

Table S1 Association rules analysis between breast pcr and axillary response (totally 57 rules)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	cT = T2, cN = N0, Breast pCR	Axillary pCR	0.05	0.95	2.48
2	cT = T2, cN = N0, Histology = Invasive Ductal, Breast pCR	Axillary pCR	0.05	0.95	2.48
3	cN = N0, PR = Negative, Breast pCR	Axillary pCR	0.06	0.95	2.47
4	cN = N0, Histology = Invasive Ductal, PR = Negative, Breast pCR	Axillary pCR	0.06	0.95	2.47
5	cN = N0, PR = Negative, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.95	2.46
6	cN = N0, Breast pCR	Axillary pCR	0.07	0.95	2.46
7	cN = N0, PR = Negative, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.95	2.46
8	cN = N0, Histology = Invasive Ductal, PR = Negative, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.95	2.46
9	cN = N0, Histology = Invasive Ductal, Breast pCR	Axillary pCR	0.07	0.95	2.46
10	cN = N0, Histology = Invasive Ductal, PR = Negative, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.95	2.46
11	cN = N0, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.95	2.46
12	cN = N0, PR = Negative, CT Course \leq 5, Breast pCR	Axillary pCR	0.06	0.95	2.46
13	cN = N0, PR = Negative, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.95	2.46
14	cN = N0, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.07	0.95	2.46
15	cN = N0, Histology = Invasive Ductal, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.95	2.46
16	cN = N0, Histology = Invasive Ductal, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.07	0.94	2.46
17	cN = N0, Histology = Invasive Ductal, PR = Negative, CT Course \leq 5, Breast pCR	Axillary pCR	0.06	0.94	2.46
18	cN = N0, Histology = Invasive Ductal, PR = Negative, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.46
19	cN = N0, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.94	2.45
20	cN = N0, PR = Negative, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.45
21	cN = N0, CT Course \leq 5, Breast pCR	Axillary pCR	0.07	0.94	2.45
22	cN = N0, Histology = Invasive Ductal, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.94	2.45
23	cN = N0, PR = Negative, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.05	0.94	2.45
24	cN = N0, Histology = Invasive Ductal, PR = Negative, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.45
25	cN = N0, Histology = Invasive Ductal, CT Course \leq 5, Breast pCR	Axillary pCR	0.07	0.94	2.45
26	cN = N0, PR = Negative, Ki67 Expression = High, Breast pCR	Axillary pCR	0.05	0.94	2.45
27	cN = N0, Histology = Invasive Ductal, PR = Negative, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.05	0.94	2.45
28	cN = N0, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.94	2.45
29	cN = N0, Ki67 Expression = High, Breast pCR	Axillary pCR	0.07	0.94	2.45
30	cN = N0, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.07	0.94	2.45
31	cN = N0, Histology = Invasive Ductal, PR = Negative, CT Course \leq 5, Ki67 Expression = High, Breast pCR	Axillary pCR	0.05	0.94	2.45
32	cN = N0, Histology = Invasive Ductal, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.07	0.94	2.45
33	cN = N0, PR = Negative, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.45
34	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, Breast pCR	Axillary pCR	0.06	0.94	2.45
35	cN = N0, Histology = Invasive Ductal, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.94	2.45
36	cN = N0, PR = Negative, Ki67 Expression = High, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.45
37	cN = N0, Histology = Invasive Ductal, PR = Negative, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.45
38	cN = N0, Ki67 Expression = High, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
39	cN = N0, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
40	cN = N0, PR = Negative, Ki67 Expression = High, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.05	0.94	2.44
41	cN = N0, Histology = Invasive Ductal, PR = Negative, Ki67 Expression = High, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.05	0.94	2.44
42	cN = N0, Ki67 Expression = High, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.94	2.44
43	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
44	cN = N0, Histology = Invasive Ductal, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
45	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.94	2.44
46	cN = N0, Ki67 Expression = High, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
47	cN = N0, Ki67 Expression = High, CT Course \leq 5, Breast pCR	Axillary pCR	0.06	0.94	2.44
48	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.44
49	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, CT Course \leq 5, Breast pCR	Axillary pCR	0.06	0.94	2.43
50	cN = N0, Ki67 Expression = High, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.94	2.43
51	cN = N0, Ki67 Expression = High, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.93	2.43
52	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, CT Course \leq 5, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.93	2.43
53	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, CT Course \leq 5, Surgery = Mastectomy, Breast pCR	Axillary pCR	0.06	0.93	2.43
54	cN = N0, Ki67 Expression = High, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.93	2.43
55	cN = N0, Histology = Invasive Ductal, Ki67 Expression = High, CT Course \leq 5, Surgery = Mastectomy, Regimen = Chemotherapy, Breast pCR	Axillary pCR	0.06	0.93	2.42
56	ER = Negative, PR = Negative, Breast pCR	Axillary pCR	0.05	0.75	1.95
57	Histology = Invasive Ductal, ER = Negative, PR = Negative, Breast pCR	Axillary pCR	0.05	0.75	1.95

