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Using genetic tests to minimize chemotherapy for early-stage breast cancer patients

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Deciding how to treat breast cancer is not straightforward. The chemotherapy component of treatment is particularly unpleasant, not to mention toxic. Ideally, chemotherapy should be avoided if it will not increase patient survival. However, it is difficult to determine ahead of time whether chemotherapy will be effective and patients may be unnecessarily overtreated.

In 2002, a published study identified a panel of 70 genes whose gene expression signatures were predictive of a poor prognosis. In other words, the expression levels of these 70 genes were associated with whether an individual was at high or low risk of metastasis. This 70-gene panel became the basis for the genetic test MammaPrint, which is a product of Agendia, a molecular diagnostics company.

In August 2016, fourteen years later, a study of 6693 early-stage breast cancer patients (published in the New England Journal of Medicine) determined that using MammaPrint results could reduce the use of chemotherapy without statistically decreasing survival rate.

The patients in the study were classified as being at high or low clinical risk (based on tumor size, age, etc.), and high or low genetic risk (based on the MammaPrint test). The patients with high clinical risk but low genetic risk (1550 in total) were randomly assigned to either receive chemotherapy or not receive it. These patients were then followed for five years. Their survival and whether the cancer had metastasized were recorded.

In the patients with high clinical risk and low genetic risk who **did** receive chemotherapy, survival was 95.9% at the 5-year mark. In the patients with high clinical risk and low genetic risk who **did not** receive chemotherapy, survival was 94.4% at the 5-year mark. The study reported this 1.5% difference was not statistically significant.

The much smaller group of patients with high genetic risk but low clinical risk (592 patients) were also randomized into two groups: those who received chemotherapy and those who did not. Again, there was a statistically insignificant difference in survival rates between the two groups.

References:
UCSF press release: https://www.ucsf.edu/news/2016/08/403976/some-breast-cancer-patients-low-genetic-risk-could-skip-chemotherapy-study-finds
2002 MammaPrint study: http://www.nature.com/nature/journal/v415/n6871/full/415530a.html
2016 New England Journal of Medicine article:
http://www.nejm.org/doi/full/10.1056/NEJMoa1602253?query=featured_home&#t=articleMethods