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# Multidisciplinary management of risk-reducing mastectomy and immediate reconstruction: treatment algorithm and patient satisfaction

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## Abstract

**Background** Mutations in breast cancer type 1 and type 2 (BRCA 1/2) genes have been identified in populations expressing a strong family history of breast and ovarian cancers and account for 5–10 % of cases of breast cancer. The options for reconstruction in this cohort can be challenging because of the young age at which many patients present the sizeable defect and the psychosocial effect it has on their lives. A multidisciplinary one-stop clinic (MDOSC) is fundamental to their management

**Methods** Our study included 91 patients, from July 2007 to July 2012, who underwent RRM with immediate autologous or implant-based reconstruction within our department. Women were invited to participate in the study post surgery and completed a validated Breast-Q questionnaire detailing their experience in a number of domains including body image and perception, sexuality, and cosmetic outcome. Patients were also invited to attend an individual interview for further analysis of patient experience and expectations.

**Results** Using the questionnaire responses and private interview content, a detailed analysis of BRCA patient experience was achieved. The main concerns identified included expectations regarding the outcome and the dissatisfaction rates, less than 20 %, correlated with postoperative complication rates. Patients emphasized the importance of careful preoperative consultation with a multidisciplinary team, and >90 %

cited a desire to recommend RRM with immediate reconstruction to other patients that met similar criteria.

**Conclusions** RRM with immediate reconstruction is a good option for this unique group of patients; BRCA positive and overall patient satisfaction is high. Our study also highlights the significance of a multidisciplinary team working toward improving patient experience and outcome as well as managing patient expectations prior to surgery.

Level of Evidence: Level III, risk/prognostic study.

**Keywords** BRCA · Breast cancer · Breast reconstruction · Risk-reducing mastectomy · PROMs

## Introduction

Mutations in breast cancer type 1 and type 2 (BRCA 1/2) genes have been identified in populations expressing a strong family history of breast and ovarian cancers and account for 5–10 % of cases, conferring a lifetime risk of over 80 % of developing breast cancer [1, 2]. Genetic screening for patients with a strong family history of breast cancer has generated a demand for risk-reduction mastectomy, which achieves over 90 % risk reduction [1, 3] and has been established as the most effective means of reducing the risk of breast cancer [1]. Although mastectomy may achieve a significant degree of risk reduction and decrease in anxiety and fear of breast cancer [2], they do not eliminate the risk. Furthermore, it is an irreversible intervention with considerable physical and psychological consequences [2].

The options for reconstruction in this cohort can be challenging because of the young age at which many patients present the sizeable defect and the psychosocial effect it has on their lives [1, 2, 4]. Moreover, the need for a multidisciplinary one-stop clinic (MDOSC) is fundamental to their

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management [1]. We describe a retrospective study of a single surgeon's practice of risk-reduction mastectomy (RRM) and reconstruction in BRCA-positive patients over a 5-year period, from 2008–2012.

## Methods

Women were seen in a MDOSC, from which a cohort of patients underwent RRM and immediate reconstruction. They were subsequently invited to participate in a qualitative study, a validated Breast-Q™ questionnaire detailing their experience in a number of domains including body image perception, sexuality, and cosmetic outcome.

### One-stop multidisciplinary breast clinic

At our unit, patients are invited to attend a MDOSC specifically tailored for BRCA-positive patients, where plastic surgeons, breast surgeons, oncologists, gynecologists, psychologists, geneticists, and breast care nurses are present [5, 7, 8]. All operative and non-operative options, including associated risks, are discussed at length allowing the patient to make a comprehensively informed decision.

### Patient selection

The decision to have surgery is based on informed patient choice and surgeons' experience as well as realistic expectations. Before discussing the possibility of RRM, their suitability and the indications must be assessed. Patients with a known diagnosis of metastatic breast and/or ovarian cancer or significant co-morbidities were not offered RRM.

## Reconstructive options

Surgical options include both autologous and implant-based reconstructions. The choice depends on multiple factors including indications, feasibility, and patient expectations (see Fig. 1). All reconstructive options were discussed with each patient.

Once a decision has been made, the patient is listed for surgery. For all patients, a bilateral RRM with immediate reconstruction was performed in the same operative episode. The case is carried out jointly by both a breast surgeon, who performs the mastectomy, nipple sparing where feasible, and a plastic surgeon, who carries out the reconstruction.

