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Comparing thirty-day outcomes in prosthetic and autologous breast reconstruction: A multivariate analysis of 13,082 patients?☆

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Summary *Background:* There is a paucity of multi-institutional data that directly compares short term outcomes of autologous and prosthetic breast reconstruction. The National Surgical Quality Improvement Program provides a unique data platform for evaluating peri-operative outcomes of these two main categories of breast reconstruction. It has detailed data from nearly 250 hospitals and over 13,000 patients. We performed risk-adjusted analysis of prosthetic and autologous breast reconstruction to compare 30-day morbidity outcomes.
Methods: Patients who underwent prosthetic breast reconstruction or autologous tissue reconstruction from 2006 to 2010 were identified using operation descriptions. Over 240 tracked variables were extracted for patients undergoing breast reconstruction. Thirty-day postoperative outcomes were compared, and subgroup analysis was performed on the autologous population to describe outcomes of specific flap procedures. Reconstruction was analyzed as an independent risk factor for specific complications, with propensity scores used to help standardize compared patient populations. Regression analyses were performed using SPSS (version 20.0, Chicago, IL).
Results: A total of 13,082 patients underwent breast reconstruction; 9786 patients received prosthetic reconstruction and 3296 received autologous reconstruction. Within the autologous cohort,

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1608 (48.8%) patients underwent a pedicle TRAM flap, 1079 (32.7%) had a LD flap, and 609 (18.5%) received a free flap. Autologous reconstruction patients had higher rates of overall complications (12.47% vs 5.38%, $p < .001$), wound infection (5.46% vs 3.45%, $p < .001$), prosthesis/flap failure (3.13% vs 0.85%, $p < .001$), and reoperation (9.59% vs 6.76%, $p < .001$). Risk-adjusted multivariate analysis also showed autologous reconstruction to be a significant independent predictor of specific short term outcomes.

Conclusions: Using risk-adjusted models of a large multi-institutional database, we found that — relative to prosthetic reconstruction — autologous reconstruction had higher rates of 30-day overall complications, wound infection, prosthesis/flap failure, and reoperation. This may be due, in part, to a concomitant increase in operative time and higher case complexity. Taken with other reports such as NMBRA, this study helps to educate patients and surgeons alike on potential, comparative complications during the perioperative period.

Introduction

There were over 1.6 million breast cancer diagnoses and 425,000 breast cancer related deaths in 2010, making breast cancer both the leading cancer diagnosis and cause of death due to cancer in women worldwide.[1] While breast cancer treatment options have expanded over time to include breast conservation surgery, hormone therapy, chemotherapy, and radiation, mastectomy remains a common primary treatment option for patients.[2] Those that do undergo mastectomy procedures face post-operative changes in body image, emotional and psychological well-being, and quality of life which can be both distressing and overwhelming.[3–5] However, it has been shown that breast reconstruction following mastectomy may alleviate some of the adverse effects previously assessed in this patient population.[6–10]

Over the years, the variety of breast reconstruction procedures has increased, and the efficacy of the operations offered has improved. Breasts may be reconstructed following mastectomy by making use of autologous tissue flaps or prosthetic implants with or without tissue expanders. Reported rates of breast reconstruction after undergoing a mastectomy are low amongst developed nations, ranging from 7.7% in Canada and 16.9% in Denmark to 31% in the United Kingdom and 37.5% in the United States.[10–15] With studies supporting the psychological and emotional benefits associated with post-mastectomy breast reconstruction, it is predicted that reconstruction will be offered with increasing frequency to a broader population of patients as time goes on.

There are established advantages to prosthetic tissue reconstruction, namely shorter operative times and diminished donor site morbidity.[16] Benefits of autologous tissue reconstruction include superior esthetic results compared to prosthetic reconstruction and improved outcomes in certain patient subpopulations, such as those with a pre-operative history of external beam radiation therapy and chest wall involvement.[17–21] Yet both methods are not without complications. For those who do have to decide between prosthetic and autologous tissue breast reconstruction, education regarding the short and long term complications associated with various techniques is important.

Many studies evaluating reconstructive procedures have focused on only one or two techniques and utilized small patient cohorts or single surgeon/single center data, with the National Mastectomy and Breast Reconstruction Audit (NMBRA) as a notable exception.[10,22–29] This prospective multicenter study, based out of the United Kingdom, captured 15,479 women undergoing a mastectomy from January 2008 to March 2009 from 150 English NHS Trusts and 106 independent hospitals. Analysis of the 4796 women who received reconstruction has resulted in successive annual reports over the past four years attesting to the safety of mastectomy and breast reconstruction procedures. We have expanded upon their findings on short-term outcomes through the retrospective analysis of over 13,000 breast reconstruction patients.

While a prospective randomized controlled trial would provide the most reliable, unbiased comparison of outcomes, implementation of such a study would be ethically challenging. Thus, a retrospective review of a large sample population from multiple centers is an alternative means of studying short term outcomes of interest without any potential detriment to patients.

Of late, multi-institutional clinical registries have proven their utility in evidence-based medicine. These outcomes focused programs permit retrospective analysis of large patient populations across a range of geographical areas and clinical settings, which subsequently allows for both a balanced creation of risk profiles and unbiased examination of outcomes. The National Surgical Quality Improvement Program (NSQIP) was started in 1991 with aspirations of quantifying and improving surgical outcomes. The database is prospectively managed and houses de-identified patient variables from over 240 hospitals.[30–32] Employing the comprehensive nature of the NSQIP database, we aimed to assess the risk-adjusted relationship between reconstruction approaches and 30-day outcomes.

Methods

Data acquisition

The particulars of the ACS-NSQIP sampling method, data extraction, variables, and outcomes have previously been