pCR, pathologic complete response; ER, estrogen receptor; PR, progesterone receptor; CT, chemotherapy.

Table S2 Association Rules Analysis between No pCR in the Breast and Response in the Axilla (top 10 rules sorted by confidence from 4567 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	cN = N2, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
2	cN = N2, Surgery = Mastectomy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
3	cN = N2, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
4	cN = N2, Histology = Invasive Ductal, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
5	cN = N2, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
6	cN = N2, Histology = Invasive Ductal, Surgery = Mastectomy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
7	cN = N2, Histology = Invasive Ductal, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
8	cN = N2, Histology = Invasive Ductal, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.13	1.00	1.62
9	cN = N2, CT Course ≤ 5 , No pCR in the Breast	No pCR in the Axilla	0.12	1.00	1.62
10	cN = N2, CT Course ≤ 5 , Surgery = Mastectomy, No pCR in the Breast	No pCR in the Axilla	0.12	1.00	1.62

LHS, left-hand-side; RHS, right-hand-side; pCR, pathologic complete response; CT, chemotherapy.

Table S3 Association Rules Analysis between No pCR in the Breast and Response in the Axilla (top 10 rules sorted by support from 4567 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	cN = N1, No pCR in the Breast	No pCR in the Axilla	0.39	0.91	1.48
2	cN = N1, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.39	0.92	1.49
3	cN = N1, Histology = Invasive Ductal, No pCR in the Breast	No pCR in the Axilla	0.39	0.91	1.48
4	cN = N1, Histology = Invasive Ductal, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.38	0.92	1.49
5	cN = N1, Surgery = Mastectomy, No pCR in the Breast	No pCR in the Axilla	0.38	0.91	1.48
6	cN = N1, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.38	0.92	1.49
7	cN = N1, Histology = Invasive Ductal, Surgery = Mastectomy, No pCR in the Breast	No pCR in the Axilla	0.38	0.91	1.48
8	cN = N1, Histology = Invasive Ductal, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.38	0.92	1.49
9	cN = N1, CT Course ≤ 5 , No pCR in the Breast	No pCR in the Axilla	0.36	0.91	1.49
10	cN = N1, CT Course ≤ 5 , Regimen = Chemotherapy, No pCR in the Breast	No pCR in the Axilla	0.36	0.92	1.49

LHS, left-hand-side; RHS, right-hand-side; pCR, pathologic complete response; CT, chemotherapy.

