

BREAST-Q questionnaire: tool for evaluation of quality of life following breast reconstruction with DIEP/SIEA flap

Łukasz Ulatowski, Bartłomiej Noszczyk

Department of Plastic Surgery, Centre of Postgraduate Medical Education in Warsaw, kierownik: prof. dr hab. n. med. Bartłomiej Noszczyk

Article history: Received: 31.05.2018 Accepted: 31.04.2018 Published: 04.06.2018

ABSTRACT:

Breast cancer management is important for both oncologists and plastic surgeons. We can observe a considerable progress in knowledge and treatment modalities in this type of cancer. Treatment often requires reconstruction of the removed breast. Modern methods are becoming better and more suited to patient's needs. At the same time, we observe a steadily increasing interest in quality of life after medical procedures. This tendency is particularly visible in plastic surgery, where simple analysis of complication rate is insufficient. In order to effectively help, a scrupulous evaluation of the outcomes by the patient herself is necessary. The aim of the study is to discuss and present the use of BREAST-Q questionnaire. It allows to assess patient's satisfaction with the breast treatment as a whole and medical care. In this article, we present BREAST-Q questionnaire scores in 20 patients following secondary breast reconstruction with DIEP flap without rib removal when accessing internal mammary vessels. The assessment of quality of life is necessary for the reconstructive surgeon to evaluate his own work. It enables deeper understanding of needs and better advice for future patients during preoperative consultation. The results can also be useful for payers in order to decide about reimbursement of specific procedures.

KEYWORDS:

BREAST-Q, microsurgery, breast reconstruction, DIEP, quality of life, rib-sparing

Recommendation: Currently, no reports have been found in the literature regarding the use of BREAST-Q questionnaire to evaluate the quality of life in patients after microsurgical breast reconstruction with DIEP flap and no rib removal when accessing internal thoracic recipient vessels

Current statistics show that approximately 12 percent of females will develop breast cancer throughout lifetime [1]. At early stages, breast amputation is performed in 36% of patients. In advanced cases, breast amputation is necessary in 52% of patients [2]. Many women after breast amputation decide to undergo breast reconstruction. They account for 42% in the United States [3]. In Poland, there are no official statistics, but it can be presumed that the number does not exceed 10%. Breast reconstruction is a relatively safe procedure performed in order to improve the life quality following mastectomy. However, the surgery is often laborious and expensive. Therefore, the investigation of patient's satisfaction, especially in the light of life quality and breast appearance, seems interesting and useful.

In evaluating reconstruction outcomes, both in the broad sense and considering patient's satisfaction, various methods have been used. Complication rate [4], doctor's and third parties' impression [5], subjective opinion [5] and quality of life in the sense of satisfaction or happiness [6] have all been investigated. However, surgical breast reconstruction should influence precisely specified parameters to justify costs and present social benefits. Such parameters include fitness and activity, psychosocial functioning and sexuality. In 2009 in Plastic and Reconstructive Surgery, the BREAST-Q questionnaire was described, which enables objective and repeated quality of life assessment after breast reconstruction [7]. The questionnaire was designed by the team of physicians devoted to patient-reported outcome (PRO) evaluation for many years. The idea of PRO dates back to 1970s and since then has been adopted in many fields of medicine. It is particularly significant in plastic surgery, where patient satisfaction is the fundamental reason for reconstruction efforts. Before publication of the last version of BREAST-Q questionnaire, it has

been filled out by 3000 women. The questionnaire has been subject to thorough analysis and standardization [8]. Currently, it is one of the most commonly used tools for evaluation of breast reconstruction treatment by patients. It is estimated that the questionnaire has been filled out by more than 22 000 women worldwide [9]. Initially, the questionnaire was available only in English. Gradually, it has been translated into other languages including Polish. The last Polish preoperative module concerning breast reconstruction was released by the authors in March 2017. The rest of the revised modules were available beforehand.

