

Cosmetic outcome assessment after conservative surgery followed by radiotherapy in patients with early breast cancer

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ABSTRACT

The cosmetic effect achieved after conservative surgical treatment of early breast cancer in 192 patients has been evaluated and two methods of conservative surgery have been compared in terms of their early and long-term cosmetic outcomes. Excellent and good long-term results have been reached in 86.4% cases as assessed by the surgery team and in 82% in the opinion of the patients.

Quadrantectomy has been found to be a very good alternative to local wide excision only in the case of the upper outer quadrant location of the tumour. A definite negative effect of postoperative radiotherapy on the long-term cosmetic result has been clearly demonstrated, thereby providing evidence that sector resection and axillary dissection can be performed with good cosmetic results. This study further substantiates the role of breast conserving surgery and definitive radiation in the treatment of early-stage breast cancer.

Key words: conservative surgery, radiotherapy, breast cancer, cosmetic outcome

INTRODUCTION

The treatment of early-stage breast cancer has evolved over the past decades from one of more aggressive surgery in the form of either radical mastectomy or

modified radical mastectomy towards breast conservation with irradiation. The equivalence of breast conserving surgery and radiotherapy with mastectomy, in terms of traditional end-points such as survival, local recurrence and distant recurrence, is now well established¹⁻⁴. Several studies⁵⁻⁷ have indicated that mastectomy patients suffer high levels of anxiety and/or depression following and presumably largely related to their diagnosis and surgery. The psychological effects of breast conserving surgery and radiotherapy are less well understood. For many years clinicians have intuitively assumed that the obvious cosmetic advantage of breast conservation over mastectomy must be accompanied by a corresponding psychological advantage. Only recently, however, have some of these assumptions been borne out, with evidence for improved self-image, better adaptation to surgery, better psycho-sexual functioning and lessened fear of recurrence in patients treated with breast conservation⁸⁻⁹.

Moreover, prospective randomized trials have reported that conservative surgery and radiotherapy can achieve approximately 90% local control without any

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impairment of survival at 5-10 years, as compared to mastectomy in early breast cancer^{10,11}. As a result, the acceptance of conservative procedures has increased considerably, and the cosmetic outcome has become an important endpoint. A number of retrospective evaluations of the cosmetic outcome, focusing on the effect of specific patient characteristics and treatment factors, has been published¹²⁻¹⁶. Good-to-excellent cosmetic results have been reported in up to 90% of the cases, as evaluated by the women themselves, compared to 60-80% evaluated by other observers. Among the factors that have been mentioned as influencing the results are the volume of the excised tissue, the tumour size, the type of incision, whether an axillary dissection was conducted, the size of the breast, body weight, the location of the tumour, administration of chemotherapy and the type and dose of radiation administered to the breast. In most of these studies, the methods and the time after treatment when the evaluations were made not standardized. The surgical and radiotherapeutic procedures usually did not adhere to a specified protocol. The impact of radiotherapy on the cosmetic outcome has not been evaluated in a randomized series.

Since the pioneering research of Veronesi^{17,18}, who showed that radical mastectomy could be successfully substituted with the breast quadrant excision accompanied by axillary lymphadenectomy, the conservative surgical treatment has replaced the classical Patey-Maden's mastectomy method. However, although the new method followed by postoperative radiotherapy fully guarantees oncological radicalism, its cosmetic outcome often turns out unsatisfactory. It is for this reason that an alternative method of breast conserving surgery, referred to as local wide excision (LWE) of the tumour accompanied by axillary dissection and followed by radiotherapy, was introduced and is presently the most frequently applied type of conservative surgery in clinical practice¹⁹⁻²¹.

The research aimed at evaluation of the cosmetic result of conservative treatment in patients with early advanced breast cancer operated at the Department of Surgical Oncology and Breast Cancer of the Polish Mother's Memorial Hospital in Lodz.

