Detection of tumor cells in peripheral blood of colorectal carcinoma patients

Winfried Albert, Bertha Gutierrez, Oliver Böcher

The most important factor resulting in the death of patients with cancer are metastatic processes, e.g. in colon cancer. Spreading of tumor cells into the blood circulation from either primary tumors or subsequently from a lymphatic origin may be a result of dissemination of the primary tumor or a secondary event during tumor progression. Many of these cells reaching the circulation may be killed by an individual response of the immune system but the metastatic potential of remaing tumor cells cannot be ruled out.

30-40% of patients with colorectal cancer develop tumor relapse during follow-up which is not recognized in time by available diagnostic methods. Therefore, detection of tumor cells circulating in peripheral blood is urgently required for earlier identification of micrometastases.

We established a RT-PCR assay with increased specificity for detecting tumor cells in peripheral blood of colorectal carcinoma patients. To achieve this we combined the enrichment of tumor cells using an antibody mixture with RT-PCR techniques for the detection of mRNAs encoding for tumor associated gene expression.

Analyses of mRNA of four tumor markers and ELISA of CEA from peripheral blood in 50 patients were performed. Our investigations show that tumor cells of colon cancer patients can be analysed with high specificity using the combination of tumor cell enrichment with the RT-PCR. Preliminary results of this study showed occurence of tumor cells in blood of carcinoma patients despite resection of primary tumors. The results give evidences that this procedure enable us to monitor patients during follow-up with very high sensitivity as well and the relapse free interval can be analysed more accurately (about 2 tumor cells in 5 ml blood).

Taking the results together, we concluded that this procedure offers clinicians new opportunities for patient’s monitoring and prognosis and may result in an appropriate selection of patients for adjuvant therapy.