

Immediate Versus Delayed Breast Reconstruction

Evolving Concepts and Evidence Base

Oliver C. Thamm, MD, PhD*, Christoph Andree, MD, PhD

KEYWORDS

- Prophylactic mastectomy • Therapeutic mastectomy • Implant-based breast reconstruction
- Autologous breast reconstruction • Immediate breast reconstruction
- Delayed breast reconstruction • IDEAL concept

KEY POINTS

- Immediate breast reconstruction is oncologically safe with good results, but patient selection must be done properly.
- If postmastectomy radiotherapy is indicated or cannot securely be excluded, an immediate-delayed autologous breast reconstruction should be considered, and an implant is temporarily placed in an epipectoral plane.
- Neoadjuvant radiochemotherapy in combination with the IDEAL concept is a promising treatment protocol to achieve optimal oncologic and aesthetic results.

INTRODUCTION

Breast reconstruction is usually performed after oncologic surgery or prophylactic mastectomy. Breast cancer is the most frequent cancer in women, appearing with a lifetime risk of up to 10%. As a method of treatment, one-third of affected patients receive a mastectomy of different oncologic extents resulting in a reconstructive challenge for the oncoplastic surgeon.¹

A higher genetic risk for the occurrence of breast cancer was first reported in 1993.² Women who have inherited mutations in the BRCA-1 or -2 genes have considerably elevated risks of breast cancer and ovarian cancer. The risk for developing breast cancer in their lifetime ranges between 56% and 84%.³ The options for cancer risk management include risk-reducing mastectomy, annual

cancer screening, and chemoprevention. Domchek and colleagues⁴ analyzed the outcome in a large prospective, multicenter cohort study of 2482 women with BRCA-1 or -2 mutations ascertained between 1974 and 2008 at 22 different genetics centers in Europe and North America. Of the 247 women with prophylactic mastectomy, breast cancer was not detected in any of the women during the follow-up period, compared with 7% of women diagnosed with breast cancer who did not undergo prophylactic surgery. It is evident that risk-reducing prophylactic mastectomy significantly lowers the risk of breast cancer in women with BRCA-1 and -2 mutations.^{4,5} Therefore, an increasing number of women with either genetically higher risk for breast cancer or already diagnosed unilateral cancer decide to undergo prophylactic bilateral mastectomy. The number

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Department for Plastic and Aesthetic Surgery, Certified Breast Center, Sana Hospital Gerresheim, Graeulinger Str. 120, Duesseldorf 40625, Germany

* Corresponding author.

E-mail address: Oliver.Thamm@sana.de

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of contralateral prophylactic mastectomies (CPMs) increased substantially over the last decade, mainly in the United States. Even patients with early-stage breast cancer occasionally chose mastectomy instead of breast-conserving surgery.⁶ The number of mastectomies in the United States increased up to 51% between 2005 and 2011 with an increasing number of patients receiving bilateral prophylactic mastectomy with immediate reconstruction.^{7,8} This trend reflects a shift toward bilateral mastectomy with contralateral prophylactic procedures that may be facilitated by breast reconstruction availability.

Breast Reconstruction

Breast reconstruction following total mastectomy has benefits in body image, self-esteem, sexuality, and quality of life.^{9,10} Most of the women, especially younger patients, decide on breast reconstruction procedures after mastectomy. Because detection of BRCA-1/2 gene mutations has become a more standard test, prophylactic mastectomy in affected women is increasing with understandably high demands for the aesthetic outcome.

Breast reconstruction depends on different conditions and should always be attempted in a multidisciplinary approach. First, an optimal oncologic and surgical treatment decision must be made. Advantages and disadvantages concerning oncologic safety and aesthetic outcome should be considered and discussed extensively with the patient before choosing a surgical procedure, which could be either breast-conserving therapy (BCT), mastectomy, or skin- or nipple-sparing mastectomy (SSM/NSM), respectively. In addition, possibly indicated preoperative or postoperative radiation therapy and desired technique of breast reconstruction should be considered before starting the oncologic surgery.

Breast reconstruction may be classified in mainly 2 different considerations, the reconstruction type (alloplastic vs autologous) and the timing of reconstruction (immediate vs delayed).

Implant-based Breast Reconstruction

Although autologous breast reconstruction is offered to women as a reconstructive option, implant-based reconstruction appears to be the most common type of breast reconstruction, reaching 80% of any reconstruction in most centers.¹¹ A 10-year data analysis from the United States indicates that between 1998 and 2008 immediate implant-based breast reconstruction increased on average 11% per year, whereas autologous reconstruction remained stable.¹²

The increasing number of prophylactic bilateral mastectomies in the United States is probably one reason for the increased use of implants for immediate breast reconstruction (IBR). This trend may be due to the health system and cost coverage allowing CPM and IBR. In contrast to the findings in the United States, Canadian data from a comparable time period showed a constant number of contralateral prophylactic mastectomies over time.¹³

Nevertheless, implant-based breast reconstruction has many advantages: short operation time, presumably easy method, low early postoperative complication rate, and short hospital stay, resulting in low treatment costs. However, long-term complication rate is high; more than 30% of women who receive implants after mastectomy present complications during the first 5 years after surgery. The most frequent problems are capsular contracture, followed by implant rupture, hematoma, and wound infection. Complications among women with cosmetic implants are much lower (12% after 5 years).¹⁴ Irradiation of the breast significantly leads to an even higher risk of early capsular contracture and other complications after prosthetic breast reconstruction.¹⁵⁻¹⁷ Because invasiveness of surgical treatment of breast cancer has decreased over time, adjuvant radiation therapy increased. Therefore, the number of irradiated patients desiring breast reconstruction is constantly growing, and the reconstructive surgeon must consider this problem with his surgical treatment.

Autologous Breast Reconstruction

In 1982, Hartrampf and colleagues¹⁸ described the use of the superior pedicled rectus abdominis muscle flap with a transverse oriented adipocutaneous skin island (TRAM flap) supplied by the deep superior epigastric artery for anatomically reconstruction of the breast in one single stage without using implants. Since then, this flap was the gold standard for autologous breast reconstruction and is still often used in hospitals where microsurgical expertise is not available. In 1984, Taylor and colleagues¹⁹ and Boyd and colleagues²⁰ demonstrated the predominance of the inferior epigastric vessels in the blood supply of the TRAM flap, which delivered two to three periumbilical perforators to the skin. Friedman and colleagues²¹ described that the critical zones 3 and 4 are usually sufficiently perfused with the inferior pedicled TRAM flap. However, only a few years later, after several refinements of the method, the free deep inferior epigastric perforator (DIEP) flap was first described in 1989 by Koshima and Soeda²² and has evolved into the workhorse for

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