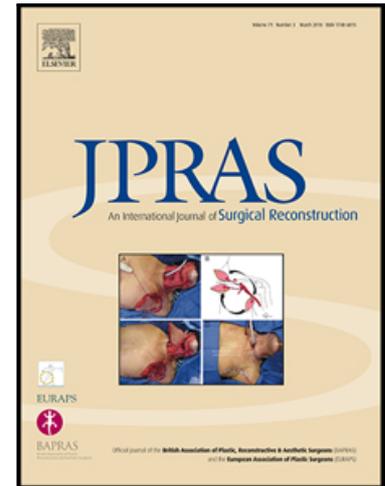


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Free Tissue Transfer After Unsatisfactorily Implant-based Breast Reconstruction, a Cohort Study

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This paper has not previously been presented.

Summary

Breast reconstruction can be performed using implants or autologous tissue, either alone or in combination. Implants typically require re-operation during the patient's lifetime, often for adverse capsular contracture. Conversion from implants to autologous tissue may improve symptoms and deliver a definitive reconstruction. This is known as salvage breast reconstruction. In this paper we evaluate the indications, outcomes, complications and cost implications of salvage breast reconstruction in our regional centre and report these in line with the STROBE guidelines.

Retrospective casenote analysis of all salvage breast reconstruction patients from January 2018 to January 2020 was performed.

Nineteen patients were identified, with a median age of 52 years. Indications were all capsular contracture other than two each of implant rupture and patient request. Thirty-two perforator free flaps; 29 deep inferior epigastric, two profunda artery and one lateral thoracic artery flap were performed. Median time from first implant to free flap reconstruction was nine years.

Median hospital stay was five days. No total flap losses and one partial flap loss occurred. Three patients underwent secondary procedures to the breast to improve the aesthetic outcome. All patients reported improvement in symptoms and appearance.

For implant-intolerant patients adequately counselled and accepting of the post-operative downtime, salvage reconstruction with autogenous tissue offers a lasting solution. The upfront healthcare costs are higher with a free tissue transfer, but may become comparable longer term given the multiple exchange of implant procedures required over a patient's lifetime.

Keywords

Breast Implants, Free Tissue Flaps, Mammoplasty, Aesthetics, Contracture

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Breast reconstruction is known to improve quality of life after mastectomy and can involve implants and/or autologous tissue. Implant-based breast reconstruction is generally considered less technically demanding than free flap reconstruction, has less downtime and no donor site morbidity. The major long-term disadvantage of implant-based reconstruction is the need for subsequent procedures. The recent immediate implant-based breast reconstruction with and without mesh (iBRA) study demonstrated an 18% reoperation rate within three months¹. At three, six and ten years following initial implantation for primary reconstruction, manufacturers report rates of

reoperation to be 34%, 42% and 53%². The majority of these procedures are for adverse capsular contracture. Re-operation may also be indicated for rippling, infection, malposition, exposure or implant rupture.

Autologous reconstruction, particularly from the abdomen, is associated with improved general- and aesthetic patient satisfaction³. The deep inferior epigastric perforator (DIEP) flap is the widely accepted, gold standard for breast reconstruction.

Autologous reconstruction is a definitive form of reconstruction with minimal surgical maintenance over the patients' lifespan. This can be seen as attractive for patients whom have had previous implant-based reconstruction and have reached the time for implant exchange. Thus, there is demand for explantation of implant and exchange for autologous tissue.

We hypothesise that a free flap offers a satisfactory method of salvage breast reconstruction, resulting in a good aesthetic outcome with an acceptable risk profile. The aims of this study were to (1) assess the outcomes and complications of salvage breast reconstruction with free flaps in our unit and (2) to consider the cost implications of the service.

We included all patients with failed implant-based reconstructions from January 2018 to January 2020. Patients were retrospectively identified using clinical coding and their case notes interrogated. All recipient and donor site complications were recorded.

Nineteen consecutive patients were identified of which ten patients underwent expander-to-implant procedures and nine patients had definitive implant insertion. There was a median of nine years between implant placement and time to salvage reconstruction. During that time, two patients underwent exchange of implants, four patients underwent one or more lipofilling sessions and one patient underwent both implant exchange and lipofilling. The median number of implant-related procedures was two per patient. Median age was 52 years (31- 61 years).

The 19 salvage reconstruction patients underwent a total of 32 free flaps; 29 DIEPs, two profunda artery perforator and one lateral thoracic artery perforator flap. Median follow up was 11 months

(range 4-30). All patients were satisfied with the end aesthetic result, and found improvement in their symptoms.

Median length of stay was five days (range 2-11). One patient returned to theatre for evacuation of a haematoma. There were no total- but one partial flap loss. There were five wound breakdowns, all managed conservatively. One donor site seroma required aspiration.

Three patients required revisions to improve the aesthetic outcome of the breast flap; symmetrising lipofilling in two cases and one excision of a small stitch sinus at the flap inset. There were no donor site corrective procedures.

Table 1 shows the cost of salvage breast reconstruction, using the 2019/20 National Tariff Payment System for reference. It can be seen that if implant intolerant patients have two procedures (e.g. implant exchange and lipofilling) costs become comparable to unilateral free tissue transfer, at £7,375.78 and £7,604, respectively. If an additional product such as an acellular dermal matrix is utilised alongside an exchange of implant, or if an additional investigation is required such as an MRI the costs converge further. As the median patient age is 52, it would be reasonable to infer that a third procedure would likely be required in the womans lifetime. Furthermore, a woman undergoing multiple implant related procedures for capsular contracture also has a personal cost of reduced quality of life and loss of productivity. Salvage reconstruction aims to break this cycle, by delivering a lasting reconstruction without ongoing maintenance procedures.

Salvage breast reconstruction with free tissue transfer has been reported since the mid 1990s^{4,5}. These have shown high post-operative patient satisfaction and a significant improvement in the aesthetic result⁴.

Salvage breast reconstruction with a free flap is a major surgical undertaking, and is not suitable for all patients with capsular contracture or unsatisfactory cosmesis following implant reconstruction. However, in symptomatic patients adequately counselled and accepting of the post-operative downtime, salvage breast reconstruction with autogenous tissue offers a lasting result that ages

naturally. The upfront healthcare costs are higher with a free tissue transfer, but may become comparable longer term given the multiple exchange of implant procedures required over a patient's lifetime.

We believe conversion to definitive autologous reconstruction to be a worthwhile endeavour based on patient improvement in symptoms, and the diminishing return of multiple implant related revisions.

Ethical approval

Not required

Conflicts of interest

None declared

Funding

None

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Table 1. The cost of salvage breast reconstruction

Item	Cost (£)
Initial plastic surgery outpatient clinic	139
Follow up plastic surgery outpatient clinic	86
Implant exchange (not including physical implant)	3,345
Lipofilling of breast	2,584
Procurement of implants	791.78 (based on 2x MENTOR® CPG™ Gel Breast Implants cost of £395.89 each)
Bilateral delayed DIEP	9004
Unilateral delayed DIEP	7181
Pre-operative CT angiogram	112
Totals*	
1 Implant exchange	4,447.78
2 Implant exchanges	8,895.56
Implant exchange and lipofilling	7,375.78

Lipofilling	2, 895
2 Lipofilling sessions	5, 651
Bilateral DIEP	9,427
Unilateral DIEP	7, 604
Unilateral DIEP and lipofilling	10, 360

DIEP, Deep inferior epigastric perforator.

*Totals assume one pre-operative and two subsequent plastic surgery outpatient appointments after each procedure. All DIEP costs includes a pre-operative CT angiogram £112