the entire cohort, multivariable analysis showed that there was no significant difference between the PMRT and no PMRT groups in terms of overall reoperations (odds ratio [OR] 0.89, 95% confidence interval [CI] 0.58–1.37, $p = 0.602$) and unanticipated reoperations (OR 1.71, 95% CI 0.92–3.17, $p = 0.089$). Compared with immediate reconstruction, delayed reconstruction and delayed–immediate reconstructions were associated with an increased risk of both overall reoperations (OR 3.35, 95% CI 1.56–7.18, $p = 0.002$; and 99.04, 95% CI 38.74–253.15, $p < 0.001$, respectively) and unanticipated reoperations (OR 4.04, 95% CI 1.54–10.58, $p = 0.004$; and OR 3.99, 95% CI 1.82–8.72, $p = 0.001$, respectively) [Table 4].

Multivariable analysis according to different reconstruction types demonstrated that the impact of PMRT on unanticipated reoperations differed based on the reconstruction type. In patients with implant-based reconstruction, PMRT was associated with a 3.05-fold (95% CI 1.20–7.75, $p = 0.019$) higher odds of unanticipated reoperations, while there was no difference in patients who underwent autologous reconstruction (OR 1.17, 95% CI 0.51–2.66, $p = 0.713$) [Table 5]. PMRT was still not associated with overall reoperations in either implant-based (OR 1.00, 95% CI 0.43–2.37, $p = 0.995$) or autologous reconstruction patients (OR 0.85, 95% CI 0.52–1.40, $p = 0.533$). Similarly, delayed reconstruction or delayed–immediate reconstruction was still associated with a higher risk of overall and unanticipated reoperations in autologous or implant-based reconstruction patients (Table 5).

TABLE 2 Reoperation classifications

Reoperation types	Indications	Frequency [N (%)]
Anticipated reoperations		283 (34.0)
	Replace a temporary expander with a permanent implant	171 (20.6)
	A nipple reconstruction	127 (15.3)
Unanticipated reoperations		64 (7.7)
	Treat complications after breast reconstruction at breast or donor, or take out temporary expander/implant/autologous tissue because of reconstruction failure	54 (6.5)
	Ipsilateral or contralateral revision or balancing operation	12 (1.4)
Other reoperations		77 (9.3)
	Contralateral breast cancer or other secondary primary cancer surgeries, or other benign disease	68 (8.2)
	Operations to treat breast cancer recurrences	10 (1.2)

The bolded data means the total number (rate) of patients that received anticipated, unanticipated, and other reoperations

TABLE 3 Overall reoperation and unanticipated reoperation rates by PMRT status and reconstruction type

Cohort	No. of patients	Overall reoperations [N (%)]	Unanticipated reoperations [N (%)]
The entire cohort [n = 842]			
PMRT	159	67 (42.1)	19 (11.9)
No PMRT	673	317 (47.1)	45 (6.7)
Autologous reconstruction [n = 438]			
PMRT	107	38 (35.5)	11 (10.3)
No PMRT	331	116 (35.0)	22 (6.6)
Implant-based reconstruction [n = 394]			
PMRT	52	29 (55.8)	8 (15.4)
No PMRT	342	201 (58.8)	23 (6.7)

PMRT postmastectomy radiotherapy

TABLE 4 Adjusted odds ratio estimates of overall and unanticipated reoperations in the entire cohort [n = 842]

Variable ^a	Overall reoperations		Unanticipated reoperations	
	OR (95% CI)	p value	OR (95% CI)	p value
PMRT, yes vs. no	0.89 (0.58–1.37)	0.602	1.71 (0.92–3.17)	0.089
Age, years [≥ 40 vs. < 40]	1.00 (0.70–1.42)	0.980	1.03 (0.59–1.82)	0.906
BMI [≥ 24 vs. < 24]	1.06 (0.68–1.65)	0.792	1.66 (0.87–3.12)	0.130
Menopause status [postmenopausal vs. premenopausal]	1.00 (0.47–2.12)	0.997	0.79 (0.22–2.82)	0.711
Prior breast radiotherapy [yes vs. no]	0.91 (0.23–3.54)	0.892	1.49 (0.18–12.40)	0.712
Reconstruction type [implant-based vs. autologous]	0.72 (0.50–1.06)	0.093	0.63 (0.29–1.37)	0.244
Reconstruction timing		(< 0.001)		(< 0.001)
Delayed vs. immediate	3.35 (1.56–7.18)	0.002	4.04 (1.54–10.58)	0.004
Delayed–immediate vs. immediate	99.04 (38.74–253.15)	< 0.001	3.99 (1.82–8.72)	0.001
Systemic therapy [yes vs. no] ^b	1.00 (0.59–1.71)	0.984	0.99 (0.43–2.32)	0.989

PMRT postmastectomy radiotherapy, BMI body mass index, OR odds ratio, CI confidence interval

