Clinical and Genetic Predictions of Early-onset Cardiac Toxicity in Adjuvant Chemotherapy for Breast Cancer

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Background: Although cardiotoxicity has been widely researched, there is little known regarding early onset cardiotoxicity and it is difficult to explain the occurrence of cardiotoxicity only by clinical factors in patients with receiving a low cumulative dose of chemotherapy. The purpose of this study was to investigate adjuvant chemotherapy-related cardiac events in breast cancer patients, and to find out the genetic risk factors related to early-onset cardiotoxicity.

Methods: A total of 388 recruited patients completed routine blood, liver and kidney function, D-dimer, TnT, NT-proBNP (or BNP), ECG and UCG tests before and after adjuvant chemotherapy. Twenty-five single nucleotide polymorphisms were tested. Univariable and multivariable analyses were performed to identify independent risk factors.

Results: A total of 256 adjuvant chemotherapy-related cardiac events were recorded in 180 patients (46.4%), and these included an abnormal ECG (37.4%), an abnormal UCG (8.8%), an elevated BNP (5.7%), and elevated TnT (0.3%). The ATG13 (rs10838611) GG genotype was a protective factor of early-onset cardiotoxicity (10% reduction in the LVEF) ([OR]= 0.188; 95% CI: 0.067-0.525; P=0.001).

Conclusion: Adjuvant chemotherapy-related cardiac events are quite common in the real world. Genetic factors were closely related to the susceptibility of early-onset cardiotoxicity.