Triple-Negative Breast Cancer

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C.S., a premenopausal, 40-year-old, single, Hispanic woman with no children, was diagnosed in April 2006 with invasive adenocarcinoma by needle biopsy of her right breast. Pathology showed estrogen receptor (ER)-negative, progesterone receptor (PR)-negative, and HER2/neu-negative—triple-negative breast cancer (TNBC). A magnetic resonance image of the breast showed a 3.5 x 2.5 x 3 cm round mass with irregular margins in the right breast at the 10 o'clock position. The mass was associated with pectoral muscle involvement with marked central necrosis with angiogenesis peripherally. Neoadjuvant treatment started with adriamycin and cyclophosphamide and was to be followed by paclitaxel. C.S. completed four adriamycin and cyclophosphamide treatments, but marked progression of the breast mass on palpation was visibly noted (the lesion was very close to skin surface). One paclitaxel treatment was given with an obvious increase in the size of C.S.'s breast mass; therefore, she was switched to docetaxel. C.S. received three cycles of docetaxel, with the last dose occurring in December 2006. Radiation therapy was planned, but a computed tomography scan showed lung nodules which were positive for metastatic disease. C.S. was referred to the University of Texas M.D. Anderson Cancer Center in Houston for a clinical trial in January 2007 and placed on tipifarnib and gemcitabine. C.S. had issues with cytopenias and infections during the treatment protocol.

By April 2007, C.S. showed progression of her disease: Her breast mass was larger, and her pulmonary nodules had increased in size. She was placed on capecitabine and bevacizumab. A computed tomography scan in May 2007 showed a T12 osteoblastic lesion previously unseen. C.S. had a significant nose bleed in June 2007, possibly related to bevacizumab treatment, and she was switched to navelbine. By July 2007, her right breast mass was large and painful. C.S. was referred to the University of New Mexico Cancer Treatment Center in Albuquerque because of an interest in a phase I trial. She was admitted to the hospital on July 16, 2007, with pleural effusion, poor performance status, and pain. C.S. died on July 26, 2007, just 15 months after diagnosis.

Overview

An estimated 182,460 cases of breast cancer occurred in women in the United States in 2008, with 40,480 deaths (American Cancer Society, 2008). Breast cancer diagnosis often comes when a woman finds a suspicious lump, after a mammogram, or after an examination by a healthcare professional. After the lump has been verified via mammography, ultrasound, or magnetic resonance imaging, a biopsy is performed. If breast cancer is confirmed, tissue is sent for additional analysis to evaluate for hormonal receptor (ER and PR) and HER2/neu status. Prior to the advent of trastuzumab, hormone receptor status determined the course of additional treatment after completion of adjuvant or neoadjuvant chemotherapy. Hormonal status reviews ER and PR and reveals whether patients are ER-positive, ER-negative, PR-positive, or PR-negative. Hormonal treatment is an option if the patient is either ER- or PR-positive (see Figure 1). ER-negative and PR-negative patients have fewer treatment options.

Staging for breast cancer occurs after diagnosis and possibly after surgical intervention. At that point, patients may be referred to a surgeon, an oncologist, or both. Staging will include family history, a physical, laboratory testing (e.g., complete blood count, comprehensive metabolic panel, alkaline phosphatase), diagnostic bilateral mammogram, and ultrasound (National Comprehensive Cancer Network, 2008). Optional staging criteria include a breast magnetic resonance image, bone scan (if symptomatic), abdominal computed tomography scan (if abnormal liver function is noted), chest x-ray, or chest computed tomography scan.

Treatment decisions are made after staging has been determined. Treatment is based on adjuvant and neoadjuvant needs. Size of lesion, nodal status, and preference regarding breast conservation all help determine treatment options.

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TNBC accounts for about 10%–17% of all types of breast cancer (Reis-Filho & Tutt, 2008). Similarities are seen between TNBC and basal-like breast cancers (Reis-Filho & Tutt), so much so that some healthcare professionals consider them to be the same. Basal-like tumors can account for about 15% of breast tumors and also generally are ER- and PR-negative (some may have positive receptor status), HER2/neu-negative, and affect younger

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