Ann R Coll Surg Engl 1998; **80**: 173–177

An audit of outcome including patient satisfaction with immediate breast reconstruction performed by breast surgeons

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Key words: Mastectomy; Breast reconstruction; Tissue expansion; Patient satisfaction

Reconstruction of the female breast is becoming ever more frequently requested by patients after mastectomy for cancer. One of the least complex techniques is that of local tissue expansion with a permanent prosthesis. We present our experience and the clinical outcomes of the first 100 patients to have undergone surgery in the 4 years since the introduction of this method of breast reconstruction in our unit. A retrospective study was performed with a detailed questionnaire being sent to each patient for subjective assessment of satisfaction. Data were also collected on the rates of clinical infection of the prosthesis and the need for further surgery, including capsulotomy, nipple reconstruction and contralateral procedures.

With 84% expressing their satisfaction at the final result, immediate breast reconstruction is both feasible and highly acceptable to the majority of patients.

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Immediate breast reconstruction after mastectomy for breast cancer affects neither survival nor recurrence *(1)*. Several studies have emphasised the psychological benefits of reconstructing the female breast *(2,3)*. In the United Kingdom, immediate breast reconstruction after mastectomy for breast carcinoma has been available to few women. The modern breast surgeon has acquired reconstructive skills enabling more women to be offered immediate restoration of body image with primary reconstruction; but do the results justify such intervention?

In our unit, breast reconstruction using a permanent tissue expander prosthesis has been carried out since 1992. We present an audit of our experience with this technique and a patient satisfaction survey undertaken retrospectively since that time.

Patients and methods

The case records of the first 100 patients to undergo breast reconstruction between 1992 and 1996 were reviewed. All patients were under the care of the same surgeon (RC) and the technique employed was reconstitution of the breast mound with the Becker Expander/ Mammary Prosthesis (Mentor, California, USA). Pre-

operative counselling included details of the operative procedure, expansion of the prosthesis as an outpatient, the risks of implant infection and capsular contraction. Additionally, all patients were shown photographs of good, satisfactory and suboptimal results. This was facilitated by the presence of the clinical nurse specialists working as an integral part of the unit team and, indeed, their role was frequently praised by the patients.

Standard total mastectomy was followed by the insertion of the prosthesis into a subpectoral pocket during the same operation. There were no absolute exclusion criteria and all those requiring mastectomy were offered reconstruction.

The injection port was placed in the medial wall of the axilla, subcutaneously for ease of location, but avoiding areas of potential discomfort such as the band of the brassiere. The expansion procedure was started 2 weeks postoperatively and continued at weekly intervals in the outpatient department. Over-expansion was achieved before the volume being slightly reduced in order to reproduce an element of ptosis, until both patient and surgeon considered the shape to be optimal. Finally, the injection port was removed as a day-case procedure under local anaesthesia. In addition, all patients were offered ipsilateral nipple reconstruction and aesthetic surgery to the contralateral breast as necessary.

In order to audit our service a simple postal questionnaire (Fig. 1) was sent to all patients with the aim of obtaining a subjective analysis of patient satisfaction.

Assessment of the early and late complications was also made and utilised in assessing any learning curve effect.

Name:
Date of Operation: Number:

Information: Did you receive information about reconstruction:

1. Before surgery Yes No
2. See photographs of reconstruction before surgery: Yes No
3. Information about the expansion procedure and aftercare: Yes No
4. Did you receive enough information: Yes No
5. Other comments:

After surgery:

Was the discomfort: Severe:
Moderate:
Mild:
Was the discomfort controlled by the painkillers or not:

Was the healing after the operation:
as you expected:
better:
worse:
Comments:

Cosmetic results:

1. Are you satisfied with the end results: Yes No
2. If yes; how satisfied are you: 1 2 3 4 5 6 7 8 9 10 (in a scale out of 10: 1 = most unhappy, 10 = most satisfied)
3. Do you think that better cosmetic results can be achieved: Yes No
4. Would you recommend the same surgical reconstruction to other patients with a similar condition: Yes No
5. Other comments

Figure 1. Sample patient questionnaire.

Results

General clinical details

The median age at operation was 52 years (range 25–74 years) with 34% presenting through the NHS Breast Screening Programme and the remaining 66% with either a symptomatic breast lump (63%) or Paget's disease of the nipple (3%).

Thirty-nine women received radiotherapy, 26 chemotherapy and 46 Tamoxifen hormonal adjuvant therapy.

