Multicenter Retrospective Observational Study on the Safety and Timing of Radiotherapy After Oncoplastic Breast-Conserving Surgery

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Introduction

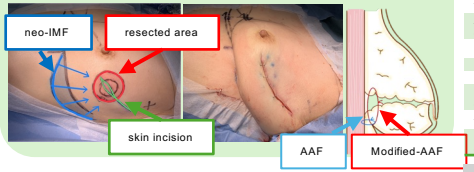
In Japan, particularly in Mie Prefecture, oncoplastic breast-conserving surgery (OPBCS) is frequently performed. However, evidence regarding the safety of postoperative radiotherapy following OPBCS remains limited. Since OPBCS involves significant tissue rearrangement, concerns persist about its potential impact on radiotherapy delivery and oncologic outcomes. While an international cohort study of 4,135 patients found no adverse effect on prognosis,[1] relevant data from Japan are scarce. This multicenter retrospective study aimed to assess the safety of radiotherapy after OPBCS, with ipsilateral breast tumor recurrence (IBTR) as the primary endpoint.

1) André C et al, BJS Open. 2021 Jan 8;5(1):zraa013.

OPBCS commonly performed at our hospital

-Modified AAF: abdominal advancement flap-

The neo-IMF is sutured to the cranial breast tissue to lift it and fill the resection defect



Material and Methods

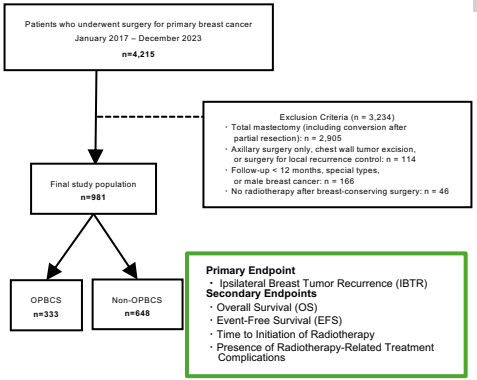
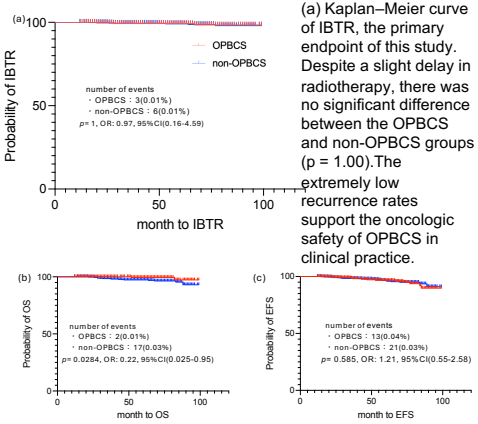


Table1. Patient Characteristics

variable	OPBCS (n=333)	non-OPBCS (n=648)	P value
Median follow-up (months)	55(12-99)	54(12-99)	0.676
Age			
Premenopausal	197(59)	417(64)	
Postmenopausal	136(41)	230(35)	0.109
Median age	54(26-88)	57(31-94)	0.114
BMI			
≦25	246(74)	453(70)	
>25	87(26)	195(30)	0.206
Median BMI	22(15.7-38.3)	23(15.5-51.1)	0.076
Smoking	36(11)	69(11)	0.944
Tumor size (mm)			
≦20	301(90)	569(88)	
>20	32(10)	79(12)	0.243
Median size	9(0-65)	10(0-130)	0.153
Invasive lobular carcinoma	20(6)	29(4)	0.353
ER-positive	256(77)	557(86)	0.0410
HER2-positive	41(12)	52(8)	p <0.01
Axillary LN metastasis	82(25)	170(26)	0.642
Axillary lymph node dissection	18(5)	31(5)	0.645
Positive surgical margin	70(21)	113(17)	0.194
Re-excision	18(5)	15(2)	0.0131
Boost irradiation	70(21)	119(18)	0.347
Neoadjuvant chemotherapy	26(8)	31(5)	0.0614
Adjuvant chemotherapy	59(18)	102(16)	0.467
Postoperative complications	60(18)	58(9)	p <0.001

