ABSTRACT

Circulating tumor cells (CTCs) represent a systemic phase of the localised cancer disease. They can be distinguished and enriched from the peripheral blood and so from the surrounding leukocytes by either physical properties (e.g., density and size) or biological properties (e.g., expression of epithelial proteins such as EpCAM or cytokeratins) and are usually further characterized by immunostaining or RT-PCR assays.

Selecting patients with the risk of disease relaps at the time of diagnosis is crucial for clinicians in deciding who should, and who should not, receive adjuvant chemotherapy. We know that CTCs are strong prognostic factor in patients with metastatic as well as localized breast cancer (BC). It is also known that the prognostic power of circulating tumor cells in women with BC is independent from the standard prognostic indicators. Testing of CTCs known recently as ”liquid biopsy" could be informative not only as predictor of the disease relapse, but also as the predictor of therapy effectiveness.

The clinical use of CTCs must be strictly encouraged by clinical trials results. Monitoring of CTCs in time could zoom in the mechanism of therapy resistance and/or may provide the identification of new druggable targets.

The purpose of my work was therefore to assess the CTCs positivity rate and subsequently CTCs-characteristics in BC patients during different types of therapy phases, e.g. during neoadjuvant, adjuvant and palliative treatment. The aim of our study was mainly the characterisation of CTCs during neoadjuvant chemotherapy (NACT) by examination of tumor-associated genes and genes associated with chemoresistance by the gene expression analysis.

It was shown that tumor volume regression could be monitored by the CTCs chemoresistance profile but not with the CTCs-presence only. The data published by our group support the unique impact of CTCs-character during monitored time sequences. In summary, CTC-character does not correlate to the clinicopathological characteristic of the primary tumor disease and change dynamically in time.

Finally, we tried to implement CTCs testing into the clinical practice in department of Oncology (General Faculty Hospital in Prague). CTCs-examination is indicated only as a complementary test. The potential clinical applications of the CTCs-testing are summarized in our recent publications, which are a very important part of my dissertation work.