Current autologous reconstructive options include the deep inferior epigastric perforator (DIEP) flap, the superior gluteal artery perforator (SGAP) flap, and the transverse myocutaneous gracilis (TMG) flap.

Alternatively, implant-based reconstructive options include implant only (two-stage reconstruction), implant-based reconstruction with an autologous pedicled latissimus dorsi (LD) flap, or an implant with a tissue matrix such as Strattice® [Lifecell, New Jersey, USA].

### Breast-Q™ questionnaire [appendix I]

The *Breast-Q™* questionnaire has been used to assess the impact and effectiveness of breast surgery through the patient's own perspective and experience with respect to psychosocial sequelae, physical functioning, and perception of the aesthetic result [6]. By qualitatively measuring satisfaction and health-related quality of life, the *Breast-Q™* can add an evidence-based approach to surgical practice. It consists of three procedure-specific modules (augmentation, reduction, and reconstruction) with independent scales that examine the issues most important to women who have undergone each procedure.

The framework itself includes six domains: satisfaction with breasts, overall outcome, process of care, psychosocial, physical, and sexual well-being. Patient's input was incorporated at each step of the development of the Breast-Q™ questionnaire.

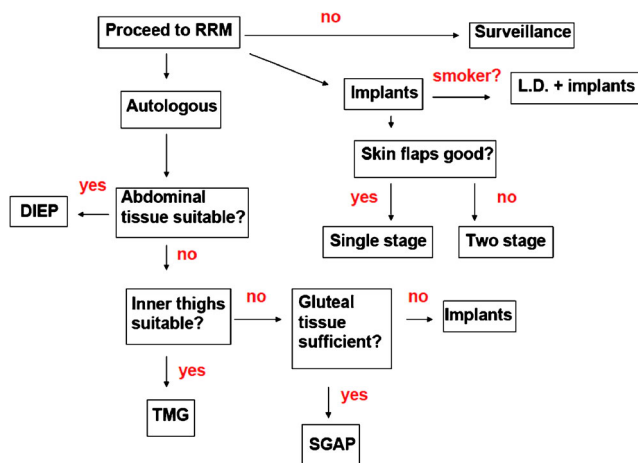


Fig. 1 Age of patient population

Table 1 One-stop multidisciplinary clinic breakdown

Patient population	2008–2012
No. of referrals to genetics clinic	270
Reconstruction (patients)	91 [34 % of referrals]
Mean age	42.9
Bilateral RRM+reconstruction	66 [72 % of patients wanting RRM]
Unilateral therapeutic+unilateral prophylactic	18 [20 % of patients wanting RRM]
Bilateral therapeutic	7 [8 % of patients wanting RRM]
Breast-Q™ questionnaire	62 [68 % response rate]

**Results**

Over the 5-year period, 270 patients were referred to the MDOSC. Of these, 91 patients underwent risk-reducing mastectomy and immediate reconstruction (see Table 1), based on indications and informed choice. Around 50 % of the patients were within the age bracket of 30–49 years of age (see Fig. 1).

Fifty-two patients underwent autologous reconstruction with free tissue transfer [40 DIEP, 9 TMG, 3 SGAP], 25 underwent implant-based reconstruction with a LD flap or Strattice™ [Lifecell, NJ, USA], and 14 underwent solely implant-based reconstruction (see Fig. 2).

Sub-categorizing the study population into two groups: 2008–2010 and 2011–2012, we noted that the proportion of autologous reconstruction vs. implant-based reconstruction did not change; however, in the implant-based group, the option of implant with LD flap was virtually replaced with implant-based reconstruction+acellular dermal matrix, Strattice™ [Lifecell, NJ, USA].

The complication rate was collated in both the autologous and implant-based reconstruction groups. With regards to the autologous cohort, there were four cases of complications (see Table 2), 7.7 %, and these were mainly due to fat necrosis. The implant-based reconstruction cohort suffered a complication rate of 5 %, and all of these were due to red breast syndrome post use of Strattice™ [Lifecell, NJ, USA], which is a recognized complication of this acellular dermal matrix. It usually manifests as erythema along the inferior pole of the breast often mistaken for cellulitis. Its only treatment is to rule out infection and monitor until it settles down.