METHODS

In the years from 1992-2002, in the Polish Mother's Memorial Hospital in Lodz- a total of 1092 women with breast cancer were operated, 210 of these women qualified for breast conserving treatment. 188 of these patients had a tumour with diameter smaller than or equal to 2 cm, while the tumour in 22 women was 2-3 cm in diameter. Based on postoperative

histopathological examination 18 women (8.6%) out of 210 were subjected to radical mastectomy in view of multifocality or intraductal component of the tumour.

Eventually, the research covered 192 patients after breast conserving surgery. 104 of them (54.2%) underwent quadrantectomy (QRT) and the remaining 88 women (45.8%) had LWE. Standard postoperative radiotherapy was applied in all cases. The age of the patients varied from 22 to 75 with the average of 50.3 for the whole group.

The choice of the surgery type depended on the tumour location and the size and shape of the breast (Fig.1).

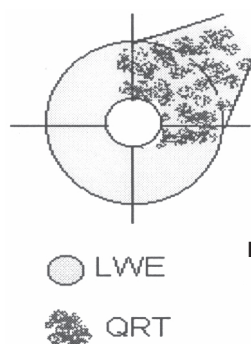


Fig. 1. A diagrammatic representation of the local wide excision (LWE) and the quadrantectomy (QRT) procedure.

Local wide excision was employed to tumours located in any quadrant whereas QRT was applied only to tumours in the upper outer quadrant and its close neighbourhood. Location in the centre excluded and type of breast conserving treatment.

The cosmetic result was assessed twice in the four-grade scale (excellent, good, fair, poor) modified as proposed by Noguchi and Al.-Ghazal^{22,23}.

Briefly, the cosmetic outcome was assessed by a scoring system using nipple deviation, irregularity of Moire's curve, breast atrophy, skin change, and surgical scar as parameters for assessment. The nipple deviation was assessed as % difference between the anterior breast surface length from the sternal notch to the nipple on the affected side and that on the healthy side, with the patient in an erect position. The degree of nipple deviation was scored as 2 for a difference less than 5%, 1 for a difference of 5-10%. 0 for a difference more than 10%. The breasts were examined for symmetry with a Moire topography camera (Moire camera FM 3011, Fuji Photo Optical Co., Ohmiya). The interval between each topographical line was set to be 5 mm in height. Irregularity of Moire's curve was scored as 2 for no unsymmetrical topographical line, 1 for less than 3 unsymmetrical topographical lines, 0 for 3 or more unsymmetrical topographical lines. Furthermore, the breast atrophy, skin change, and surgical scar were subjectively

assessed by one of the present authors. The degree of breast atrophy was scored as 2 for not atrophic, 1 for slightly atrophic, 0 for atrophic. The skin change was scored as 2 for no change, 1 for slightly pigmentary, and 0 for telangiectasia present. The degree of surgical scar was scored as 2 for not visible in an anterior view, 1 for slightly visible, 0 for remarkable. The cosmetic outcome was assessed by summing the scores of subjective and objective assessments: 9-10 as excellent, 7-8 as good, 5-6 as fair, and <5 as poor.

RESULTS

The assessment was performed separately by the patients and by the surgery team two weeks after surgery but before radiotherapy and six weeks after the radiotherapy was over. The evaluation results are presented in Tables 1 and 2. The cosmetic outcome was rated as excellent in 72 patients (37.5%) following second week after surgery and as good in 110 women (57.3%). Overall favourable outcome was noted in 182/192 women (94.8%) while 158 of these patients (82.3%) gave a similar rating six weeks after radiotherapy.

