

## Supplemental Online Content

Lee J, Ryu JM, Kim HK. Long-term oncologic outcome of breast-conserving treatment in breast cancer with BRCA variants. *JAMA Netw Open*. 2025;8(5):e259840. doi:10.1001/jamanetworkopen.2025.9840

**eFigure.** Kaplan-Meier survival curve of breast surgery type for prognosis after IPTW

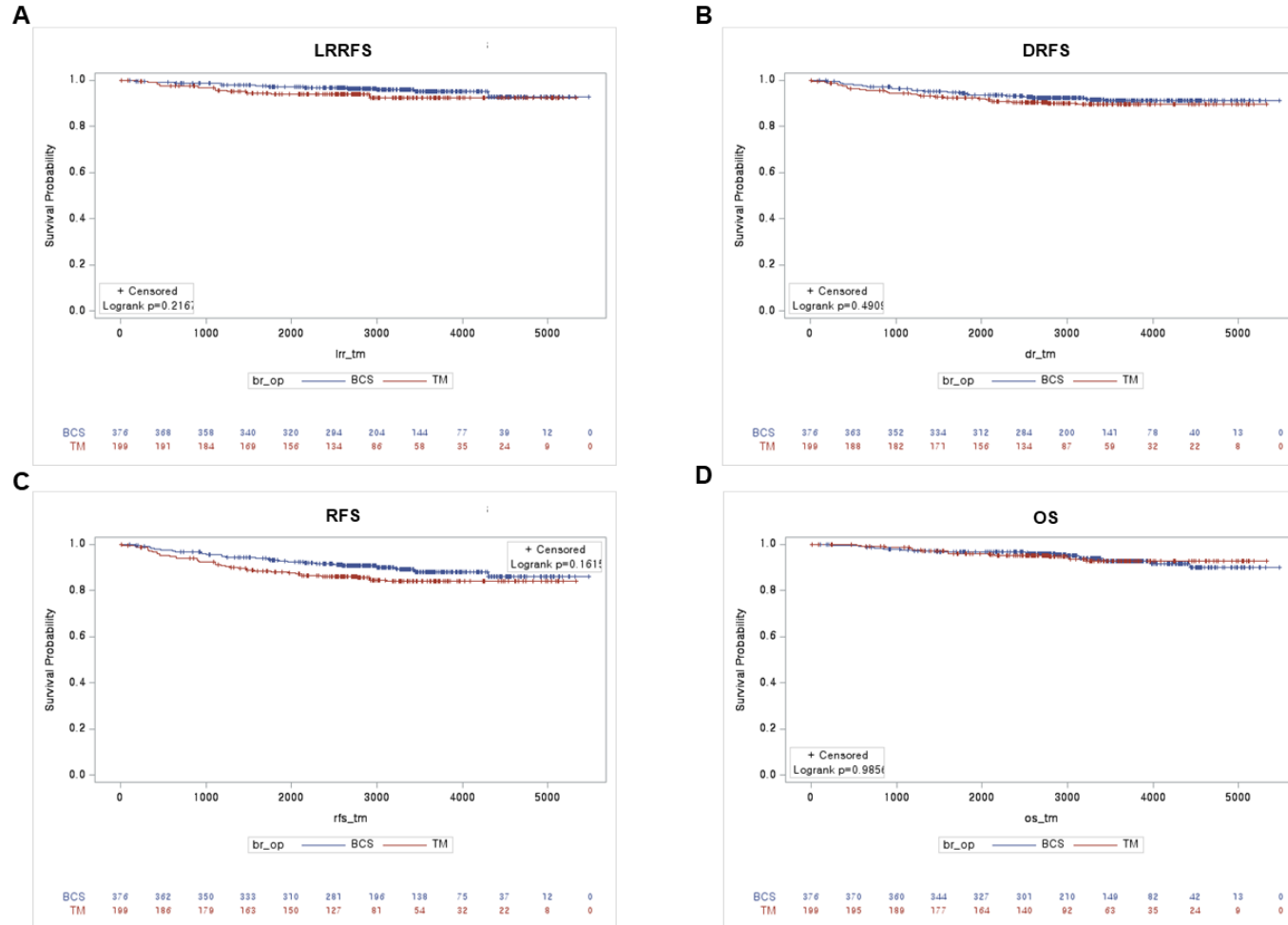
**eTable 1.** Baseline characteristics of enrolled patients with BRCA pathogenic variants

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**eTable 4.** Incidence of survival events according to surgery type in 1:1 PS matched patients

This supplemental material has been provided by the authors to give readers additional information about their work.



