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Is the use of a dermal matrix mandatory in breast reconstruction with prosthesis after radiotherapy?

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ABSTRACT

Breast reconstruction is a crucial step in the treatment of breast cancer, allowing not only the restoration of body shape but also a significant improvement in patients' quality of life. However, choosing the ideal technique is a multifactorial challenge that requires consideration of several anatomical and clinical aspects. During the Northeast Mastology Conference held in September 2024 in Natal, it was agreed by consensus that the use of a dermal matrix (ADM) is not mandatory in breast reconstruction with prosthesis after radiotherapy.

KEYWORDS: mammaplasty; radiotherapy; breast neoplasms; acellular dermis.

INTRODUCTION

As the treatment of invasive breast carcinoma has evolved, new options for breast reconstruction have been established for patients. Reconstruction is a fundamental step in treatment, as it allows the restoration of body shape, improvement in quality of life, and reintegration of patients into social life. Choosing the ideal technique is a multifactorial challenge that requires consideration of various anatomical and clinical aspects.

METHODS

Consensus meeting held during the Northeast Mastology Conference to establish the use of dermal matrix (ADM) after breast reconstruction with post-radiotherapy prosthesis.

RESULTS

The choice of a surgical technique: an individualized challenge

Selecting a surgical technique is a complex process that involves analyzing multiple factors related to both the patient and the disease. Aspects such as body composition, breast size, sagging, and symmetry, as well as tumor involvement in the skin and muscles, and the ratio between tumor size and breast volume, must be carefully evaluated. This decision does not follow strict or standardized criteria, since each case presents unique characteristics that require a personalized approach.

Radiotherapy, although essential for tumor control in many breast cancer cases, presents an additional challenge for reconstruction due to its effects on breast tissue, such as capsular contracture, skin thickening and edema, as well as muscle fragility. These factors increase the risk of surgical complications, such as dehiscence and implant extrusion.

The role of the dermal matrix in breast reconstruction

Acellular dermal matrix (ADM) is a biocompatible material that acts as a structural support, promoting tissue integration. It can be derived from human, animal, or synthetic sources, and is available in different forms, such as fenestrated or smooth, being used for total or partial implant coverage.

Among its benefits are:

- Implant stabilization, reducing the risk of displacement.

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- Improves aesthetic results, providing a more natural contour.
- Reduction of capsular contracture, as highlighted by Craig et al.[1]
- Lower donor site morbidity compared to autologous flaps.
- Reduced postoperative pain, verified by Mohammadyari et al.[2]

However, ADMs are also associated with complications such as seromas, necrosis, hematomas, infections, and red breast syndrome[2].

Breast reconstruction and subsequent radiotherapy

The effects of radiotherapy following reconstruction with ADM have been widely studied. Apte et al. highlighted that ADM significantly reduces capsular contracture compared to reconstruction without ADM, however, complications such as infection, seroma, and necrosis remain more frequent in irradiated patients[3].

Craig et al. reported an increase in early complications, such as seromas and infections, within the first postoperative month in patients who received ADM[1]. Dueñas-Rodríguez et al. demonstrated that ADM reduces the implant extrusion rate, even in radiotherapy scenarios[4].

Reconstruction with autologous flaps: an alternative?

For irradiated patients, autologous flaps remain a robust option, offering greater tolerance to the effects of radiotherapy. Muscle flaps, such as the TRAM flap and the latissimus dorsi flap, allow for safe reconstructions, but with greater morbidity and functional impact.

Clemens and Kronowitz highlighted that reconstruction with total muscle coverage has lower explant rates compared with the use of ADM in irradiated patients[5].

Patient perception and cost-effectiveness

Lohmander et al. observed that the quality of life of patients did not show significant differences between those who received ADM and those who did not, suggesting that subjective perception is variable[6].

Regarding costs, Brunbjerg et al. pointed out that the use of ADM increases hospital and material costs but reduces total surgical time. This analysis reinforces the need to weigh the benefits against the costs in each case[7].

DISCUSSION

Radiotherapy introduces significant challenges in breast reconstruction, including a higher risk of complications such as capsular contracture, infection, and skin necrosis. Although the use of a dermal matrix is not mandatory, it offers a valuable alternative that can improve outcomes compared to the exclusive use of prostheses or autologous flaps. However, this decision should be based on a careful assessment of the patient´s individual factors, such as anatomical characteristics, availability of materials, and the surgeon's preferences.

Additionally, complications associated with ADM, such as seromas and infections, should be discussed transparently with patients, allowing for shared decision-making. In situations where autologous muscle flaps are not viable, the dermal matrix can increase the chances of successful reconstruction, especially in irradiated patients.

CONCLUSIONS

The use of ADM has become established as an important tool for breast reconstruction, provided that its use is planned in a personalized manner to balance the benefits and risks involved.

AUTHORS' CONTRIBUTIONS

JMCFS: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. VAS: Data curation, Formal analysis, Investigation, Methodology, Visualization, Validation, Writing – original draft. WJAJ: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Validation, Visualization, Writing – review & editing. ACA: Resources, Software, Writing – original draft.

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