Latissimus dorsi myocutaneous reconstruction: a study of long-term outcomes in a district general hospital

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ABSTRACT

INTRODUCTION The aim of this study was to evaluate the long-term outcome and durability of both autologous and implant-assisted latissimus dorsi reconstruction in a district general hospital over a 10-year follow-up period.

METHODS A prospective cohort study was carried out using a detailed database of all latissimus dorsi flap reconstructions performed by a single consultant surgeon between 2003 and 2013 at the Royal United Hospital, Bath. The long-term outcome following reconstruction was assessed by analysing all episodes of 'reconstruction-specific' operations required from 6 months after the initial surgery.

RESULTS The study included 110 patients with latissimus dorsi flap reconstructions, 21 autologous and 95 implant-assisted. Radiotherapy was given to 27 patients with reconstructed flaps. Mean follow-up was 69 months. Further reconstruction-specific surgery was needed in 27 (23%) cases, with 5 of these being post-radiotherapy flaps. Implant-related surgery was the most common reason for further surgery. Complications of the implant itself made up 52% of these cases, chronic sepsis being the most common. The rate of symptomatic capsular contracture requiring further surgery was 4.2%. Of these, one of four patients had undergone radiotherapy.

DISCUSSION In our institution, latissimus dorsi reconstruction is durable and safe over the long term, with limited need for further substantial intervention to maintain a good outcome from the initial reconstruction. Autologous flaps were less likely to require further surgery over the long term compared with implant-based reconstructions. The low rate of symptomatic capsular contracture may be due to the protective mechanism provided by the extended harvest flap used.

KEYWORDS

Breast reconstruction – Breast implant – Breast cancer

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Introduction

The latissimus dorsi myocutaneous flap has been used successfully for many years to facilitate breast reconstruction after mastectomy, either as an immediate or a delayed procedure. Traditionally, the volume of the flap is assisted with a prosthetic implant,^{1,2} but more recent technical advances, such as extended harvest of the flap and lipomodelling, have allowed more patients to have a purely autologous reconstruction.³

Despite being the most widely used reconstruction in both the immediate and delayed setting in the 2011 National Mastectomy and Breast Reconstruction Audit,⁴ there has been a decline in its use in the UK owing to the rise in popularity and availability of alternative techniques such as free tissue transfer from the anterior abdominal wall and acellular dermal matrix (ADM) assisted implant-based reconstructions. Reasons include both short-term complications, such as seroma,⁵ as well as long-term adverse effects that include

chronic discomfort, muscle weakness and the durability of the procedure, especially for those requiring an implant to assist the volume of the reconstruction.⁶

While short-term complications and outcomes are frequently reported, the literature for longer-term durability is scarce.⁷ In a series published by Roy *et al*, 37% of patients with latissimus dorsi flap reconstruction required a second operation at some point during the 9-year follow-up period.⁸ The majority of the secondary operations were related to the prosthesis.

The aim of this study was to evaluate the long-term outcome and durability of both autologous and implant-assisted latissimus dorsi reconstruction in a district general hospital under a single surgeon over a 10-year follow-up period. This was achieved by assessing how many patients required additional surgery to maintain a good outcome or to treat subsequent problems and complications. Data looking at the subsequent surgery required were also collated.

Method

A prospective cohort study was carried out using a detailed database of all latissimus dorsi flap reconstructions carried out by a single consultant surgeon between 2003 and 2013 at Royal United Hospital, Bath, UK. Patients were added by the surgeon to the database once they had undergone reconstruction. Records were then maintained regularly following each theatre attendance and clinic appointment. Access to the database was via secure password to maintain patient confidentiality.

The long-term outcome following reconstruction was assessed by analysing all episodes of 'reconstruction-specific' operations that were required at least 6 months after the initial surgery. Any operations in the immediate postoperative period were excluded. Operations for the nipple-areolar complex, prosthesis port removal or for cancer recurrence were also excluded as these did not reflect the durability of the reconstruction.

All flaps were created using an extended harvest,³ whereby additional fat around the margins of the latissimus dorsi muscle is harvested in an attempt to improve the volume of the flap and the quality of the reconstruction, irrespective of whether an implant is used to assist with the final reconstruction. The reconstructions were either purely autologous or augmented with a prosthesis (style 150 manufactured by Allergan). The data included patients who had immediate (skin sparing) and delayed reconstruction. It should also be noted that, at the time of this study, our unit did not offer lipo filling and thus any patients requiring this procedure would have been referred elsewhere.

With regards to clinical governance, the study was performed as a means of service evaluation. It explored clinical effectiveness by looking at the number of operations required to achieve an acceptable outcome. This information can be used to assess the overall value for money of the procedure for the trust.

Results

In total, 110 patients were included in the study and 116 latissimus dorsi flap reconstructions were performed, with 6 patients undergoing bilateral reconstruction either as a consequence of bilateral pathology or as a contralateral risk-reducing procedure; 86 reconstructions were immediate using a skin-sparing technique and 30 were delayed.

The mean period of follow-up for patients was 69 months (range 6 months to 10 years). The average age of the patients was 49 years (range 25–65 years) at the time of initial reconstruction.

Table 1 illustrates the primary pathology and adjuvant treatment received by the cohort of patients.

Tumour recurrence occurred in a total of 18 patients. Loco-regional recurrence developed in nine patients; three patients had declined adjuvant endocrine therapy; three patients had triple-negative cancers; one patient had initial ductal carcinoma in situ only; the remaining two had recurrence despite compliance with endocrine therapy. As a result, the reconstruction had to be taken down in six patients.

