

Association of breast cancer subtypes and body mass index

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ABSTRACT

Aims and background. Breast cancer is a heterogeneous disease with various pathological and molecular subtypes. This study aims to determine the association between BMI and the distribution of breast cancer subtypes defined by estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor (HER2/neu) expression in pre- and postmenopausal breast cancers.

Methods and study design. A total of 1847 female breast cancer patients were involved. After the exclusion of 457 patients due to missing subtype information (n = 400) or benign histology (n = 57), 1390 were included in the analyses. The histological type of the tumor, ER and PR expression, HER2/neu with immunohistochemistry and HER2/neu gene evaluation with interphase fluorescence *in situ* hybridization (if necessary), age, body weight, height and menopausal status at diagnosis were investigated retrospectively. The patients were stratified as having a normal body weight if BMI was ≤ 24.9 kg/m², as being overweight if BMI was between 25.0 and 29.9 kg/m², and as being obese if BMI was ≥ 30.0 kg/m².

Results. Median BMI was 28.7 kg/m² (17.6-55.6) in the postmenopausal and 25.6 kg/m² (16.4-51.1) in the premenopausal group ($P < 0.001$). BMI at diagnosis did not differ significantly between the molecular subtypes ($P = 0.12$). Distribution of BMI strata was similar between the molecular subtypes both in pre- and postmenopausal breast cancer ($P = 0.24$ and $P = 0.99$, respectively). Premenopausal women with a BMI of ≥ 25.0 kg/m² showed a tendency towards ER- tumors when compared to premenopausal women with a BMI of < 25.0 kg/m² ($P = 0.009$).

Conclusions. The risk of specific breast cancer subtypes may not be associated with BMI in pre- and postmenopausal breast cancer. However, obesity might be related to an increased risk of premenopausal hormone receptor-negative breast cancer. Further studies are needed for clarification of the probable mechanisms in the pathogenesis of premenopausal hormone receptor-negative breast cancer.

Key words: breast cancer, body mass index, estrogen receptor, progesterone receptor, HER2.

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