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Bilateral DIEP flap breast with simultaneous unilateral nipple-sparing mastectomy — case report

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Abstract: With the steady increase in the incidence of breast cancer in women, treatment that includes not only tumor removal but also breast reconstruction is becoming a more relevant issue for oncologic and plastic surgeons. Mastectomy recently evolved as a form of primary prevention of hereditary breast cancer, commonly performed in combination with simultaneous reconstruction. A case of 44-year-old woman who underwent right mastectomy with adjuvant radiotherapy is presented. Due to the patient's positivity for BRCA1 mutation and her wishes, a risk-reducing mastectomy with nipple-areola complex preservation and bilateral deep inferior epigastric artery perforator flap reconstruction were performed in one-stage. In selected cases this method appears to be the best possible procedure for simultaneous preventative and reconstructive management in patients with genetically determined breast cancer who have undergone mastectomy with radiotherapy.

Keywords: bilateral breast reconstruction, DIEP flap, risk-reducing mastectomy, prophylactic mastectomy, breast cancer, nipple-sparing mastectomy.

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Introduction

Breast cancer is the most common malignant tumour among women worldwide [1]. Risk-reducing mastectomy (RRM) refers to surgical removal of the breasts in the absence of malignancy to reduce breast cancer risk in women. RRM is synonymous with prophylactic mastectomy, and is further specified as either bilateral or contralateral. One of the fundamental indications for this procedure is the presence of a BRCA1 or a BRCA2 gene mutation. In women with such mutations, the risk of breast cancer is estimated at 72%, and in those who have already developed cancer in one breast, the risk of developing cancer in the contralateral one is 40% [2]. When performing the RRM, it is recommended to reconstruct the removed breast, and in a patient after previous mastectomy of the contralateral breast, a bilateral reconstruction should be considered.

In Poland, the risk-reducing mastectomy as a preventative procedure was implemented into the guaranteed health benefits basket in 2019. Therefore, it became possible to perform RRM on a wider scale under the reimbursement coverage from the National Health Fund.

Case report

We present the case of a 44-year-old woman with the BRCA1 gene mutation, after right-sided radical mastectomy and postoperative radiotherapy due to invasive carcinoma of no special type (NST), G2 grade of differentiation, who subsequently underwent left-sided RRM with simultaneous bilateral deep inferior epigastric artery perforator (DIEP) flap breast reconstruction on October 15, 2019. Operation was planned and directed by the first author (ŁU). Preoperative magnetic resonance imaging (MRI) showed no suspicious lesions in the healthy breast, while a contrast-enhanced computed tomography of the abdomen visualized perforators of adequate diameter from both deep inferior epigastric arteries (DIEAs), enabling dissection of two DIEP flaps with independent blood supply (on separate pedicles). Perforators in the lower abdomen were mapped using Color-Doppler ultrasound imaging on a day before surgery (Fig. 1). The procedure was performed under general anesthesia, with the patient in the supine position, in 2 two-person operating teams. The first team elevated the adipocutaneous flap, which was divided into two parts, leaving the blood supply to each of them on two perforators with a diameter of 1.2–1.5 mm stemming from both DIEAs (Fig. 2). Both vascular pedicles were dissected, maintaining the normal, independent blood supply to the flaps. At the same time, the second operating team performed a left-sided nipple-sparing mastectomy (NSM). The medial incision also allowed direct access to the ipsilateral internal mammary vessels (Fig. 3). The removed gland was weighed to initially assess the flap mass necessary to fill the resulting skin