Mastectomy and later breast reconstruction obviously affect patient's physical state, psychosocial functioning and sexuality. Precise questions included in the questionnaire make it possible to assess that influence. The questionnaire consists of three parts. The first part deals with patient's expectations regarding the reconstruction surgery. The next two parts are two similar surveys filled out before and after surgery. The questionnaire includes modules with questions relating to satisfaction with the breast, psychosocial satisfaction, sexual satisfaction as well as thoracic and abdominal symptoms.

The last module is particularly important in evaluating breast reconstruction using patient's own tissues such as deep inferior epigastric perforator (DIEP) flap. It is one of the well-established microsurgical techniques of breast reconstruction. It was popularized by Robert Allen in 1994 [10]. The method is frequently applied in patients who had undergone radiotherapy. In such cases, the relocation of non-radiated healthy tissues from other body parts brings the most benefits. The data from questionnaires are later analyzed with software designed to translate answers into numerical values.

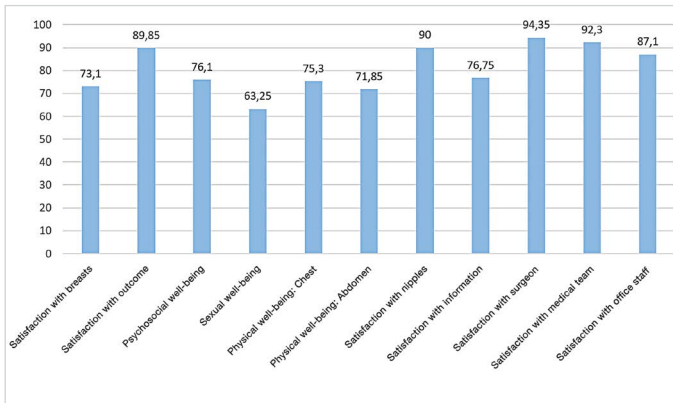


Fig. 1. BREAST-Q scores for 20 patients after rib-sparing breast reconstruction with DIEP/SIEA flap.



Fig. 2. Outcomes of delayed right breast reconstruction with DIEP flap and nipple-areola complex reconstruction.

Score 0 denotes total lack of satisfaction, while score 100 means 100% satisfaction. The analysis enables assessment of various reconstruction techniques, detection of fine differences and better understanding of patient's needs. The aim of the study was to present possible use of Polish version of the BREAST-Q questionnaire in breast reconstruction evaluation with DIEP or SIEA flaps with rib-sparing recipient vessels access, as well as in comparing data from different countries.

MATERIALS AND METHODS

Patients

The patients enrolled in the study had been referred by oncologists or primary care physicians. They were qualified for reconstruction in the order of application, following consultation in our outpatient clinic. All surgeries were planned as elective reconstructions. They were performed after previous mastectomy and completion of adjuvant treatment. Before and after the reconstruction, the patients were given BREAST-Q questionnaires to fill out on their own, which took them about 15 minutes.

Surgery

Before the operation, color Doppler ultrasound of the abdominal wall was performed in all patients by the operator in order

to determine the vascular supply of the flap. The DIEP flap reconstruction started with preparation of a cutaneo-adipose flap with the perforator vessel supplying blood, the trunk of the inferior epigastric artery and accompanying veins. The rectum abdominis muscle was not harvested. In the case of the superficial inferior epigastric artery (SIEA) flap, having intraoperatively checked the sufficient size, we resigned from DIEP flap and based the vascular supply on that artery and accompanying superficial epigastric vein.

Next, the flap was displaced onto the thoracic wall at the reconstruction site and connected to the recipient vessels, those being internal thoracic artery and vein coursing underneath the ribs parallel to the sternum. In order to create anastomoses, the vessels were identified within the chosen intercostal space. In the case of tightly packed ribs, the vascular supply and microsurgical anastomoses may require removal of approximately 3 cm parasternal fragments of the 3rd or 4th rib. In the studied group, there was no need for rib removal. The anastomoses were created in the 3rd or 4th intercostal space. The last stage was to model the flap in order to form mammary prominence. Nipple reconstruction and areolar tattoo were performed as a separate procedure under local anesthesia several months after breast reconstruction.