**eFigure. Kaplan-Meier survival curve of breast surgery type for prognosis after IPTW. (A) LRRFS ( $p = .216$ ). (B) DRFS ( $p = .49$ ). (C) RFS ( $p = .615$ ). (D) OS ( $p = .985$ ).**

BCS, breast-conserving surgery; TM, total mastectomy; LRRFS, locoregional recurrence-free survival; DRFS, distant recurrence-free survival; RFS, recurrence-free survival; OS, overall survival; IPTW, inverse probability of treatment weighting;

**eTable 1. Baseline characteristics of enrolled patients with *BRCA* pathogenic variants**

Variables	All patients, % (n=575)	Patients with BCT, % (n=377)	Patients with mastectomy, % (n=198)	<i>p</i>
Age (years), mean (SDs)	42.0 (9.6)	41.8 (9.4)	42.3 (10.0)	.54
<i>BRCA</i>				.004
<i>BRCA1</i> positive	338 (58.8)	237 (62.9)	101 (51.0)	
<i>BRCA2</i> positive	223 (38.8)	135 (35.8)	88 (44.5)	
<i>BRCA1/2</i> positive	14 (2.4)	5 (1.3)	9 (4.5)	
Prophylactic contralateral mastectomy				<.001
Not performed	548 (95.3)	371 (98.4)	177 (89.4)	
Performed	27 (4.7)	6 (1.6)	21 (10.6)	
Risk-reducing BSO				.01
Not performed	429 (74.6)	269 (71.4)	160 (80.8)	
Performed	146 (25.4)	108 (28.6)	38 (19.2)	
Tumor size (mm)				<.001
≤20	351 (61.0)	252 (66.8)	99 (50.0)	
>20	218 (37.9)	120 (31.8)	98 (49.5)	
Unknown	6 (1.0)	5 (1.3)	1 (0.5)	
LN metastasis				<.001
Negative	387 (67.3)	281 (74.5)	106 (53.5)	
Positive	183 (31.8)	92 (24.4)	91 (46.0)	
Unknown	5 (0.9)	4 (1.1)	1 (0.5)	
HG				<.001
I/II	231 (40.2)	128 (34.0)	103 (52.0)	
III	307 (53.4)	224 (59.4)	83 (41.9)	
Unknown	37 (6.4)	25 (6.6)	12 (6.1)	

Subtype				.004
HR+/HER2-	274 (47.7)	163 (43.2)	111 (56.1)	
HER2+	40 (7.0)	24 (6.4)	16 (8.1)	
TNBC	251 (43.7)	185 (49.1)	66 (33.3)	
Unknown	10 (1.7)	5 (1.3)	5 (2.5)	
CTx				.33
Not performed	121 (21.0)	86 (22.8)	35 (17.7)	
Performed	452 (78.6)	290 (76.9)	162 (81.8)	
Unknown	2 (0.3)	1 (0.3)	1 (0.5)	

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SD, standard deviation; BCT, breast-conserving treatment; BSO, bilateral salpingo-oophorectomy; LN, lymph node; HG, histologic grade; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple negative breast cancer; CTx, chemotherapy

**eTable 2. Recurrence, death, and contralateral breast cancer events**

Event	Patients (%)
Total events	184
Locoregional recurrence	27 (4.9)
Distant recurrence	50 (9.0)
Contralateral breast cancer among patients who not performed prophylactic contralateral mastectomy	72 (14.2)
Death	35 (6.3)

