

Comparing ¹⁸F-FDG positron emission tomography (PET) and breast magnetic resonance imaging (MRI) to predict pathological complete response (pCR) and 3-year invasive disease-free survival (3-y iDFS) in HER2+ early breast cancer (EBC) patients (pts): An unplanned exploratory analysis of PHERGain trial

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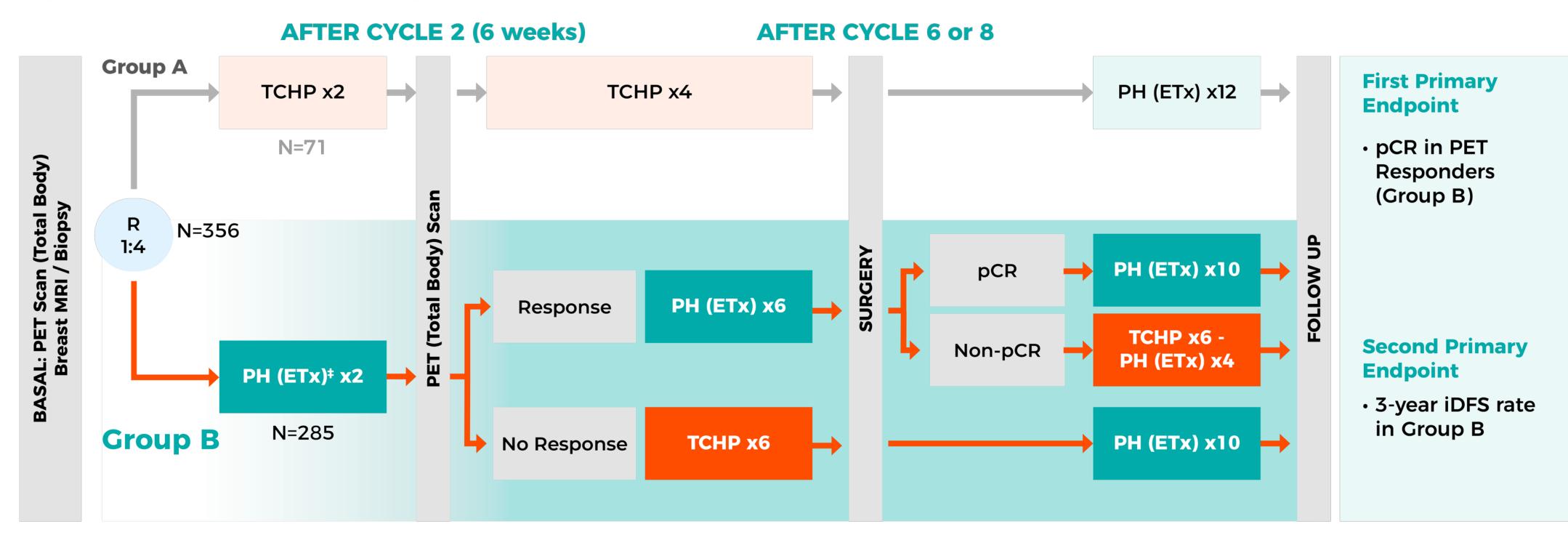
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BACKGROUND

- The PHERGain phase II trial (NCT03161353) demonstrated the feasibility of a chemotherapy-free treatment using a PET-based, pCR-adapted strategy in HER2-positive EBC pts treated with dual HER2 blockade with trastuzumab and pertuzumab (HP)^[1].
- Due to the limited availability and costs of PET imaging, breast MRI is warranted as an alternative tool for assessing early treatment response after two cycles of HP^[2].
 - We aimed to compare PET with MRI imaging results after two cycles of HP in the PHERGain trial, and their respective ability to predict pCR and 3-y iDFS.

METHODS

Figure 1. PHERGain study design.



Key Eligibility Criteria.

- 1. Centrally confirmed HER2[+] stage I-IIIA EBC.
- 2. Tumor diameter ≥1.5 cm by MRI or ultrasound.
- 3. Presence of a breast PET-evaluable lesion.

Stratification factors.

Hormonal receptor status (+/-).

PET and MRI were performed before randomization and after two treatment cycles, with an additional MRI performed before surgery.

- 1. PET response after two cycles of HP was centrally-assessed per EORTC criteria.
- 2. Locally-assessed MRI response after two cycles of HP was defined as a ≥30% decrease in the sum of diameters of the target lesions.
- 3. Locally-assessed MRI reduction after two cycles of HP was defined ad hoc as any shrinkage in the diameter of target lesions without new lesions or progressive disease in non-target lesions.

C: Carboplatin; D: Docetaxel; EBC: Early breast cancer; ETx: Endocrine therapy (letrozole post-menopausal/tamoxifen pre-menopausal), Adjuvant ETx up to 3 years from surgery; PET: 18F-fluorodeoxyglucose positron emission tomography/computed tomography; H: Trastuzumab SC; HER2: Human Epidermal Growth Factor Receptor 2; iDFS: Invasive disease-free survival; MRI: Magnetic resonance Imaging; P: Pertuzumab IV; R: Randomization; TCHP: Trastuzumab, pertuzumab, docetaxel, and carboplatin.

[‡]All hormonal receptor-positive patients received ETx concomitantly with PH (except on chemotherapy).

PET RESPONDERS: RECIST responders after cycle 2 with SUV_{max} reduction ≥40%. pCR, Pathological complete response (ypT0/isN0).

RESULTS

- After two cycles of HP, 79.6% (227/285) of patients from group B were PET responders, 47% (134/285) had an MRI response, and 82.5% (235/285) achieved an MRI reduction.
- A total of 78.2% (223/285) of patients were equally classified by PET response and MRI reduction after two cycles of HP (PET responders with MRI reduction or PET non-responders without MRI reduction).
- Similar rates of pCR and 3-y iDFS were observed between patients with either PET response or MRI reduction.
- PET-nonresponders without MRI reduction had the worst 3-y iDFS despite receiving standard neoadjuvant treatment with chemotherapy and HP (Table 1).

Table 1. Comparison between PET response and MRI reduction in terms of pCR and 3-y iDFS.

	Group B (N=285)			
	PET response after 2 cycles (227/285) No neoadjuvant CT		No PET response after 2 cycles (58/285) Neoadjuvant CT	
	MRI reduction (N=200)	No MRI reduction (N=27)	MRI reduction (N=35)	No MRI reduction (N=23)
pCR	39.0% (78/200)	29.6% (8/27)	28.0% (10/35)	21.7% (5/23)
3-y iDFS	95.1%	96.3%	100%	75.3%

CONCLUSIONS

- The complex design of this study did not allow a direct formal comparison between PET and MRI in this clinical scenario.
- Although PET is the recommended imaging technique for early treatment response, these data suggest that MRIassessed tumor shrinkage could alternatively guide neoadjuvant treatment after the first two cycles of HP in HER2positive EBC pts following the PHERGain strategy, when PET is not available.

ACKNOWLEDGEMENTS AND AUTHOR INFORMATION

The PHERGain team is extremely grateful to all the patients and their families. We warmly acknowledge all the trial teams of the participating sites, the trial unit staff at MEDSIR (study sponsor), and Hoffmann-La Roche (trial funder).

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