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Modified aesthetic abdominoplasty approach in perforator free-flap breast reconstruction: Impact of drain free donor site on patient outcomes[☆]

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DIEP;
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Summary *Background:* The use of progressive tension sutures alone has been shown to be comparable to using abdominal drains in aesthetic abdominoplasty. This study reviews outcomes with the use of barbed progressive tension suture technique without drains in DIEP donor site closure compared to standard closure with drains.

Methods: A two year retrospective review was conducted of DIEP flap reconstructions in the enhanced recovery program at Mayo Clinic, Rochester (USA). Donor site closure was divided into barbed progressive tension sutures (B-PTS) without drains, and standard abdominal closure with drains (S-AD). Demographics, perioperative data and donor site complications were documented.

Results: 93 patients were included in the study, 42 in the B-PTS no drain group and 51 in the S-AD with drains. 81% of all procedures were bilateral and 39% were immediate. Patients were discharged faster to the ward postoperatively and total hospital admission was reduced in the B-PTS group, 3.7 (SD = 1.4) days versus 4.7 (SD = 2.1) days in the standard group ($P = 0 < 0.001$ and 0.004 respectively). Less morphine was required postoperative day (POD) 1, 2 and 3 ($P = 0.04, 0.03, 0.02$ respectively), and time to mobilize was quicker but

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not statistically significant ($P = 0.09$) in the B-PTS group. Overall there were 18 patients in the S-AD group who had complications versus 9 in the B-PTS group ($P = 0.14$). The incidence of complications occurring within 30 days were lower in the B-PTS group ($P = 0.05$). The overall seroma rate was 5.4% and rates in the B-PTS group was 2.4% versus 7.8% in the S-AD group, $P = 0.37$.

Conclusions: Use of barbed progressive tension sutures for abdominal closure after DIEP flap harvest can obviate the need for abdominal drains, reduce postoperative pain and encourage early discharge from the hospital without an increased risk in complications.

Level of evidence: III.

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Introduction

The use of perforator flaps such as the Deep Inferior Epigastric Artery Perforator flap (DIEP) preserves the underlying rectus muscle and led to significant reduction of donor site morbidity compared to the free Transverse Rectus Abdominis Myocutaneous (TRAM) flap,^{1,2} however the comparison with muscle-sparing TRAM (MS-TRAM) is debated.³ Perforator-based abdominal tissue transfer is associated with donor site complications reporting seroma rates up to 8.8% and wound dehiscence rates up to 12.4% following DIEP flap harvest.⁴

The upper abdominal skin flap (abdominoplasty flap) is undermined following DIEP flap harvest to assist in donor site closure. This is traditionally carried out in layers together with placement of closed-suction abdominal drains. Often multiple drains are used, which are removed sequentially although the exact timing and drainage volumes for removal are commonly subject to surgeon preference, and patients may be discharged with drains. There is paucity of evidence and consensus on drain management, associated antibiotic prophylaxis and techniques for donor site closure in breast reconstruction.⁵

The introduction of an enhanced recovery program following free-flap breast reconstruction at our institution, focused on improving patient recovery, early mobilization and discharge from the hospital. Many patients were discharged between day 3 and 5, with one or two abdominal drains, which required appropriate care and monitoring in the community.

This study evaluated a modified technique adopted from aesthetic abdominoplasty practice using continuous barbed progressive tension sutures (B-PTS) and no abdominal donor site drains, compared to standard closure with drains in the context of DIEP breast reconstruction. In aesthetic surgery and from the senior author's (M.S.C) preliminary study in DIEP breast reconstruction this technique has demonstrated no increased abdominal-based complications.^{6,7} The primary aim was to compare donor site complications, and secondary outcomes included postoperative recovery, including pain and analgesic requirement, and follow up drain management. The null hypothesis was there was no

difference between standard and the new donor site closure technique.

Material and methods

A retrospective review of women who underwent DIEP breast reconstruction following mastectomy between January 2012 and March 2014 was conducted at our institution. This study was approved by the Institutional Review Board (IRB) at the Mayo Clinic, Rochester, Minnesota. The senior author (M.S.C) used the continuous B-PTS technique and no abdominal drains in all of his patients. This group was compared to patients who had standard abdominal closure (S-AD) with abdominal drains performed by two other plastic reconstructive surgeons within the Department of Plastic Surgery. All women were in the enhanced recovery breast reconstruction program at the Mayo Clinic. Any women who underwent a free TRAM or had any flap or breast complications during their inpatient stay were excluded. Women who had a bilateral procedure with a DIEP, but may have had one side converted to a muscle-sparing (MS-TRAM) were included. Medical charts were reviewed and information on demographics, operative procedures, postoperative recovery, pain control, hospital stay, drain management and donor site complications were recorded.

Statistical analysis

Patient and operative characteristics between the two groups were compared using a chi-square test for discrete variables and a Wilcoxon rank sum test for continuous variables. Donor site complications were compared using a chi-square test or Fisher's exact test as appropriate. The association of patient and treatment variables with the odds of any donor complication was assessed using logistic regression, reporting the result as odds ratio (OR) and 95% confidence interval (CI). Note that in 22 of the 27 patients that had a donor site complication, it was first identified within 30 days of the procedure. In the other 5 patients, it was first identified after 30 days. The analysis categorized

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