

Assessment of trop2 and pdl1 expression on circulating tumor cells (ctcs) of patients with triple negative breast cancer

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Abstract

Background: Trophoblast cell surface antigen 2 (TROP2) and programmed death-ligand 1 (PD-L1) are emerging biomarkers and therapeutic targets in triple-negative breast cancer (TNBC). Given that tumor molecular profiles often differ between primary and metastatic lesions, real-time biomarker assessment via liquid biopsy can provide clinically relevant information for treatment decisions. Circulating tumor cells (CTCs) represent a promising liquid biopsy approach for monitoring disease progression and identifying therapeutic targets in real time.

Objective: This study aimed to evaluate the expression levels of TROP2 and PD-L1 on CTCs in the peripheral blood (PB) of TNBC patients.

Methods: PB was obtained from patients with early (n=65) and metastatic (n=29) TNBC. CTC enrichment was performed using Ficoll density gradient centrifugation. Additionally, in a subset of 28 early-stage patients, CTCs were simultaneously captured using the semi-automated size-based Parsortix® PC1 System (ANGLE plc). Enriched cells were immunofluorescently stained for CK/TROP2/CD45 and CK/TROP2/PDL1. TROP2 and PD-L1 expression was assessed on single CTCs, using the MDA.MB.231 TNBC cell line as internal control.

Results: CTCs (CK+/CD45- cells) were detected in 7/65 (10.8%) and 8/29 (27.6%) of patients with early and metastatic disease, respectively (mean CTC number per patient: n=1 and n=8.3, respectively). TROP2+ CTCs were identified in both early and metastatic settings (in 85.7% and 87.5% of patients, respectively), while PD-L1+ CTCs were detected only in the metastatic setting (50% of patients). Co-expression of the two markers (TROP2+/PD-L1+ phenotype) on single CTCs was evident in 37.5% of patients with metastatic TNBC.

Conclusions: TROP2 is expressed on CTCs of patients with both early and metastatic TNBC, while PD-L1 positivity is primarily observed in metastatic disease. Notably, co-expression of TROP2 and PD-L1 was identified only in metastatic TNBC patients. These findings highlight the value of CTC analysis as a liquid biopsy tool for real-time biomarker assessment. Furthermore, in CTC-positive samples, TROP2 expression will be further classified as high, low, or negative to assess its potential significance as a non-invasive biomarker in TNBC.

Do you have any conflicts of interest?

No, I do not have a conflict of interest.