

## REVIEW

### Alloplastic Breast Reconstruction

RĂZVAN DANCIU<sup>1</sup>, CRISTINA-NICOLETA MARINA<sup>1,2</sup>,  
CRISTIAN RADU JECAN<sup>1, 2</sup>✉

<sup>1</sup> Prof. Dr. Agrippa Ionescu Clinical Emergency Hospital, Department of Plastic and Reconstructive Surgery, 7 Arh Ion Mincu Str., 011356, Bucharest, Romania

<sup>2</sup> Carol Davila University of Medicine and Pharmacy, Faculty of Medicine, Discipline of Plastic and Reconstructive Surgery, 37 Dionisie Lupu Str., 020021, Bucharest, Romania.

**Correspondence to:** Cristian Radu Jecan, Prof.Dr.Agrippa Ionescu Clinical Emergency Hospital, Department of Plastic and Reconstructive Surgery, Carol Davila University of Medicine and Pharmacy, Bucharest, Romania, e-mail: cristian.jecan@umfcd.ro

#### Abstract

*Immediate breast reconstruction is a surgical technique that involves placing an implant or expander in the same operation with the mastectomy intervention. Thus, the remaining flaps are viable, fresh and the remaining space can be filled with an implant. Patient satisfaction is increased, thus avoiding the psychological shock of not having a breast and they support better the following interventions.*

*The aim of this paper is to review and find in the current literature the indications and technique of immediate breast reconstruction in order to help surgeons to choose and perform the most appropriate breast reconstruction method. We have also researched in the literature the rates of complications that have arisen, especially in the case of subsequent radiotherapy.*

*Multidisciplinary approach of these cases presented the key to success, oncological safety is the main concern, then the reconstruction must respect the patient's requirements and ensure the best aesthetic result.*

**Key words:** immediate breast reconstruction, mastectomy, surgical technique.

#### Introduction

Breast cancer is the most common malignancy in female population [1]. In the current era, the detection of breast cancer in a low stage has increased considerably which has led to an increase in the number of mastectomies and immediate or delayed reconstruction surgeries [2,3]. Immediate breast reconstruction (IBR) is designed to increase patient quality of life, the surgery should be proposed for patients about to

undergo mastectomy being part of the breast cancer treatment protocol. The purpose of intervention is to protect the integrity and psychological state of the patient [4].

Breast reconstruction can be allogeneic (with a silicone implant or expander), autologous (with loco-regional or free flaps) or a combination of the two. Reconstruction may be performed at the same time as mastectomy as a single-stage intervention or may be delayed as a two-stage intervention

[5]. It is better to consider also the possibility of performing a second surgery that may be necessary for: reconstruction of the areolo-nipple complex, symmetrisation of the contralateral breast or revision of the scar [6].

The aim of this paper is to review and find in the current literature the indications and technique of immediate breast reconstruction in order to help surgeons to choose and perform the most appropriate breast reconstruction method.

### **Indication**

Immediate breast reconstruction uses an implant or expander to shape the breast in a single intervention using the remaining flaps of the mastectomy without affecting the local vascularization. Preoperatively, parameters such as trunk skin elasticity, soft tissue characteristics and body proportions are evaluated [7]. Intraoperatively, it was found that the flaps remaining for the mastectomy should be at least one cm thick with good vascularization [8].

Young and thin women with small or medium breast represent the ideal candidates for the IBR [9]. This technique is intended for breast cancer cases in stage I or in selected cases in stage II [10]. When the contralateral breast has a degree of ptosis, ADM (Acellular Dermal Matrix) can be used to determine a similar appearance [11]. This can increase the muscular plane, stabilize the inframammary fold and improve the appearance of the lower pole [12]. An expander can be used when the tissues require modification but it must be replaced later with a definitive implant. It has been shown that this causes a higher rate of complications later [11].

According to the European Society of Breast Cancer Specialists more than 40% of patients benefit from immediate breast reconstruction after mastectomy [13].

### **Surgical technique**

The immediate reconstruction is usually performed after surgical operation like skin-sparing mastectomy or nipple-sparing mastectomy. After the mastectomy is completed, the surgeon checks the viability of the remaining flaps, the color of the skin, the temperature, the capillary refill and the skin bleeding [14]. At this time, the plastic surgeon has several surgical options. The implant pocket can be created either in the submuscular plane or in the subcutaneous plane using materials such as: ADMs, autografts or synthetic meshes [15].

Placing the implant in the prepectoral position presents the great advantage of leaving the pectoral muscle untouched, which means an increased tolerance of patients to this intervention. This eliminates the deformity animation when moving the arms and chest. It should be noted that this technique requires the implant to be wrapped with a mesh like ADM that acts as a vascular regenerative tissue and allows stabilization of the breast reconstruction. Sometimes other interventions are needed to transfer fat to the upper pole of the breast because the implant may be visible due to its superficial position [16]. Placing the implant in a retropectoral position is similar to breast augmentation for cosmetic purposes but the lower pole should be covered with a mesh like ADM to stabilize its position and give it a better aesthetic appearance. In this case covering of the lower pole with the serratus fascia could also be used, but the appearance is not so natural.

