

MODERN TRENDS IN THE BREAST CANCER CONSERVING SURGERY AND ONCOPLASTIC BREAST SURGERY

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Abstract

Introduction: The highest priority for modern clinical oncology is functionally-sparing and organ-conserving treatment. In Russia, breast cancer (BC), among all malignant tumors, accounted for 21.1 % of women in 2017. Oncoplastic radical resections (OPS-BCS = oncoplastic surgery – breast conserving surgery) have been widely used. This term means resection of the breast for cancer using plastic surgery to restore the shape of the breast, in most cases with one-stage correction of the contralateral breast.

Purpose: It was the creation of various techniques of oncoplastic breast surgery, applicable for the appropriate localization of breast cancer and the evaluation of surgical, oncological and aesthetic results.

Methods: From 2013 to 2017, in the P.A. Hertsen Moscow Oncology Research Center, organ-conserving surgery were performed in 570 patients with BC with an average age of 54.2. Stage 0 was diagnosed in 4.6 %, I – 5.9 %, IIA – 28.7 %, IIB – 6 %, IIIA – 5.1 %, IIIC – 3.3 %, IIIB – 0.2 %, IV – 0.2 %. Radical resection in the standard version was performed in 290 patients with breast cancer, oncoplastic breast surgery in various modifications – in 280. All patients after the organ-conserving surgical treatment received radiation therapy. Patients received chemotherapy, targeted therapy and hormone therapy according to the indications in depending the disease stage and the immunohistochemical type of the tumor.

Results: After an urgent and planned morphological study positive margins of resection were revealed in 10 patients, which required re-resection of the edges to a negative state of them in case of an urgent intraoperative response and mastectomy – in case of a planned response. Within 4 years, local recurrences were detected in 4 patients (0.7 %), which required a mastectomy with a one-stage reconstruction. In 1 patient (0.2 %), the disease progressed as metastases to the lung – in this case lobectomy and a necessary chemotherapy were conducted. Cosmetic results were defined as excellent in 70 % cases, good – 25 %, satisfactory – 5 %.

Conclusion: If there are indications for organ-conserving treatment of breast cancer and the patient's decision concerning this surgery, the patient should be offered methods of oncoplastic surgery for the prevention of psychological and emotional stress, effective rehabilitation, and a quick return to active social life.

Key words: breast cancer, breast conserving surgery, oncoplastic surgery, oncoplastic resection, local recurrence

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Introduction

The highest priority for modern clinical oncology is functionally-sparing and organ-conserving treatment. In Russia, breast cancer (BC), among all malignant tumors, accounted for 21.1 % of women in 2017. Cumulative risk of developing breast cancer from 2007 to 2017 increased from 4.81 to 6.02 respectively. Among women belonging to the most socially active age category (those at the age from 20 to 59) 30818 cancer patients were diagnosed in 2017, i.e. 43.7 % of the total number (70569). In 2017, patients with I–II stages of the disease accounted for a greater number – 69.9 % compared with those with neglected forms of disease [1].

Invalidation of cancer patients is a consequence of functional, anatomical, aesthetic and psychological disorders due to the crippling radical treatment [2]. It is particularly important for young patients for whom the psychological trauma after such a radical type of surgery becomes a barrier to normal life [3]. The choice of the method of surgical treatment depends on the morphological characteristics of the tumor, somatic state, the age of a patient, constitutional factors, the size of the breast. Thus, G. Aurilio, V. Bagnardi [4] point out that, on the basis of immunological, histological and chemical characteristics of the tumor, careful selection of patients is required for a one-stage reconstruction.

The modern strategy of surgical treatment of breast cancer is aimed at solving the following oncological prob-

lem: to cure cancer and to create conditions for breast reconstruction [5, 6], which contributes to a more rapid recovery and rehabilitation of the patient.

At present, oncoplastic radical resections (OPS-BCS = oncoplastic surgery – breast conserving surgery) have been widely used. This term means resection of the breast for cancer using plastic surgery to restore the shape of the breast, in most cases with one-stage correction of the contralateral breast. The term “oncoplastic surgery” was first used by John Bostwick III in 1986 [7–9]. This method has been developed under Werner Audretsch at the Interdisciplinary Breast Cancer Clinic in Düsseldorf [10, 11].

In Russia, the term “oncoplastic resections” was not used; the term “radical resection of the breast with a one-stage reconstruction” was common. At the 2nd Annual Congress of the Russian Society of Oncology Experts September 4, 2015, the Council of Experts headed by the Academician V.F. Semiglazov and professor G.M. Manihas took a unanimous decision concerning the equivalence of the two terms and the eligibility of the application of the term “oncoplastic resection” in oncological institutions of the Russian Federation [12].