There was a 68 % response rate to the Breast-Q™ questionnaire. The main concerns identified included preoperative information provision (Fig. 3), expectations regarding the outcome and body image perception (Figs. 4 and 5), and whether they would recommend RRM to other patients (see Fig. 6).

**Table 2** Complications

Autologous	Implant based
Two complete flap failures	Two red breast syndrome
Two partial flap failure due to fat necrosis	

The dissatisfaction rates, less than 20 %, correlated with postoperative complication rates (see Fig. 3). Patients emphasized the importance of careful preoperative consultation with a multidisciplinary team and >90 % cited a desire to recommend RRM with immediate reconstruction to other patients that met similar criteria.

The dissatisfaction rate was approximately 13 % for this cohort, which was a satisfactory result compared to the National Breast Mastectomy and Reconstruction Audit's value of 20 %. Patients, on the whole, felt that their outcome matched the expectations, 80 %, and felt that their breasts looked natural, 86 %.

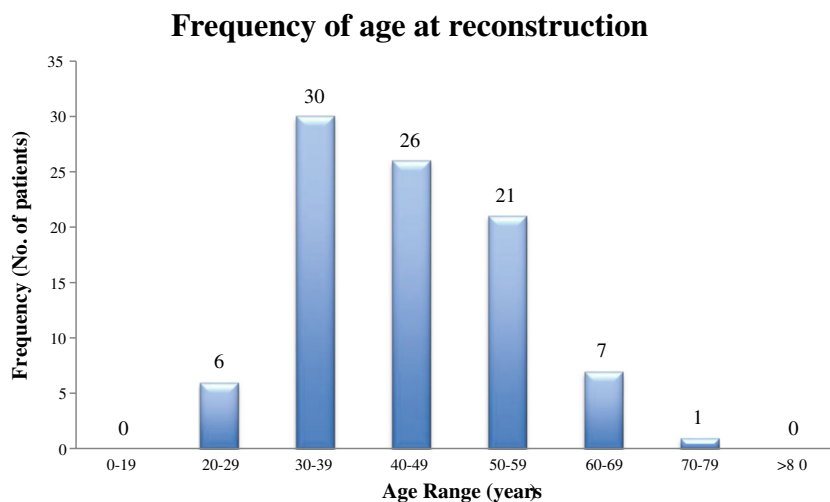
More specifically, and based on reconstruction choice, the satisfaction rates were higher in the autologous reconstruction and implant-based reconstruction+acellular dermal matrix, Strattice™ [Lifecell, NJ, USA] compared to implant only and implant+LD flap.

**Discussion**

Women with an inherited predisposition to breast and ovarian cancer, BRCA 1/2 gene, are challenged with coming to terms with this magnified risk and with making decisions on how to reduce it [1].

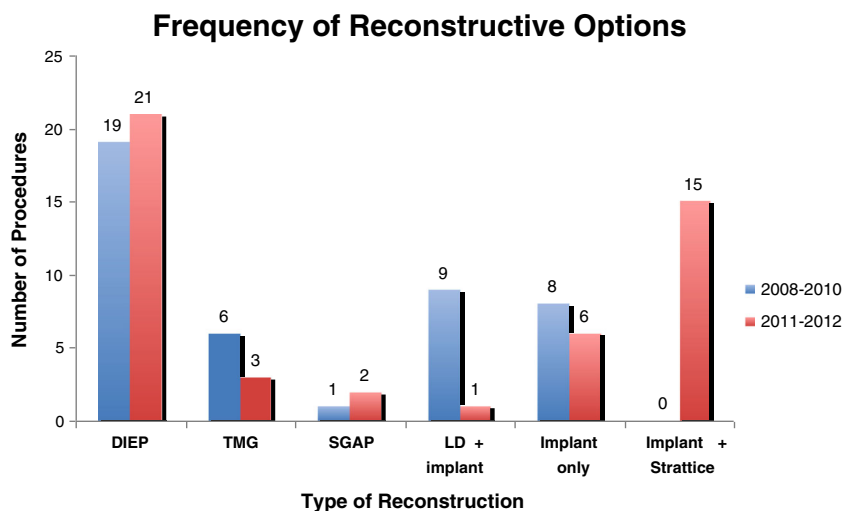
This study was carried out to look at both patient satisfaction, which was recently highlighted as a key component of patient outcomes in the National Mastectomy and Breast Reconstruction Audit, based on the different reconstructive

**Fig. 2** Trends in reconstruction





**Fig. 3** Preoperative information provision



options, and to design a “reconstructive flowchart” to guide management of patients requesting RRM with immediate reconstruction.

