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DIEP flap for breast reconstruction: Is abdominal fat thickness associated with post-operative complications?☆

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KEYWORDS
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Summary *Introduction:* Some surgeons consider a high body mass index (BMI) or important abdominal fat excess as contraindications for breast reconstruction with free deep inferior epigastric perforator (DIEP) flap. This study aimed to identify factors associated with post-operative complications by using this type of flap, with an emphasis on BMI and abdominal subcutaneous fat thickness.
Methods: A retrospective chart review of 105 consecutive patients who underwent DIEP flap breast reconstruction at our institution was performed to assess post-operative complications. Among other risk factors, we specifically studied the influence of BMI and abdominal wall thickness on complication occurrence. Abdominal wall thickness was measured at 10 different points on the angio-computed tomography scan performed pre-operatively.
Results: Median age was 49.8 years (range, 27–69); average BMI was 25.57 kg/m^2 (range, 18.07–41.91). Immediate breast reconstruction was performed for 35% of patients, and five patients (4.7%) underwent bilateral reconstruction. Twenty-six patients (24.8%) presented 29 post-operative complications; 12 concerned abdominal complications (delayed wound healing [n = 6] and seroma [n = 6]) and 17 were related to complications of the reconstructed breast (six minimal necrosis treated conservatively, eight minor necrosis requiring surgical

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debridement and three total flap loss). The complication rate was not correlated with increased BMI or abdominal wall thickness. The only factor that significantly predicts DIEP flap complications was pre-operative radiotherapy (odds ratio = 4.05; $p = 0.03$).
Conclusions: No significant correlation was observed between BMI of 25—35 kg/m^2 or abdominal wall thickness and post-operative complications of the donor site or DIEP flap. Therefore, these factors should not be considered as contraindication criteria.

Introduction

The use of deep inferior epigastric perforator (DIEP) flaps in breast reconstructive surgery is currently a popular approach. Since the first description by Allen and Treece in 1994, the number of patients undergoing DIEP free tissue transfer continues to increase.[1] However, some surgeons advocate a body mass index (BMI) over 30 kg/m^2,[2—7] diabetes or old age as absolute or relative contraindications.[8] From our clinical experience, we hypothesise that it was not the BMI per se but rather the abdominal subcutaneous fat tissue thickness that could increase the rate of flap adipose necrosis and the incidence of complications on the donor site, e.g. delay in wound healing or scar dehiscence. The aim of this single-centre study was to analyse risk factors for complications after breast reconstruction using DIEP, with a particular emphasis on BMI and abdominal wall thickness.

Patients and methods

Approval from local ethics committee was obtained. A chart review was performed for all patients who underwent immediate or secondary DIEP flap breast reconstruction after mastectomy for breast cancer in our department between January 2007 and December 2013. Key variables regarding patient demographics, treatment and outcomes were assessed.

Surgical technique

Surgery was performed under general anaesthesia. Antibiotic prophylaxis was administered according to hospital guidelines. Pre-operative abdominal computer tomographic (CT) angiography was performed in all patients to determine the location of dominant perforators from the deep inferior epigastric artery. DIEP flaps were raised in a standard manner.[1] To allow optimal vascularisation of the flap, when vessels localisation and anatomic status of patient permitted, the flap was raised with at least two perforators. Deep inferior epigastric vessels were anastomosed to the internal mammary vessels. The clinical appearance (e.g. colour, recapillarisation time) and the venous and arterial flow of the flap detected by a handy Doppler device were assessed every hour during the first 48 h by nursing staff. Subsequently, surveillance intervals were doubled each 24 h until an 8-h interval was achieved. In the case of any doubt about the patency of the vascular pedicle of the flap, an emergency surgical revision was performed.

Complications

The study population comprised of two subgroups: (1) patients with a simple uneventful post-operative course and (2) patients with post-operative complications. DIEP flap complications at the recipient site were graded according to the classification described by Kwok et al.[9] (Table 1), and abdominal complications were classified according to Fischer et al. (Table 2).[4]

Abdominal subcutaneous fat

Abdominal wall thickness was measured on the pre-operative angio-CT scan performed to assess DIEP. All patients were scanned using a multi-detector CT scanner (Discovery 750 HD, GE Healthcare, Milwaukee, WI) with a

Table 1 DIEP flap necrosis classification adapted from Kwok et al..[9]

Degree	Clinic	Treatment
Grade I: Minimal necrosis (<5% of flap)	Patients have a lump smaller or equal to 2 cm	Reassurance and conservative treatment
Grade II: Minor necrosis (5—15% of flap)	Patients suffer from minimal contour defect	Debridement
Grade III: Major necrosis (15—50% of flap)	Patients suffer from major contour defect	Debridement and a secondary procedure to address defect
Grade IV: Subtotal flap loss (>50% of flap)	Patients suffer from skin defect and global volume loss	Debridement and a secondary local or free tissue reconstruction
Grade V: Non-viable flap	Non-viable flap	Flap removal indicated

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