According to K.B. Clough, the advantage of the oncoplastic approach during breast-conserving operations is an increase in indications for breast-conserving surgery (BCS) to achieve the best aesthetic results. The disadvantages of this approach are as follows: a greater complexity and dura-

tion of the operation, as well as an increased risk of complications associated with it. However, “oncoplastic surgery is the so-called third way between standard organ-conserving operations and mastectomy” [13].

Currently, there are many options for oncoplastic resections [14, 15]. The technique and method of the operation is dictated by the oncological situation, the shape of the breast, specific features of the state of tissues, skills of the surgeon.

The development of specific methods for the mammaplasty using glandular tissue for various tumor localizations together with radical surgery is important in modern oncological surgery.

In our opinion, the advantage of oncoplastic breast surgery consists in the possibility of removing large volumes of glandular tissue if the breast are large and reconstructing the glandular shape using various techniques of reduction mammaplasty [16, 17, 28–32], which can also be used in patients after neoadjuvant therapy which results in partial or complete regression if the patient wishes to perform an organ-conserving treatment [18, 19]. For this type of surgery, morphological evaluation of the margins of the resection is mandatory [20–27].

Moreover, an important aspect here is that surgical intervention must be safe, because it is complemented by not only the reduction in the size of the gland, but also by the transfer of the nipple-areolar complex (NAC). “To achieve long-term aesthetic results by a safe way is the goal of reduction mammaplasty” [33]. In 1960, I. Pitanguy et al. [34] formulated the principles of safe reduction mammaplasty: en-bloc resection, skin detachment from the gland and gland detachment from the large pectoral muscle are minimal or absent, transfer of NAC to the dermoglandular pedicle, sufficient reduction in the size of the breast, minimal scarring, aesthetic long-term results. Therefore, when performing oncoplastic resections, the oncologist is facing two tasks simultaneously. They are: to carry out a radical oncological operation and to contribute to the achievement of stable aesthetic results. If it is not possible to perform BCS with an oncoplastic component – either due to small breast sizes or some unfavorable prognosis factors – reconstructive intervention using autologous flaps (TRAM, TDL) or artificial materials can be used when subcutaneous/ skin sparing mastectomy is necessary.

The purpose of our work was the creation of various techniques of oncoplastic breast surgery, applicable for the appropriate localization of breast cancer and the evaluation of surgical, oncological and aesthetic results.

Material and methods

From 2013 to 2017, in the P.A. Hertsen Moscow Oncology Research Center, organ-conserving surgery were performed in 570 patients with BC with an average age of 54.2. Stage 0 was diagnosed in 26 cases (4.6 %), I T₁N₀M₀ – 296 (51.9 %), IIA T₀N₁M₀ – 1 (0.2 %), T₁N₁M₀ – 79 (13.8 %), T₂N₀M₀ – 84 (14.7 %), IIB T₂N₁M₀ – 32 (5.6 %), IIB T₃N₀M₀ – 2 (0.4 %), IIIA T₁N₂M₀ – 19 (3.3 %), T₂N₂M₀ – 7 (1.2 %), T₃N₁M₀ – 1 (0.2 %), T₃N₂M₀ – 2 (0.4 %), IIIC T₁N₃M₀ – 5 (0.9 %), T₂N₃M₀ – 14 (2.4 %), IIIB

T₄N₀M₀ – 1 (0.2 %), IV T₁N₁M₁ – 1 (0.2 %). Most patients were in menopause – 70.7 %. Breast cancer on the right side had 48.6 % of the patients, on the left side – 51.4 %. Neoadjuvant therapy was conducted in 31 cases, 4 of which had breast cancer antiestrogen hormone therapy. Partial regression (PR) was established in 91.4 % of cases, complete regression (CR) – 8.6 %. Tumor localization in the upper-outer quadrant was diagnosed in 248 patients (43.5 %), lower-outer – 48 (8.4 %), lower-inner in 25 (4.4 %), upper-inner – 58 (10.2 %), the central one – 30 (5.2 %), 71 (12.5 %) on the border of the upper quadrants, 28 (4.9 %) – on the border of the lower quadrants, 49 (8.6 %) – on the border of the outer quadrants, the border of internal – 13 (2.3 %).

All patients received ultrasound, mammography, trepan biopsy of the tumor with histological and immunohistochemical studies, puncture biopsy of lymph nodes according to indications, radiography or computed tomography of the chest, ultrasound of the abdomen, scintigraphy of the bones of the skeleton, clinical and biochemical studies of blood and urine as a comprehensive examination.

