

**S2 Table.** Clinical features and MRD status of each patient

Patient ID	Age (yr)	Tumor size <sup>a)</sup>	Node <sup>a)</sup>	Stage (AJCC 8) <sup>a)</sup>	Molecular type	Neoadjuvant	Clinical risk	Somatic gene variants of postoperative plasma	ctDNA status of postoperative plasma	MRD status of postoperative plasma
Patient 1	36	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 2	67	T2	N3	III	HER2+	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 3	43	T4	N3	III	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 4	47	T4	N1	III	HER2+	Yes	High	TP53 (c.497C>A, 0.3%), PAX5 (c.887C>G, 0.1%), ARID1B (c.921CGG[8>3], 0.2%), MAP3K1 (c.720_721insCACAG, 0.4%), NFE2L2 (c.1345C>A, 0.2%), MLH1 (c.412C>T, 0.4%), HIST1H2AC (c.270C>G, 0.2%), NF1 (c.821T>G, 0.4%), CCND2 (c.812C>T, 0.1%)	Positive	Detectable MRD
Patient 5	56	T2	N1	II	HER2+	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 6	32	T4	N1	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 7	31	T1	N3	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 8	41	T1	N0	I	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 9	32	T2	N1	II	HER2+	Yes	High	TP53 (c.535C>T, 0.03%)	Positive	Detectable MRD

Patient 10	30	T2	N0	II	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 11	44	T2	N3	III	TNBC	Yes	Median	NF1 (c.403C>T, 0.7%), CCNE1 (c.200dupT, 0.6%)	Positive	Detectable MRD
Patient 12	42	Unknown	Unknown	Unknown	TNBC	No	Unknown	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 13	54	T2	N0	II	HER2+	No	Median	MLL3 (c.8323G>T, 0.05%), PPP1R17 (c.179A[8>9], 0.5%)	Positive	Detectable MRD
Patient 14	47	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 15	28	T4	N2	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 16	51	T2	N0	II	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 17	43	T2	N1	II	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 18	48	T2	N1	II	TNBC	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 19	65	T1	N1	II	HER2+	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 20	35	T2	N0	II	HR+HER2-	No	Low	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 21	45	T2	N0	II	HER2+	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 22	55	T2	N1	II	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 23	73	T2	N1	II	TNBC	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 24	45	T2	N2	III	HER2+	Yes	High	NTRK3 (c.223G>A, 0.2%)	Positive	Detectable MRD
Patient 25	41	T2	N3	III	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 26	48	T2	N1	II	HER2+	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD

Patient 27	45	T1	N1	II	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 28	43	T2	N0	II	TNBC	No	Median	TP53 (c.659A>G, 0.3%), FAT1 (c.748G>A, 0.2%)	Positive	Detectable MRD
Patient 29	63	T2	N0	II	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 30	57	T2	N0	II	TNBC	Yes	Unknown	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 31	51	T2	N1	II	TNBC	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 32	55	T2	N0	II	HR+HER2-	Yes	Median	MLL3 (c.2722G>T, 1.9%), ATM (c.1009C>T, 0.1%)	Positive	Detectable MRD
Patient 33	56	T2	N1	II	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 34	37	T2	N1	II	TNBC	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 35	51	T1	N0	I	HER2+	No	Low	No somatic gene variant was detected	Negative	Undetectable MRD
patient 36	37	T4	N2	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 37	49	Unknown	Unknown	Unknown	HR+HER2-	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 38	42	Unknown	Unknown	Unknown	HR+HER2-	No	Unknown	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 39	40	T2	N3	III	TNBC	Yes	Median	TP53 (c.817C>T, 0.06%)	Positive	Detectable MRD
Patient 40	33	T3	N3	III	TNBC	Yes	High	TP53 (c.380C>T, 0.2%), ATR (c.1201A>G, 0.2%), EXT2 (c.2077G>A, 0.1%), MAP3K1 (c.1580_1611delCTTTGGCTGGATCACGAAGGAATCAAGAGAGC, 0.01%)	Positive	Detectable MRD
Patient 41	51	T1	N1	II	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD

Patient 42	50	T3	N1	III	HER2+	Yes	High	ERBB2 (c.650G>A, 0.06%)	Positive	Detectable MRD
Patient 43	46	T1	N0	I	HR+HER2-	No	Unknown	RECQL (c.112A[9>10], 1.2%), SERPINB3 (c.1042G>A, 0.2%)	Positive	Detectable MRD
Patient 44	67	T2	N1	II	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 45	68	T2	N0	II	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 46	55	T1	N0	I	HER2+	No	Low	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 47	46	T2	N1	II	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 48	38	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 49	56	T2	N3	III	HR+HER2-	No	High	SPEN (c.10072C>T, 0.4%)	Positive	Detectable MRD
Patient 50	56	T4	N3	III	TNBC	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 51	49	T4	N1	III	HER2+	Yes	Low	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 52	42	T1	N0	I	TNBC	Yes	Low	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 53	46	T2	N0	II	HR+HER2-	Yes	Median	BRCA1 (c.2666C>T, 0.3%)	Positive	Detectable MRD
Patient 54	71	T2	N2	III	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 55	49	T1	N0	I	TNBC	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 56	40	T4	N3	III	HER2+	No	High	TP53 (c.581T>G, 0.09%)	Positive	Detectable MRD
Patient 57	39	T2	N1	II	HER2+	No	Low	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 58	67	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD

Patient 59	46	T2	N0	II	HER2+	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 60	50	T3	N3	III	TNBC	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 61	36	T2	N0	II	HER2+	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 62	48	T3	N1	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 63	50	T2	N3	III	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 64	56	T2	N0	II	HER2+	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 65	35	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 66	29	T2	N0	II	TNBC	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 67	50	T1	N0	I	HER2+	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 68	57	T2	N3	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 69	40	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 70	46	T1	N0	I	HR+HER2-	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 71	42	T2	N3	III	HER2+	No	High	APC (c.869G>A, 0.2%), TP73 (c.613G>A, 0.1%), SPOP (c.896T>A, 0.1%), TP53 (c.95dupT, 0.3%), NSD1 (c.6962C>T, 0.09%), IGF1R (c.3837C>G, 0.3%), MLL2 (c.10966C>T, 0.05%)	Positive	Detectable MRD
Patient 72	48	T2	N1	II	TNBC	No	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 73	53	T2	N3	III	TNBC	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD

Patient 74	58	T2	N3	III	TNBC	Yes	High	TP53 (c.438G>A, 0.1%)	Positive	Detectable MRD
Patient 75	35	T2	N0	II	HER2+	No	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 76	30	T2	N1	II	HR+HER2-	Yes	Median	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 77	54	T3	N1	III	HR+HER2-	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD
Patient 78	45	T3	N3	III	HER2+	No	High	CDKN1A (c.226C>T, 0.5%), MAP2K1 (c.612C>G, 0.2%)	Positive	Detectable MRD
Patient 79	44	T3	N1	III	TNBC	No	High	PIK3CA (c.323G>A, 0.2%)	Positive	Detectable MRD
Patient 80	42	T2	N2	III	HER2+	Yes	High	No somatic gene variant was detected	Negative	Undetectable MRD

ctDNA, circulating tumor DNA; HER2, human epidermal growth factor receptor 2; HR, hormone receptor; MRD, molecular residual disease; TNBC, triple-negative breast cancer. <sup>a)</sup>For neoadjuvant patients, the stage, tumor size, and lymph node status were determined before neoadjuvant therapy.