Table S4 Association rules analysis between no pCR in the axilla and response in the breast (top 10 rules sorted by confidence and support from 8008 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	cT = T3, HER2 = Negative, No pCR in the Axilla	No pCR in the Breast	0.07	1.00	1.13
2	Menstrual Status = Postmenopausal, Ki67 = Low Expression, No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13
3	cT = T3, HER2 = Negative, CT Course ≤ 5 , No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13
4	cT = T3, HER2 = Negative, Surgery = Mastectomy, No pCR in the Axilla	No pCR in the Breast	0.07	1.00	1.13
5	cT = T3, HER2 = Negative, Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.07	1.00	1.13
6	cT = T3, Histology = Invasive Ductal, HER2 = Negative, No pCR in the Axilla	No pCR in the Breast	0.06	1.00	1.13
7	Menstrual Status = Postmenopausal, Ki67 = Low Expression, Surgery = Mastectomy, No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13
8	Menstrual Status = Postmenopausal, Ki67 = Low Expression, Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13
9	Menstrual Status = Postmenopausal, Histology = Invasive Ductal, Ki67 = Low Expression, No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13
10	Menstrual Status = Postmenopausal, cT = T2, PR = Positive, No pCR in the Axilla	No pCR in the Breast	0.05	1.00	1.13

LHS, left-hand-side; RHS, right-hand-side; HER2, human epidermal growth factor receptor 2; pCR, pathologic complete response; CT, chemotherapy; PR, progesterone receptor.

Table S5 Association rules analysis between no pCR in the axilla and response in the breast (top 10 rules sorted by support from 8008 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	No pCR in the Axilla	No pCR in the Breast	0.58	0.94	1.07
2	Histology = Invasive Ductal, No pCR in the Axilla	No pCR in the Breast	0.57	0.94	1.07
3	Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.57	0.94	1.06
4	Surgery = Mastectomy, No pCR in the Axilla	No pCR in the Breast	0.57	0.94	1.06
5	Histology = Invasive Ductal, Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.56	0.94	1.06
6	Histology = Invasive Ductal, Surgery = Mastectomy, No pCR in the Axilla	No pCR in the Breast	0.56	0.94	1.06
7	Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.56	0.94	1.06
8	Histology = Invasive Ductal, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Axilla	No pCR in the Breast	0.55	0.94	1.06
9	CT Course ≤ 5 , No pCR in the Axilla	No pCR in the Breast	0.53	0.94	1.06
10	Histology = Invasive Ductal, CT Course ≤ 5 , No pCR in the Axilla	No pCR in the Breast	0.53	0.94	1.06

LHS, left-hand-side; RHS, right-hand-side; pCR, pathologic complete response; CT, chemotherapy.

Table S6 Association rules analysis between no pCR in the breast and pCR in the axilla (top 10 rules sorted by confidence from 1312 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, No pCR in the Breast	Axillary pCR	0.05	0.97	2.53
2	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.53
3	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, Surgery = Mastectomy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
4	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
5	Lesion Side = Left, cT = T2, cN = N0, Histology = Invasive Ductal, HER2 = Negative, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
6	Lesion Side = Left, cT = T2, cN = N0, Histology = Invasive Ductal, HER2 = Negative, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
7	Lesion Side = Left, cT = T2, cN = N0, Histology = Invasive Ductal, HER2 = Negative, Surgery = Mastectomy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
8	Lesion Side = Left, cT = T2, cN = N0, Histology = Invasive Ductal, HER2 = Negative, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
9	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, CT Course ≤ 5 , No pCR in the Breast	Axillary pCR	0.05	0.97	2.52
10	Lesion Side = Left, cT = T2, cN = N0, HER2 = Negative, CT Course ≤ 5 , Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.05	0.97	2.52

LHS, left-hand-side; RHS, right-hand-side; HER2, human epidermal growth factor receptor 2; pCR, pathologic complete response; CT, chemotherapy.