Radical resection in the standard version was performed in 290 patients with breast cancer, oncoplastic breast surgery in various modifications – in 280. Patient classification according to the type of OPS is presented in Table 1. Invasive cancer without signs of specificity was diagnosed in 468 (82.1 %) patients, invasive lobular – 42 (7.4 %), combined – 20 (3.5 %), other forms, including in situ – 40 (7 %). Simultaneous reduction mammaplasty on the contralateral side was performed on 83 patients (29.6 %) with OPS.

All patients after the organ-conserving surgical treatment received radiation therapy. Radiation therapy for the breast was carried out in a single focal dose 2.5 Gy to the total focal dose 45 Gy with a boost on the tumor bed in a single focal dose 3 Gy to the total focal dose 60 Gy. If necessary, radiotherapy of the regional areas was carried out in a single focal dose 2.5 Gy to the total focal dose 45 Gy. Patients received chemotherapy, targeted therapy and hormone therapy according to the indications in depending the disease stage and the immunohistochemical type of the tumor.

Methods of oncoplastic breast surgery

The choice of the specific method of organ-conserving surgery depended on the location of the tumor, its size, immunological, chemical and histological type of tumor, breast size, tumor-to-breast volume ratio, patient’s decision. The types of OBS used in 280 cases are presented in Table 1.

Each procedure of oncoplastic resection is based on preoperative marking, which means that the median line, midline of the breast, lateral and medial meridians, submammary folds, medial and lateral horizontal lines of incisions, new location of the nipple-areola complex, and glandular pedicle are marked. Whatever method was applied, the breast sector with tumor was removed together with the fascia of the large pectoral muscle, urgent morphological examination of the edges of the resection was performed, the tumor bed was labeled with metal clips, an additional

Table 1
Distribution of patients according to the type of oncoplastic breast surgery

Type of Resection		Number of Patients	
	Grandular Pedicle	The absolute number of patients	%
Method developed by E. Hall-Findlay	Upper-Medial	25	8.9
	Upper-Lateral	5	1.8
	Combined United	10	3.6
	Combined Dermal Grandular	11	3.9
	Combined Separate	9	3.2
T-invers method	Upper	26	9.3
	Combined United (Method Developed by McKissok)	3	1.1
	Lower	81	29
Method developed by Madlen Lejour	Upper	10	3.6
Method developed by Grisotti	Lower Dermal Grandular	4	1.4
Method developed by Hammond		2	0.7
Thoracoepigastral flap		2	0.7
SBW-plastic method		27	9.6
Round-Block method		35	12.5
Batwing method		18	6.4
Latissimus dorsi flap		5	1.8
Triangular sliding flap		7	2.5
Total Number		280	100

incision was made for lymphodissection, which is a generally accepted technique) and vacuum drainage of the wound. The volume of lymphadenectomy was determined depending on the presence or absence of metastatically altered lymph nodes according to clinical and instrumental examination and intraoperative examination of the sentinel lymph node.

Oncoplastic breast surgery by M. Lejour

The technique combined the use of the upper glandular pedicle to move the NAC, the central resection of the parenchyma, wide skin detachment from the vertical incisions. The operation was performed at a length of the lower slope of no more than 10 cm and it was terminated by the formation of a vertical postoperative scar (Fig. 1, 2).

Oncoplastic breast surgery by an inverted T type on the upper glandular pedicle

The technique included the use of the upper glandular pedicle to move the NAC, resection of the central and lower parts of the parenchyma. The operation was performed when the tumor was localized in the lower quadrants (Fig. 3), the length of the lower slope was over 10 cm and it was terminated by the formation of a scar of an inverted T pattern (Fig. 4). This technique was used in 26 cases of breast cancer.



Fig. 1. Cutaneous incisions according to the preoperative marking (M. Lejour's technique)

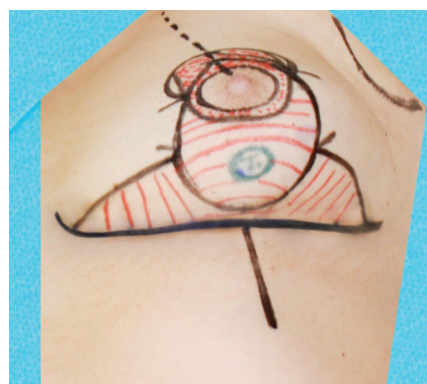


Fig. 3. Preoperative marking with the technique of an inverted T on the upper pedicle with the marking of the tumor area



Fig. 2. Type of postoperative wound (M. Lejour's technique)

