Further Progress for Patients with Breast Cancer

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Substantial progress has been made over the past 50 years in the evaluation and treatment of patients with breast cancer, leading to a nearly 40% decrease in mortality from this disease and associated reductions in complications of treatment. This progress has occurred with the understanding that breast cancer is not one but several diseases with biologically driven subtypes. Each of these subtypes is amenable to different treatment strategies, so that a personalized-medicine approach is possible in the treatment of patients with breast cancer.

For example, endocrine treatment in women with estrogen-receptor–positive, but not estrogen-receptor–negative, breast cancer has led to considerable improvement in survival while avoiding toxic effects in patients who would not benefit. Similarly, identification of overexpression of its protein product, human epidermal growth factor receptor 2 (HER2), or both has produced remarkable results. The humanized monoclonal antibody trastuzumab, which is directed against HER2, is highly effective in patients with metastatic HER2-positive breast cancer, and it has decreased the rate of distant recurrence and death by nearly one half among patients with early-stage disease. In addition to trastuzumab, several other anti-HER2 agents, including pertuzumab, lapatinib, and neratinib, have been introduced into the clinic.

Yet another agent, trastuzumab emtansine, designated T-DM1, consists of an antitubulin chemotherapeutic agent, emtansine, which is chemically linked to trastuzumab. T-DM1 has impressive activity against HER2-positive metastatic breast cancer, even in patients with cancer that had previously progressed with trastuzumab-based therapy, and it has serious but mainly reversible toxic effects. Results of studies of T-DM1 suggest that it behaves as a Trojan horse, delivering emtansine only to HER2-expressing cells and mostly sparing patients from the considerable toxic effects seen with the predecessor of emtansine, maytansine, when used as a single agent.

Successful neoadjuvant treatment of patients with metastatic breast cancer frequently portends even greater benefit in the adjuvant setting. Indeed, tests of most of the new anti-HER2 therapies as preoperative (or neoadjuvant) therapy in patients with early disease have induced substantial tumor shrinkage. However, enigmatically, results of classic trials of adjuvant lapatinib and pertuzumab, either alone or in combination with trastuzumab, have been disappointing with regard to clinically meaningful end points such as a reduction in rates of distant recurrence or death.

In this issue of the Journal, von Minckwitz et al. report a remarkable benefit in women with stage I to III HER2-positive breast cancer. All patients enrolled in this trial had residual disease after receiving neoadjuvant chemotherapy plus trastuzumab (and, in a minority, after receiving pertuzumab) and were randomly assigned to postoperative T-DM1 or trastuzumab for the succeeding 42 weeks. A significant reduction of nearly one half in the risk of invasive events (invasive breast cancer or death), including the risk of distant recurrence, was observed. Overall, there was an absolute improvement of 11.3 percentage points in the rate of invasive disease–free survival. Even though the trial was underpowered to detect a significant reduction in mortality, the hazard ratio for death was similar to the hazard ratio for distant recurrence (0.7 and 0.6, respectively).

These results are impressive and clinically meaningful. However, success does not come without a price. More serious adverse events occurred in patients who received T-DM1 than in those who received trastuzumab (12.7% vs.
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Breast cancer risk varies by age and race/ethnicity: Breast Cancer Facts & Figures 2019-2020 3. Table 2. Age-specific Ten-year Probability of Breast Cancer Diagnosis or Death for US Women. Current age. 20 30 40 50 60 70 80 Lifetime risk. Diagnosed with invasive breast cancer. 0.1% (1 in 1,479) 0.5% (1 in 209) 1.5% (1 in 65) 2.4% (1 in 42) 3.5% (1 in 28) 4.1% (1 in 25) 3.0% (1 in 33) 12.8% (1 in 8). Dying from breast cancer. At the time of diagnosis, approximately 64% of breast cancer patients have local-stage breast cancer, 27% have regional stage, and 6% have distant (metastatic) disease. 4 Breast Cancer Facts & Figures 2019-2020. Rate per 100,000 Percent. The known risk factors for breast cancer are listed below. Click on each link to learn more about the risk factor and ways you can minimize it in your own life. If a factor can't be changed (such as your genetics), you can learn about protective steps you can take that can help keep your risk as low as possible. Established risks: Being a Woman. Light Exposure at Night. The results of several studies suggest that women who work at night -- factory workers, doctors, nurses, and police officers, for example -- have a higher risk of breast cancer compared to women who work during the day. Other research suggests that women who live in areas with high levels of external light at night (street lights, for example) have a higher risk of breast cancer. Read more ». Learn more about the progress being made by the Breast Cancer Research Foundation thanks to your generosity that has funded millions of hours of research. To us, progress means making discoveries in the lab that will have a meaningful impact on breast cancer patients today as well as tomorrow. Since 1993 and because of your generosity, BCRF-supported investigators have been deeply involved in every major advance in breast cancer prevention, diagnosis, treatment and survivorship. Your support has funded more than 14 million hours of research, bringing us all closer to prevention and cure. PDF | Breast cancer is the second leading cause of cancer death among women. National cancer institute of the US estimates that one in eight women will be diagnosed with breast cancer during their lifetime. Considering the devastating effects of the disease and the alarming numbers many scientists clinical trials are in progress, but so far no breast cancer vaccine has been approved [80]. A few immunogenic peptides from HER2/neu are being examined for the development of the first breast cancer vaccine [81]. 3. vaccines for breast cancer. For an optimal prophylactic and therapeutic vaccine.