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Trends in post-mastectomy breast reconstruction types at a breast cancer tertiary referral centre before and after introduction of acellular dermal matrices[☆]

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KEYWORDS

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Summary *Background:* Reconstructive breast surgery has continued to evolve over the last decade with a key change being the adoption of acellular dermal matrices (ADMs) as an adjunct for implant-based procedures. This retrospective observational study assesses the effect of ADMs on post-mastectomy reconstructive practice performed in a single institution.

Methods: We conducted a review of all patients undergoing breast reconstruction at a University Teaching Hospital for an 18-month period before and after adopting ADMs. Demographic, procedural and complication data for these two cohorts were compared (χ^2 and Student's *t*-tests).

Results: A total of 264 women (336 breasts), mean age 47.5 years, were identified: 137 before and 127 after the introduction of ADM. Implant-only reconstructions increased from 16% to 52% following the adoption of ADM ($p < 0.01$), whereas the proportion of both latissimus dorsi and deep inferior epigastric perforator flap reconstructions decreased significantly (31%–11% and 49%–34%, respectively, $p < 0.01$). The rate of early complications for the implant-only procedures was not significantly different with or without ADM (26% versus 20%, respectively,

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$p = 0.44$), despite there being no difference in the rate of adjuvant radiotherapy (22% versus 35%, respectively, $p = 0.30$).

Conclusions: This study showed that since ADM introduction to our centre, more breast reconstructions have been of the implant-only type with consequent reductions in the more complex and expensive autologous techniques. Implant-only procedures that incorporated ADM use had similar complication rates to those that did not.

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Introduction

Reconstructive breast surgery has evolved in the UK over the last decade with an increase in rates of immediate breast reconstruction (IBR)^{1,2} and introduction of acellular dermal matrices (ADMs).³ ADMs are animal-derived soft-tissue substitutes that have been decellularised to eliminate an antigenic response or rejection.⁴ The three main types are obtained from human, pig or calfskin. Their use was first described in reconstructive breast surgery in 2001, but previous applications included treatment of burns and abdominal wall repair, amongst others.^{5–9} The advantages of ADMs have resulted in widespread adoption and increased use in implant-based breast reconstructive procedures. Potential advantages of incorporating ADMs into subpectoral implant-based reconstruction include enhanced coverage of the implant inferolaterally, especially in patients with attenuated soft tissues^{10,11}; greater initial expander fill volumes, thus enabling reconstruction of larger breasts and single-stage surgery¹²; improved definition of the inframammary fold^{10,11}; and a theoretical reduction in the incidence of radiotherapy-induced capsular contracture.^{13–15}

ADMs were first introduced to the Cambridge Breast Unit in October 2013. It was surmised that adoption of ADMs had resulted in a significant alteration in patterns of reconstructive workload, with an increased proportion of implant-only reconstructions. With this in mind and reported national trends,¹ we decided to review our practice to ascertain whether any changes paralleled findings from other centres around the UK. This study assesses the temporal and practice-changing impact of ADMs on types of post-mastectomy reconstruction performed at a tertiary university hospital comprising three breast surgeons and three dedicated reconstructive plastic surgeons. A secondary objective was to assess clinical outcomes of ADM-assisted reconstruction anew in terms of early complication rates.

Methods

A retrospective review of case notes of patients undergoing immediate or delayed post-mastectomy breast reconstruction at a university hospital for a period of 18 months before and after the adoption of ADMs was conducted. The study period was between April 2012 and April 2015 to allow for a minimum follow-up of 1 year. Patients were identified from reconstruction diaries and operating theatre registers.

For these two patient cohorts, demographic, procedural and postoperative data were collected. The latter included details of any failed implant-only reconstructions and plans for adjuvant radiotherapy. Implant removal within 3 months of surgery constituted a reconstruction failure, and this time frame excluded radiotherapy-induced complications occurring beyond 3 months. Routine expander to implant exchange was not considered to be a failure when conducted as a planned procedure, and longer-term effects of radiotherapy on breast reconstruction were not the subject of the present study.

Complications occurring within 12 months of surgery were recorded for all implant-only breast reconstructions, irrespective of ADM usage. Complications recorded were infection, wound dehiscence, seroma formation, haematomas requiring evacuation, and Baker grade III or IV capsular contracture. A high clinical index of suspicion for infection with wound exudate, pyrexia or erythema was confirmed with swab cultures and C-reactive protein levels.

Surgical technique – implant and ADM reconstructions

All mastectomies were performed by a breast surgeon with subsequent reconstruction by a plastic surgeon. For implant-only procedures that incorporated the use of ADMs, the sub-pectoral pocket was dissected with release of the inferomedial border of the pectoralis major. After washing in aqueous betadine solution, implants were placed in the sub-pectoral pocket. ADMs were prepared by rehydration and positioned along the inframammary fold with suturing to the inferolateral free border of the pectoralis major above and chest wall below. An illustrative video provides the salient surgical details.¹⁶

Statistical analysis

Baseline characteristics and pre- and post-operative data were compared between the pre- and post-ADM cohorts using χ^2 tests for categorical variables. Continuous variables such as patient age were compared using Student's *t*-test. Complication, failed implant-only reconstruction and adjuvant radiotherapy rates were compared in implant-only procedures with and without an ADM using χ^2 tests.

This study was reported using the STROBE checklist as a framework.¹⁷

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