Table S1 Inclusion and exclusion criteria of the study

Inclusion criteria

(I) Females aged 18–70 years old

(II) Patient has operable or locally advanced breast cancer with stage IIA to stage IIIC based on the AJCC staging system. The primary breast tumor could be measured and evaluated and has been pathologically confirmed as invasive ductal carcinoma. No clinical or imaging evidence of metastasis based on abdominal ultrasound, chest CT and whole-body bone scan

(III) The estrogen receptor, progesterone receptor, and HER2 status of primary breast tumor were confirmed by histopathology, of which HER2-negative status was defined as a score of 0 or 1 by IHC analysis or the absence of HER2 amplification by FISH with an immunohistochemistry score of 2

(IV) No prior treatment with surgery, chemotherapy, endocrine therapy, or radiotherapy for invasive breast cancer

(V) A Karnofsky score ≥70 and an ECOG performance status of 0 to 2

(VI) Normal renal, hepatic, and cardiac function

(VII) Adequate hematologic function and normal blood counts: leukocyte count ≥4×10^9/L; hemoglobin ≥90 g/L; platelet ≥100×10^9/L

(VIII) Participants voluntarily joined the study and signed the informed consent before any trial related activities were conducted

Exclusion criteria

(I) Presence of distant metastasis

(II) Pregnant or lactating women, or women of childbearing age who cannot practice effective contraceptives

(III) Other invasive malignant diseases in addition to breast cancer (except for excised basal cell skin carcinoma and cervical carcinoma in situ) within the past 5 years

(IV) Patients participating in other similar clinical trials within the last 2 months

(V) Severe or uncontrolled systemic diseases or infections

(VI) Evidence of sensory or motor disease

(VII) Known hypersensitivity to the treatment agents used in the study

(VIII) Patients unable to understand the purpose of the study or unable to agree to the requirement of the study

AJCC, American Joint Committee on Cancer; CT, computed tomography; ECOG, Eastern Cooperative Oncology Group; FISH, fluorescence in situ hybridization; HER2, human epidermal growth factor receptor 2; IHC, immunohistochemical.
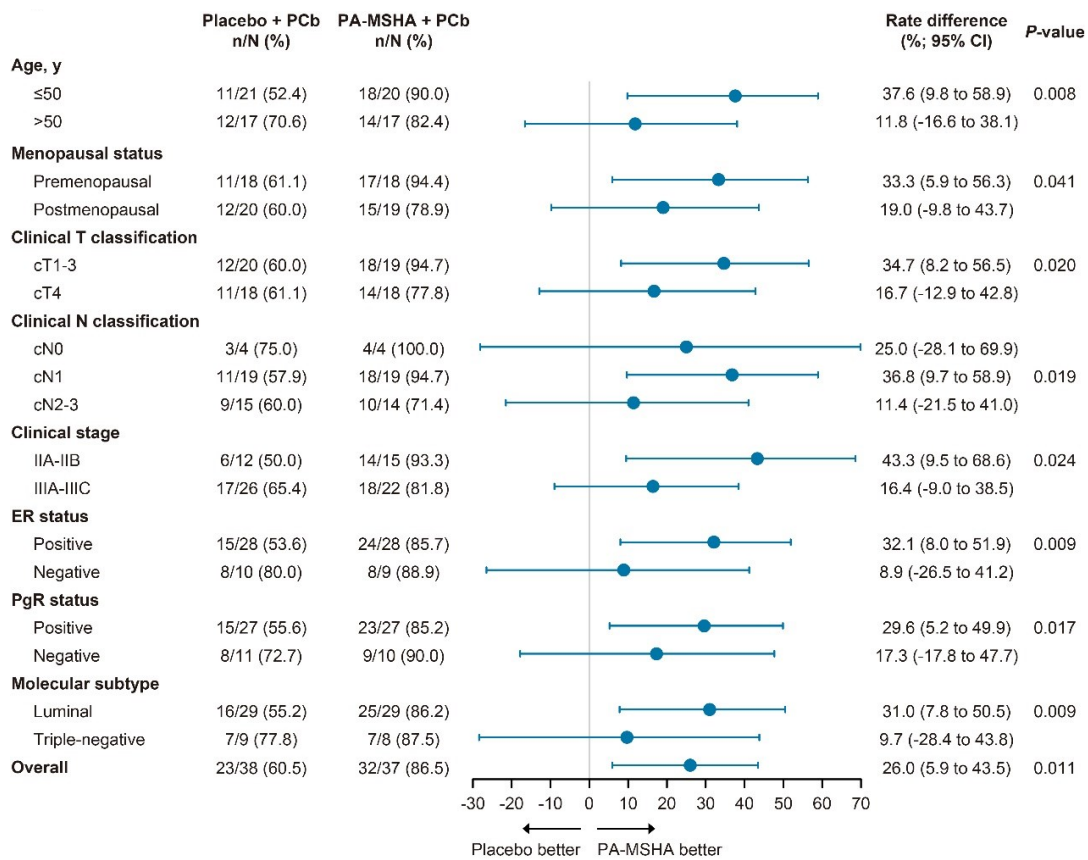
Figure S1 Subgroup analysis of differences in the percentages of patients with objective response rates. CI, confidence interval; ER, estrogen receptor; ITT, intention-to-treat; PA-MSHA, *Pseudomonas aeruginosa* mannose-sensitive hemagglutinin; PCb, paclitaxel and carboplatin; PgR, progesterone receptor.