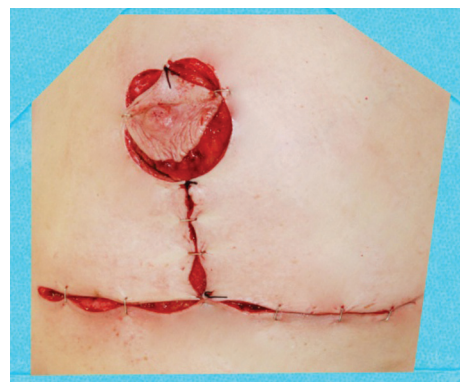


Fig. 4. Type of postoperative wound after using the technique of an inverted T on the upper pedicle

Oncoplastic breast surgery using an inverted T on the lower glandular pedicle

The procedure included the use of the lower glandular pedicle to move the NAC (Fig. 5), the resection of the parenchyma of the border of the upper quadrants, the lower lateral and medial glandular triangles. The operation was performed when the tumor was localized on the border of the upper quadrants, the length of the lower slope was over 10 cm and it was terminated by the formation of a scar of an inverted T (Fig. 6). This type of oncoplastic resection was used in 81 cases of breast cancer patients.



Fig. 5. Lower de-epidermized glandular pedicle



Fig. 6. The view of the reconstructed breast

Oncoplastic breast surgery by E. Hall-Findlay

This method of mammoplasty in patients with breast cancer is based on the use of de-epidermal medial, upper medial or upper-lateral glandular pedicle (Fig. 7, 8). The use of this method of mammoplasty is advisable if there are I–IV perforators of the a. thoracica interna, the surface branch of the a. thoracica lateralis, blood supplying and providing a venous outflow from the used glandular tissues.

The operation in its various modifications was performed in 60 cases of BC.



Fig. 7. Operating wound. De-epidermal zone corresponds to the marking of the glandular pedicle (E. Hall-Findlay's modified technique)



Fig. 8. Type of postoperative wound

Oncoplastic breast surgery by Round-block

Preoperative marking included lines of the outer and inner incision and on the area between them epidermis was removed (Fig. 9). A section of breast with a tumor was separated, with margins of resection of not less than 5 mm in circumference. After the removal, the sector was sent for urgent morphological examination.

The technique was applied in 35 patients with BC.

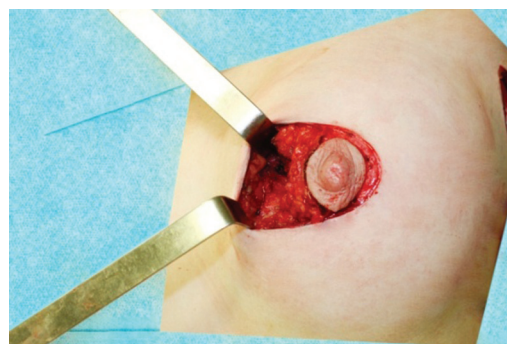


Fig. 9. Type of surgical wound after the removal of the sector with the tumor at the border of the inner quadrants

Oncoplastic breast surgery by the method of Batwing

The preoperative marking is of the type “bat wings”; skin and subcutaneous tissue were dissected (Fig. 10), the central breast fragment with the nipple-areolar complex and the fascia of the muscle pectoralis major was excised and sent for urgent morphological investigation of the margins of resection.

The technique was used in 18 patients with BC.



Fig. 10. Comparison of the edges of the wound after oncoplastic resection using the “Batwing” technique

Oncoplastic breast surgery by the method of Grisotti

A special feature concerning this method consisted in the replacement of the volume of the removed breast with a lower dermal glandular pedicle, including a glandular fat flap from the lower quadrant of the breast with a rounded epidermis zone, an analogue of the nipple-areolar complex (Fig. 11).

The technique was applied in 4 cases of BC.



Fig. 11. Type of postoperative wound after oncoplastic resection of breast by Grisotti method

Oncoplastic breast surgery by SBW-technique

There are several modifications of this technique which depend on whether the line of the incision is S- or W-shaped (Fig. 12). These modifications are combined into a single term SBW-plastic surgery, introduced by Norbert K. Schönendorf. This technique does not only include the removal of the glandular tissue with the tumor, but also the skin flap over it in the form of a half-oval and circular de-epidermization of the skin around the nipple [6].



Fig. 12. Type of postoperative wound after oncoplastic resection of breast by SBW-technique

The technique was used in 27 patients with BC.

Results and discussion

After an urgent and planned morphological study positive margins of resection were revealed in 10 patients, which required resection of the edges to a negative state of them in case of an urgent intraoperative response and mastectomy – in case of a planned response. Within 4 years, local recurrences were detected in 4 patients (0.7 %), which required a mastectomy with a one-stage reconstruction. In 1 patient (0.2 %), the disease progressed as metastases to the lung – in this case lobectomy and a necessary chemotherapy were conducted.