**Implant-based reconstruction**

Implant-based reconstruction at our unit consisted of implant with latissimus dorsi flap or implant-based reconstruction+acellular dermal matrix, Strattice™ [Lifecell, NJ, USA]. Our study showed that between 2008 and 2010, patients who chose an implant-based reconstruction or did not have sufficient tissue for autologous reconstruction were mainly offered an implant with latissimus dorsi flaps or two-stage expander/implant reconstruction. After 2011 and the introduction of the use of acellular dermal matrix to our unit, the option of implant with LD flap was effectively replaced with implant-based reconstruction+acellular dermal matrix, Strattice™ [Lifecell, NJ, USA].

Patients who underwent implant-based reconstruction, either with LD flap or two-stage expander/implant reported a lower satisfaction rate than those with implant-based

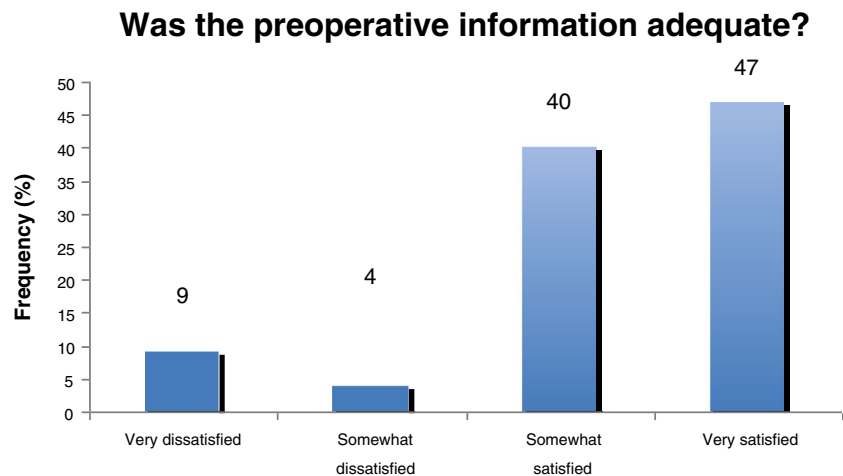
reconstruction+acellular dermal matrix, Strattice™ [Lifecell, NJ, USA]. This is due to the fact that a pedicled LD flap carries a much higher risk of morbidity postoperatively, including scarring, seroma formation, and wound breakdown as well as neurovascular compromise, which can be debilitating, compared to the use of Strattice™. Furthermore, implant only reconstruction results can be varied due to different factors including wound breakdown, implant protrusion, and formation of capsule.

**Autologous reconstruction**

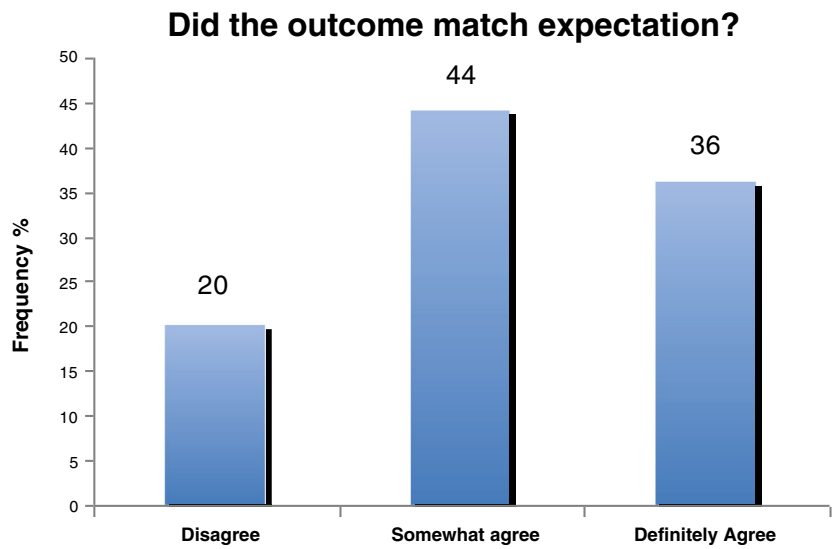
The majority of patients underwent autologous free flap reconstruction [n=52]. The deep inferior epigastric artery flap was the most popular choice resulting in the highest satisfaction rate among patient, 60 %.

