Abstract

Background: Previous studies have shown that dense breast on mammography is an important risk factor for breast cancer and at a higher risk of missing detection of breast cancer. Dense breast has been shown to have a 2-5 times higher risk of breast cancer and reduce the sensitivity of mammography. Hence, evaluation of breast density on mammography is important as a predictor of breast cancer and a masking risk estimator on screening. Although the relationship between parity and dense breast is under investigation, there is a scarcity of studies regarding the association between a history of childbirth and mammographic breast density. In this study, we aimed to investigate whether parity affects breast density.

Methods: The study design is a cross-sectional study. The subjects are healthy women who underwent annual health check-up at the Center for Preventive Medicine at a single institution from January 2016 to December 2018. The questionnaire collected demographic information, and the data of blood test and mammographic findings were extracted from the hospital database. Multivariate logistic regression analysis was conducted to investigate the relationship between parity and dense breast among premenopausal women and postmenopausal women separately.

Results: For premenopausal women, 3878 nulliparous and 3732 parous women were recruited. Parous women showed significantly higher age (nulliparous; 44.12±5.95 years old, parous; 45.06±5.04 years old), and lower BMI (nulliparous; 21.51±3.45 kg/m^2, parous; 21.17±3.03 kg/m^2). In contrast, for postmenopausal women, 3279 nulliparous and 5973 parous women were recruited. Parous women showed significantly higher age (nulliparous; 58.93±7.57 years old, parous; 62.92±8.45 years old), and higher BMI (nulliparous; 21.56±3.65 kg/m^2, parous; 21.70±3.29 kg/m^2). For premenopausal women, dense breast was shown among 62.6% of nulliparous women, and 57.3% of women with single parity, and 45.8% of women with more than one parity. In contrast, for postmenopausal women, dense breast was shown among 41.6% of nulliparous women, and 31.1% of women with single parity, and 17.0% of women with more than one parity. For premenopausal women, adjusted by age, BMI, HbA1c, and alcohol status, parity showed a significant relationship with dense breast. Compared with women with more than one parity, single parity showed a 61.9% increase in the likelihood for dense breast (OR: 1.619 (95%CI; 1.413-1.856), $p<0.001$), and nulliparity showed a higher likelihood

for dense breast (OR: 2.116 (95%CI; 1.889-2.370), $p < 0.001$). In contrast, for postmenopausal women, adjusted by age, BMI, HbA1c, smoking status, alcohol status, and hormonal therapy, parity showed a significant relationship with dense breast. Compared with women with more than one parity, single parity had a higher risk of dense breast (OR: 1.958 (95%CI; 1.699-2.256, $p<0.001$), nulliparity showed further higher risk of dense breast (OR: 3.135 (95%CI; 2.796-3.515, $p<0.001$).

Conclusions: Parity appears to have a relationship with breast density among both premenopausal and postmenopausal women. The number of parity showed an inverse trend of having dense breast on mammography. In particular, nulliparous women need to recognize their higher risk of dense breast. In the future, the declining fertility rate may affect the prevalence of dense breast in the world. We have to take steps to cope with the serious situation in advance.

Keywords: parity · dense breast · mammography screening · breast neoplasms