In 100 % of patients in the postoperative period, lymphorrhea caused by regional lymphadenectomy was observed. There was a direct interdependence between the volume of lymphadenectomy and the indices (duration and volume) of lymphorrhea. In 1.1 % (6) cases, at the initial stages of the development of the techniques, marginal skin necrosis was observed when performing operations with scar formation of a pattern-invers, in 0.4 % (2) – marginal necroses of areola, of which 0.2 % had free autotransplantation of the nipple-areolar complex after reduction mam-moplasty on the contralateral side. Since 2013, all patients were under the supervision of an oncologist of the local polyclinic and an oncologist of the P.A. Hertsen Moscow Oncology Research Center. During the first year after the operation, follow-up examinations, ultrasound examination of the breast, regional areas and abdomen were performed once in 3 months, during the second year – once in 6 months, mammography – once a year. Aesthetic results were evaluated on the basis of both subjective and objective data. The parameters that were evaluated are as follows: the breast symmetry, the location and the look of the nipple-areolar complexes, the condition of the postoperative scars, the volume of the reconstructed breast, the presence or absence of defects in the reconstructed mammary glands, the patient’s and the surgeon’s satisfaction of the results of the operation. Cosmetic results were defined as excellent in 70 % cases, good – 25 %, satisfactory – 5 %.

Conclusion

Oncoplastic breast surgery in patients with BC is:

- 1) ablast surgery with a good cosmetic result;
- 2) unlike radical mastectomy with one-stage reconstruction, oncoplastic resection is less traumatic, requires less operation time, is characterized by less blood loss and a shorter postoperative rehabilitation period;
- 3) is an adequate alternative to radical mastectomy with reconstruction on condition of proper selection of breast cancer patients;
- 4) leads to a more rapid psychological recovery of patients due to the sense of the integrity of the organ.

Recommendations

If there are indications for organ-conserving treatment of breast cancer and the patient’s decision concerning this surgery, the patient should be offered methods of oncoplastic surgery for the prevention of psychological and emotional stress, effective rehabilitation, and a quick return to active social life.

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Современные направления органосохраняющего лечения и онкопластическая хирургия у больных раком молочной железы

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Реферат

Введение: Приоритетное направление современной клинической онкологии – функционально-щадящее и органосохраняющее лечение. В структуре злокачественных новообразований у женщин рак молочной железы в 2017 г. составил 21,1 %. В настоящее время широкое внедрение в практику получили онкопластические радикальные резекции. Данный термин подразумевает резекцию молочной железы по поводу рака с использованием методов пластической хирургии для восстановления формы молочной железы, в большинстве случаев с одномоментной коррекцией контралатеральной молочной железы.

Цель работы: Разработка различных методов онкопластических резекций, применимых для соответствующих локализаций рака молочной железы и оценка полученных хирургических, онкологических и эстетических результатов.

Материал и методы: С 2013 по 2017 г. в МНИОИ им. П.А. Герцена органосохраняющие операции выполнены 570 больным РМЖ средним возрастом 54,2. 0 стадия диагностирована в 4,6 %, I – 51,9 %, IIА – 28,7 %, IIВ – 6 %, IIIА – 5,1 %, IIIВ – 0,2 %, IIIС – 3,3 %, IV – 0,2 %. Радикальные резекции в классическом варианте были выполнены у 290 больных РМЖ, онкопластические резекции в различных модификациях – 280. Всем больным после операции выполнена лучевая терапия.

Результаты: У 10 пациенток при срочном и плановом морфологическом исследовании были выявлены позитивные края резекции, что потребовало рerezекции краев до негативного состояния в случае получения срочного интраоперационного ответа и мастэктомии – в случае получения планового ответа. В течение 4 лет локальные рецидивы были выявлены у 4 пациенток (0,7 %), что потребовало выполнения мастэктомии с одномоментной реконструкцией. У 1 пациентки (0,2 %) диагностировано прогрессирование заболевания в виде метастазов в легкое. Косметические результаты отмечены как отличные в 70 % случаев, хорошие – 25 %, удовлетворительные – 5 %.

Выводы: При наличии показаний к органосохраняющему лечению РМЖ и желании больной на хирургическом этапе лечения пациентке должны быть предложены методики онкопластической хирургии с целью эффективной реабилитации, профилактики психоэмоциональных стрессов и быстрого возвращения к активной социальной жизни.

Ключевые слова: рак молочной железы, органосохраняющее лечение, онкопластическая хирургия, онкопластические резекции, местные рецидивы

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