Neoadjuvant chemotherapy combined with Toripalimab for HR+/HER2- breast cancer : a prospective, single-arm, multi-center clinical study (NEOTORCHBREAST01)

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Background

Hormone receptor (HR)-positive/human epidermal growth factor receptor 2 (HER2)-negative breast cancer (BC) exhibits low pathologic complete response (pCR) to neoadjuvant therapy, urgently requiring more effective alternatives. The phase III trials KEYNOTE-756[1] and CheckMate-7FL [2]demonstrate the potential of neoadjuvant immunotherapy combined with chemotherapy in HR+/HER2- breast cancer. Here we aim to evaluate the efficacy and safety of toripalimab combined with neoadjuvant chemotherapy plus adjuvant toripalimab in HR+/HER2- BC, with the goal of providing more treatment options and potential theoretical support for precision therapy in breast cancer.

Study Design

A prospective, single-arm, phase II clinical trial.(NCT06611813)

Eligibility Criteria
- Female, 18-75y
- Patients with untreated HR+/HER2- BC
- T1N1-3; T2-4N0-3; M0
- ECOG PS of 0-1

Epirubicin (or liposomal doxorubicin) and **Cyclophosphamide** 12w → **Nab-paclitaxel** 12w

Toripalimab

SURGERY(2-4 weeks after completion of neoadjuvant therapy)

Toripalimab+Endocrine Therapy

Primary Endpoints: pCR and RCB 0-1.
Secondary endpoints: Safety, EFS,ORR.

Patient Characteristics

As of August 20, 2025, 37 patients had been enrolled in the study. The median age was 52 years. Of all patients, 81.1% (30/37) had clinical stage II, 18.9% (7/37) had clinical stage III. 73% (27/37) had node-positive disease, 73.0% (27/37) had ER expression≥50%, 37.8% (14/37) had PR expression≥50%, and 89.2% (33/37) had Ki67 expression≥15%, (33/37))

Table1. Baseline Patient Characteristics [No.(%)]

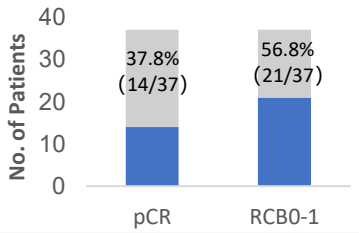
		Chem+Toripalimab
Age median,range (y)		52.3 (31-72)
Age range(y)	<40	7 (19)
	≥40 to <60	20 (54)
	≥60	10 (27)
ECOG	0	32 (86)
	1	5 (14)
T stage	T1	6 (16)
	T2	29 (78)
	T3-T4	2 (5)
N stage	N0	10 (27)
	N1	21 (57)
	N2~N3	6 (16)
Clinical stage	II	30 (81)
	III	7 (19)
PD-L1 expression	CPS <10	14 (38)
	CPS≥10 to <50	15 (41)
	CPS≥50	8 (22)

Table1. Baseline Patient Characteristics [No.(%)]

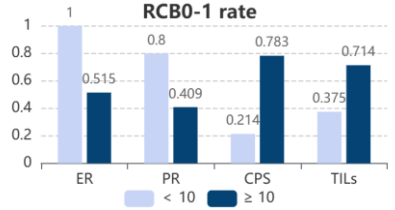
		Chem.+Toripalimab
ER	<10	4(11)
	≥10 to <50	5(14)
	≥50 to <90	4(11)
	≥90	24(65)
PR	<10	15(41)
	≥10 to <50	7(19)
	≥50 to <90	8(22)
	≥90	7(19)
Ki-67	<15	4(11)
	≥15 to <50	20(54)
	≥50	13(35)
Tils	<10	16(43)
	≥10 to<30	11(30)
	≥30	10(27)
Menopausal	pre-menopausal	16(43)
	post-menopausal	21(57)

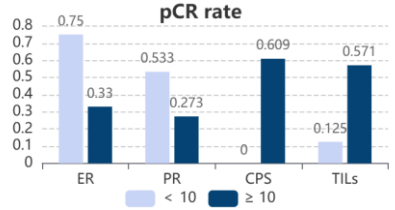
Primary Outcomes

All 37 subjects received neoadjuvant therapy and completed surgery. The pathologic complete response (pCR) rate was 37.8% (14/37), and the residual cancer burden (RCB) 0–1 rate was 56.8% (21/37).



Subgroup Analysis





Safety Outcomes

TRAEs	Any Grade	Grade 3 or Grade 4
Total	35/37 (94.6%)	13/37 (35.1%)
Fatigue	26/37 (70.3%)	4/37(10.8%)
Nausea	23/37 (62.2%)	
Anemia	21/37 (56.8%)	
Alopecia	20/37 (54.1%)	
Leukopenia	18/37 (48.6%)	2/37 (5.4%)
Hypertriglyceridemia	17/37 (45.9%)	2/37 (5.4%)
Elevated AST	16/37 (43.2%)	3/37 (8.1%)
Neutropenia	16/37 (43.2%)	4/37(10.8%)
Elevated ALT	15/37 (40.5%)	3/37 (8.1%)
Vomiting	10/37 (27.0%)	
Asthenia	8/37 (21.6%)	
Hypercholesterolemia	8/37 (21.6%)	1/37 (2.7%)
Peripheral neuropathy	7/37 (18.9%)	
Insomnia	7/37 (18.9%)	
Diarrhea	6/37 (16.2%)	
Constipation	5/37 (13.5%)	
Hand-foot syndrome	4/37(10.8%)	
Thrombocytopenia	3/37 (8.1%)	1/37 (2.7%)
Pyrexia	2/37 (5.4%)	
Febrile neutropenia	2/37 (5.4%)	

Conclusion

Our results indicate that toripalimab-based neoadjuvant chemotherapy achieves favorable efficacy signals in HR+/HER2- breast cancer, with a safety profile consistent with prior immunotherapy studies.

References: 1. Cardoso, F. et al. Nat Med 31, 442–448 (2025) 2. Loi, S. et al. Nat Med 31, 433–441 (2025).