Mammographic density - a marker of treatment prediction in breast cancer?

PhD thesis - Half time review seminar November 20th, 2019, at 10.00 in Malmö (place will be announced later)

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**Background**

Mammographic density (MD) is a risk factor for developing breast cancer (BC). To study MD might be a feasible way to clarify the role of both potential risk factors and risk reducing factors for BC, among the latter: statins. MD may also serve as a treatment predictive marker. In the neoadjuvant treatment setting it is possible to radiologically evaluate treatment response and compare the results to whether pathological complete response (pCR) was accomplished or not.

**Methods**

Study 1: Over 41,000 women attending BC screening and filled-in a questionnaire covering BC risk factors and various baseline characteristics as included in the study cohort. Information on statin use was derived from national registers.

Study 2: The retrospectively gathered regional study cohort consists of over 300 patients receiving neoadjuvant BC treatment. Diagnostic mammograms were scored according to BI-RADS. Patient and tumor characteristics were retrieved from medical charts.

Study 3 and 4: BC patients receiving neoadjuvant chemotherapy (N=200) enrolled in the study, underwent mammographic and ultrasound evaluation at baseline, after 2 and 6 cycles, respectively, and finally one year later. MD will be measured with Volpara. We will study the different imaging modalities’ (including tomosynthesis) capacities in terms of evaluating response and their relation to pCR.

**Results**

Study 1: After multivariable adjustment we found no effect of statin use on absolute dense volume. Statin users reporting ever hormonal replacement therapy (HRT) use had a larger absolute dense volume than the non-statin users with ever HRT use.

Study 2: Logistic regression models, with multiple adjustment factors, showed that in comparison to patients with non-dense breasts (BI-RADS a), patients with denser breasts had a lower OR of accomplishing pCR, most prominently seen in premenopausal patients.

Study 3 and 4: The inclusion is completed and currently the database is being finalized.

**Implications**

The biological explanation for the link between MD and BC seems to be highly complex. Our research aims at addressing this association from a different point of view and understand if pharmaceuticals can cause decrease in MD, thereby studying how MD can serve as a predictive biomarker, advantageously tested in the neoadjuvant BC setting.

**Publications**

Skarping I, Brand J, Hall P, Borgquist S. Effects of statin use on volumetric mammographic density; results from the KARMA study, BMC Cancer 2015-05-27 (15:435)

**Manuscripts**

In revision:

Skarping I, Fornvik D, Sartor H, Heide-Jørgensen U, Zackrisson S, Borgquist S. Mammographic density is a predictive marker of pathological response after neoadjuvant chemotherapy in breast cancer