Estradiol metabolites as possible predictor for breast cancer risk in pre- and postmenopausal women

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Context: Two main estradiol metabolites have different biological behaviour with tumorigenic features of 16OHE1 and antiproliferative characteristics of 2OHE1.

Objective: Investigation the ratio in patients with breast cancer (BC) and with benign diseases.

Patients: 41 premenopausal pts. with (cases) and without (controls n=211) BC and 207 postmenopausal pts with and without BC (n=206). The control group comprised following diagnoses: fibroadenoma, mastopathy, hysteromyoma, urinary incontinence, benign ovarian cysts.

Methods: Urine samples were collected prior to surgery. 2OHE1 and 16OHE1 were measured by ELISA. Main outcome measures: Absolute values expressed in ug steroid hormone/mg creatinine were compared after logarithmic transformation (log ratio 2OHE1 to 16OHE1) by t-test. The multiple linear regression test with two interactions was performed to evaluate the influence of different factors on the metabolic ratio.

Results: In premenopausal pts. log ratio was 0.25 (CI 0.20;0.29) and 0.21 (CI 0.11;0.31) for controls and cases without significant difference. In postmenopausal pts log ratio was 0.22 (CI 0.17;0.26) and 0.11 (CI 0.07;0.15) in controls and cases respectively and was statistically significant lower (p = 0.0002). In multiple linear regression test log ratio was significantly influenced by BMI, but only in postmenopausal pts. In these pts an increased BMI resulted in a significantly (p< 0.042) decreased ratio of 2OHE1 to 16OHE1.

Conclusions: In postmenopausal women a different metabolism of estrogens may play an important role in the tumorigenesis of breast cancer. This genetically determined metabolism could be influenced by the exogenic factor BMI. In premenopausal women different hormone levels at different time points of the menstrual cycle may be an explanation that we could not find an influence of estrogen metabolism in this population.

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