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Original Research Article

BREAST-Q outcomes after autologous breast reconstruction: a comparative analysis of deep inferior epigastric perforator, transverse rectus abdominis myocutaneous, and latissimus dorsi flaps

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ABSTRACT

Background: Autologous breast reconstruction is commonly performed after mastectomy; however, the impact of different flap techniques on patient-reported outcomes remains unclear.
Methods: An observational, analytical, cross-sectional study was conducted at Hospital General de México "Dr. Eduardo Liceaga." Thirty women who underwent unilateral breast reconstruction following mastectomy for breast cancer between 2016 and 2024 were included. Patients were reconstructed with a deep inferior epigastric perforator (DIEP) flap, Latissimus dorsi flap, or transverse rectus abdominis myocutaneous (TRAM) flap (n=10 per group). Patient-reported outcomes were assessed 12 months after surgery using the validated BREAST-Q questionnaire.
Results: The mean age was 51.6 years, with no significant differences among groups (p=0.225). Overall BREAST-Q scores were highest in the DIEP group (88.9), followed by the TRAM (84.2) and latissimus dorsi (82.3) groups. Most BREAST-Q domains showed no significant differences between reconstruction techniques, including psychosocial well-being, sexual well-being, satisfaction with breast appearance, adverse effects of radiation, satisfaction with information, satisfaction with the surgeon, satisfaction with the medical team, and satisfaction with staff (all p>0.05). Physical well-being of the chest was significantly higher in the Latissimus Dorsi group than in the DIEP and TRAM groups (p=0.045). Abdominal satisfaction was significantly higher in the DIEP group compared with the TRAM group (p<0.0001).
Conclusions: All three autologous reconstruction techniques achieved high postoperative satisfaction. Significant differences were observed only in chest physical well-being, favouring the latissimus dorsi flap, and abdominal satisfaction, favouring the DIEP flap. These findings support individualized flap selection according to patient priorities and expected donor-site outcomes.

Keywords: Breast reconstruction, Perception, Breast-Q, Deep inferior epigastric perforator, Transverse rectus abdominis myocutaneous, Latissimus dorsi flap

INTRODUCTION

Breast cancer is the most commonly diagnosed cancer among women worldwide and represents a significant public health burden. In the United States, it accounts for approximately 30% of all cancer cases in women.[1]

The incidence of breast cancer has shown a steady increase, rising by 1% annually between 2012 and 2021, particularly in localized, hormone receptor-positive disease. This increase is more pronounced in women under 50, especially among white and Asian American/Pacific Islander women.[2]

Despite the rising incidence, breast cancer mortality rates have declined significantly since 1989, with a 44% reduction by 2022, translating to 517,900 fewer deaths during this period. However, this decline has not been uniforming across all racial and ethnic groups. Black women have a 38% higher mortality rate than White women, despite having a 5% lower incidence, reflecting disparities in social determinants of health and access to quality healthcare.[2]

Globally, breast cancer has surpassed lung cancer as the most diagnosed cancer, with 2.26 million new cases in 2020. Incidence and mortality rates are projected to rise disproportionately in low- and middle-income countries due to socioeconomic factors and tumor biology differences linked to genetic ancestry.[3]

The incidence of breast reconstruction after breast cancer varies depending on geographic and temporal factors, as well as demographic and clinical characteristics. In the United States, a national data analysis from 2005 to 2017 found that 32.7% of mastectomy patients opted for breast reconstruction. This study also noted that reconstruction rates increased until 2012 and then stabilized. Factors such as age, insurance type, and comorbidities influenced the likelihood of undergoing reconstruction.[4]

In the context of the U.S. military healthcare system, the immediate breast reconstruction rate was 29.9%, with an upward trend from 1998 to 2014. However, a significant difference was observed between private sector care and direct military care, with higher rates in the private sector.[5]

Among the techniques used for breast reconstruction, both synthetic implants and autologous grafts have been considered; however, current evidence suggests that the use of grafts generally yields better results and higher patient satisfaction.[6]

Even among autologous flaps, there are various types, including the deep inferior epigastric perforator (DIEP) flap, latissimus dorsi flap, and transverse rectus abdominis myocutaneous (TRAM).[7,8] However, although it is currently known which types of flaps lead to which complications, it remains unclear which type of autologous flap yields the best patient satisfaction with the results; therefore, this study aims to compare postoperative satisfaction 12 months after reconstruction by comparing the different types of flaps.