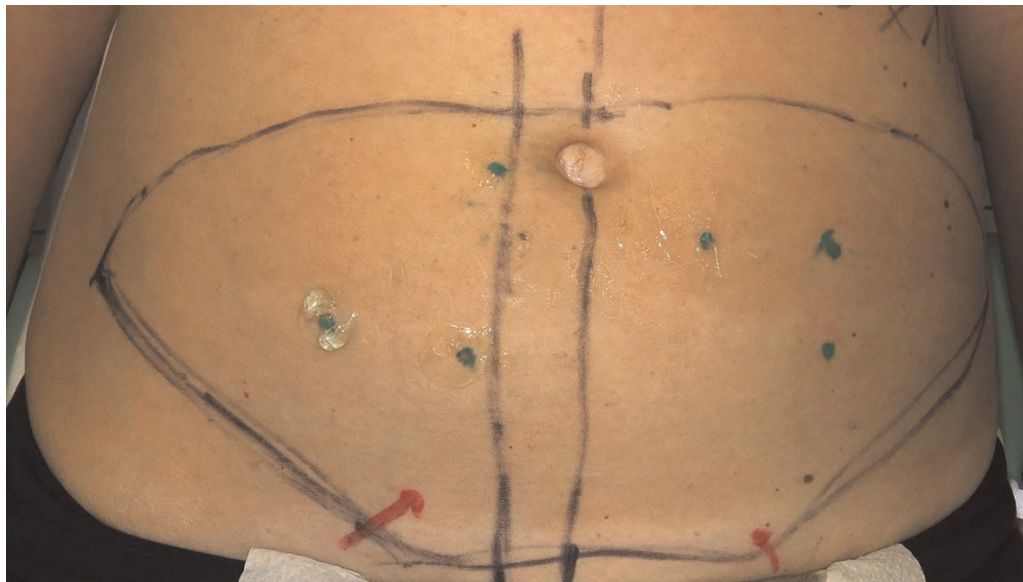


Fig. 1. Markings of the DIEP flaps in the lower abdomen. Green points indicate perforators. Red lines indicate superficial inferior epigastric veins.

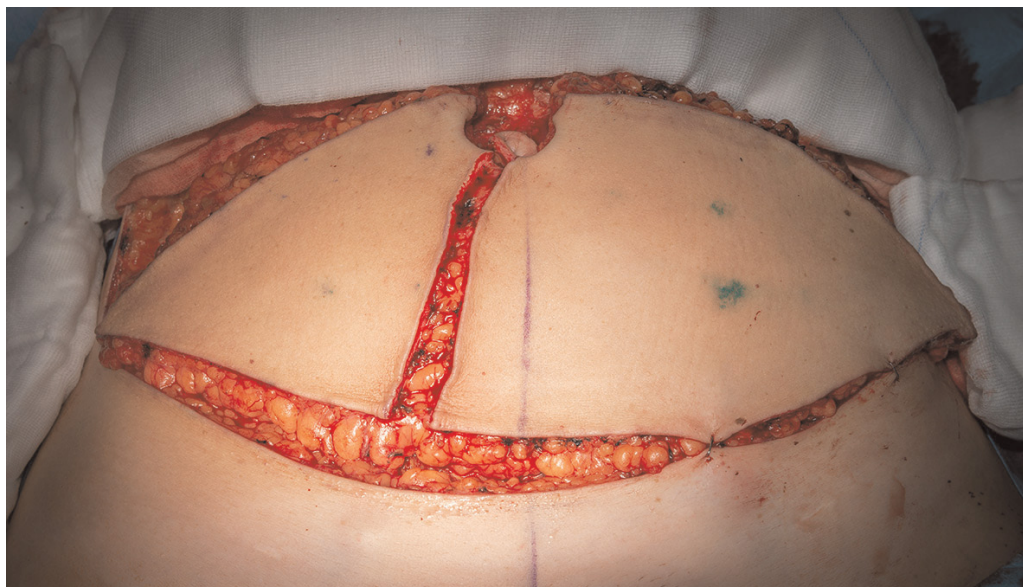


Fig. 2. Elevated DIEP flaps.