Table S7 Association rules analysis between no pCR in the breast and pCR in the axilla (top 10 rules sorted by support from 1312 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	cN = N0, No pCR in the Breast	Axillary pCR	0.26	0.89	2.32
2	cN = N0, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.26	0.90	2.34
3	cN = N0, Surgery = Mastectomy, No pCR in the Breast	Axillary pCR	0.26	0.89	2.33
4	cN = N0, Histology = Invasive Ductal, No pCR in the Breast	Axillary pCR	0.26	0.89	2.33
5	cN = N0, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.25	0.90	2.34
6	cN = N0, Histology = Invasive Ductal, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.25	0.90	2.34
7	cN = N0, Histology = Invasive Ductal, Surgery = Mastectomy, No pCR in the Breast	Axillary pCR	0.25	0.90	2.33
8	cN = N0, Histology = Invasive Ductal, Surgery = Mastectomy, Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.25	0.90	2.34
9	cN = N0, CT Course ≤ 5 , No pCR in the Breast	Axillary pCR	0.24	0.89	2.31
10	cN = N0, CT Course ≤ 5 , Regimen = Chemotherapy, No pCR in the Breast	Axillary pCR	0.24	0.90	2.33

LHS, left-hand-side; RHS, right-hand-side; pCR, pathologic complete response; CT, chemotherapy.

Table S8 Association rules analysis between pCR in the axilla and response in the breast (top 10 rules sorted by confidence from 716 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	PR = Positive, Ki67 = Low Expression, Axillary pCR	No pCR in the Breast	0.05	1.00	1.13
2	PR = Positive, Ki67 = Low Expression, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.05	1.00	1.13
3	Histology = Invasive Ductal, PR = Positive, Ki67 = Low Expression, Axillary pCR	No pCR in the Breast	0.05	1.00	1.13
4	cT = T2, ER = Positive, PR = Positive, HER2 = Negative, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
5	cT = T2, ER = Positive, PR = Positive, HER2 = Negative, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
6	cT = T2, ER = Positive, PR = Positive, HER2 = Negative, Surgery = Mastectomy, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
7	cT = T2, ER = Positive, PR = Positive, HER2 = Negative, Surgery = Mastectomy, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
8	cT = T2, Histology = Invasive Ductal, ER = Positive, PR = Positive, HER2 = Negative, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
9	cT = T2, Histology = Invasive Ductal, ER = Positive, PR = Positive, HER2 = Negative, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10
10	cT = T2, Histology = Invasive Ductal, ER = Positive, PR = Positive, HER2 = Negative, Surgery = Mastectomy, Axillary pCR	No pCR in the Breast	0.06	0.97	1.10

LHS, left-hand-side; RHS, right-hand-side; PR, progesterone receptor; pCR, pathologic complete response; ER, estrogen receptor; HER2, human epidermal growth factor receptor 2.

Table S9 Association rules analysis between pCR in the axilla and response in the breast (top 10 rules sorted by support from 716 rules totally)

Rule ID	Antecedent (LHS)	Consequent (RHS)	Support	Confidence	Lift
1	PR = Positive, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
2	PR = Positive, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
3	PR = Positive, Surgery = Mastectomy, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
4	Histology = Invasive Ductal, PR = Positive, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
5	PR = Positive, Surgery = Mastectomy, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
6	Histology = Invasive Ductal, PR = Positive, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
7	Histology = Invasive Ductal, PR = Positive, Surgery = Mastectomy, Axillary pCR	No pCR in the Breast	0.14	0.92	1.04
8	Histology = Invasive Ductal, PR = Positive, Surgery = Mastectomy, Regimen = Chemotherapy, Axillary pCR	No pCR in the Breast	0.13	0.92	1.04
9	ER = Positive, PR = Positive, Axillary pCR	No pCR in the Breast	0.13	0.92	1.04
10	PR = Positive, CT Course ≤ 5 , Axillary pCR	No pCR in the Breast	0.13	0.92	1.04

LHS, left-hand-side; RHS, right-hand-side; PR, progesterone receptor; pCR, pathologic complete response; ER, estrogen receptor; CT, chemotherapy.