Neoadjuvant Chemotherapy for Breast Cancer Treatment and the Evidence-Based Interaction with Immediate Autologous and Implant-Based Breast Reconstruction

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KEYWORDS

• Immediate breast reconstruction • Autologous breast reconstruction
• Breast reconstruction with prosthesis • Adjuvant chemotherapy • Neoadjuvant therapy
• Systematic review

KEY POINTS

- Chemotherapy for the treatment of breast cancer dates to the 1960s. At that time it was used for locally advanced and even inoperable cancer to provide a few more months of life to the patients suffering from it.
- Historically, patients underwent resective surgery (lumpectomy or mastectomy) followed by adjuvant therapy (chemotherapy and/or radiotherapy).
- Later, when the adjuvant treatment was completed and sufficient time had elapsed to be considered disease-free, delayed breast reconstruction proceeded.
- The development of more effective chemotherapy regimens has made it possible to put forth neoadjuvant chemotherapy in the case of breast tumors larger than 2 cm with or without axillary involvement.

INTRODUCTION

Although approximately 30% of oncologists think that breast reconstruction may interfere with the oncological treatment of breast cancer,[1,2] there is currently sufficient scientific evidence to demonstrate that immediate breast reconstruction is a safe procedure from the oncological perspective because it does not modify the patient's overall disease-free survival rate or interfere with subsequent oncological controls.[3,4]

There are multiple benefits for the patient, from the biological to the psychosocial, including a clear improvement in body image acceptance.[5,6]

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The introduction of neoadjuvant chemotherapy for the treatment of breast cancer before its immediate reconstruction has been a source of controversy. Certain groups have questioned its compatibility with immediate reconstructive surgical treatment. They argue that there is a higher incidence of perioperative complications secondary to the neoadjuvant therapy before the intervention.[7–9] This is also true in certain cases of delays in the implementation of coadjuvant therapy due to the presence of these postoperative complications.

The aim of this review is to examine the effect of neoadjuvant chemotherapy on immediate breast reconstruction by assessing the incidence of postoperative complications and the latency time until the onset of adjuvant therapy, and comparing it with the oncological and surgical results obtained from the combination of immediate breast reconstruction and coadjuvant therapy following surgery.

DISCUSSION

Chemotherapy for the treatment of breast cancer dates to the 1960s. It was used at that time for locally advanced and even inoperable cancer to provide a few more months of life for the patients suffering from it.

With the improved survival rates (currently, around 85% of cases[10]) achieved with the establishment of new chemotherapeutic lines,[11–13] the need has arisen to proceed to breast reconstruction in patients who have suffered the consequences of a partial or total resection of the mammary gland.

Historically, patients underwent resective surgery (lumpectomy or mastectomy) followed by adjuvant therapy (chemotherapy and/or radiotherapy). Later, when the adjuvant treatment was completed and sufficient time had elapsed to be considered disease-free, delayed breast reconstruction proceeded. The development of more effective chemotherapy regimens has made it possible to put forth neoadjuvant chemotherapy in the case of breast tumors larger than 2 cm with or without axillary involvement. This was mainly done to increase the possibility of having conservative surgery.[14–16] Neoadjuvant chemotherapy entails several cycles of chemotherapy before the definitive surgical treatment, which is usually between 4 and 6 weeks after the end of the treatment. The most commonly used programs are based on combinations of anthracyclines and taxanes. Depending on the tumor subtype, specific targeted therapies are combined with chemotherapy, as is the case for antiHER2 therapies in the case of human epidermal growth factor receptor 2 (HER2) positive tumors.[17]

Currently, many studies demonstrate the oncological safety, as well as the aesthetic and psychological benefit, of immediate breast reconstruction after mastectomy, whether it be therapeutic or prophylactic.[18–20] The relationship between breast reconstruction and postoperative adjuvant treatment has been well studied[1,21] and provides data that support the compatibility and even synergy between the 2 procedures.

In contrast, there is no consistent data relative to the interaction that may exist between the introduction of a neoadjuvant therapy before surgery and the results and complications that may result from the surgical procedure performed shortly thereafter.

For this reason, different groups have initiated retrospective clinical studies to assess the incidence of neoadjuvant chemotherapy in the subsequent mammary reconstruction procedure (**Table 1**).

A priori, it might seem that undergoing several cycles of chemotherapy a few weeks before proceeding to a complex and demanding surgery, such as breast reconstruction, would increase the occurrence of perioperative and postoperative complications. It would be the case both locally[22,23] and at the systemic level. Locally, there would be a compromising of immunogenicity and the tissue healing capacity that may predispose to infection or dehiscence. Affectations at the systemic level might include deep vein thrombosis of the lower extremities with potential pulmonary embolization.

The main problem arising from these postoperative complications would be the need to delay the adjuvant chemotherapy treatment,[24–26] which demonstrates increases in the rate of local recurrence of the disease and decreases in the life expectancy of this type of patient.[27–29]

Although it is true that these fears are based on the damage that chemotherapy causes at the local and systemic level, the results obtained from various studies call into question this allegedly harmful relationship between preoperative chemotherapy followed by immediate breast reconstruction.

One of the studies with the largest sample size is that of Mehrara and colleagues.[30] In its analysis of 1195 microsurgical flaps for breast reconstruction, approximately 70 cases had undergone neoadjuvant chemotherapy. Preoperative neoadjuvant therapy was determined to be a predictor of risk for minor complications in the early postoperative phase (with an increase in infections at the donor site) and the late phase (with a greater percentage of patients with flap fat necrosis). There was no delay in any of the cases at the beginning of the postoperative adjuvant therapy.

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