Nodal recurrence occurred in three patients, involving either cervical, supraclavicular or high axillary nodes. Seven patients had systemic disease and ten patients died directly as a result of breast cancer.

It should be noted that, in this series, no patient suffered either partial or total loss of the flap immediately postoperative and only one patient required implant removal within the first 2 months as a consequence of sepsis.

Twenty-seven reconstructions (23%) required further reconstruction-specific surgery, excluding port removal and nipple-areolar complex reconstruction. Table 2 compares autologous to implant-assisted reconstructions with regards to further surgery, taking into account those flaps that were subjected to radiotherapy. Of the 27 patients whose reconstructions which required post-mastectomy radiotherapy,

Table 1 Pathology and adjuvant treatment received

	Reconstruction	
	Implant assisted (n)	Autologous (n)
Main pathology:	5	1
None	1	0
Benign disease	14	5
Ductal carcinoma in situ	1	0
Phylloides	56	14
Invasive ductal carcinoma	11	1
Invasive lobular carcinoma	7	0
Mixed invasive carcinoma	5	1
Adjuvant therapy:		
None	25	5
Hormone	56	12
Chemotherapy ± herceptin	46	9
Radiotherapy	22	5

Table 2 Comparison of patients with implant-assisted and autologous reconstructions having further reconstruction-specific surgery

Treatment	Reconstruction	
	Implant-assisted (n)	Autologous (n)
No radiotherapy	73	16
Radiotherapy received	22	5
Further reconstruction-specific surgery	23	4
No radiotherapy	21	1
Radiotherapy received	2	3
Total	95	21

only 5 required further surgery. In the autologous group, this was due to flap atrophy (2 patients) and redefinition of the inframammary fold (1 patient). In the implant-assisted group, further surgery was performed for capsular contracture (1 patient) and revision of scar (1 patient).

Table 3 demonstrates the reasons for long-term reconstruction-specific surgery. Implant-related surgery was the most common reason for reoperation. Half of these were due to complications related to the implant itself, suspected chronic sepsis around the implant being the most common. The rate of symptomatic capsular contracture requiring further surgery, as a function of total implant-assisted reconstructions, was assessed as 4.2%. Only one of four reconstructions complicated by capsular contracture had undergone radiotherapy. Statistical analysis comparing implant-assisted with autologous flaps, while preferable, was not appropriate in this study owing to the small numbers involved.

Discussion

Reconstructive breast surgery is a process commonly requiring more than one operation, irrespective of technique. While there are reservations regarding the procedure with respect to short-term complications, this study demonstrates that latissimus dorsi reconstruction, in our institution, is reasonably durable over the long-term, with limited need for further substantial intervention to maintain a good outcome from the initial surgery. Only 23% of patients required further long-term surgery, which is comparable to the 37% quoted previously.⁸ As yet, there are no national guidelines with which to compare these data.

Table 3 Procedures performed during further reconstruction-specific surgery

Reason for surgery	Patients (n)
Donor site:	
Revision scar	1
Delayed seroma	3
Aesthetics:	
Revision intramammary fold	3
Lipofilling	1
Revision of scar	6
Implant surgery:	
Capsular contracture	4
Removal (infection/pain)	8
Exchange	
Shape maintenance	8
Rupture	1
Reaugmentation (following removal)	2
Primary augmentation of autologous reconstruction	2

As expected, autologous flaps were less likely to require further intervention compared with implant-based flaps, because implant-related surgery was the main cause of further surgery. However, the autologous latissimus dorsi flap will only provide an adequate volume in certain patients.

Flap atrophy requiring augmentation with implant occurred in two of five patients with autologous flaps which had undergone radiotherapy. There are too few data to make a conclusion from this and previous studies have shown that results are generally satisfactory despite radiotherapy.⁹

It was observed that reoperation for symptomatic capsular contracture was 4.2%. Furthermore, of the 22 patients with implant-assisted flaps undergoing radiotherapy, only one required reoperation due to symptomatic contracture. We propose that this is a result of the protective mechanism provided by the extended-harvest flap used. This study did not attempt to evaluate the number of patients who actually developed capsular contracture but analysed, arguably more importantly, how many patients were troubled by the capsular contracture sufficiently to request further surgery. This figure is comparable to the 5% Baker III/IV capsular contracture rate for implants used in reconstructions quoted by Allergan's large post-approval study in the 2011 US Food and Drug Administration update on the safety of silicone gel filled breast implants.¹⁰ Unfortunately, we do not have long-term patient-reported outcome measures for our patient cohort. This is an area we will look at in the future.

It is widely believed that autologous free tissue transfer techniques achieve the best long-term outcomes in reconstructive breast surgery. Patient-recorded outcomes in the National Mastectomy and Breast Reconstruction Audit found this technique to be the most acceptable in breast area appearance, as well as emotional, physical and sexual well-being.⁴ However, some patients are either not suitable for or choose not to have these techniques used. Implant-based reconstructions involving different acellular dermal matrices and meshes are therefore on the increase but their long-term outcome has yet to be proven.

In this study, we have shown that the latissimus dorsi flap achieves reliable and safe outcomes for patients choosing reconstructive breast surgery, whether implant-based or autologous. It appears reasonably durable with the passage of time, even for those who are required to have radiotherapy. The majority of patients (77%) who underwent latissimus dorsi reconstruction in this study did not require further surgery long-term. This obviously has significant cost implications for the trust and offers good value for money as well as providing an appropriate standard of care.

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