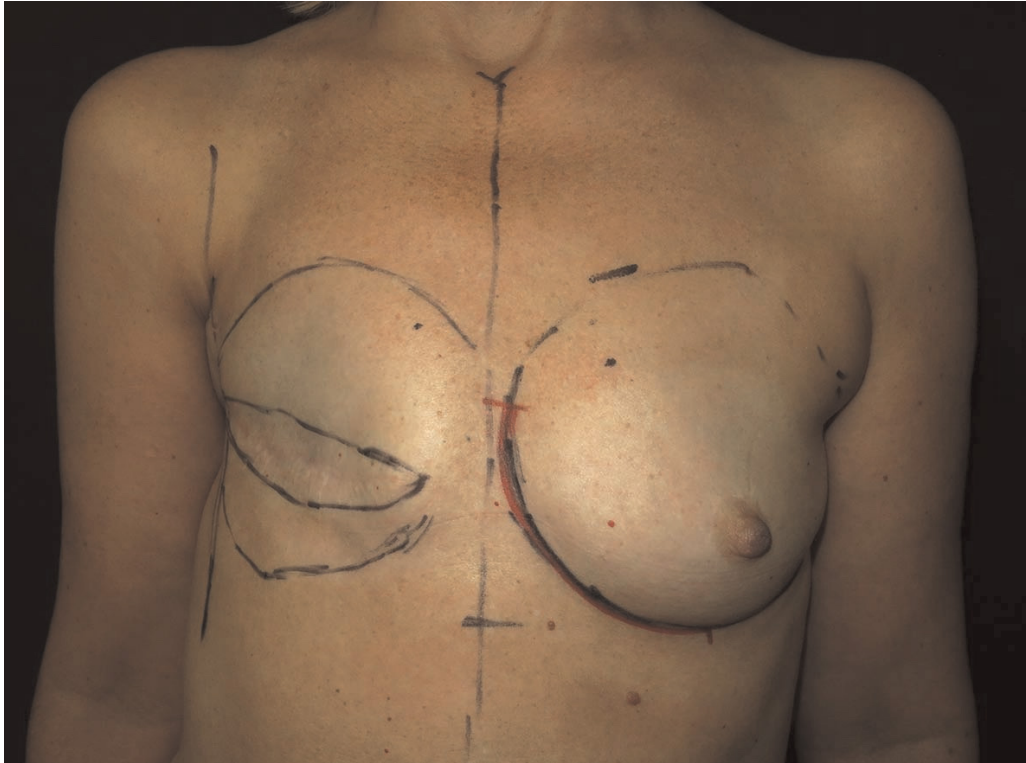


Fig. 3. Extent of reconstruction. Post-mastectomy scar marked with surrounding irradiated skin (to be excised) on the right side. On the left side red line indicates the operative access to the nipple-sparing mastectomy and internal mammary vessels.

envelope. The specimen margins were marked for histological examination and additional tissue fragment was collected from the retro-areolar region. On the right side, the scar after mastectomy was excised along with surrounding post-radiotherapy skin lesions, and a skin envelope was prepared. Access to the internal mammary vessels was obtained on both sides consecutively. To expose the vessels over a 2 cm long segment on the left side, it was necessary to remove a fragment of the third rib. On the right side, the required access was obtained through the third intercostal space without the need of the rib fragment removal. The right DIEP flap was transferred to the left side of the chest and the left flap to the right side (Fig. 4). End-to-end arterial and venous anastomoses were performed with a 9/0 monofilament suture (Fig. 5). On the right side the flap was deepithelialized partially, while on the left side almost completely; only a small skin island was left for clinical observation, allowing assessment of its blood supply. The flaps were placed inside the skin envelopes and formed in the shape of breasts, reconstructing the thoracic prominences. At the donor site,



Fig. 4. DIEP flaps transferred to the chest. The umbilicus brought through in a new position. The abdominal wall closed as in abdominoplasty.

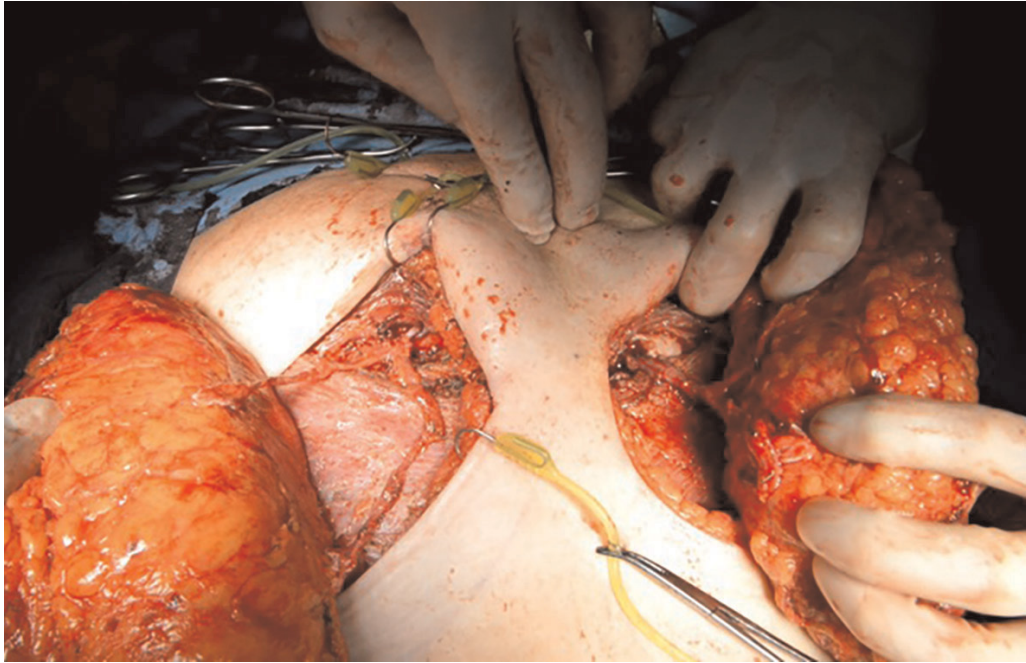


Fig. 5. Intraoperative view — vascular pedicles after microsurgical anastomoses.