METHODS

A cross-sectional, observational, analytical study was conducted by the Department of Plastic and Reconstructive Surgery at Hospital General de México "Dr. Eduardo Liceaga." The study included patients who underwent unilateral mastectomy between 2022 and 2024 and subsequently received breast reconstruction using an autologous flap. Patients reconstructed with a DIEP flap, latissimus dorsi flap, or TRAM flap were eligible for inclusion.

All enrolled patients completed the BREAST-Q questionnaire 12 months after surgery during a routine follow-up visit. The questionnaire was administered by a physician who was not involved in the patients' medical or surgical care. The BREAST-Q has been previously validated and standardized in the Mexican population.[9]

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the institutional ethics committee.

Statistical analysis

Statistical analyses were performed using IBM statistical package for the social sciences (SPSS) statistics version 27 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized using frequencies and percentages. Quantitative variables were described as means and standard deviations or medians and interquartile ranges, according to their distribution. Normality was assessed using the Shapiro–Wilk test.

Comparisons among the three reconstruction groups for each BREAST-Q domain were performed using one-way analysis of variance (ANOVA) or the Kruskal–Wallis test, as appropriate according to data distribution. A $p \leq 0.05$ was considered statistically significant.

RESULTS

For a comparative analysis of postoperative satisfaction among women who underwent breast reconstruction using three types of grafts, 30 postoperative women were included at the Dr. Eduardo Liceaga General Hospital of Mexico. The patients ranged in age from 33 to 68 years, with a mean age of 51.56 years; 100% of the patients underwent breast reconstruction surgery following mastectomy due to breast cancer.

Each group was characterized by the type of graft used DIEP, Latissimus Dorsi, and TRAM and each group consisted of 10 patients. Table 1 shows the mean age and standard deviation for each group, with no significant difference found between the ages of the groups (Figure 1).

Table 1: Age means and comparison of each group.

DIEP	TRAM	Latissimus dorsi	ANOVA
55.1±5.87	51±6.49	48.6±11.35	1.576, p=0.2253

Subsequently, the total scores and scores for the different sections of the postoperative BREAST-Q questionnaire were calculated, yielding a median total score of 88.9 for DIEP, 84.2 for TRAM, and 82.3 for latissimus dorsi.

Comparative analyses were then performed based on the distribution of the data, the results for each group, and the sections of the questionnaire (Table 2). Regarding satisfaction with the implants, this could only be evaluated in the latissimus dorsi group (82.3), so no comparison could be made; the same was true for "back satisfaction" (78.9) and "back and shoulder" (78.5). Meanwhile, "abdomen satisfaction" was assessed only in the DIEP (90.6±9.25) and TRAM (51±6.49) groups; comparison of these groups revealed a significant difference, with higher satisfaction in the DIEP group (Mann-Whitney, p<0.0001).

Table 2: Dominions BREAST-Q comparison between different flaps.

Flaps	DIEP	TRAM	Latissimus dorsi	P value
Psychosocial well-being*	80.2±5.18	78.8±4.46	76.7±4.11	0.2496
Sexual well-being°	72, IQR=9.25	59, IQR=15.75	70, IQR=2	0.0646
Satisfaction breast appearance°	77, IQR=29.75	80, IQR=28	82, IQR=28	0.7501
Physical well-being: chest°	72, IQR=6	76 IQR=4	80, IQR=10	0.045
Adverse effects of radiation°	71.5, IQR=20	63.5, IQR=31	61, IQR=20	0.5197
Satisfaction with information*	83.7±6.29	83.5±8.56	84.3±5.67	0.964
Satisfaction with surgeon°	89, IQR=6	91.5, IQR=8.25	88.5, IQR=22	0.8264
Satisfaction with medical team°	88, IQR=7.75	92, IQR=10.25	86, IQR=22	0.2529
Satisfaction with staff*	89.5±5.25	87±7.16	86.2±4.84	0.4313

*Parametric distribution; ANOVA test used; mean and standard deviation reported. °Nonparametric distribution; Kruskal-Wallis test used; median and interquartile range reported

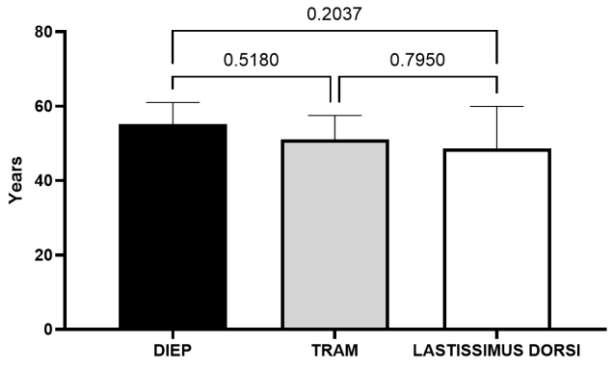

Figure 1: Histogram comparison between age of the different flaps.