The cosmetic assessment of the surgical team was also compatible with 75(39%) rating as excellent and 110(57.3%) as good. After 6 weeks of radiotherapy, 50 women (26%) and 116 women (60.4%) were considered excellent and good respectively with respect to outcome following irradiation (Table 2). The impact of surgery by QRT and LWE as assessed by the patients were 42% and 33.6% being excellent and 52% and 61.5% respectively for these two surgical procedures (Table 3). Similarly, the outcome of the 2 surgical methods as rated by the surgical teams were 42%

and 36.5% being excellent and 54.5% and 59.6% being good respectively for the QRT and LWE procedures at 2 weeks. The respective ratings for the six month period were 22.7% and 28.8% for excellent results and 63.6% and 57.7% for good outcomes using QRT and LWE methods (Table 4). Among the factors lowering the position cosmetic effect in the second week after surgery (before radiotherapy) include visible changes in breast size and shape, nipple asymmetry and size of the postoperative scar. Postoperative scar size was least tolerated by 58% of women subjected to QRT (Table 5).

The distribution of the cosmetic outcome evaluation results depending on the applied breast conserving treatment method as presented in Tables 3 and 4.

The following factors have been found to have a negative impact on the level of the cosmetic effect perception:

- changes in breast size,
- changes in breast shape (deformity, retraction),
- nipple deviation (asymmetry)
- size of postoperative scar,
- postradiation skin changes (pigmentation, teleangectasiae, oedema, ulceration),
- changes in breast consistency (postradiation fibrosis, induration).

The frequency of occurrence of these factors, depending on the evaluation time and on surgery treatment type, are shown in Tables 5 and 6.

TABLE 1
Cosmetic outcome assessed by patients (n=192).

	Second week after surgery (before radiotherapy)	Six weeks after radiotherapy
Excellent	72 (37.5%)	50 (26%)
Good	110 (57.3%)	108 (56.3%)
Excellent+Good	182 (94.8%)	158 (82.3%)
Fair	9 (4.7%)	29 (15.1%)
Poor	1 (0.5%)	5 (2.6%)
Fair+Poor	10 (5.2%)	34 (17.7%)

TABLE 2
Cosmetic outcome assessed by surgery team

	Second week after surgery (before radiotherapy)	Six weeks after radiotherapy
Excellent	75 (39%)	50 (26%)
Good	110 (57.3%)	116 (60.4%)
Excellent+Good	185 (96.3%)	166 (86.4%)
Fair	7 (3.6%)	21 (10.9%)
Poor	0	5 (2.6%)
Fair+Poor	7 (3.6%)	26 (13.5%)

TABLE 3
Cosmetic outcome of the two surgery methods assessed by patients (n=192)

	Second week		Six months	
	QRT	LWE	QRT	LWE
Excellent	37 (42%)	35 (33.6%)	23 (26.1%)	27 (25.9%)
Good	46 (52%)	64 (61.5%)	50 (56.8%)	58 (55.7%)
Excellent+Good	83 (94.3%)	99 (95.2%)	73 (83%)	85 (81.7%)
Fair	4 (4.5%)	5 (4.8%)	12 (13.6%)	17 (16.3%)
Poor	1 (1.2%)	0	3 (3.4%)	2 (1.9%)
Fair+Poor	5 (5.7%)	5 (4.8%)	15 (17%)	19 (18.2%)
TOTAL	88 (45.8%)	104 (54.1%)	88 (45.8%)	104 (54.1%)

TABLE 4
Cosmetic outcome of the two surgery methods assessed by surgery team.

	Second week		Sixth month	
	QRT	LWE	QRT	LWE
Excellent	37 (42%)	38 (36.5%)	20 (22.7%)	30 (28.8%)
Good	48 (54.5%)	62 (59.6%)	56 (63.6%)	60 (57.7%)
Excellent+Good	85 (96.6%)	100 (96.2%)	76 (86.4%)	90 (86.5%)
Fair	3 (3.4%)	4 (3.8%)	9 (10.2%)	12 (11.5%)
Poor	0	0	3 (1.6%)	2 (1.9%)
Fair+Poor	3 (3.4%)	4 (3.8%)	12 (13.6%)	14 (13.5%)
TOTAL	88	104	88	104

TABLE 5

Factors lowering the cosmetic effect assessment result in the second week after surgery, before radiotherapy.