the anterior walls of the rectus muscle sheaths were sutured. After dissection of the adipocutaneous flap up to the xiphoid process of the sternum, the tissues were closed primarily and in layers, as in abdominoplasty (Fig. 4). The postoperative period was uneventful, and patient's discharge from the hospital was possible on the sixth day. No cancer cells were found in the histopathological examination of the tissues excised during the RRM. Almost five months later, the patient underwent lipofilling (fat grafting) from the abdominal flanks to both breasts. Improved symmetry and volume of the upper poles of the reconstructed breasts were achieved. At the same time, the nipple was reconstructed using the C-V flap technique (Fig. 6). In the next stage, a nipple-areola complex (NAC) tattoo was made at a medical micropigmentation center.

Discussion

The main goal of RRM is to reduce the risk of developing breast cancer. It should be noted that the procedure is irreversible and may affect the patient's entire social and family life. The aesthetic effect depends not only on the patient's anatomy, but also on

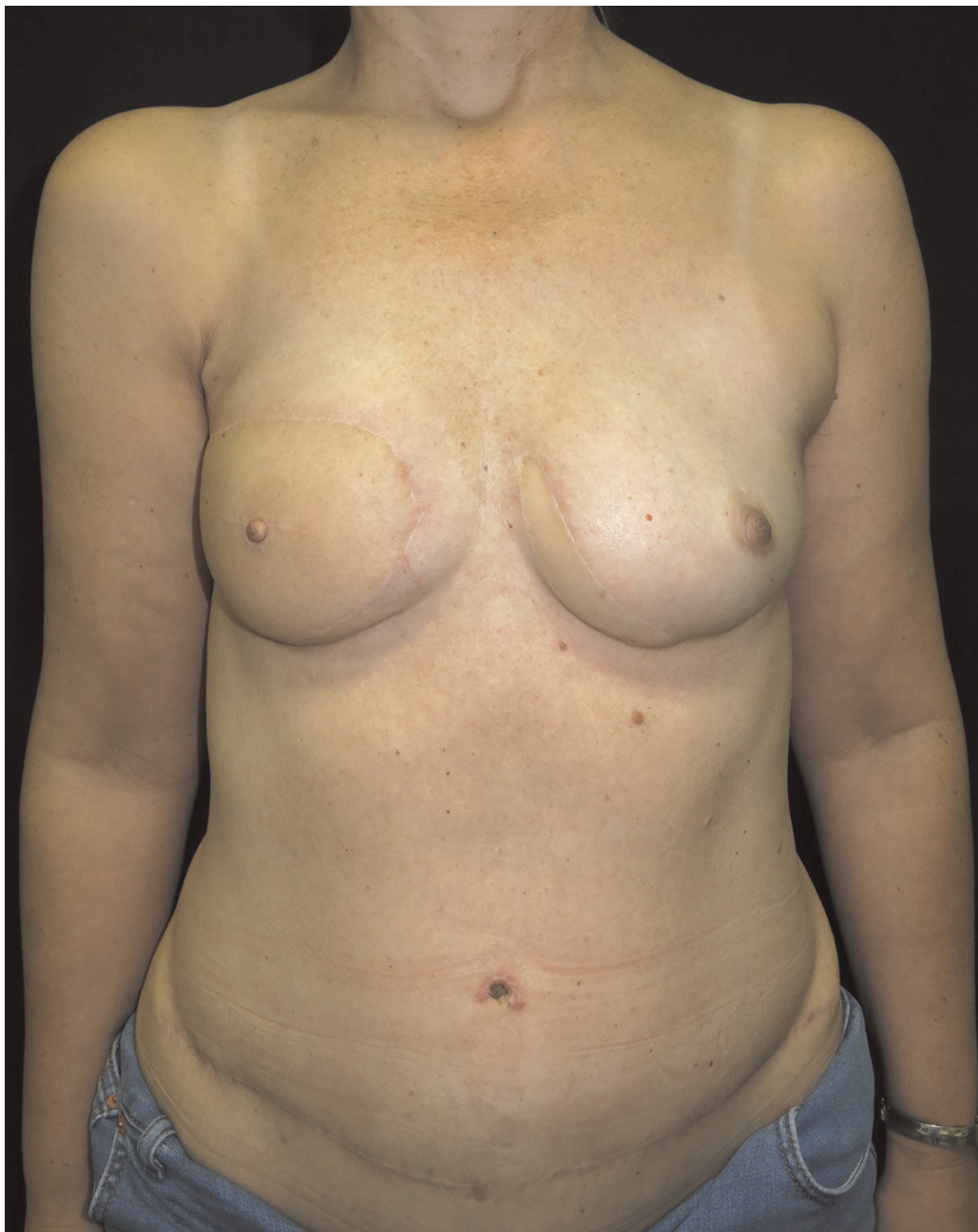


Fig. 6. Effect of bilateral breast reconstruction, lipofilling and left nipple reconstruction.

