The role of circulating tumor cells in the course of disease and therapy of high-grade-serous ovarian cancer patients

Annabelle Lobermeyer[1]
Sandra Lenz[1], Paul-Nick Rademacher[1], Maximilian Christian Wankner[1], Nikhil Kalra[1], Sabine Riethdorf[1], Cornelia Coith[1], Anna Jaeger[1], Moritz Lattermann[1], Eva Johanna Hambrecht[1], Leticia Oliveira-Ferrer[1], Linn Woelber[1], Barbara Schmalfeldt[1], Klaus Pantel[1], Mina Netkova-Heintzen[1], Katharina Prieske[1] and Simon Joosse[1]
[1] University Medical Center Hamburg-Eppendorf

Background & objectives

Patients with advanced-stage high-grade serous ovarian cancer (HGSOC) generally have poor prognosis due to the high rate of disease recurrence. Accurate methods for predicting therapy outcome are lacking. Monitoring circulating tumor cells (CTCs) in blood during treatment may improve the clinical management of these patients. However, because ovarian cancer metastasizes mainly intra-abdominal, the role of CTCs in peripheral blood as prognostic marker is still debated and needs further investigation.

Our aim is to investigate the correlation between the number of CTCs detected in the blood of HGSOC patients before surgery and during systemic treatment with therapy response and overall survival.

Methods

We recruited 49 women diagnosed with primary ovarian cancer (FIGO III-IV) and collected 7.5 ml blood at regular time intervals: before surgery, one day after surgery, and every 3-6 months during chemo- and maintenance therapy. CTCs were enriched and detected with the CellSearch System.

Results

CTCs were detected in 53.2% of the patients before surgery, staying stable with 39.5% after surgery (p=0.2751). In seven and six cases ≥ 3 CTCs were detected before and after surgery, respectively. The overall median number of CTCs in CTC-positive cases dropped from 2 to 1, but not significantly (p=0.2816).Separating patients by CTC change, in those with a decrease in CTCs (34.1%), the median number of CTCs changed from 1 to 0 (p=0.0004), whereas in patients with an increase (21.9%), the median number of CTCs changed from 0 to 2 (p=0.0038). 43.9% showed no detectable change in CTC number: 7.3% staying CTC-positive and 36.6% staying CTC-negative. During systemic chemotherapy, the number of CTC-positive patients remained stable at 33.3% (three cases ≥ 3 CTCs) and decreased to 12.5% at the second blood

draw during chemotherapy. During the median follow-up of 9.4 months, three patients developed a relapse, only one was CTC-positive throughout all blood draws after diagnosis.

Conclusion

Monitoring numerical changes in CTCs throughout cancer progression and therapy regime may improve the management of HGSOC patients. In this on-going study, a longer follow-up of patients is required to make a conclusive statement on the use of CTCs as a prognostic marker for predicting therapy response and overall survival.