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Deep inferior epigastric perforator (DIEP) flap: Impact of drain free donor abdominal site on long term patient outcomes and duration of inpatient stay☆

Amitabh Thacoor*, Muholan Kanapathy, Jana Torres-Grau, Jagdeep Chana

Department of Plastic and Reconstructive Surgery, Royal Free Hospital, Pond Street, London NW32QG, United Kingdom

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Abstract *Background:* The deep inferior epigastric perforator (DIEP) flap is widely regarded as the Gold Standard in autologous breast reconstruction. Although drain-free abdominoplasty is performed in many centres, there is a paucity of evidence comparing outcomes when applied to DIEP breast reconstruction.
Method: A retrospective review of patients who underwent DIEP breast reconstruction without abdominal drain insertion at Royal Free Hospital between Jan 2012-Nov 2016 was undertaken. Results were compared to previously published data from our centre on patients undergoing DIEP breast reconstruction with abdominal drains between Jan 2011-Jul 2012.
Results: Thirty-five patients underwent abdominal drain-free reconstruction (GroupA). Of 74 patients who previously underwent reconstruction with abdominal drains, 33 patients underwent drain removal by postoperative day (POD)3 regardless of output (GroupB) and 41 underwent drain removal after POD3 following instructions on drainage volume/24 h (GroupC). There was no significant difference in the length of stay between patients in Group A and B (3.6 vs. 3.9 days; $p = 0.204$). Length of stay in Group C was significantly higher than Group A and B ($p = 0.001$, $p = 0.001$). There were no statistically significant differences in total (11.43% vs. 12.12% vs 17.07%, $p = 0.780$) or specific complications: Seroma: 2.86% vs. 0% vs. 4.88% ($p = 0.774$); Wound dehiscence: 8.57% vs. 9.09% vs. 4.88% ($p = 0.728$); Haematoma: 0% vs. 3.00% vs. 7.32% ($p = 0.316$) between Groups A, B and C, respectively.
Conclusion: Our data suggests that drain-free abdominal closure in DIEP reconstruction can be safely achieved without increased postoperative complications. These conclusions support existing evidence on the use of a drain-free approach in cosmetic abdominoplasty.

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* Corresponding author.
E-mail address: Amitabh.thacoor@doctors.org.uk (A. Thacoor).

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Introduction

In 2016, 109 256 women in the USA underwent breast reconstruction, with autologous flap reconstruction being performed in 20 650 of them.[1] In the UK, the 2010 National Mastectomy and Breast Reconstruction Audit of 18 216 women stated that free flaps were performed in 476 out of 3389 women who underwent immediate reconstruction and in 566 out of 1731 women who underwent delayed reconstruction.[2] The deep inferior epigastric perforator (DIEP) flap is fast becoming the Gold Standard in breast reconstruction due to its advantage of offering an autologous option replicating the feel of breast tissue as well as its associated lower donor site morbidity and overall better cost effectiveness.[3,4]

Complications associated with DIEP flap breast reconstruction were described in a 10-year retrospective review of 758 women; 5.9% returned to theatre for flap-related issues, partial and total flap loss rates were 2.5% and 0.5%, respectively, 12.9% developed fat necrosis, 5% developed abdominal donor site seromas and 0.7% developed postoperative abdominal herniae.[5] More recently, Beugels et al.[6] analysed 530 DIEP flap reconstructions and reported 14% of fat necrosis, 5.6% of infection, minor donor-site complications in 0.9% and major complications in 19.5% of cases. Modarressi et al.[7] reviewed 105 consecutive patients and noted 6 cases (5.7%) of delayed wound healing, 6 cases (5.7%) of seroma and 3 cases (2.9%) of total flap loss. In addition, complication rates are reported to be even higher in bilateral DIEP flap reconstruction, with the risk of total flap loss being six times higher than in unilateral reconstruction.[8]

Donor site complications have been compared to those associated with elective abdominoplasty, due to the similar abdominal closure involved with lower rates of seroma in DIEP flap patients (3.5% vs. 16.1%) and no differences in wound dehiscence.[9] Abdominal wall drains prevent fluid accumulation in the dead space resulting from tissue undermining and flap harvest, potentially minimising the above complication rates. However, they also represent a gateway for infection, are painful, limit patient mobility, require daily care upon discharge, potentially increase inpatient stay and ultimately resulting in an increased financial burden.[10]

Although the drain-free approach in cosmetic abdominoplasty is widely published in the literature, there is currently minimal evidence to support both the use and duration of abdominal drains in DIEP flap reconstruction.

Aim

Data has been previously published by the Senior Author (JC) retrospectively comparing the length of inpatient stay and postoperative donor-site complications associated with early closed suction abdominal drain removal by postoperative day (POD) 3 irrespective of output, versus late removal (after POD3) based on drainage output (less than 30 ml/24 h) and consistency in post-mastectomy DIEP flap reconstruction patients.[11]

The primary outcome of this study was to compare clinical outcomes associated with performing post-mastectomy DIEP flap reconstruction without the use abdominal drains (Group A) versus previously published data on early removal of drains by POD 3 (Group B) and late removal of drains after POD3 (Group C).

Secondary outcome included analysis of duration of hospital inpatient stay between the above three groups.

Methods

A retrospective review of a prospectively collected electronic hospital patient database was performed to generate a spreadsheet of patients who underwent drain free donor site DIEP flap breast reconstruction by the Senior Author between January 2012 and November 2016, ensuring a minimum follow-up time of 12 months for all patients.

Previously collected data by our centre was analysed. This included a retrospective review of all patients who underwent unilateral DIEP flap breast reconstruction using donor site abdominal drains between January 2011 and July 2012, ensuring a minimum follow-up time of 1 year.

Patient notes were analysed for: age, date of birth, operation date, date of discharge, BMI, pre-operative smoking status, neoadjuvant chemotherapy, previous surgery, radiotherapy, donor site complications including seroma, haematoma and wound dehiscence as well as flap-related or systemic complications. Complications were defined as per previous publication.[11] Definitions were as follows: haematoma (post-operative collection due to extravasation of blood requiring surgical evacuation), seroma (post-operative collection of a fluctuant mass yielding straw-coloured serous fluid requiring aspiration), and dehiscence (post-operative wound separation due to any underlying cause).

All data was presented as mean $\pm$ standard deviation (SD). The difference in patient demography between the three groups was compared using one- way ANOVA followed by Bonferroni test for multiple comparisons. Difference in complication rates between groups was compared using Fisher's exact test. A p-value of less than 0.05 was considered significant. All analyses were conducted using SPSS version 22 (IBM,Armonk, NY, USA).

Surgical technique

The DIEP flap harvest was performed in a standard fashion. A sub-Scarpa's fascia dissection was performed, preserving a layer of fat over the anterior rectus sheath up to the medial perforators to preserve cutaneous lymphatic collectors