According to studies that observe complication rates for both techniques, there is no significant differences in terms of complications, so the choice of a reconstruction technique depends on the patient's preferences and the surgeon's experience [17].

---

## **Discussions**

Nowadays advanced plastic surgery techniques allow breast reconstruction to be performed more easily and to achieve better aesthetic results. Breast reconstruction performed in a single stage is an appealing option when anatomical considerations and allow its oncology. There was considerably increased psychological satisfaction with breast reconstruction in one stage compared with the two stages reconstruction when studies compared these techniques, which encourages both patients and surgeons to attempt single-stage reconstruction [18].

Careful selection of patients who can benefit from immediate reconstruction is mandatory. First, the primary considerations are oncological, aesthetic considerations being subsequently analyzed.

Detection of the positive sentinel lymph node prior to breast resection or reconstruction intervention guides the operative plan because it may reduce further complications or implant loss. Patients in whom the sentinel lymph node was positively identified have an increased risk of complications following immediate breast reconstruction and are potential for postmastectomy radiotherapy [19].

Another aspect that need to be planned ahead is the post-mastectomy radiation therapy because it determine significant changes in tissues and presents an increased risk of complications. A study in Sweden that included 725 patients in four hospitals showed a 28% risk of failure to five years in suffering radiotherapy group vs. 10% in the group without radiotherapy [20]. Also, a risk of implant removal of 26% vs 8.3% and of infection 20% vs 2.6% has been reported in patients who have undergone radiotherapy compared to non-irradiated patients [21]. Other long-term complications that have been reported are pain, deformity of the breast and capsular contracture [22].

Taking all these aspects into consideration, it has been found that an immediate reconstruction using an expander

followed by radiation and subsequent autologous reconstruction is an option with high success rate [23]. Such a reconstruction has a lower rate of long-term complications, but it is an elaborate surgery that requires a complex and experienced surgical team [24].

Whenever we consider the use of an implant either as a therapeutic or cosmetic option, we must inform the patient about the possibility of a cancer associated with the implant. Breast implant associated anaplastic large cell lymphoma is a type of lymphoma detected in the implant capsule. Is associated with the persistence of a seroma in the breast, the palpation of a tumoral mass or a capsular contraction [25]. The occurrence of this disease has been observed so far in the case of textured implants, having as proposed mechanism the existence of a chronic inflammation determined by the existence of the implant [26]. The occurrence of another cancer after a mastectomy surgery can have a strong psychological impact on the patient, so it is important to carefully monitor these patients and report any symptoms.

The greatest advantage of these techniques is of a psychological nature, because women undergoing mastectomy surgery have a fear of appearance and the absence of a breast can remind them constantly of the trauma they have gone through. Thus, immediate reconstruction helps women forget this episode faster and be more satisfied with their physical appearance.

## **Conclusions**

Immediate breast reconstruction using an implant or expander is a surgical technique used more and more often due to its many advantages. Surgeons are considering this technique when oncological and anatomical considerations allow it. The existence of viable flaps is essential for the reconstruction and the placement of the implant in the retropectoral or prepectoral plane determines

good results that can satisfy the patients requirements.

