Autologous versus Implant-Based Breast Reconstruction: Complication and corrective surgery rates with and without Radiotherapy

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Introduction

Breast surgery is integral part of multidisciplinary approach to breast cancer (BC) treatment and consists of either breast-conserving surgery or mastectomy. Approximately 40% of patients in the US undergo mastectomy (1), with most undergoing breast reconstruction (2). Breast reconstruction can be either implant-based reconstruction (IBR) or autologous breast reconstruction (ABR).

IBR can be either in one stage (immediate to implant) or in two stages (tissue expander followed by delayed permanent implant). The autologous reconstruction can be immediate, immediate-delayed after the completion of postmastectomy radiotherapy (PMRT) with the placement of tissue expander at the time of mastectomy, or secondary after completion of treatment (3).

Although PMRT significantly improves oncological outcomes of patient with high-risk BC (4) and has shown a potential benefit in immediate risk-patients (5,6), radiation exposure of the reconstructed chest wall may affect breast symmetry, impair long term aesthetic results, and may potentially compromise the original goal of improving quality of life benefits of BC (7). The aim of this study was to compare complication rates between ABR and IBR in non-radiated and irradiated patients in one year.

Methods and Materials

A retrospective review of consecutive patients treated at the Institute of Oncology Ljubljana and University Medical Centre Ljubljana with mastectomy and ABR or IBR in the year 2019, with or without RT, was conducted. Complication and corrective surgery rates were compared between ABR and IBR. The associations between categorical variables were investigated using Pearson's chi-square test and multivariate analysis. A two-tailed test was used to identify significant differences with a p-value of ≤0.05.

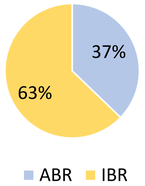


Figure 1: A total of 285 breast reconstructions, with 106 (37.2%) being ABR and 179 (62.8%) being IBR.

Results

In 2019, we identified 219 patients who underwent breast reconstruction; among them, 153 (69.5%) had unilateral reconstructions and 66 (30.5%) had bilateral reconstructions, resulting in a total of 285 breast reconstructions, with 106 (37.2%) being ABR and 179 (62.8%) being IBR (**Figure 1**). Most patients (87.7%) had immediate breast reconstruction. Risk-reducing surgery was done in 30.2% of reconstructions. Eighty-nine (31.2%) breast reconstructions underwent RT, of whom 46 had IBR and 43 had ABR. Twenty-eight (9.8%) reconstructed breasts received preoperative RT.

We detected 22.1% of early complications and 6.3% of late complications. Patients who had preoperative RT and IBR experienced early complications (necrosis and infections) more often, with 18.8% of them affected compared to only 4.8% of those who did not have preoperative RT in IBR, p=0.014 (**Figure 2**). For the analysis of corrective surgery rates, we excluded breast reconstructions that had delayed-immediate ABR (3.2%) and included 276 breast reconstructions for analysis. Patients who had ABR or IBR had similar rates of corrective procedures when compared, regardless of RT (25.8% ABR no RT vs 25.6% IBR no RT; 42.5% ABR with RT vs 36.6% IBR with RT) (**Figure 3**). Overall, patients who received RT had more corrective surgeries (39.5% with RT vs 25.6% no RT, p=0.502), but the difference was not statistically significant. In subgroup analysis of unilateral reconstruction, we excluded patients that later received risk-reducing contralateral mastectomy with reconstruction, and detected a difference in the symmetrization rate according to the type of reconstruction (16.1% in ABR vs 50.8% in IBR; p<0.0001). Although the difference in the symmetrization rate was detected between patients who received RT (36.8%) and those who did not (25.8%) (p=0.196), statistical significance was not observed.

Discussion

Preoperative RT significantly increases microsurgical complications in ABR (8), adversely affects IBR by increasing the rate of moderate to severe capsular contracture (9) and the risk for complications is increased after mantle radiation for Hodgkin lymphoma (10). We report statistically significant higher early complications in patients who had preoperative RT and IBR.

With PMRT, IBR in the immediate and delayed setting is associated with higher rates of complications and reconstruction failure in IBR compared with ABR (11), despite statistically significant higher risk of fat necrosis, volume contracture and secondary surgery in ABR, this may not always translate into clinical significance (12). In our study, ABR or IBR had similar rates of corrective procedures when compared, regardless of RT. In large UK study symmetrization rate was 47%. The most common procedure was mastopexy with or without small reduction (13). Although contralateral symmetrization rate in our study was lower, we detected a difference in the symmetrization rate according to the type of reconstruction between patients who received RT (36.8%) and those who did not (25.8%), no statistical significance was observed.

Conclusions

In patients with preoperative RT, IBR was associated with a higher probability of early complications. Breast reconstruction type selection does not influence the need for further corrective surgical procedures in patients receiving RT according to this analysis. Symmetrization surgery was more common after IBR. RT increases the need for symmetrization surgery in both reconstruction types.

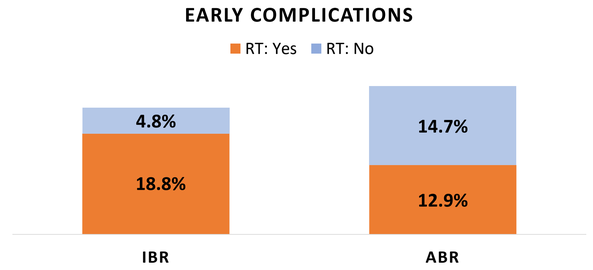


Figure 2: Early complications by breast reconstruction type in patients with preoperative RT.

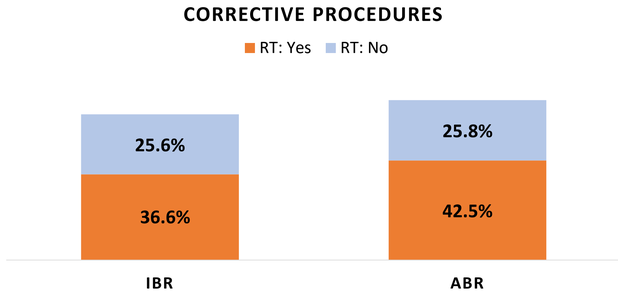


Figure 3: Corrective procedures by breast reconstruction type in patients with RT.

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