STATISTICAL ANALYSIS

In order to exclude possible influence of age, education and time passed since mastectomy on the results, the correlations between those variables and the scores for each question were studied. The normality of distribution was verified using the Shapiro-Wilk test. The direction and magnitude of correlation between pairs of variables were assessed using Pearson linear correlation coefficient (r) or Spearman's rank correlation coefficient (R). The significance of differences between the groups was verified with Student's t -test for un-paired variables or Mann-Whitney U test. All statistical calculations were performed using Statistica 10 software (StatSoft, USA) and the significance level was set at $p \leq 0.05$.

RESULTS

Twenty female patients aged 36 to 65 were enrolled in the study. All patients were operated on by the first author. In the studied group, 95% patients underwent chemotherapy and 75% radiotherapy (Table 1). The nipple-areola complex (NAC) reconstruction was performed in 5 patients.

The following variables showed normal distribution: Age, Breast satisfaction, Sexual well-being, Chest satisfaction, Abdominal satisfaction. The distribution of the rest of the variables was far from normal. No statistically significant correlation was noted between age and answer scores. With age, chest satisfaction increased, however, the difference was barely statistically significant (R : 0.417, r : 0.105, p : 0.067). No statistically significant correlation was noted between time since mastectomy and answer scores. With time passed since mastectomy, only satisfaction with the medical team increased, which was barely significant (R : 0.422, p : 0.064). No statistically significant differences were observed in answer scores among patients with higher education compared to other types of education (mainly secondary).

Tab. I. Demographics of studied group.

	WARTOŚĆ	ZAKRES	MEDIANA	SD
Number of patients	20	36–65	46	8,321658489
Operated side (L/R)	11/9			
Type of reconstruction (DIEP/SIEA)	17/3			
Chemotherapy / radiotherapy	19 (95%)/15 (75%)			
Hospital stay (days)		8–12	9	0,852241626
Time since mastectomy (months)		11–250	23,5	56,9888955

All patients correctly filled out postoperative modules of the questionnaire. The lowest scores were observed for sexual well-being. The highest scores were reached for satisfaction with the surgeon. Detailed data are shown in the diagram (Fig. 1).

DISCUSSION

Several factors might have affected understanding of the questions included in the questionnaire as well as perception of the investigated variables. Two of them, which we considered the most important, were the patient's age and education level, however, they did not seem to have any influence on answer scores. Some statistically insignificant correlation between chest satisfaction and age was observed. It is an interesting observation as it might appear that elderly people should experience greater difficulty recovering. However, the small population size might have affected the results.

In the studied group, most patients presented higher ($n = 12$) or secondary ($n = 7$) level of education. It might be associated with the previously described tendency to give more attention to quality of life among patients with better education [11]. The studied group does not reflect Polish population of oncoplastic patients [12]. Therefore, it is hard to interpret the fact that with the time passed since mastectomy, satisfaction with the medical team grew.

In the first module, the patients evaluated their satisfaction with the reconstructed breast to be 73.1 (out of 100). The questions were relating to the shape, size and symmetry of the breast, as well as matching underwear and clothes. The outcomes are in accordance with clinical observations and conclusions derived from interviews with the patients. Some patients later decided for operations to improve breast symmetry such as flap modelling or symmetrization of the contralateral breast. The patients evaluated their satisfaction with the outcome to be 89.85. It confirms clinical observations by other authors. The breast reconstruction patients are satisfied with the decision they made and recommend this type of breast reconstruction to other mastectomy patients [13]. Post-reconstruction psychosocial well-being was assessed to be 76.1. Similar results (around 77.18) were presented by centers that utilize silicone implants [14].

It is worth noting that despite breast reconstruction, many patients do not experience satisfactory sex life. The studied patients assessed their satisfaction with their sex life (sexual well-being) to be 63.25. Some of them ticked 'not applicable' as the answer to questions regarding their sexual attractiveness. This issue requires further psychological studies in order to reach the core of the problem and to precisely determine the cause of such an attitude.