**eTable 3. Multivariate analysis for survival outcomes in enrolled patients**

Variables	LRRFS		DRFS		RFS		OS	
	Hazard ratio (95% CI)	<i>P</i>	Hazard ratio (95% CI)	<i>P</i>	Hazard ratio (95% CI)	<i>P</i>	Hazard ratio (95% CI)	<i>P</i>
Breast surgery								
BCT	Ref.		Ref.		Ref.		Ref.	
Mastectomy	1.87 (0.79-4.42)	.16	1.36 (0.76-2.48)	.29	1.47 (0.93-2.33)	.10	1.03 (0.50-2.13)	.94
Age (years), mean (SDs)	0.96 (0.91-1.01)	.08	1.01 (0.98-1.04)	.53	1.00 (0.98-1.02)	.90	0.98 (0.95-1.02)	.38
BRCA								
BRCA1 positive	Ref.		Ref.		Ref.		Ref.	
BRCA2 positive	0.99 (0.35-2.82)	.98	0.52 (0.26-1.05)	.07	0.83 (0.48-1.42)	.49	0.99 (0.41-2.40)	.97
BRCA1/2 positive	0 (0-NE)	.99	0.65 (0.15-2.81)	.56	0.75 (0.23-2.47)	.64	0.71 (0.09-5.53)	.74
Prophylactic contralateral mastectomy								
Not performed	Ref.		Ref.		Ref.		Ref.	
Performed	0 (0-NE)	.99	0.41 (0.06-3.02)	.38	0.25 (0.03-1.83)	.17	0 (0-NE)	.97
Risk-reducing BSO								
Not performed	Ref.		Ref.		Ref.		Ref.	
Performed	0.68 (0.23-2.05)	.49	0.47 (0.21-1.05)	.07	0.41 (0.22-0.79)	.007	0.17 (0.04-0.71)	.02
Tumor size (mm)								
≤20	Ref.		Ref.		Ref.		Ref.	
>20	1.94 (0.82-4.62)	.13	2.81 (1.55-5.12)	.001	2.46 (1.56-3.89)	<.001	2.03 (1.00-4.12)	.05
LN metastasis								
Negative	Ref.		Ref.		Ref.		Ref.	
Positive	0.83 (0.32-2.17)	.71	1.60 (0.88-2.92)	.13	1.33 (0.83-2.13)	.24	2.01 (1.01-4.30)	.047
HG								
I/II	Ref.		Ref.		Ref.		Ref.	

III	0.59 (0.22-1.55)	.29	0.78 (0.40-1.50)	.45	0.80 (0.47-1.34)	.39	0.91 (0.39-2.10)	.82
Subtype								
HR+/HER2-	Ref.		Ref.		Ref.		Ref.	
HER2+	1.77 (0.35-8.83)	.49	0.46 (0.11-1.99)	.30	0.81 (0.31-2.13)	.67	0.85 (0.18-4.01)	.83
TNBC	2.10 (0.66-6.70)	.21	0.88 (0.43-1.80)	.72	1.25 (0.69-2.27)	.45	1.68 (0.64-4.38)	.29
CTx								
Not performed	Ref.		Ref.		Ref.		Ref.	
Performed	0.61 (0.20-1.83)	.38	1.45 (0.59-3.59)	.42	1.02 (0.54-1.93)	.96	1.54 (0.45-5.30)	.49

LRRFS, locoregional recurrence-free survival; DRFS, Distant recurrence-free survival; RFS, recurrence-free survival; OS, overall survival; BCT, breast-conserving treatment; BSO, bilateral salpingo-oophorectomy; LN, lymph node; HG, histologic grade; HR, hormone receptor; HER2, human epidermal growth factor receptor 2; TNBC, triple negative breast cancer; CTx, chemotherapy

**eTable 4. Incidence of events according to surgery type in 1:1 PS matched patients**

Type of events	BCT (n=159)		Mastectomy (n=159)		p
	n	%	n	%	
Locoregional recurrence	8	5.1	8	5.1	.83
Distant recurrence	10	6.4	16	10.3	.18
MCBC	21	13.3	17	10.7	.13
Death	10	6.4	10	6.4	.87

PS, propensity score; BCT, breast conserving treatment; MCBC, metachronous contralateral breast cancer