DISCUSSION

This study explored patient-reported outcomes following breast reconstruction with DIEP, latissimus dorsi, and TRAM flaps using the BREAST-Q questionnaire. Overall, patients expressed high satisfaction with breast appearance and surgical outcomes, which is consistent with previous studies showing that autologous reconstruction offers favorable aesthetic and psychosocial benefits compared to implant-based techniques.[10] Despite these positive results, sexual well-being turned out to be the domain with the lowest score, a finding that has been previously reported in studies comparing the use of autologous grafts versus implants.[10,11] Although the DIEP flap showed a higher degree of satisfaction than the other flaps evaluated, the difference was not statistically significant in this study; however, in a meta-analysis, the DIEP flap has been shown to provide greater sexual satisfaction compared to the latissimus dorsi flap, but there are not comparison to TRAM flap.[12]

The absence a clear difference in sexual well-being between the different flaps using to breast reconstruction implies that sexual satisfaction is a more complex issue than simply the presence or absence of breast tissue; while breast reconstruction does improve sexual satisfaction, assessing sexual satisfaction based solely on breast reconstruction is not sufficient to identify the factors that affect the sexuality of women who have undergone a mastectomy.[13,14]

In terms of overall scores, the highest score was obtained with the use of the DIEP flap, suggesting greater overall satisfaction with this type of flap; this is consistent with other published studies.[12,15] However, to date, studies have shown that the DIEP flap or the latissimus dorsi flap yield the highest satisfaction rates, though there is no clear trend indicating which type of flap achieves the best postoperative satisfaction outcomes in breast reconstruction.[16]

The three types of flaps evaluated (DIEP, TRAM, and latissimus dorsi) yielded broadly equivalent quality-of-life outcomes 12 months after surgery, with no significant differences in the various domain of the BREAST-Q questionnaire. However, with regard to physical well-being, satisfaction with breast appearance was significantly higher with the latissimus dorsi flap than with the DIEP or TRAM flaps in our cohort. These findings differ from those described in a recent meta-analysis, which favored the DIEP flap in terms of physical well-being outcomes.[12] The inconsistency between the available evidence and our results highlights the complexity of the outcomes reported by patients following breast reconstruction and suggests that the superiority of one reconstructive technique over another remains unclear.

Since no single flap has proven to be the most satisfactory, recommendations regarding the type of flap to use in breast reconstruction have focused on minimizing the complications or risks associated with the different types of flaps.[16-18] But, the absence of differences among the three types of flaps evaluated was also observed in the healthcare team's assessment, indicating that staff did not influence the satisfaction of breast reconstruction outcomes. Furthermore, the lack of age differences among the three groups suggests that this variable does not influence satisfaction levels.

Given the lack of clear evidence indicating which type of flaps itself is not the primary determinant of patient satisfaction among patients undergoing breast reconstruction. Instead, satisfaction may be influenced by a variety of confounding factors. Some of these factors have been previously investigated, such as patients' baseline health status and the interval between mastectomy and breast reconstruction, while others remain poorly understood, including surgeon experience and technical expertise.[15]

Limitations

This study has several limitations. First, the sample size was relatively small, which may have limited the statistical power to detect differences between groups. Second, information on potentially important confounding variables was not available, preventing adjustment for factors that may have influenced patient-reported satisfaction outcomes. These findings have direct clinical implications: the choice of reconstruction type should be individualized, considering the specific donor-site morbidity most relevant for each patient, her personal priorities (physical activity, sexual function, donor-site scar appearance), and the oncological and anatomical characteristics of the case.

CONCLUSION

Overall, patients reconstructed with the DIEP flap showed higher postoperative satisfaction scores; however, these differences did not reach statistical significance. In contrast, patients reconstructed with the latissimus dorsi flap demonstrated significantly greater chest physical well-being. Taken together, these findings suggest that no single reconstructive technique is clearly superior across all patient-reported outcomes. Therefore, the choice of reconstruction method should be individualized, considering the patient's clinical condition, anatomical characteristics, expected donor-site morbidity, and the available evidence regarding complications and functional outcomes.

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