Table S2 Tumor clinical response in the subgroups stratified by irAEs

Subgroup	Placebo + PCb (n=38), n (%)	PA-MSHA + PCb (n=37), n (%)	P value	P for interaction
Without irAEs (n=40)	16 (59.3)	9 (69.2)	0.730	0.014
With irAEs (n=35)	7 (63.6)	23 (95.8)	0.026	

irAEs, immune-related adverse events; PA-MSHA, Pseudomonas aeruginosa mannose-sensitive hemagglutinin; PCb, paclitaxel and carboplatin.
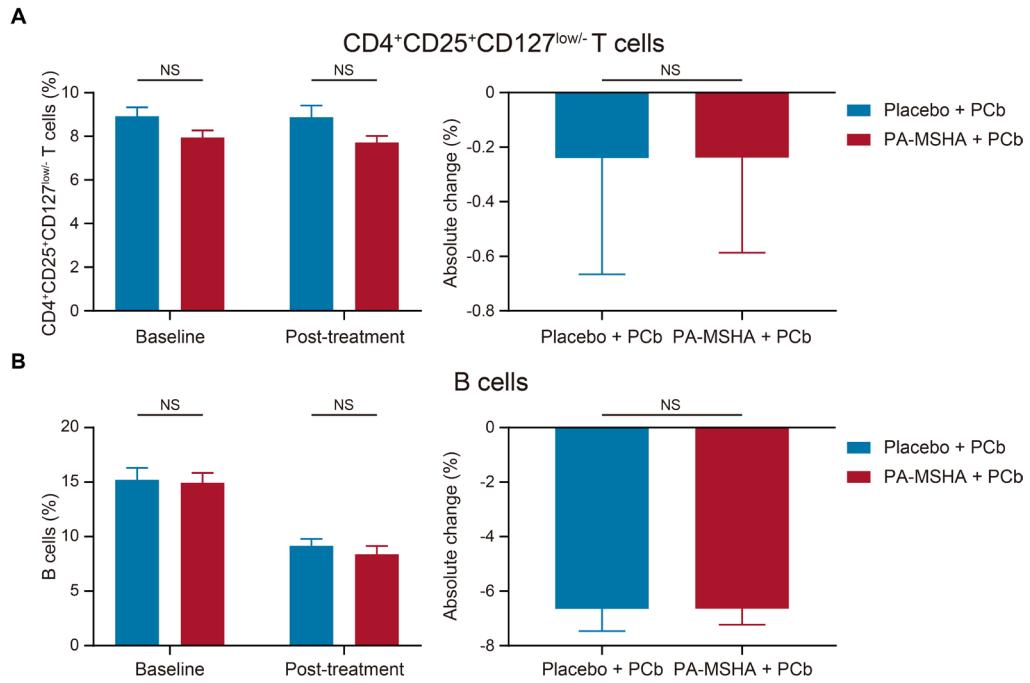
Figure S2 Comparison of the percentage of peripheral blood CD4+ CD25+ CD127low/- T cells (A) and B cells (B) at baseline and posttreatment, as well as the absolute change during the neoadjuvant treatment between the 2 treatment groups. PA-MSHA, *Pseudomonas aeruginosa* mannose-sensitive hemagglutinin; PCb, paclitaxel and carboplatin; NS, not significant.