Factor	Number of cases	
	QRT (n=88)	LWE (n=104)
Visible change in breast size	16 (18.2%)	15 (14.4%)
Change in breast shape	15 (17%)	23 (22.1%)
Nipple asymmetry	2 (2.3%)	14 (13.5%)
Size of postoperative scar	51 (58%)	17 (16.3%)

TABLE 6

Factors lowering the cosmetic effect assessment result in the sixth month after the end of radiotherapy.

Factor	Number of cases	
	QRT (n=88)	LWE (n=104)
Visible change in breast size	18 (20.5%)	17 (16.3%)
Change in breast shape	18 (20.5%)	26 (25%)
Nipple asymmetry	4 (4.5%)	14 (13.5%)
Size of postoperative scar	30 (34.1%)	12 (11.5%)
Postradiative skin changes	30 (34.1%)	35 (33.7%)
Breast consistency changes	20 (22.7%)	22 (21.2%)

DISCUSSION

Good and excellent long-term cosmetic effect after breast conserving treatment has been achieved with 86.4% patients in the assessment made by the surgery team and with 82% in the opinion of the patients, Comparing with reports by other authors the result proves to be very good and is similar to that presented by Halyard²⁴⁻²⁶. This may be due to the considerably strict criteria qualifying for conservative surgery treatment. In patients with breasts of small or medium size, the tumour diameter never exceeded 2 cm. In the cases of tumours of 2-3 cm in diameter, the breasts of the patients qualified for conservative treatment were of big sizes.

The influence of breast size on the cosmetic effect was noticed by Liljegren as early as in the year 1993²⁷.

According to numerous reports, the cosmetic outcome of QRT is usually worse than that of local wide excision, especially when the tumour is located in a lower inner quadrant^{19,20,21,27,28}. That is why QRT was applied only for tumours located in the upper outer quadrant, which allowed achievement of good cosmetic effects.

With this tumour location, nipple asymmetry as well as changes in breast shape were significantly less frequent than after LWE.

Our research definitely confirmed the negative impact of postoperative radiotherapy on the final cosmetic outcome. Postradiative complications can damage even excellent cosmetic result of conservative surgery, which is in agreement with reports of numerous authors^{25,27,29}. The only aesthetic advantage of radiotherapy observed so far is its positive influence on postoperative scar. This is of special importance for QRT scars, which are usually longer than those resulting from tumorectomy.

It is noteworthy that blind evaluation by other observers is more sensitive than evaluation by the patients themselves of differences due to e.g radiotherapy or postoperative infections. From a clinical standpoint, however, it is particularly relevant to learn as much as possible about the patient's view.

In this study and in several others, where both the patients' views and an observers' opinions have been given, the patients have given higher scores for

satisfaction³⁰⁻³². This finding may have several different or interacting explanations: patients, when asked by a person involved in their treatment about the cosmetic results, may not want to express any criticism. If this is thought to be a major problem, additional evaluations by an independent panel, such as that used in this study, may be a prerequisite for valid results. To retain the breast even if the treated breast differs clearly from the other, may be so essential for many women choosing conservative surgery that its appearance is of less importance to them.

In conclusion, this self-evaluation series demonstrates good patient acceptance and perception of the end result of their treatment program. The extent of the primary surgical procedure is the most significant

determinant of final appearance and overall satisfaction. Axillary irradiation also detracts significantly from the overall satisfaction due to a higher incidence of arm oedema. The reporting of a significant incidence of breast sensitivity, breast pain and shoulder pain have important implications in the counselling of patients prior to conservation treatment. However, significant potential for improvement of aesthetic and functional results in conservation treatment exists in our patients, From our data these improvements may be mainly achieved by minimizing the primary surgery and avoiding axillary irradiation if possible. The questions of the omission of radiotherapy to the internal mammary chain, supra-clavicular area, boost to the primary site and the use of quadrant radiotherapy alone, remain unanswered to be randomized trials.

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