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ORIGINAL ARTICLE

The DIEP flap breast reconstruction: Starting from scratch in a university hospital



La reconstruction mammaire par DIEP : retour d'expérience d'une équipe débutante en milieu hospitalier à partir des 132 premiers lambeaux

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Breast reconstruction;
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Learning curve

Summary

Purpose. — The deep inferior epigastric perforator (DIEP) flap provides excellent results when performed by a trained surgical team. However, the beginning of the procedure is often complicated. To date, few authors have published their initial experiences. This study presents our team's experience using a DIEP flap in breast reconstruction.

Methods. — From June 2008 until December 2013, the same leading operator performed 132 consecutive DIEP flaps. Breast reconstructions were immediate ($n = 18$) or delayed ($n = 114$), unilateral ($n = 110$) or bilateral ($n = 11$). The learning curve was assessed using the operating time, ischemic time, postoperative hospital stay, and complications. For statistical comparisons, unilateral reconstructions were divided into five chronologic groups of 22 consecutive DIEP flaps and two chronologic groups of 55 flaps.

Results. — The average time of surgery was 291 min (range, 185–645) for unilateral breast reconstruction and 513 min (range, 400–790) for bilateral breast reconstruction. The global complication rate was 24.5%. In the unilateral series, the time of surgery decreased progressively from 415 min to 233 min ($P = 4.8 \times 10^{-8}$). The mean postoperative hospital stay was reduced from 7.14 days to 6.32 days ($P = 0.042$). The complications and flap failure rates had regular time distributions. Initially, the revision rate reached 50% for the first ten unilateral cases but decreased rapidly and remained steady at 6% for the following cases ($P = 0.0012$).

Conclusions. — Our initial experience of DIEP flap breast reconstruction showed a significant improvement of surgical performances exceeding 50 cases, with a critical ten first case period.

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MOTS CLÉS

Reconstruction mammaire ;
Microchirurgie ;
Deep inferior epigastric perforator flap (DIEP) ;
Courbe d'apprentissage

Résumé

Sujet. — Le lambeau de DIEP (*deep inferior epigastric perforator flap*) assure des reconstructions de très bonne qualité lorsqu'il est réalisé par une équipe entraînée. Cependant, la pratique de cette intervention est compliquée pour les débutants ; à ce jour, peu d'auteurs ont publié leur expérience initiale. Dans cette étude, nous présentons notre courbe d'apprentissage du DIEP en reconstruction mammaire.

Méthode. — De juin 2008 à décembre 2013, le même chirurgien sénior a réalisé 132 lambeaux de DIEP consécutifs. Les indications de reconstructions mammaires étaient immédiates ($n = 18$) ou différées ($n = 114$), unilatérales ($n = 110$) ou bilatérales ($n = 11$). La courbe d'apprentissage était analysée au travers du temps opératoire, du temps d'ischémie, de la durée d'hospitalisation et des complications. Pour l'analyse statistique, les reconstructions unilatérales étaient divisées en cinq groupes chronologiques de 22 lambeaux consécutifs et deux groupes chronologiques de 55 lambeaux.

Résultats. — Le temps opératoire moyen était de 291 minutes (185–645) pour les reconstructions unilatérales et 513 minutes (400–790) pour les reconstructions bilatérales. Le taux de complications global s'élevait à 24,5 %. Dans la série des reconstructions unilatérales, le temps opératoire a diminué progressivement de 415 minutes à 233 minutes ($p = 4,8 \times 10^{-8}$). Le temps d'hospitalisation moyen est passé de 7,14 jours à 6,32 jours ($p = 0,042$). Les complications et les échecs étaient régulièrement répartis dans le temps. Le taux de reprise chirurgicale était cependant de 50 % pour les 10 premiers cas alors qu'il s'est stabilisé à 6 % par la suite ($p = 0,0012$).

Conclusion. — Notre expérience initiale de la reconstruction mammaire par DIEP a clairement montré une amélioration progressive des performances qui se poursuit au-delà des cinquante premiers cas avec une phase critique pour les 10 premiers cas.

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Introduction

The deep inferior epigastric perforator (DIEP) flap represents one of the most advanced procedures for breast reconstruction because of the minimization of donor site morbidity [1] and leads to a high level of satisfaction [2]. However, perforator abdominal flap harvesting and microsurgical anastomosis are technically demanding procedures. Intensive training and experience are necessary for developing competence and offering patients successful breast reconstruction. From the time that Allen and Treece proposed a DIEP flap for postmastectomy breast reconstruction in 1994 [3], few authors have shared their initial practice concerning specific difficulties, complications and learning curve.

When we decided to start using the DIEP flap procedure in 2008, our plastic surgery department had 25 years of breast reconstruction experience [4]. Free flaps were regularly performed for the face, trunk and limbs, but not for breast. Before we started to use a DIEP flap, we visited two highly regarded teams to learn the necessary advanced surgical techniques. Five years later, we are examining the introduction of this surgical procedure and demonstrating the existence of an obvious learning curve. The aim of this work was to better understand and to facilitate the learning process for teams that wish to use free flaps in breast reconstruction.

Materials and methods**Patients**

Our department conducted a retrospective analysis of the first 132 DIEP flaps performed by the same lead operator between 2008 and 2013. The development of this surgical

procedure over time is presented per semester on Fig. 1. The Ethical Committee of the Strasbourg Academic Hospital approved this study, and patients provided their written informed consent to participate in the study. All of the indications were postmastectomy breast reconstructions. Eighteen DIEP flaps were eligible for immediate breast reconstruction, and 114 were eligible for a delayed procedure. Among the 132 patients, breast reconstruction was unilateral in 110 patients and bilateral in 11 patients. Bilateral prophylactic mastectomy was performed in nine BRCA mutation carriers. At the time of surgery, the average age of the patients was 49.6 years (range, 27–67). The mean body mass index (BMI) was 25.8 (range, 19.5–33.6); eight patients were of moderate obesity. The patients were selected with no major comorbidities. They were all non-smokers, and 9.8% of them had quit smoking at least two months before surgery (Table 1).

Surgical protocol

Systematic computed tomographic angiography was performed before each operation. Inferior epigastric artery courses and three dominant periumbilical perforators per side were mapped. The perforators were identified on the abdominal wall the day before surgery using a hand-held audible Doppler. The surgical procedure was performed as previously described using a double team approach from the beginning to the end of surgery [5]. The first team harvested the flap using 4 × 450 mm magnifying glasses, and the second team prepared the recipient site. In 100% of the cases, the internal thoracic artery (ITA) and vein (ITV) were located in the second or third intercostal space. A portion of the below or above rib cartilage was removed if necessary. The second team closed the abdominal wall, and the first team

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