

CASE REPORT



DIEP flap breast reconstruction preserving a lumbar peritoneal shunt tube

Kentarou Ueki^a, Katsuhiko Yoshikawa^b, Tatsuki Enoshiri^a, Masahiro Tanji^c, Megumi Takeuchi^d and Shigehiko Suzuki^a

^aDepartment of Plastic and Reconstructive Surgery, Kyoto University Graduate School of Medicine, Kyoto, Japan; ^bDepartment of Plastic and Reconstructive Surgery, Shiga Medical Center for Adults, Shiga, Japan; ^cDepartment of Neurosurgery, Kyoto University Graduate School of Medicine, Kyoto, Japan; ^dDepartment of Breast Surgery, Kyoto University Graduate School of Medicine, Kyoto, Japan

ABSTRACT

We herein report a case of immediate deep inferior epigastric perforator flap (DIEP flap) breast reconstruction surgery in a 50-year-old female patient with a lumbar peritoneal shunt tube. We performed DIEP flap reconstruction in the patient by withdrawing and subsequently reinserting the abdominal side of an implanted shunt tube.

ARTICLE HISTORY

Received 14 June 2016
Accepted 12 February 2017

KEYWORDS

Breast reconstruction; DIEP flap; abdominal flap; contraindication; medical device

Introduction

The deep inferior epigastric perforator flap (DIEP flap), which does not include the rectus abdominal muscle, was a breakthrough to overcome the disadvantages of the musculocutaneous flap [1]. However, in patients with a history of abdominal surgery, the DIEP flap can be a relative contraindication. Although several authors have reported the performance of the DIEP flap operation after laparotomy or liposuction surgery [2,3], there are no reports on DIEP flap reconstruction in a patient with medical device implanted in her abdomen. We herein present a case in which immediate DIEP flap breast reconstruction in a patient with a lumbar peritoneal shunt tube that had been implanted in her abdomen due to hydrocephalus after a subarachnoid hemorrhage.

Case report



A 50-year-old woman with left breast cancer was referred to the Plastic Surgery Department for immediate breast reconstruction. She had a history of subarachnoid hemorrhage and a lumbar peritoneal shunt tube had been implanted in her abdomen to treat hydrocephalus. She had no other obvious sequelae from the subarachnoid hemorrhage and her medical

condition was quite stable with the shunt. Her breasts were large and drooping (Figure 1), and left nipple areola sparing mastectomy was scheduled. A pre-operative computed tomography scan showed the shunt tube, which pierced the intervertebral lumbar and traveled through the subcutaneous layer of the left trunk (Figure 2) and entered into the abdominal cavity from the outer edge of the left rectus abdominal muscle (Figure 3).

In the selection of the reconstruction method, we thought that abdominal flap would be suitable because implant reconstruction would not achieve morphologically favorable results and because a latissimus dorsi musculocutaneous flap would not have sufficient volume. However, it was considered that the shunt tube might cause difficulty in the elevation of the flaps.

We consulted brain surgeons on the feasibility of the abdominal flap operation and decided to withdraw the tube from the abdominal cavity once, when the flap was elevated, and to reinsert it upon the closure of the donor site. The patient consented to our pre-operative explanation of the procedure and indicated that she desired to undergo DIEP flap reconstruction.

She underwent nipple areola sparing mastectomy of the left breast and immediate DIEP flap reconstruction.

CONTACT Yoshikawa Katsuhiko  khiro@kuhp.kyoto-u.ac.jp  Department of Plastic and Reconstructive Surgery, Shiga Medical Center for Adults, 5-4-30 Moriyama, Moriyama-shi, Shiga 524-8524, Japan

© 2017 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.



Figure 1. A preoperative photograph. The patient was a 50-year-old woman with left breast cancer and a lumbar peritoneal shunt tube in her abdomen. Arrow: the scar of L-P shunt insertion. Dotted line: the subcutaneous course of shunt tube.



Figure 2. A preoperative CT scan: the shunt tube pierced the intervertebral lumbar and traveled through the subcutaneous layer of the left trunk.

In the elevation of the flap, a skin incision was first made around the whole circumference of the flap and dissection was carried down to the muscle fascia. The shunt tube was confirmed above the fascia on the left side of the abdomen. The perforator vessel passing

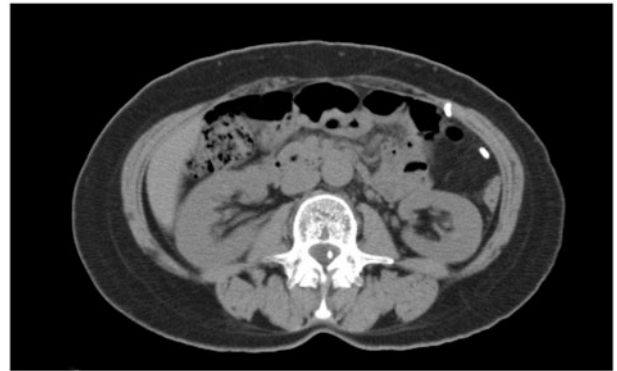


Figure 3. The shunt tube entered into the abdominal cavity from the outer edge of the left rectus abdominal muscle.

