BRCA1 gene mutation associated with neoadjuvant chemotherapy

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Nearly half of breast cancer patients carrying the BRCA1 gene mutation experience a complete pathological response (pCR) – the disappearance of all evidence of disease from the breast tissue and lymph nodes – regardless of disease stage after standard neoadjuvent chemotherapy, according to new research from The University of Texas MD Anderson Cancer Center.

The study, published online in *The Journal of Clinical Oncology* on September 6, is the largest study to date to find that the pCR rate is significantly higher in BRCA1 carriers (46 percent) than in women carrying the BRCA2 mutation (13 percent) and non-carriers (22 percent). Among all the women, researchers did not find a statistical difference in overall survival rates, but noted that BRCA1 carriers who achieved a pCR had better five-year, relapse-free survival and overall survival rates.

BRCA1 and BRCA2 belong to a class of human genes known as tumor suppressors. The mutation is inherited and increases a woman's chance of developing breast cancer with more aggressive features by 80 percent. Researchers aimed to determine whether women with and without the mutations would respond differently to the same treatment.

"While hereditary breast cancers typically carry aggressive tumor features compared to sporadic breast cancers, we found that BRCA1-related tumors were as responsive and sensitive to anthracycline and taxane-based chemotherapy as were sporadic breast cancers," said

Banu Arun, M.D., professor in the Department of Breast Medical Oncology at MD Anderson and lead author of the study. "These findings may help physicians determine the best treatment method for this subset of women with unique genetic mutations."

For the study, researchers used MD Anderson's Breast Cancer Management System Database to identify 317 women at varying disease stages who received neoadjuvent chemotherapy and clinical genetic testing for BRCA1 and BRCA2 between 1997 and 2009. Fifty- seven women were BRCA1 carriers, 23 were BRCA2 mutation carriers and 237 were non-carriers. After chemotherapy, 61 patients received breast-conserving surgery, while 256 opted for mastectomy.

Median follow up time for the patients was 3.2 years, at which point 22 percent of patients experienced disease recurrence or death. There were no significant differences noted in survival outcomes with respect to BRCA status and type of neoadjuvent chemotherapy received.

According to Arun, there is no consensus on the most effective chemotherapy regimen for treating women who carry the BRCA mutation, due to a lack of prospective studies.

"This new insight tempts us to speculate that the presence of the BRCA1 mutation determines how some women will respond to neoadjuvent chemotherapy. However, we need future prospective studies with larger cohorts and longer-term follow up to validate these findings and determine optimum treatment," Arun noted.

Provided by University of Texas M. D. Anderson Cancer Center