Chest satisfaction is the module evaluating mainly pain and discomfort within the chest, ribs and upper extremities. The studied group scored 75. The presence of local post-radiation fibrosis in tissues surrounding the mammary prominence can be the cause of low satisfaction. Abdominal satisfaction was evaluated at 71.85. It should be emphasized that breast reconstruction using abdominal tissues often yields additional esthetic benefits. It can be clearly seen in women after many deliveries, C-section or abdominal surgery. Abdominoplasty results in skin tightening, hypogastric tissue redistribution and waist narrowing between the rib cage and pelvis in sagittal plane. In this context, however, relatively low abdominal satisfaction can be unrelated to sexual self-esteem.

Areolas were reconstructed in 5 patients in the next stage of treatment. The procedure was performed under local anesthesia with star-shaped flap. Next, the areola was reconstructed outside the clinic at the facility offering micropigmentation procedures (Fig. 2). The score of 90 shows that this additional and minor procedure can drastically improve satisfaction level. Interestingly, despite encouragement by the operator during follow-up visits, only a small percentage of patients decided for NAC reconstruction.

Satisfaction with preoperative information score was 76.75. It suggests the need of repeated preoperative consultations. The procedure is complex and many issues need a thorough discussion, while the emotions present during consultation impede understanding and memorization of new information. In the studied group, satisfaction with the operating and consulting surgeon was 94.75, while satisfaction with medical team engaged in patient care was 92.3. The data serve the plastic surgeon performing the reconstructions to evaluate his and his surgical team's work. It enables deeper understanding of needs and better advice or future patients during consultation [8].

The positive appraisal of DIEP/SIEA method should be emphasized. Satisfaction with the breast was 73.1 on average. Statistics showed in other studies investigating long-term effects support reconstruction with flaps [6]. Satisfaction with the breast reconstructed with an implant measured by BREAST-Q questionnaire was estimated to be 65.51 [14]. Comparison of data from various breast reconstruction centers indicate the usefulness of the BREAST-Q questionnaire. It also allows to compare outcomes in small and large cohorts of patients as well as to draw conclusions regarding the effectiveness of different reconstruction techniques.

This report is probably the first attempt to use the BREAST-Q questionnaire to evaluate breast reconstruction with DIEP/SIEA flaps in Poland. Full analysis of the procedure on the national scale would require larger patient group from multiple centers. It would bring more reliable insight into patients' needs.

Comparing the outcomes of different reconstruction techniques with respect to quality of life improvement could be useful for payers and constitute a helpful tool in decision making regarding reimbursement of specific reconstructive procedures. Microsurgical breast reconstruction with free abdominal flap (DIEP) is a complex and long-lasting microsurgical procedure, requiring specialty instruments, several members of surgical team and a few days of hospital stay. Currently, its price (the same as with implants) is set at only 5138 PLN [1 190.68€].

CONCLUSIONS:

The BREAST-Q questionnaire is a useful tool to evaluate patient satisfaction with breast reconstruction. Nowadays, decisions regarding method of reconstruction are made by both reconstructive surgeon and the patient. Questionnaire scores let us better understand patients' needs and precisely tailor reconstruction method to individual requirements. It might be interesting to compare the questionnaire scores from various breast reconstruction centers using tissues flaps all over Poland.

REFERENCES:

