

Breast Cancer Treatment: Comprehensive Approaches to Management

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Editorial

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Postoperative radiation is commonly used after breast-conserving surgery to reduce local recurrence risk. It is also used after mastectomy in cases with high risk of residual disease. Advances like intensity-modulated radiation therapy (IMRT) improve targeting while minimizing side effects.

Systemic Therapies

Systemic treatments target cancer cells throughout the body and are essential for reducing recurrence and treating metastatic disease.

**Chemotherapy:** Uses cytotoxic drugs to kill rapidly dividing cells. Often given before surgery (neoadjuvant) to shrink tumors or after surgery (adjuvant) to eliminate micrometastases.

**Hormonal (Endocrine) Therapy:** For hormone receptor-positive cancers [3], therapies like tamoxifen or aromatase inhibitors block estrogen’s growth-promoting effects.

Targeted Therapy: Includes agents targeting specific molecular abnormalities, such as:

**HER2-Targeted Therapy:** Trastuzumab, pertuzumab, and newer drugs for HER2-positive tumors.

**CDK4/6 Inhibitors:** For hormone receptor-positive advanced breast cancer.

**Immunotherapy:** Emerging role, especially in triple-negative breast cancer with agents like immune checkpoint inhibitors.

INTRODUCTION

Breast cancer is one of the most common malignancies affecting women worldwide, with significant advances in diagnosis and treatment improving survival rates over recent decades. Treatment of breast cancer is multidisciplinary and personalized, tailored to the tumor’s biological characteristics, stage at diagnosis, and patient preferences. It often involves a combination of surgery, radiation therapy, systemic therapies (such as chemotherapy [1], hormonal therapy, and targeted therapy), and emerging immunotherapies.

This article provides an overview of current breast cancer treatment modalities, highlighting the principles guiding therapy selection, advances in targeted approaches, and ongoing challenges in managing this complex disease.

Treatment Modalities

Surgery

Surgery remains the cornerstone of early-stage breast cancer treatment, aimed at removing the tumor and ensuring clear margins.

**Breast-Conserving Surgery (Lumpectomy):** Removal of the tumor with a margin of healthy tissue, preserving most of the breast.

**Mastectomy:** Complete removal of one or both breasts; indicated for larger tumors, multifocal disease, or patient preference.

**Sentinel Lymph Node Biopsy and Axillary Lymph Node Dissection:** Assess regional lymph node involvement for staging and prognosis [2].

Radiation Therapy

## Personalized Treatment Approach

Breast cancer treatment increasingly depends on tumor biology, assessed by hormone receptor status (estrogen and progesterone receptors) [4], HER2 expression, and genomic profiling. These factors guide therapy decisions:

**Hormone Receptor-Positive:** Endocrine therapy is mainstay.

**HER2-Positive:** Combination of chemotherapy and HER2-targeted agents.

**Triple-Negative:** Chemotherapy and emerging immunotherapy; currently no approved targeted agents.

Molecular assays (e.g., Oncotype DX) help predict recurrence risk and benefit from chemotherapy in early-stage disease.

## Challenges and Considerations

**Side Effects and Quality of Life:** Managing toxicities from surgery, radiation, and systemic therapies is critical.

**Resistance to Therapy:** Some tumors develop resistance to hormonal or targeted treatments.

**Metastatic Disease:** Treatment aims to prolong survival and maintain quality of life; cure is rare.

**Access to Care:** Disparities in diagnosis and treatment availability affect outcomes worldwide [5].

## Future Directions

**Novel Targeted Agents:** Including PARP inhibitors for BRCA-mutated cancers.

**Enhanced Immunotherapy:** Expanding options for triple-negative breast cancer.

**Liquid Biopsy:** For monitoring minimal residual disease and treatment response.

**Precision Medicine:** Integrating multi-omics data to refine treatment.

**De-escalation Strategies:** Avoiding overtreatment in low-risk patients

## CONCLUSION

Breast cancer treatment has evolved into a highly personalized, multidisciplinary endeavor combining surgery, radiation, systemic therapies, and emerging modalities. Advances in molecular biology have enabled targeted and immunotherapeutic approaches, improving outcomes and reducing toxicity. Despite progress, challenges such as therapy resistance and metastatic disease persist, underscoring the need for ongoing research and equitable care access. With continued innovation, breast cancer management promises even greater survival and quality of life improvements for patients worldwide.

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