^aThe latter variables were regarded as references

^bUnknowns excluded

DISCUSSION

The current study is the first with a large sample size in a single institution to investigate the impact of PMRT on reoperation rates in women undergoing mastectomy and different types of breast reconstruction. Our study demonstrated that PMRT did not increase the overall reoperation rates in patients with either autologous or implant-based reconstruction, while showing different impacts on unanticipated reoperation rates according to different reconstruction types. PMRT was associated with a higher risk of unanticipated reoperations among patients who underwent implant-based reconstruction, but not among those who underwent autologous reconstruction. These findings have important implications for both patients and physicians when selecting the appropriate type of breast reconstruction when PMRT is planned. Except for reconstruction complications and reconstruction failures,

patients who may receive PMRT and who prefer implant-based restoration should be informed about an increased risk of unanticipated reoperations.

A considerable number of patients underwent reoperation after the initial breast reconstruction surgery, although the reported rates of reoperation varied from 37% to 88% in previous studies.^{5,12–14} The differences in reoperation rates might be attributed to different reconstruction types and timings, diverse population characteristics, and treatment settings across those studies. The current study showed that PMRT did not increase the overall reoperation rates in either the autologous or implant-based reconstruction cohorts. This finding was consistent with the results of two previous studies.^{13,15} The impact of the timing of reconstruction on overall reoperations was inconsistent. The current study, as well as the study by Eom et al., showed that delayed or delayed–immediate reconstructions were predictive of receiving more

TABLE 5 Adjusted odds ratio estimates of overall and unanticipated reoperations according to breast reconstruction types

Variable ^a	Overall reoperations		Unanticipated reoperations	
	OR (95% CI)	<i>p</i> value	OR (95% CI)	<i>p</i> value
<i>Autologous reconstruction cohort [n = 438]</i>				
PMRT [yes vs. no]	0.85 (0.52–1.40)	0.533	1.17 (0.51–2.66)	0.713
Age, years [≥ 40 vs. < 40]	1.09 (0.71–1.67)	0.687	1.32 (0.61–2.86)	0.483
BMI [≥ 24 vs. < 24]	1.10 (0.66–1.86)	0.710	2.22 (0.98–5.02)	0.056
Menopause status [postmenopausal vs. premenopausal]	1.02 (0.45–2.33)	0.965	1.09 (0.28–4.25)	0.901
Prior breast radiotherapy [yes vs. no]	0.60 (0.12–2.96)	0.531	–	–
Reconstruction timing		(0.007)		(0.014)
Delayed vs. immediate	3.55 (1.61–7.83)	0.002	3.95 (1.48–10.59)	0.006
Delayed–immediate vs. immediate	–	–	4.32 (0.45–41.38)	0.205
Systemic therapy [yes vs. no] ^b	1.19 (0.61–2.32)	0.608	1.49 (0.33–6.72)	0.600
<i>Implant-based reconstruction cohort [n = 394]</i>				
PMRT [yes vs. no]	1.00 (0.43–2.37)	0.995	3.05 (1.20–7.75)	0.019
Age, years [≥ 40 vs. < 40]	0.81 (0.41–1.60)	0.548	0.75 (0.30–1.84)	0.527
BMI [≥ 24 vs. < 24]	0.98 (0.41–2.31)	0.954	0.89 (0.27–2.94)	0.852
Menopause status [postmenopausal vs. premenopausal]	0.78 (0.12–5.24)	0.799	–	–
Prior breast radiotherapy [yes vs. no]	–	–	16.70 (0.82–339.41)	0.067
Reconstruction timing [delayed–immediate vs. immediate] ^c	9.53 (6.04–15.04)	< 0.001	2.02 (1.32–3.09)	0.001
Systemic therapy [yes vs. no] ^b	0.66 (0.27–1.62)	0.368	0.65 (0.23–1.90)	0.435

PMRT postmastectomy radiotherapy, BMI body mass index, OR odds ratio, CI confidence interval

^aThe latter variables were regarded as references

^bUnknowns excluded

^cDelayed reconstruction was excluded in this analysis as no patients who received delayed reconstructions were included in the implant-based reconstruction cohort

reoperations,¹⁵ while another study showed that the average number of reoperations was not significantly different between immediate and delayed reconstruction.⁵ With regard to reconstruction types, several previous studies^{5,13} concluded there were no significant differences in overall reoperations between autologous and implant-based reconstruction, while another study found that implant-based reconstruction was associated with a higher rate of reoperations.¹⁵

Among all types of reoperations, unanticipated reoperations were of the most concern because they were directly related to reconstruction complications, reconstruction failures, or revision surgeries. The American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) reported the unplanned reoperation rates stratified by different types of breast surgery in 18,500 breast cancer patients and found that the rates of unplanned reoperations were higher in patients undergoing mastectomy plus breast reconstruction (7.5%) than in those undergoing mastectomy alone (3.5%), lumpectomy alone (2.5%), or lumpectomy plus breast reconstruction (3.6%).¹⁶ The unanticipated reoperation rate in the current study was