Revision surgery for capsular contraction was undertaken in 29%; there was no relationship of capsule formation to either radiotherapy or chemotherapy. All patients were offered ipsilateral nipple reconstruction, but only 4% felt further surgery was necessary. Contralateral reduction (five patients), mastopexy (two patients) and augmentation (one patient) were undertaken in the pursuit of symmetry for those with particularly large or small breasts.

Over the study period of 4 years, of the original 100 patients, seven died as a result of metastatic disease, one emigrated, another died as a result of cardiovascular disease and 76 returned their questionnaire yielding a final response rate of 84%.

Preoperative information

Sixty-two patients (82%) indicated that they were satisfied with the information given before surgery. Twelve (16%) were dissatisfied in this regard, with the most common complaint being insufficient details about the expansion procedure and its duration. Perhaps significantly, five of these 12 women had their prosthesis removed because of infection. Two others complained that they were admitted for surgery with insufficient time to allow assimilation of all the information. Two patients did not comment.

Postoperative pain and its control

Three grades of pain were offered and Table I shows that the majority (83%) graded it as either mild or moderate. A

Table I. Postoperative pain and its control

		Controlled	*Not controlled*	*No comment*
Mild	15	14	1	0
Moderate	48	44	1	3
Severe	11	7	3	1
No comment	2	1	0	1
	76	66	5	5

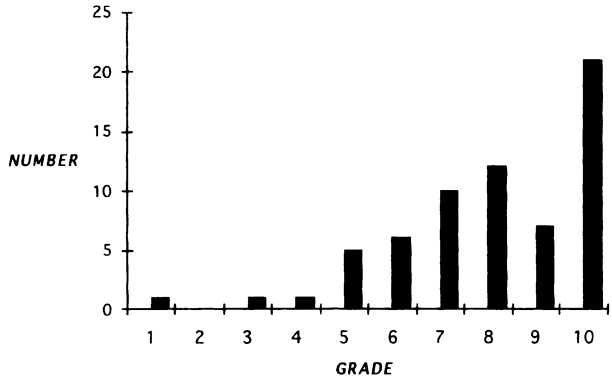

Figure 2. Patient satisfaction scores.

similar number (87%) found their pain well controlled by postoperative analgesics, but 60% of those for whom the analgesia was insufficient graded the pain as severe.

Patients' expectation of healing

The majority (78%) felt the postoperative healing was equal to or in excess of expectations. It is noteworthy that half of those who claimed the healing to be worse than they had expected also graded the pain as severe, and 83% of this group required removal of the prosthesis because of infection.

Aesthetic satisfaction

Overall, 64 women (84%) expressed satisfaction with the end result. In an attempt to obtain a more precise assessment we also offered a visual analogue scale (from 1–10 where 1 indicated least and 10 greatest satisfaction) for the patients to provide their own subjective grade. Figure 2 shows that the median score was 8 and the mode 10. Twelve (16%) expressed dissatisfaction and all of these, except one, required either removal of the prosthesis or capsulotomy.

Of the 13 patients (17%) who failed to provide a numerical grade, 10 (77%) underwent either removal or capsulotomy and a single patient felt that the procedure was insufficiently complete for her to comment.

Recommendation to other patients

As a further assesment of the patients' satisfaction we asked whether they felt able to recommend the experience to other patients. A large majority (83%) would not hesitate to recommend the procedure and, again, half of those not recommending had experienced infection of the prosthesis with consequent removal. This latter fact suggests that, despite their problems, half of those requiring removal would actually recommend the procedure.

Table II. Procedure-related morbidity and associated adjuvant therapies

	Total	*Chemotherapy*	*Radiotherapy*
Removals			
Infection	14	2	7
Pain	1	0	0
Valve failure	1	1	1
Other			
Port infection	1	0	0
Infected seroma	1	0	0
Flap necrosis	4	0	0
	20	3	8

Table III. Analysis of infections by experience and operator

	First 50		*Second 50*	
	Operations	*Infections*	*Operations*	*Infections*
Consultant	39 (78%)	4 (10.3%)	29 (58%)	2 (6.9%)
SR	11 (22%)	3 (27.3%)	21 (42%)	5 (23.8%)
	50	7	50	7

Complications and adverse effects

Mortality associated with the surgery has thus far been nil and procedure-related morbidity is summarised in Table II.

The clinical infection rate necessitating implant removal was 14%. In all, 29% have required revision surgery for capsular contraction over the study period and there was no relationship between infection, capsule formation and postoperative radiotherapy or chemotherapy ($P > 0.05$; χ^2 analysis).

