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The impact of systemic chemotherapy on circulating epithelial tumor cells (CETC) in breast cancer. *K. Pachmann, O. Camara, U. Hammer, C. Joerke, S. Krauspe, C. Rabenstein, I. Runnebaum, K. Hoeffken; Clinic for Internal Medicine II University of Jena, Jena, Germany; Women's Hospital Friedrich Schiller University, Jena, Germany; Transfusion Center, Bayreuth, Germany*

Background: The number of CETC can be influenced by natural shedding of cells from the tumor, mobilization of tumor cells by diagnostic and therapeutic manipulations (mammography, surgery), apoptosis and cell death. Here we report on the influence of systemic chemotherapy on the number of CETC. **Methods:** Tumor cells were quantified with an automated microscope (Laser Scanning Cytometer® or Olympus Scan R) from anticoagulated blood drawn before each new therapy cycle and before and after surgery from 70 patients treated with primary systemic chemotherapy. After red blood cells lysis leucocytes were stained with PE-anti-CD45 and tumor cells with FITC-anti-EpCAM and changes registered as % increase or decrease. The same was performed for 150 patients treated with adjuvant therapy and until 3 weeks after the end of chemotherapy. The response of CETC to therapy was correlated to outcome. **Results:** Almost all breast cancer patients had CETC before therapy, the number of which correlated with tumor size. During primary systemic therapy the variable initial decrease in cell numbers highly correlated with the final tumor size reduction. In spite of a subsequent re-increase in all neoadjuvantly treated patients, the reduction in CETC also predicted for relapse free survival. In response to adjuvant systemic therapy CETC showed three typical groups of response pattern. 1. Reduction in CETC more than tenfold 2. Marginal changes throughout therapy. 3. Increase or initial response and subsequent re-increase more the tenfold in numbers of CETC. During the post-therapy observation interval of 4.5 years, no relapse occurred in the group of patients with good response, whereas most relapsing patients are found in group 3 with an 11 - 16fold hazard ratio. **Conclusion:** Monitoring CETC will not only provide the earliest and most reliable indicator of successful neoadjuvant treatment and spare patients unnecessary treatment. It also, for the first time, allows monitoring of therapy efficiency in the adjuvant situation which is highly predictive for relapse free survival. This warrants further therapy studies to control what patients may benefit from additional or modified therapy already before metastases appear.