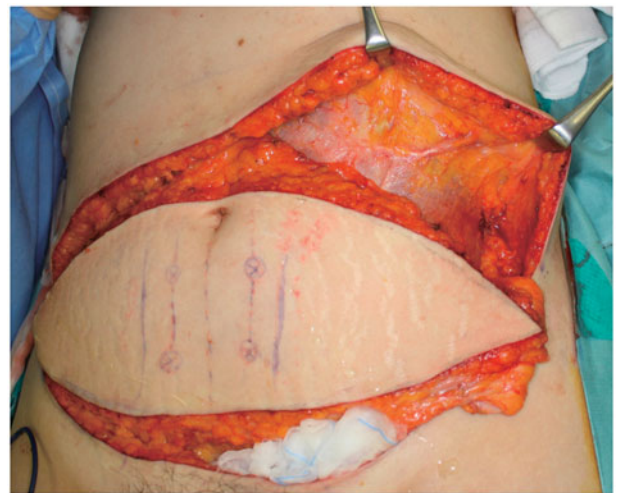


Figure 4. The shunt tube was detected but not exposed upon the elevation of the flap.

through the right rectus sheath, which had been confirmed by color Doppler ultrasound on the day before surgery, was secured and dissected to the right deep inferior epigastric vessels. As the shunt tube was placed on the left side, we prepared the pedicle of the DIEP flap on the right side. Although we could have used the penetrating branch on the left side containing the shunt tube, we considered that using the penetrating branch on the right side that had not previously undergone surgical operation would be safer. The shunt tube, which was located on the fascia, was covered with fibrous tissue and was not directly exposed (Figure 4). However, on the closure of the donor site, the shunt tube was obstructed as it was excessively bent. We, therefore, dissected the tube from the surrounding tissue and temporarily withdrew it from the abdominal cavity and re-inserted it 5-cm caudal from its original position by a brain surgeon (Figure 5). After surgery, the patient had a smooth recovery and we found no signs of increased

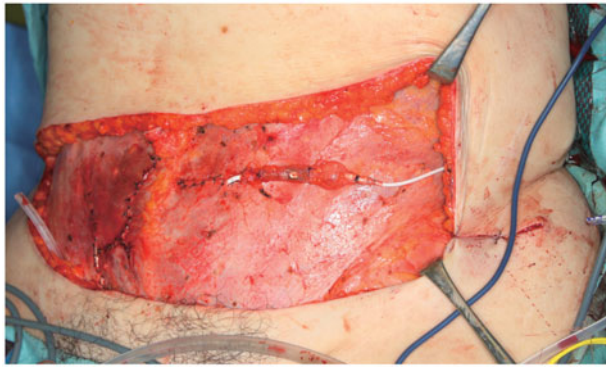


Figure 5. The tube was withdrawn from the abdominal cavity once and re-inserted 5 cm caudal from the original position on closure of the abdominal skin.

intracranial pressure or complications of abdominal wall. Partial necrosis of the spared skin of the breast occurred but was successfully treated following a conservative approach.

Since her breast cancer was less than 1 cm in diameter and classified as clinical stage 1 (T1N0M0), adjuvant therapy after surgery was expected to be unnecessary. Thus, immediate reconstruction was performed. However, a sentinel lymph node biopsy was positive, and broad invasion of the primary tumor was observed in the pathological examination. Therefore, she received postoperative chemotherapy and radiotherapy, and there was no recurrence of the breast cancer and her reconstructed left breast showed good shape and symmetry in comparison with the right breast at one 1 year after surgery (Figure 6).

Discussion

DIEP flap reconstruction, which preserves rectus abdominis muscle and is associated with a minimal loss of function at the donor site [1], has become a standard of breast reconstruction surgery in recent years [4]. However, it cannot be performed safely in cases where the deep inferior epigastric vessels or its perforator vessels are damaged or the subcutaneous circulation of the lower abdomen is inhibited. The presence of a vertical midline abdominal scar has been regarded as a relative contraindication to DIEP flap reconstruction [5]. In the past decade, some authors have reported that DIEP flap reconstruction can be successfully performed in patients with vertical abdominal scars [2,6] or a past history of multiple abdominal liposuction procedures [3]. Furthermore, the indications for DIEP flap reconstruction are currently expanding due to intraoperative perfusion assessment using indocyanine green angiography [7]