In order to evaluate any learning curve effect, we analysed the cases of prosthesis infection by comparison of the first 50 with the second 50 patients. Table III shows that although there were seven infections in each half, the rates had fallen from 10.3% to 6.9% for the procedures performed by the consultant and from 27.3% to 23.8% for the senior registrar (SR).

Discussion

In 1982 Becker *(4)* described his modification of the original Radovan tissue expander *(5)*, to which a valve was attached allowing for gradual inflation as an outpatient procedure. Additionally, he showed that the prosthesis could be left *in situ*, thereby consituting a permanent implant and removing the necessity for a second operative procedure to replace the tissue expander.

Inflation of the prosthesis may be rapid, ie starting 1 week postoperatively with daily saline injections, or gradual, ie weekly injections starting at 2 weeks. Although the difference in subsequent capsular contraction rates has not been shown to be statistically significant

(6,7), it has been our practice to inflate gradually because of greater patient acceptance.

Persoff *(8)* suggests that the ultimate aim of breast reconstruction should be symmetry with the opposite breast. Critics of tissue expansion with permanent prostheses highlight the difficulty in achieving symmetry, particularly with the larger and more pendulous breast; however, this method has several clear advantages over the use of autogenous tissue. Although operative time is slightly extended compared with mastectomy alone, the procedure is less time-consuming and of less complexity than the raising of latissimus dorsi (LD) or transverse rectus abdominis myocutaneous (TRAM) flaps, invariably used as sources of autogenous tissue. The latter techniques also create potential problems including pain, herniation and cosmesis with the donor sites. Locally expanded skin is matched for colour and texture and is sensate, whereas that transplanted from a remote site is not. Procedural failure, although more common, is rectifiable with relative ease compared with the loss of a LD or TRAM flap at rates of 9% and 3% respectively *(9)*. Additionally, the use of tissue expansion in no way proscribes the future use of the more complex tissue transfer techniques if required. Seven women in this study group, with a median follow-up of 27 months (range 2–53 months), have already died from breast cancer and more extensive surgery with attendant higher morbidity may not have been appropriate in these cases. Regarding the important question of cancer surveillance, because the prosthesis is placed subpectorally, follow-up is not prejudiced *(10)*.

Tissue expansion is not without disadvantages, and in this category must be placed a financial burden; the current cost of the system employed in this study is £690, and further demands on resources are made by the additional outpatient attendance for inflation and the removal of the port as a day-case procedure under local anaesthesia.

Although our figure of capsular contraction requiring surgery may appear to be high at 29%, it compares with published figures ranging from 28% at 32 months *(11)* to 33% on a follow-up period of 3 years *(7)*. In addition, this apparently high rate appears not to have adversely affected the very high degree of patient satisfaction.

A major drawback of the implantation of any prosthesis is infection, and we experienced an infection rate of 14%. In only one-half of these could micro-organisms be cultured and six of the seven grew staphylococci. Routine antibiotic prophylaxis consisted of intravenous administration, on induction of anaesthesia, of the third generation cephalosporin, cefotaxime. This policy is currently under review and the need for a more potent antistaphylococcal has been assessed as part of the audit process.

In total, we experienced a failure rate of 16%, one prosthesis being removed because of failure of the valve system and another at the request of the patient because of persistent pain. This compares with the figure of 21% reported by Kroll and Baldwin in 1992 *(9)*.

One particular problem with patient satisfaction studies is the grouping of results so that figures of 100% *(12)* and 92.3% *(13)* have been published for 'good' and 'excellent' grades combined. To avoid this, we asked merely whether the patient was satisfied with the final result. In order to evaluate this more subjectively a visual analogue scale was supplied.

Published response rates for postal satisfaction questionnaires range from 44% *(14)* to 90% *(15)* and it has been suggested that low survey response rates moderately bias satisfaction estimates towards higher values *(16)*. We feel that the high response rate in this study allows confidence with the satisfaction results produced.

The use of the permanent tissue expander prosthesis has been shown to be a safe method of breast reconstruction *(11,17)*. Furthermore, the results which can be achieved using this relatively simple technique are eminently acceptable to the majority of patients, as demonstrated in this study.

We are continuing to evaluate the outcome of this cohort of women as a continuing audit. As follow-up time increases we expect the capsular contraction rate to increase and more to die of their disease. Patient satisfaction too will be further assessed with increasing time from surgery; however, we are currently not able to predict whether this will decrease or increase with time.

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Received 22 December 1997