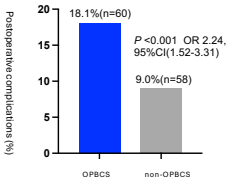
Fig1. Survival curves comparing the OPBCS and non-OPBCS



(a) Kaplan–Meier curve of IBTR, the primary endpoint of this study. Despite a slight delay in radiotherapy, there was no significant difference between the OPBCS and non-OPBCS groups (p = 1.00).The extremely low recurrence rates support the oncologic safety of OPBCS in clinical practice.

Table2. Factors linked to delayed start of radiation therapy

	95% CI	p-value
ER positive	-0.241 to -0.0430	0.00503
HER2 positive	0.0781 to 0.295	0.000765
OPBCS	0.0747 to 0.205	p<0.0001
Neoadjuvant chemotherapy	-42.2 to -19.7	p<0.0001
Postoperative chemotherapy	93.1 to 108	p<0.0001
Tumor size(>20mm)	-0.00851 to 0.181	0.0745
Positive surgical margin	-0.0183 to 0.143	0.129
Axillary lymph node dissection	0.147 to 0.432	p<0.0001



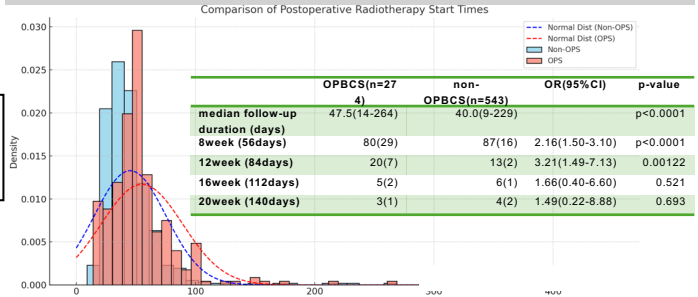
Multivariate analysis confirmed OPBCS as a factor for delayed radiation therapy. In the OPBCS group, postoperative complications occurred about twice as often, most commonly delayed wound healing. These increased complications likely delayed the start of radiation therapy.

Table3. Post-radiation therapy complications

	OPBCS	non-OPBCS	OR (95% CI)	p-value
Radiation-related complications (total)	14(0.051%)	27(0.048%)	0.95(0.45-1.92)	1
Dermatitis ≥ Grade 2	2	7	0.52(0.053-2.77)	0.505
Radiation pneumonitis	4	7	1.05(0.22-4.18)	1
Radiation fatigue	3	6	0.91(0.14-4.35)	1

Grade 1 radiation dermatitis was excluded, and there was no difference between patients with or without OPBCS.

Fig2. Comparison of the timing of postoperative radiotherapy initiation according to the presence or absence of oncoplastic surgery



	OPBCS(n=274)	non-OPBCS(n=543)	OR(95%CI)	p-value
median follow-up duration (days)	47.5(14-264)	40.0(9-229)		p<0.0001
8week (56days)	80(29)	87(16)	2.16(1.50-3.10)	p<0.0001
12week (84days)	20(7)	13(2)	3.21(1.49-7.13)	0.00122
16week (112days)	5(2)	6(1)	1.66(0.40-6.60)	0.521
20week (140days)	3(1)	4(2)	1.49(0.22-8.88)	0.693

Fig2 shows the number of patients who experienced a delay in the initiation of radiotherapy. In the OPBCS group, the start of radiotherapy was delayed by approximately 1 week. No difference was observed between the groups after 16 weeks.

Conclusion

This study suggests that postoperative complications following OPBCS may have some impact on the timing of radiotherapy initiation; however, no significant adverse effects on the safety of radiotherapy or ipsilateral breast tumor recurrence were observed. OPBCS can be considered a safe surgical approach when appropriate perioperative management is implemented.

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