

P027

The Determinant Methylenetetrahydrofolate Reductase Genotypes for Taiwan Breast Cancer Early Onset and Lower Survival

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Backgrounds: To evaluate the effects of the genotypic polymorphisms in methylenetetrahydrofolate reductase (*MTHFR*) and its interaction with early onset on breast cancer risk in Taiwan. Two well-known polymorphic variants of *MTHFR*, C677T (rs1801133) and A1298C (rs1801131), were analyzed in association with breast cancer susceptibility, and discussed about their joint effects with individual age on breast cancer risk. **Materials and Methods:** In total, 1232 breast cancer patients and 1232 healthy controls recruited from China Medical Hospital in central Taiwan. The *MTHFR* C677T genotype, but not the A1298C, was differently distributed between the breast cancer and control groups. **Results:** The T allele of *MTHFR* C677T was significantly more frequently found in controls than in cancer patients. The genotype of *MTHFR* C677T was closely related to early onset of breast cancer. Those female carrying *MTHFR* C677T CT or TT genotypes conferred a higher odds ratio of 1.88 (95% confidence interval=1.44-2.47, $P=1.85E-5$) for breast cancer, especially before the age of 45 (odds ratio= 2.63 and 95% confidence interval=1.78-3.88). **Conclusion:** Our results indicate that the *MTHFR* C677T T allele was associated with increased risk of breast cancer and lower survival rate in Taiwan, and the association was more significant in patients who were younger than or equal to 45 years of age.