In our experience and that of our patients, autologous reconstruction when indicated affords the patient the highest degree of satisfaction with their body image. Sixty-five percent of our patients were under the age of 60 years old, and of

**Fig. 4** Outcomes vs. expectations



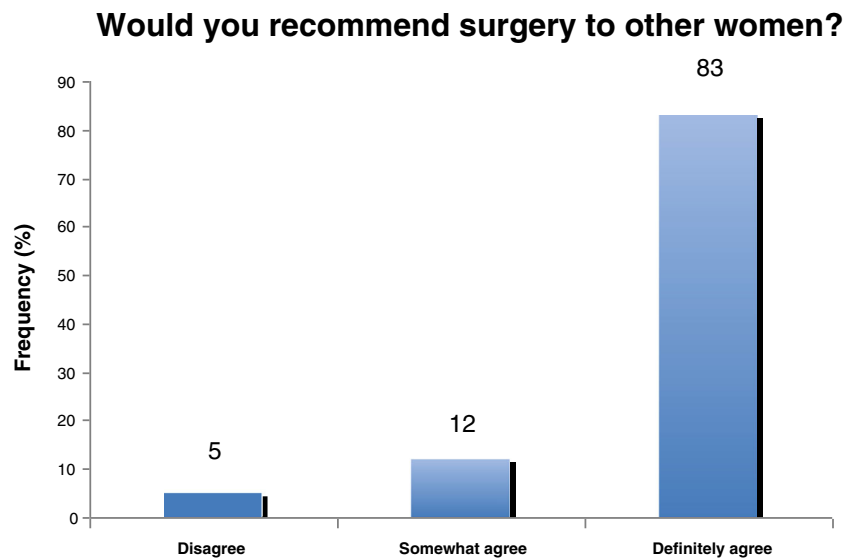
**Fig. 5** Body image perception following reconstruction



**Fig. 6** Recommendation to others



**Fig. 7** Reconstructive flowchart for RRM



these, 57 % opted for autologous reconstruction. Satisfaction rates for this cohort were in the order of 85 %.

Multiple reconstructive options are available to patients after risk-reduction mastectomy, and it is important that the patient is made aware of them during their multidisciplinary preoperative assessment. Nonetheless, deciding on the most appropriate surgical option can still be a challenge, and accordingly, we have devised an algorithm (see Fig. 7), based on our experience of over 200 patients, to aid the surgeon and patient in the decision-making process taking in to account factors such as the patient's preoperative smoking status and sufficient donor site tissue. We recommend the use of this algorithm in all MDOSC. Fat transfer has not been considered an option in RRM with immediate reconstruction.

Evaluation, education, and effective counseling are key factors in the recovery and welfare of such affected women. Moreover, these patients should be managed by a multidisciplinary specialist team and given support and encouragement to make their own decisions [1]. Various protocols have been developed for women deciding on risk-reducing surgery based on guidelines and data [1], advocating that all possible breast reconstruction options are discussed and demonstrated to the patient through demonstration material and pictures to allow them to make an informed choice. This has been further re-enforced by the National Mastectomy and Breast Reconstruction Audit. The majorities who undergo risk-reducing mastectomy experience some degree of dissatisfaction with their body image, lowered self-esteem, and sexuality [2] but have no regrets. Breast reconstruction consequently helps to maintain their quality of life through significant reduction in risk of developing breast cancer.

RRM with immediate reconstruction is a good option for BRCA-positive patients, and overall patient satisfaction is high [7, 8]. Our study also highlights the significance of a multidisciplinary team working toward improving patient's experience and outcome as well as managing patient expectations prior to surgery. Furthermore, this review highlights the advances in breast reconstruction leading to safer and more reliable reconstructive options as evidenced by the changing

algorithm adopted locally with older reconstructive options being replaced by more current and safer ones.

**Conflict of interest** R. Alamouti, N. Hachach-Haram, J Farhadi declare they have no conflict of interest

**Ethical standards** For this retrospective study a formal consent from an ethics committee is not required.

**Patient consent** All patients have given their informed consent prior to their inclusion in the study. Details that might disclose the identity of the subjects under study have been omitted.

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