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Measuring the patient perspective on latissimus dorsi donor site outcomes following breast reconstruction

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Summary *Background:* There is little evidence about the long-term donor site outcome of latissimus dorsi breast reconstruction and no patient-reported outcome measures designed specifically for the procedure.
Methods: A prospective cohort of breast cancer patients having latissimus dorsi reconstruction after a mastectomy was recruited from 270 hospitals in the United Kingdom. An 18-month follow up questionnaire containing two novel scales was sent to consenting patients. The prevalence of aesthetic and functional morbidity at the donor site was described. The two new scales were refined using the Rasch measurement model and subsequently validated.
Results: 1,096 women completed the new scales. 78% of patients reported that no back appearance issues had bothered them "most of the time" or "all of the time" in the past two weeks.

The work should be attributed to the Clinical Effectiveness Unit of the Royal College of Surgeons of England.

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The equivalent figure for functional morbidity was 60%. Four items were eliminated following initial psychometric testing. This produced an 8-item Back Appearance scale and an 11-item Back and Shoulder Function scale. Both scales showed adequate fit to the Rasch measurement model. Higher levels of aesthetic and functional bother were observed for completely autologous procedures versus those where latissimus dorsi reconstruction was used to cover an implant ($p < 0.05$). Higher levels of aesthetic bother were observed in women who had suffered a perioperative complication at the donor site ($p = 0.003$).

Conclusion: These results can inform patients of the morbidity associated with latissimus dorsi reconstruction. The new scales can be used to compare groups undergoing different variations of the procedure and to monitor individual patients.

Introduction

Latissimus dorsi (LD) breast reconstruction involves rotating a flap of muscle, skin, fat and blood vessels from the upper back to the mastectomy site. There are two main types of LD reconstruction. The first involves the use of LD tissue to cover an implant. The second involves a pedicled flap of completely autologous tissue and is commonly known as an extended LD reconstruction. The largest study of LD reconstruction to date remains the UK National Mastectomy and Breast Reconstruction Audit, which recruited patients in 2008 and 2009. This found that both types of LD reconstruction were associated with higher patient-reported breast appearance scores than implant-only procedures, but slightly worse breast appearance scores than reconstruction with abdominal tissue.[1] Morbidity at the donor site must also be considered when comparing different types of breast reconstruction. The LD muscle can be functionally impaired when it is used in a breast reconstruction, pulling the arm back into the body, and turning it inward. There may also be aesthetic damage to the back which can be exacerbated by wound infection and skin necrosis. Two systematic reviews, both published in 2014, have synthesised the available literature on functional outcomes.[2,3] The reviews, which were limited by a reliance on small, single-centre studies, found that LD procedures lead to measurable reductions in shoulder and upper back strength and function in the short term. There was insufficient evidence to provide clear guidance on the extent of functional morbidity beyond six months. There is little published literature on aesthetic outcomes at the LD donor site. This may be due to an untested assumption that women are unconcerned by the appearance of their back because it is rarely visible to them. For both functional and aesthetic outcomes there are no patient-reported outcome measures that have been developed specifically for LD patients. It is possible, therefore, that the measures used in previous studies have lacked content validity.

In this study, we describe the long-term donor site morbidity arising from LD breast reconstruction after mastectomy in a large prospective cohort study using the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines. The psychometric properties of two new measurement scales developed specifically for LD reconstruction patients are also described.

Methods

The data presented in this paper are from the National Mastectomy and Breast Reconstruction Audit, which recruited patients between 1 January 2008 and 31 March 2009 from 270 public and private hospitals in the United Kingdom.[4] Data on surgical procedures and patient characteristics were prospectively recorded for women aged 16 years and over with a diagnosis of invasive carcinoma of the breast, or ductal carcinoma in-situ, undergoing mastectomy with immediate reconstruction or primary delayed reconstruction following a previous mastectomy. Written consent to participate in a follow-up survey was also obtained.

Questionnaires were sent to the home address of consenting patients 18 months after surgery and included two new scales designed to evaluate the aesthetic and functional outcomes of LD flap reconstruction. The scales are part of the BREAST-Q family of patient-reported outcome measures.[5,6] They were developed in qualitative work with patients who had undergone LD flap reconstruction in the United States, and pre-tested with English breast cancer patients to ensure acceptability. The resulting Back Appearance (9 items) and Back and Shoulder Function scales (14 items) asked patients to record how often in the past two weeks they had been bothered by a set of problems, using five response options: none of the time, a little of the time, some of the time, most of the time and all of the time. Endorsement frequencies were used to quantify the morbidity of an LD procedure.

The new scales were tested using two distinct measurement paradigms. The dominant paradigm in quality of life measurement has traditionally been Classical Test Theory (CTT).[7,8] In CTT, observed patient responses are considered equal to a theoretical true score plus random error. The observed score on a scale is assumed to be a random variable which produces a bell-shaped curve around the true score. The error score is taken to have a value of zero as positive and negative errors cancel each other. A major difficulty with CTT is the need to measure repeatedly in order to reduce the size of random errors around individual patient scores. In practice, CTT is rarely used to measure individual patients, and error is dealt with by focusing on groups of patients only. CTT also does not evaluate the extent to which scales have interval level properties and this may lead to inappropriate usage when scores are analysed. Although