Cancer cells in blood predict chances of survival and can help target breast cancer treatment

March 22 2012

Detecting the presence of circulating tumour cells (CTCs) in the blood of women with early breast cancer after surgery but before the start of chemotherapy can provide useful information about their chances of surviving the disease. CTCs are cancer cells which are detectable in patients with a solid tumour and their value in the prognosis of metastatic breast cancer has been known for a few years. Until now, however, there has been little information about their role in early disease.

Results to be presented today from the first large-scale study of the relevance of CTCs in early breast cancer prognosis show that patients with at least five CTCs detected straight after surgery have a four-fold increase in risk of recurrence and a three-fold increase in risk of death. Dr. Bernadette Jäger, from the Department of Gynecology and Obstetrics – Innenstadt, Ludwig Maximilian University Hospital Munich, Germany, will tell the 8th European Breast Cancer Conference (EBCC-8) that, in addition to helping provide a more accurate evaluation of disease outcome, CTCs might also become targets for treatment in the future.

Dr. Jäger and colleagues from nine German university hospitals analysed the numbers of CTCs in the blood of 2026 patients in a trial called SUCCESS A. The patients had all had a complete resection of their primary tumour prior to commencing chemotherapy. CTCs were

detected in 21.5% of them, a much lower rate than that which is usually seen in metastatic breast cancer.

Because the numbers of CTCs in blood are very small, their detection is difficult – they are found in frequencies in the order of 7.5 per millilitre of blood in cancer patients. In comparison a millilitre of blood contains a few million white blood cells and a billion red blood cells. However, recent advances in technology have meant that it is possible to find CTCs using a semi-automated detection device.

"From the patient's point of view looking for CTCs in blood samples is much less invasive than taking bone marrow, the other means of evaluating them," Dr. Jäger will say. "So although there is currently no direct advantage to the patient of knowing her CTC status, this is already a step forward, and in future we believe that the presence of CTCs could be used as a marker for monitoring the efficacy of treatment. If this proves to be the case, it will also help us determine the best chemotherapy regime for each patient."

CTC detection in blood also has the advantage that it can be combined with any routine blood collection and therefore carried out frequently during the course of disease, unlike many other predictive measures, which are carried out at diagnosis alone, the researchers say. They are following up their work by evaluating CTC counts of patients straight after chemotherapy and at intervals of two and five years later.

In addition, Dr. Jäger and colleagues have just started a new trial, DETECT III. "In this trial we will be looking at the effect of adding a secondary drug, lapatinib, to standard treatment in patients with HER2-negative metastatic breast cancer and HER2-positive CTCs," Dr. Jäger will say. Over-expression of the HER2 (human epidermal growth factor receptor 2) gene has been shown to play an important role in the progression of certain aggressive types of breast cancer, and its existence

is a significant target for therapy.

"We know that HER2 status can change as the disease advances. However, if there is no relapsed tumour in the primary cancer site it is difficult to perform a.new histopathological examination. Being able to detect this change in CTCs would be much less invasive than having to take a biopsy of a metastasis which is often anatomically inaccessible. When we find CTCs with a different HER2 status from that of the primary tumour or the metastasis, we will evaluate the advantage of changing the therapy regimen. Therefore we are now investigating the benefit of an HER2 targeted therapy in patients with HER2 positive CTCs but a HER2 negative primary tumour or metastasis; if the therapy is successful we can be sure that we are attacking the cancer in the right way and in the right place."

"If CTCs can be used as a direct treatment target, this will be a promising development and a further step on the road to enabling us to tailor treatment appropriately for individual patients", Dr. Jäger will conclude.

Professor Michael Gnant from the Medical University of Vienna (Vienna, Austria) and Chair of the EBCC Organising Committee said: "Accurately identifying circulating tumour cells is an important step forward in our two-decade-long quest to decipher these cells and their impact on treatment response and prognosis of early breast cancer patients. The excellent work by Dr. Jäger and her colleagues provides reassurance that we might be approaching an era where these serum-based tests can be used in clinical practice to help monitoring the effects of our treatments."

Provided by ECCO-the European CanCer Organisation