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# SYSTEMIC TREATMENT FOR BREAST CANCER: CHEMOTHERAPY AND BIOTHERAPY AGENTS

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**OBJECTIVES:** *To describe current systemic chemotherapy and biotherapy breast cancer treatments to better inform clinical nursing practice.*

**DATA SOURCES:** *CINAHL, Medline, Academic Research Periodicals, PubMed Clinical Queries, CANCELIT, and EBM Reviews–Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews (CDSR).*

**CONCLUSION:** *Systemic therapeutic options for patients with breast cancer can be complex and varied. Furthermore, the guidelines for the treatment of breast cancer are frequently changing as new chemotherapies and biotherapies are being developed.*

**IMPLICATIONS FOR NURSING PRACTICE:** *Nursing clinical practice has to remain current to accommodate new treatments and the side effect profiles. This knowledge is essential to providing evidence-based care for breast cancer patients receiving these treatments.*

**KEY WORDS:** *Chemotherapy, biotherapy, adjuvant, metastatic, chemotherapy in elderly, brain metastasis*

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Breast cancer treatment depends on multiple prognostic factors and often involves a combination of local interventions (e.g., surgery, radiation therapy) and systemic treatments (e.g., chemotherapy, hormone therapy, and/or targeted therapy).<sup>1</sup> Decision making for which types of systemic treatments are necessary include biologic features of the tumor, specifically the estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2) gene status, and the extent of disease considering presence or absence of metastatic disease to axillary lymph nodes, and presence or absence of

detectable distant metastatic disease.<sup>2</sup> This article will provide an overview of common systemic treatments for breast cancer using chemotherapy and biotherapy in the neoadjuvant (before surgery) or adjuvant (after surgery) settings.

### NEOADJUVANT THERAPY

Neoadjuvant therapy has become a well-established approach to the treatment of locally advanced or some early breast cancers. Originally, neoadjuvant therapy was used in locally advanced inoperable disease to minimize the disease burden and achieve surgical resection.<sup>3</sup> Neoadjuvant therapy was then studied in women with early stage breast cancer to improve surgical outcomes.<sup>4</sup> Neoadjuvant therapy was thought to improve the overall survival with earlier initiation of systemic therapy in patients at risk of distant recurrence. However, the results of the National Surgical Adjuvant Breast and Bowel Project (NSABP) B18 trial revealed that when compared with adjuvant therapy, neoadjuvant chemotherapy did not improve disease-free or overall survival.<sup>5</sup> Currently, neoadjuvant therapy is used to downstage tumors to improve surgical outcomes or facilitate breast-conserving surgery.<sup>5</sup> It also allows the clinician to evaluate whether the therapy is locally effective or to discontinue ineffective treatment.<sup>5</sup>

Neoadjuvant therapy is recommended for women with clinical stage IIA, B, and stage III disease, and in women who wish to undergo breast-conserving therapy but have large tumors in comparison with the size of their breast.<sup>4,6</sup> Chemotherapy and biotherapy regimens recommended in the neoadjuvant setting are similar to adjuvant therapy. Multiple regimens exist for women who are HER2-negative and -positive with various chemotherapy options (Table 1). Following the completion of neoadjuvant therapy the patient will typically undergo surgery to remove the primary tumor and determine if further treatment is warranted.<sup>3</sup> Once surgical and radiation therapy (if indicated) interventions are completed, patients with ER/PR receptor-positive disease will initiate anti-hormonal therapy.<sup>6</sup>

### NURSING CONSIDERATIONS

Nurses must take an active role in performing pre-treatment assessments in neoadjuvant chemotherapy candidates. Patient education

should focus on the need for neoadjuvant chemotherapy with emphasis on tumor characteristics, stage of disease, and personal risk factors. Advanced practice nurses should ensure the neoadjuvant chemotherapy recommendations and education are consistent, and precisely document the tumor size and its response to chemotherapy.

### ADJUVANT THERAPY

Adjuvant therapies generally consist of polychemotherapy, biotherapy, and/or endocrine therapy for all patients with early breast cancer, regardless of their age at the time of diagnosis.<sup>7</sup> When recommending and designing individual adjuvant therapy, the oncology provider team should consider and balance the risk of disease recurrence, benefit and toxicity of the therapy, and existing or potential comorbidities. The lymph node status is one of the most important variables in consideration for all treatments.<sup>1,8</sup> If axillary lymph nodes are positive for disease, the patient is a candidate for chemotherapy. In patients with negative lymph node involvement, further consideration of the tumor histology and anatomic and pathologic characteristics will guide treatment. Unfavorable prognostic features include estrogen-negative tumors, intramammary lymph node involvement, angiolymphatic invasion, high nuclear grade, high histologic grade (e.g. Ki67), or positive HER2 status.<sup>8</sup> Patient age, existing comorbidities, tumor size, tumor grade, number of involved axillary lymph nodes, and HER2 tumor status are the most predictive factors for future recurrence or death from breast cancer.<sup>2</sup>

The following lists several pathologic examples for consideration of chemotherapy:

- 1) negative lymph nodes, negative hormone receptors, and tumor >1 cm should consider adjuvant chemotherapy<sup>1,9</sup>;
- 2) negative lymph nodes, positive hormone receptors, tumor 0.6 to 1.0 cm with high nuclear grade or other unfavorable features should receive adjuvant chemotherapy followed by endocrine therapy<sup>9,10</sup>;
- 3) node-negative tumors >0.5 cm with positive receptor status may benefit from Oncotype DX (Genomic Health, Inc. Redwood City, CA) or MammaPrint (Agendia Inc., Irvine, CA), programs that can assist the provider to determine whether chemotherapy will reduce

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