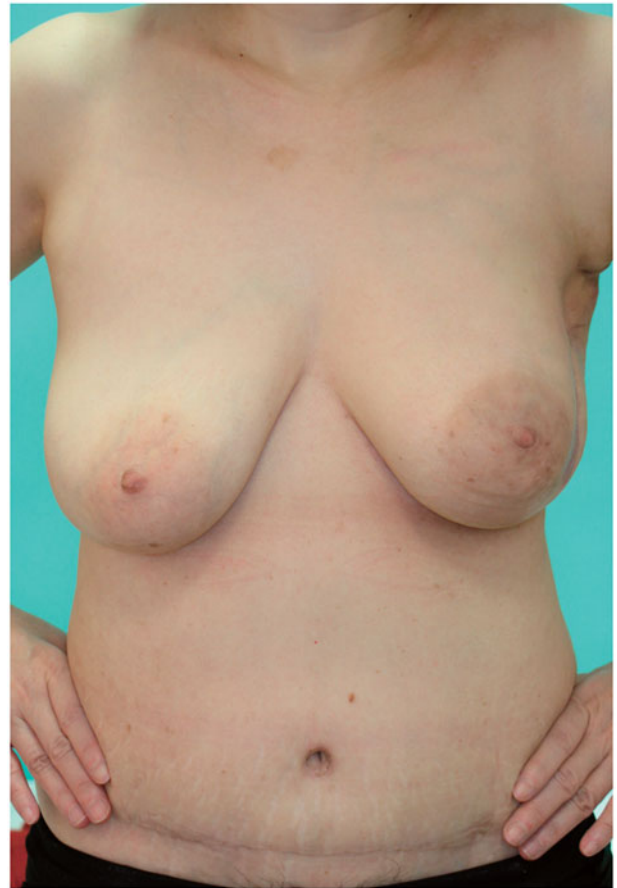


Figure 6. There was no recurrence and good shape and symmetry were achieved at 1 year after surgery.

and crossover vascular anastomosis within the flap [5,8].

On the other hand, there are no reports that describe DIEP flap reconstruction in a patient with a medical device implanted in her abdomen. In the present case, a lumbar peritoneal shunt tube had been implanted due to hydrocephalus after subarachnoid hemorrhage. DIEP flap reconstruction was clearly preferred to implant or latissimus dorsi flap reconstruction for her large drooping breast. However, it was expected that it would be necessary to withdraw the tube from the abdominal cavity once and to reinsert it after the flap elevation. We judged that the procedure would not be excessively complicated and that it could be safely performed. We were careful to avoid damaging the tube or pulling it out from the lumbar side by traction. The reinsertion of the tube was safely carried out in only 30 min.

In planning DIEP flap reconstruction in a patient with a medical device in her abdomen, it is necessary to carefully confirm that there is no adverse effect on the blood circulation of the flap. Furthermore, it is

necessary to consider whether conservation or the exchange of the medical device is safe. The positional displacement between skin/subcutaneous tissue and the abdominal wall that will be caused by the primary closure of the donor site should also be kept in mind. In the present case, although the shunt tube was not exposed on the elevation of the flap, excessive bending occurred on the closure of the donor site and re-insertion was required.

The present case suggests that with careful preparation and manipulation, DIEP flap reconstruction can be considered if a patient has a medical device implanted in her abdomen.

Conclusion

We reported a case of DIEP flap reconstruction in a patient with a lumbar peritoneal shunt tube in her abdomen. The procedure was safely performed in cooperation with a brain surgeon who was familiar with the shunt procedure.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

References

1. Koshima I, Soeda S. Inferior epigastric artery skin flaps without rectus abdominis muscle. *Br J Plast Surg.* 1989;42:645–648.
2. Dragu A, Unglaub F, Wolf MB, et al. Scars and perforator-based flaps in the abdominal region: a contraindication? *Can J Surg.* 2010;53:137–142.
3. Farid M, Nicholson S, Kotwal A, Akali A. DIEP breast reconstruction following multiple abdominal liposuction procedures. *Eplasty.* 2014;14:e47.
4. Granzow JW, Levine JL, Chiu ES, et al. Breast reconstruction with perforator flaps. *Plast Reconstr Surg.* 2007;120:1–12.
5. Chang CC, Huang JJ, Wu CW, et al. A strategic approach for DIEP flap breast reconstruction in patients with a vertical midline abdominal scar. *Ann Plast Surg.* 2014;73:S6–S11.
6. Parrett BM, Caterson SA, Tobias AM, Lee BT. DIEP flaps in women with abdominal scars: are complication rates affected? *Plast Reconstr Surg.* 2008;121:1527–1531.
7. Janes LE, Hui-Chou HG, Matthews JA, et al. Utilization of near-infrared indocyanine green angiography for immediate and delayed venous outflow assessment in breast reconstruction: a case report. *Plast Reconstr Surg Glob Open.* 2014;2:e100.
8. Hsieh F, Somia N, Lam TC. A new approach to preexisting vertical midline abdominal scars with crossover diep flap breast reconstruction. *Microsurgery* 2010;30: 151–155.