



Chemotherapy during pregnancy impacts fetal growth velocity

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Objective

Increased awareness of the feasibility of cancer treatment during pregnancy results in more pregnant patients treated with chemotherapy. As cytotoxic drugs may cross the placenta, prenatal exposure may result in the inability to reach the growth potential. A recent cohort study on 1170 patients suggested an association between prenatal exposure to chemotherapy and low birth weight (De Haan, Verheecke, Lancet Oncology, 2018). However, several factors besides chemotherapy exposure can be contributive to in utero growth restriction. To investigate the association of chemotherapy administration during pregnancy and fetal growth, the intra-uterine growth curves of fetuses prenatally exposed to cytotoxic drugs were analysed.

Methods

We analysed all patients receiving chemotherapy during pregnancy in two University Hospitals in Belgium (UZ Leuven and UCL Brussels). Only patients with at least three fetal growth scans were included. Patient records were screened for patient characteristics (maternal age, BMI, ethnicity, gravidity, parity, evolution of maternal weight during pregnancy) and cumulative dose of cytotoxic drugs during pregnancy. Estimated fetal weight (EFW) was calculated from the measurements of biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL) (Hadlock, 1991). Percentiles for fetal weight were assessed by the global bulk centile calculator (GROW v. 8. 0. 2, www.gestation.net), adjusting for maternal age, parity, ethnicity and sex of the child. Fetal growth velocity and fetal abdominal area growth velocity were assessed at the interval between the first and the last cycle of chemotherapy during pregnancy. Z-scores and percentiles were calculated according to standard growth velocity charts (Owen, BJOG, 1996).

Results

In total 30 patients with serial growth scans during pregnancy were included. 18 patients were treated with anthracyclines and cyclophosphamide +/- taxanes for breast cancer. Eight patients were treated for haematological malignancies (three with ABVD, three with R-CHOP, one with HOVON, one with daunorubicin). Three patients received platinum-based chemotherapy for cervical cancer and one patient was treated with temozolide for a brain tumour. Six patients (20%) delivered a symmetric growth restricted fetus (<P5). Three of them were treated for breast cancer, two for non-hodgkin lymphoma (R-CHOP) and one for acute lymphoblastic leukemia (HOVON). Additionally two fetuses with a birthweight within normal range (P14 and P31. 2) had a fetal abdominal area growth velocity lower than the 10th percentile. 18 out of 30 fetuses (60%) had a fetal growth velocity below the 10th percentile. Fetal growth velocity and fetal abdominal area growth velocity was associated with the interval between first and last administration of chemotherapy during pregnancy and the cumulative dose of cytotoxic drugs during pregnancy, according to type of treatment.

Conclusion

Analysis of serial fetal growth scans of fetuses prenatally exposed to chemotherapy suggests that these fetuses are at risk of failure to meet their growth potential. Chemotherapy during pregnancy has an impact on fetal growth velocity and this is associated with the duration of cytotoxic treatment during pregnancy.

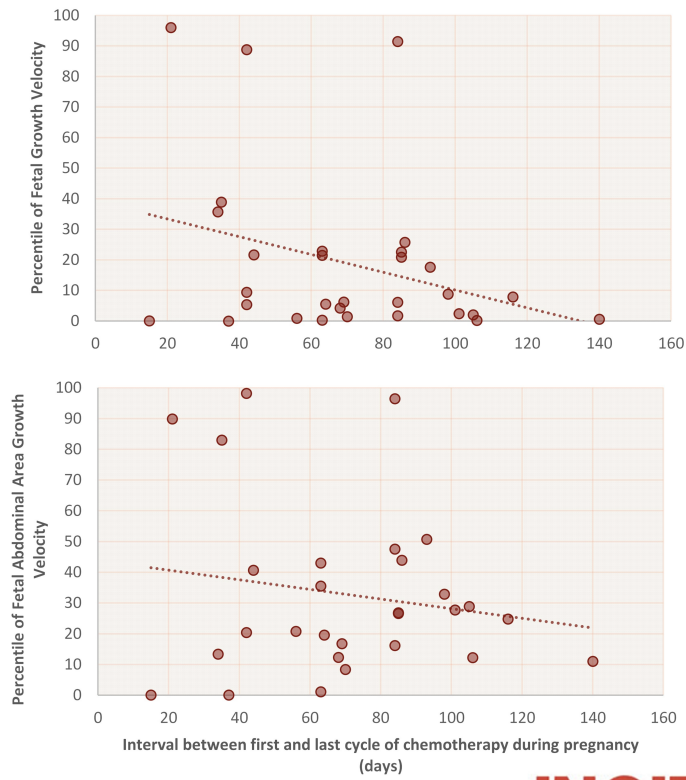


Figure 1: Percentile of Fetal growth Velocity and Fetal Abdominal Area Growth Velocity according to the interval between first and last cycle of cytotoxic treatment during pregnancy (in days).

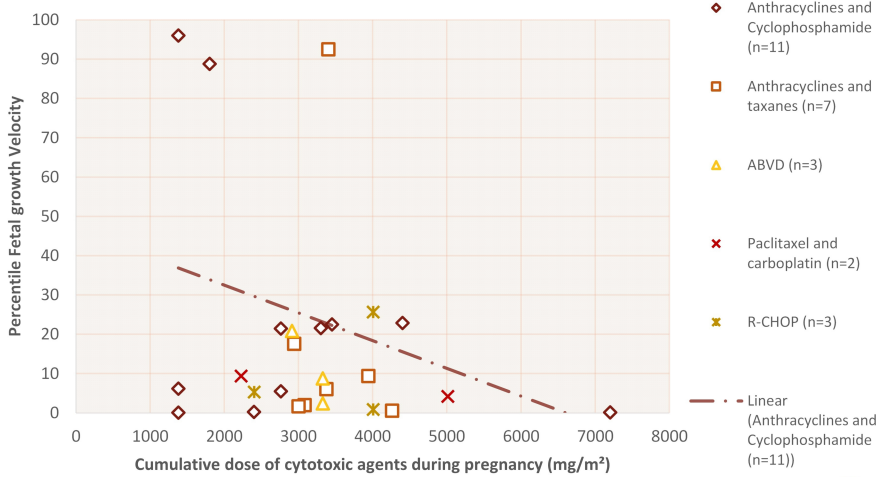


Figure 2: Percentile of fetal growth velocity according to cumulative dose of cytotoxic agents during pregnancy (mg/m²). Data of patients treated with temozolide (n=1), daunorubicin (n=1) and HOVON (n=1) are not shown.

