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Axillary Surgery De-escalation in Early Breast Cancer: Are We Truly De-escalating or Simply Shifting to Another Treatment Modality?

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Abstract: **This narrative review evaluates axillary de-escalation in early breast cancer in the context of molecular oncology. While surgical burden has reduced, systemic therapy and radiotherapy have increased, suggesting a shift rather than true de-escalation.**

Keywords: **Breast cancer; Axillary surgery; De-escalation; Genomics; Molecular subtypes.**

1. INTRODUCTION

Over the past decade, breast cancer management has undergone a paradigm shift toward de-escalation, aiming to minimize treatment-related morbidity without compromising oncological outcomes. Advances in tumor biology, imaging, and systemic therapies have enabled more personalized treatment approaches, leading to reduced surgical interventions, particularly in axillary management. However, this apparent reduction in surgical extent has been paralleled by increasing reliance on systemic therapy and radiotherapy. Consequently, the concept of de-escalation warrants critical re-evaluation, as it remains unclear whether current strategies truly reduce overall treatment burden or merely redistribute it across different modalities. This review explores the evolving landscape of breast cancer treatment, questioning whether contemporary practice reflects genuine de-intensification or a shift in therapeutic approach.

2. METHODOLOGY OF LITERATURE REVIEW

Literature search was performed using PubMed, Scopus and Web of Science from 2000–2025 focusing on axillary surgery and molecular oncology.

EVOLUTION OF AXILLARY MANAGEMENT

From ALND to SLNB

SLNB has replaced ALND in clinically node-negative patients, significantly reducing surgical complications while maintaining oncological safety.

Omission of ALND in Limited Nodal Disease

The ACOSOG Z0011 and AMAROS trials demonstrated that ALND can be safely omitted in selected patients with minimal nodal involvement receiving adjuvant therapy.

Omission of SLNB

Recent studies suggest that SLNB may be omitted in carefully selected low-risk patients, particularly elderly individuals with hormone receptor-positive tumors.

MOLECULAR AND GENETIC BASIS OF AXILLARY MANAGEMENT

Intrinsic Molecular Subtypes

Breast cancer subtypes exhibit distinct biological behaviors:

Luminal A tumors are associated with lower nodal burden

HER2-positive and triple-negative tumors demonstrate higher aggressiveness but increased sensitivity to systemic therapy

Genomic Profiling

Multigene assays such as Oncotype DX, MammaPrint, and PAM50 have reduced reliance on nodal status for treatment decisions, enabling personalized therapy.

Tumor Microenvironment

Tumor-infiltrating lymphocytes (TILs) and immune signatures influence response to therapy, particularly in aggressive subtypes

IS DE-ESCALATION TRULY OCCURRING?

Reduction in surgery is often offset by increase in systemic therapy and radiotherapy.

The concept of de-escalation must be critically distinguished from a shift in treatment modality. While surgical interventions are decreasing, this reduction is frequently offset by increased use of systemic therapies and radiotherapy.

Despite the growing narrative of treatment de-escalation in breast cancer, a critical appraisal of contemporary evidence suggests that this paradigm may not always represent a genuine reduction in overall treatment burden.

Apparent surgical de-escalation may mask therapeutic substitution: While procedures such as axillary lymph node dissection (ALND) are increasingly omitted, this is often accompanied by greater reliance on systemic therapy and/or radiotherapy, thereby maintaining or even increasing cumulative treatment exposure.

Shift rather than reduction in treatment intensity: Many modern trials demonstrate reduced surgical morbidity; however, this benefit is offset by escalation in other modalities, particularly regional nodal irradiation or prolonged systemic therapy.

Biology-driven escalation: The incorporation of genomic assays and tumor biology has refined patient selection but has also led to intensified systemic therapy in subsets previously considered low-risk, challenging the notion of universal de-escalation.

Radiotherapy expansion in lieu of surgery: Trials such as ACOSOG Z0011 and AMAROS support omission of ALND, yet demonstrate increased use of radiotherapy to achieve locoregional control, representing a modality shift rather than true de-intensification.

Neoadjuvant therapy paradox: The increased use of neoadjuvant chemotherapy allows for surgical downstaging; however, it may expose patients to systemic toxicity upfront, raising questions about whether overall treatment burden is genuinely reduced.

Patient-centered outcomes vs oncologic safety: While de-escalation aims to reduce morbidity and improve quality of life, long-term oncologic outcomes and survivorship burdens must be carefully balanced, especially when substituting one modality with another.

Heterogeneity in defining de-escalation: Lack of a standardized definition leads to variability in interpretation across studies, with some labeling reduced surgery alone as de-escalation, without accounting for compensatory increases in other treatments.

Need for holistic treatment metrics: True de-escalation should be defined by an overall reduction in treatment burden—including physical, psychological, and economic impact—rather than reduction in a single modality.

3. DISCUSSION

The reduction in surgical intervention represents a significant advancement in patient care. However, this does not necessarily equate to reduced overall treatment intensity. Instead, there appears to be a redistribution of therapeutic burden toward systemic and radiation modalities, driven by molecular insights.

This shift reflects a broader transformation in oncology, where treatment is increasingly guided by tumor biology rather than anatomical staging alone.

4. CONCLUSION

Axillary management in early breast cancer is evolving toward less invasive approaches. However, current evidence suggests that this represents a shift in treatment modality rather than true de-escalation. Future strategies should aim for genuine reduction in overall treatment burden through precise patient selection and integration of molecular diagnostics.

DECLARATIONS

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