Detection of mammaglobin expressing Breast Carcinoma Cells in the peripheral Blood by Reverse Transcriptase Polymerase Chain Reaction (RT-PCR)

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Background The mammaglobin gene encodes a novel protein that is secreted from the mammalian epithelium of normal breast tissue as well as malignant breast cancers. In order to ascertain the prognostic value of mammaglobin gene in breast cancer patients, we measured the expression of human mammaglobin (hMAM) by RT-PCR method in various stages of breast cancer patients.

Methods Peripheral blood samples from 40 healthy volunteers and 114 breast cancer patients were obtained. Peripheral blood stem cells (PBSC) collected for the purpose of autologous stem cell transplantation in 15 patients with metastatic breast cancer were used for hMAM assay. Tissues of normal breast and breast cancer patient were used as positive control.

Results All samples from peripheral blood of 40 healthy individuals (20 males and 20 females) were negative for hMAM, whereas 43 of 114 samples (38%) from breast cancer patients were positive for hMAM mRNA. All normal breast tissue were positive for hMAM mRNA. hMAM mRNA expression was detected in 11 of 42 (26%) in breast cancer patients who underwent for curative resection and had no evidence of disease, in 11of 32 (34%) with chemo-sensitive relapsed disease, and in 21of 40 (53%) with chemo-refractory progressive disease. Three (20%) samples from peripheral blood stem cell of 15 breast cancer patients were positive for hMAM, and especially 3 of 5 (60%) with refractory disease.

Conclusion In contrast to healthy volunteers, hMAM transcripts were detected in the peripheral blood of breast cancer patients. The frequency of hMAM expression in peripheral blood was correlated with the clinical stages of disease. The contamination of hMAM expressing cells in the stem cell pool warrants additional effective purging method before the transplantation. The clinical relevance of hMAM RT-PCR-based tumor cell detection in the peripheral blood of breast cancer patients should be further evaluated in prospective studies.