7.6%, which was similar to the rate reported in the studies by Al-Hilli et al.¹⁶ and Venkat et al. (7.6%);¹⁷ however, other studies reported a much higher rate of unanticipated reoperations, varying from 13.8% to 37%.^{5,14,18,19} The different reconstruction types included in these studies might explain this disparity. Most patients in the current study underwent autologous reconstruction, and all patients in the study by Venkat et al. underwent deep inferior epigastric artery perforator flap breast reconstruction.¹⁷ However, more than two-thirds of patients in the study by Roberts et al.⁵ received implant reconstruction, and all patients in the studies by Sue et al.,¹⁹ Cordeiro et al.,¹⁸ and Zion et al.¹⁴ underwent implant reconstruction. Implant-based reconstruction might be associated with a higher rate of unanticipated reconstruction, although the current study did not show this trend.

Although the impact of radiotherapy on reconstruction complications and reconstruction failures has been well investigated, few studies have reported the impact of radiotherapy on unanticipated reoperations following breast reconstruction. In the current study, we found that PMRT was associated with a significantly higher risk of

unanticipated reoperations among patients receiving implant-based reconstruction, but not among those receiving autologous reconstruction. The outcomes of the current study were consistent with previous studies.^{12,20–22} Eriksson et al.²⁰ analyzed 725 women who underwent implant-based immediate breast reconstruction at four Stockholm hospitals from 2007 to 2011 and found that the rate of unplanned reoperation was 44% in the non-irradiated group, 66% in the previously irradiated group, and 59% in the postoperatively irradiated group ($p < 0.001$). Unukovych et al.²¹ analyzed 91 patients who underwent implant-based immediate breast reconstruction and showed that radiotherapy was associated with an increased risk of reoperation (OR 5.2, 95% CI 1.9–14.6, $p = 0.002$). Furthermore, Hvilsum et al.¹² included 675 patients who underwent delayed breast implant reconstruction between 1999 and 2006, and also found that radiotherapy was associated with a non-significant increased risk of unanticipated reoperations for patients undergoing both one-stage (hazard ratio [HR] 1.4, 95% CI 0.7–2.5) and two-stage (HR 1.6, 95% CI 0.9–3.1) implant reconstructions; unanticipated reoperations were defined as operations not included in the planned reconstructive procedure. Conversely, autologous reconstruction had different results. He et al.²² included 370 patients who underwent autologous lower abdominal flap reconstruction and showed that except for secondary surgery to remove necrotic fat ($p < 0.001$), the rates of other secondary surgeries unrelated to fat necrosis and revision surgeries were similar between the PMRT and no PMRT groups ($p = 0.057$ and $p = 0.990$, respectively). Secondary surgery was defined as surgical interventions in the reconstructed breasts to address complications and fat necrosis, while revision surgery was used to achieve better contour, shape, and overall symmetry.

These findings of the impact of PMRT on unanticipated reoperations in the current study were also consistent with the effect of PMRT on reconstruction complications. The Mastectomy Reconstruction Outcomes Consortium (MROC) study, a prospective multicenter cohort study, demonstrated that radiotherapy was associated with a significantly higher risk of any complications, major complications, and lower patient-reported satisfaction in implant-based reconstruction patients, but yielded comparable risks among autologous reconstruction patients.⁸ Because unanticipated reoperations were closely related to reconstruction complications or reconstruction failures and revision surgery, our findings provide further complementary and verified evidence supporting the findings of previous studies that investigated the impact of PMRT on reconstruction outcomes.

There were several limitations in the current study. First, as this was a retrospective study, it has inherent biases in patient selection and treatment assignment. Although we endeavored to mitigate the influence of several potential confounding risk factors by performing multivariate analyses, other unmeasured or unknown confounding factors that we did not take into consideration might have impacted our results. Second, although we attempted to obtain reoperation information through both the electronic medical record system and telephone-call follow-ups, some patients were still lost to follow-up. It is possible that reoperations performed in other institutes were not recorded, leading to an underestimate of the reoperation rates. Despite these limitations, the current study provides detailed risk estimates of overall and unanticipated reoperations that are necessary when making optimally individualized decisions for patients who are undergoing breast reconstruction and PMRT.

CONCLUSIONS

Our study demonstrated that PMRT was associated with an increased risk of unanticipated reoperations among patients undergoing implant-based reconstruction, but not among those undergoing autologous reconstruction. In addition to the risk of reconstruction complications and reconstruction failure, reoperation rates, especially unanticipated reoperation rates, should also be taken into consideration when selecting the appropriate type of breast reconstruction surgery in patients undergoing mastectomy who have indications for PMRT. Prospective studies are warranted to further verify our findings.

DISCLOSURES None.

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