

Circulating tumor cell vitality during and after radiotherapy mirrors treatment response in cancer patients

Abstract Submitter: [Harriet Wikman, germany*](#)

Co-Authors: Yvonne Goy, Afroditi Nanou, Katharina Hintelmann, Cordula Petersen, Klaus Pantel, Sabine Riethdorf, Kerstin Borgann

*University Medical Center Hamburg-Eppendorf

Abstract

Background: Radiotherapy (RT) causes DNA damage, leading to tumor cell death. The response to RT is influenced by the individual DNA repair capacity of the tumor cells and the host. Objective: In this study, we assessed whether circulating tumor cell (CTC) enumeration, kinetics, and CTC vitality (i.e., apoptotic rate) could provide a more accurate monitoring and stratification tool for assessing the RT response. Methods: For this, we analyzed CTCs and tdEVs during RT in 71 lung and breast cancer patients receiving RT treatment for brain (n=56) and bone (n=19) metastases. The DNA repair capacity of the host was assessed in the peripheral blood monocytes (PBMC). Results: We found that the number of CTCs before and after RT treatment are powerful indicators of poor prognosis. Although we did not observe a significant increase in the total number of CTCs directly after RT, significantly more apoptotic CTCs were detected in samples taken directly after the RT compared to the base-line samples. Additionally, the fraction of apoptotic CTCs correlated with the RT response and patient outcome. Furthermore, our preliminary analyses indicate that inherited variations in DNA repair capacities, assessed in PBMCs, reflect the RT response and correlate with CTC numbers in these patients. Conclusions: This study shows that RT response is associated with both inherited variations and tumor-specific traits, which can be assessed using easily accessible liquid biopsy approaches.

Do you have any conflicts of interest?

No, I do not have a conflict of interest.