### References

- [1]. Jansen LA, Macadam SA. The use of AlloDerm in postmastectomy alloplastic breast reconstruction: part I. A systematic review. *Plast Reconstructive Surg.* 2011; 127(6):2232-2244.
- [2]. Katipamula R, Degnim AC, Hoskin T, et al. Trends in mastectomy rates at the Mayo Clinic Rochester: effect of surgical year and preoperative magnetic resonance imaging. *J Clin Oncol.* 2009; 27(25):4082-4088.
- [3]. McGuire K, Rosenberg AL, Showalter S, Brill KL, Copit S. Timing of sentinel lymph node biopsy and reconstruction for patients undergoing mastectomy. *Ann Plast Surg.* 2007; 59(4):359-363.
- [4]. Hansson E, Elander A, Hallberg H, Sandman L. Should immediate breast reconstruction be performed in the setting of radiotherapy? An ethical analysis. *J Plast Surg Hand Surg.* 2019; DOI:10.1080/2000656X.2019.1688165.
- [5]. Bertozzi N, Pesce M, Santi P, Raposio E. One-stage immediate breast reconstruction: a concise review. *BioMed Res Int.* 2017; Article ID 6486859, <https://doi.org/10.1155/2017/6486859>
- [6]. Agusti A, Ward A, Montgomery C, Mohammed K, Gui GPH. Aesthetic and oncologic outcomes after one-stage immediate breast reconstruction using a permanent bidimensional expandable implant. *J Plast Reconstr Aesth Surg.* 2016; 69(2):211-220.
- [7]. Stanescu AMA, Totan A, Mircescu D, et al. Contraindications to breastfeeding - current issues at the border between myth and reality. *Modern Medicine,* 2019; 26(3):105-110.
- [8]. Clemens MW, Kronowitz SJ. Acellular dermal matrix in irradiated tissue expander/implant-based breast reconstruction: evidence-based review. *Plast Reconstr Surg.* 2012; 130(5 suppl 2):27S-34S.
- [9]. Scuderi N, Alfano C, Campus GV, et al. Multicenter study on breast reconstruction outcome using becker implants. *Aesthet Plast Surg.* 2011; 35(1):66-72.
- [10]. Zhong T, McCarthy CM, Price AN, Pusic AL. Evidence-based medicine: breast reconstruction. *Plast Reconstr Surg.* 2013; 132(6):1658-1669.
- [11]. Chun Y, Ganske I, Verma K, Rosen H, Eriksson E. Minimizing complications with the use of acellular dermal matrix for immediate implant-based breast reconstruction. *Ann Plast Surg.* 2013; 71(5):464-470.
- [12]. Maruccia M, Mazzocchi M, Dessy LA, Onesti MG. One-stage breast reconstruction techniques in elderly patients to preserve quality of life. *Eur Rev Med Pharmacol Sci.* 2016; 20(24):5058-5066.
- [13]. Biganzoli L, Marotti L, Hart CD, et al. Quality indicators in breast cancer care: an update from the EUSOMA working group. *Eur J Cancer.* 2017; 86:59-81.
- [14]. Phillips BT, Lanier ST, Conkling N, et al. Intraoperative perfusion techniques can accurately predict mastectomy skinflap necrosis in breast reconstruction: results of a prospective trial. *Plast Reconstr Surg.* 2012; 129(5):778e-788e.
- [15]. Nava MB, Catanuto G, Pennati A, Cividin VV, Spano A. Expander-implants breast reconstruction. In: Neligan PC, ed. *Plastic Surgery*, 3rd ed. Elsevier; 2013: 336–369.

- [16]. Storm-Dickerson T, Sigalove N. Prepectoral breast reconstruction: the breast surgeon's perspective. *Plast Reconstr Surg.* 2017; 140(6S):43S-48S.
- [17]. Casella D, Bernini M, Bencini L, et al. TiLoop® Bra mesh used for immediate breast reconstruction: comparison of retropectoral and subcutaneous implant placement in a prospective single-institution series. *Eur J Plast Surg.* 2014; 37:599-604.
- [18]. Bernini M, Calabrese C, Cecconi L, et al. Subcutaneous direct-to-implant breast reconstruction: surgical, functional, and aesthetic results after long-term follow-up. *Plast Reconstr Surg Glob Open.* 2015; 3(12):e574.
- [19]. Christante D, Pommier SJ, Diggs BS, et al. Using complications associated with postmastectomy radiation and immediate breast reconstruction to improve surgical decision making. *Arch Surg.* 2010; 145(9):873-878.
- [20]. Eriksson M, Anveden L, Celebioglu F, et al. Radiotherapy in implant-based immediate breast reconstruction: risk factors, surgical outcomes, and patient-reported outcome measures in a large Swedish multicenter cohort. *Breast Cancer Res Treat.* 2013; 142(3):591-601.
- [21]. Kearney AM, Brown MS, Soltanian HT. Timing of radiation and outcomes in implant-based breast reconstruction. *J Plast Reconstr Aesthet Surg.* 2015; 68(12):1719-1726.
- [22]. Tallet AV, Salem N, Moutardier V, et al. Radiotherapy and immediate two-stage breast reconstruction with a tissue expander and implant: complications and esthetic results. *Int J Radiat Oncol Biol Phys.* 2003; 57(1):136-142.
- [23]. Kronowitz SJ. Delayed-immediate breast reconstruction: technical and timing considerations. *Plast Reconstr Surg.* 2010; 125(2):463-474.
- [24]. Kronowitz SJ, Robb GL. Radiation therapy and breast reconstruction: a critical review of the literature. *Plast Reconstr Surg.* 2009; 124(2):395-408.
- [25]. Cozma CN, Avino A, Balcangiu-Stroescu AE, et al. Textured breast implants and anaplastic large cell lymphoma. *Materiale plastice.* 2019; 56(1):71-72.
- [26]. Macadam SA, Ho AL, Lennox PA, Pusic AL. Patient-reported satisfaction and health-related quality of life following breast reconstruction: a comparison of shaped cohesive gel and round cohesive gel implant recipients. *Plast Reconstr Surg.* 2013; 131:431-441.

Received: January 15, 2020

Accepted: February 28, 2020