- Macadam S.A., Zhong T., Weichman K. et al.: Quality of Life and Patient-Reported Outcomes in Breast Cancer Survivors: A Multicenter Comparison of Four Abdominally Based Autologous Reconstruction Methods. *Plast Reconstr Surg.* 2016; 137 (3): 758–771.
- Miller K.D., Siegel R.L., Lin C.C. et al.: Cancer treatment and survivorship statistics, 2016. *CA Cancer J Clin.* 2016; 66 (4): 271–289.
- Mundy L.R., Homa K., Klassen A.F., Pusic A.L., Kerrigan C.L.: Breast cancer and reconstruction: normative data for interpreting the BREAST-Q. *Plast Reconstr Surg.* 2017; 139 (5): 1046e–1055e.
- Hofer S.O.P., Damen T.H.C., Mureau M.A.M., Rakhorst H.A., Roche N.A.: A Critical Review of Perioperative Complications in 175 Free Deep Inferior Epigastric Perforator Flap Breast Reconstructions. *Ann Plast Surg.* 2007; 59 (2): 137–142.
- Brandt A., Przybyła-Basista H.: Decyzja o rekonstrukcji piersi u kobiet po mastektomii – motywy, obawy, percepcja efektów. *Psychooncology / Psychooncologia.* 2016.
- Yueh J.H., Slavin S.A., Adesiyun T. et al.: Patient Satisfaction in Postmastectomy Breast Reconstruction: A Comparative Evaluation of DIEP, TRAM, Latissimus Flap, and Implant Techniques. *Plast Reconstr Surg.* 2010; 125 (6): 1585–1595.
- Pusic A.L., Klassen A.F., Scott A.M., Klok J.A., Cordeiro P.G., Cano S.J.: Development of a new patient-reported outcome measure for breast surgery: the BREAST-Q. *Plast Reconstr Surg.* 2009; 124: 345–353.
- Cano S.J., Klassen A., Pusic A.L.: The Science behind Quality-of-Life Measurement: A Primer for Plastic Surgeons. *Plast Reconstr Surg.* 2009; 123 (3): 98e–106e.
- Cohen W.A., Mundy L.R., Ballard T.N.S. et al.: The BREAST-Q in surgical research: A review of the literature 2009–2015. *J Plast Reconstr Aesthet Surg.* 2016; 69 (2): 149–162.
- Allen R.J., Treece P.: Deep inferior epigastric perforator flap for breast reconstruction. *Ann Plast Surg.* 1994; 32 (1): 32–38.
- Ashing K.T., George M.J.V.: Health-related quality of life and care satisfaction outcomes: Informing psychosocial oncology care among Latina and African-American young breast cancer survivors. *Psychooncology / Psychooncologia.* 2018.
- Kolacinska A., Hodorowicz-Zaniewska D., Bocian A. et al.: Landscape of oncoplastic breast surgery across Poland. *Pol Przegl Chir.* 2017; 89 (6): 14–19.
- Pusic A.L., Matros E., Fine N. et al.: Patient-reported outcomes 1 year after immediate breast reconstruction: Results of the Mastectomy Reconstruction Outcomes Consortium study. *J Clin Oncol.* 2017; 35 (22): 2499–2506.
- Eltahir Y., Werners L.L., Dreise M.M., Zeijlman van Emmichoven I.A., Werker P.M.N., de Bock G.H.: Which Breast Is the Best? Successful Autologous or Alloplastic Breast Reconstruction. *Plast Reconstr Surg.* 2015; 135 (1): 43–50.

Word count: 2670

Page count: 5

Tables: 1

Figures: 2

References: 14

DOI: 10.5604/01.3001.0012.0758

Table of content: <https://ppch.pl/issue/11483>

Copyright: Copyright © 2018 Fundacja Polski Przegląd Chirurgiczny. Published by Index Copernicus Sp. z o. o. All rights reserved.

Competing interests: The authors declare that they have no competing interests.



The content of the journal „Polish Journal of Surgery” is circulated on the basis of the Open Access which means free and limitless access to scientific data.



This material is available under the Creative Commons - Attribution 4.0 GB. The full terms of this license are available on: <http://creativecommons.org/licenses/by-nc-sa/4.0/legalcode>

Corresponding author: Łukasz Ulatowski, ul. Bluszczańska 54/22, 00-712 Warszawa, tel.: 501 086 187, e-mail: lukasz@tlen.pl

Cite this article as: Ulatowski L., Noszczyk B.: BREAST-Q questionnaire: tool for evaluation of quality of life following breast reconstruction with DIEP/SIEA flap; *Pol Przegl Chir* 2018; 90 (6): 1–5