the experience of the reconstructive center and the appropriate choice of the method of reconstruction. In women who have not undergone adjuvant radiotherapy, most commonly silicone implants are used as the simplest and least aggravating treatment. In patients after radiotherapy to the thoracic wall it is usually necessary to use autologous tissues [3]. Both methods of breast reconstruction are equally acceptable and oncologically safe, and the number of complications is lower in reconstructions with the use of autologous tissues [4]. If the patient has appropriate anatomy and consents to reconstruction with the use of autologous tissues, the use of DIEP flaps may be considered. Due to the character of these surgeries, the need to perform such procedures in specialized centers is emphasized [5].

In the presented case subcutaneous mastectomy was performed with NAC preservation. Nipple-sparing mastectomy is treated as an oncologically safe alternative to skin-sparing mastectomy. Such method provides greater patient satisfaction with the effect of the surgery [6]. In the discussed case, the incision did not include the areola, due to the statistically two to three-fold higher risk of NAC ischemia and complications with such access [7].

Appropriate qualification for surgery of the RRM candidate requires the cooperation of a multidisciplinary team. Preoperative preparation should include consultation with a clinical geneticist based on the results of tests necessary to assess the risk of incidence of breast cancer, physical examination and imaging tests (mammography, ultrasonography, MRI). In some cases, a consultation of a psycho-oncologist, sexologist or gynecologist may be needed [8].

When considering RRM in a patient who has undergone mastectomy of the contralateral breast and radiotherapy, reconstructive treatment should be meticulously planned. When it is necessary to operate in a previously irradiated field, reconstruction methods with the use of autologous tissues are most reliable. The use of tissues undamaged by radiotherapy significantly reduces the risk of ischemia, and thus the risk of complications with the wound healing. Tissues that have not been irradiated are also more compliant, which eliminates the problem of a potential exposure of the breast prosthesis or expander. The former complication is quite common when reconstruction with the use of implant is attempted in the post-radiotherapy area. Since the best symmetry is obtained using the same reconstructive methods for both breasts, it should be considered that in selected cases, bilateral breast reconstruction with two DIEP flaps is the procedure of choice. This way, all negative consequences of using breast prostheses are avoided.

By using the expander first, and after its expansion and stretching of the tissues, replacing it with the implant, the patient is exposed to general anesthesia more than once, and the time from the beginning of treatment to the end of the reconstruction is extended. There is also a risk of complications related to the presence of the prosthesis: the expander or the implant may leak, and over time the connective tissue capsule

around the implant may develop contractures. All these potential complications necessitate additional surgeries, and hence longer periods of inability to work, an increase in the patient's dissatisfaction with the course of treatment, and, as a result, a lower quality of life.

When discussing the available methods of breast reconstruction, one should also look at the associated costs. Bilateral DIEP flap breast reconstruction requires a one-time operation and a week-long stay in the hospital. On the other hand, several shorter hospital stays and surgeries under general anesthesia with the use of expanders and prostheses, which often must be replaced in the further course of the patient's life, in total may turn out to be more expensive.

Looking more broadly at the state of patients after mastectomy, it is necessary to mention their mental, physical, sexual and social functioning. Based on the patient evaluation, it was found that breast reconstruction after mastectomy improves the patients' quality of life and improves their functioning in the above-mentioned aspects [9]. It should be emphasized that regardless of the choice of oncological treatment strategy, breast reconstruction has a colossal impact on the well-being and functioning of the patient.

Conclusions

RRM combines the potential oncological gain with an optimal aesthetic effect. Reconstruction during the same operation allows to avoid breast loss, which is difficult for the patient, and thus reduces psychological trauma. Bilateral DIEP flap provides tissues for both breast filling after subcutaneous mastectomy and simultaneous reconstruction of the contralateral breast after previous radiotherapy. The method used seems to be the best reconstructive option in the presented case.

Conflict of interest

None declared.

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