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Preoperative anemia impacts early postoperative recovery following autologous breast reconstruction[☆]

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KEYWORDS

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Summary *Introduction:* Preoperative anemia impacts a significant portion of breast reconstruction patients, though this does not appear to affect surgical outcomes. The impact of anemia on postoperative physical and mental health, however, is unknown. This study aimed to prospectively evaluate the role of preoperative anemia in recovery after autologous reconstruction.

Methods: From 2005 to 2010, we prospectively assessed autologous breast reconstruction patients with satisfaction surveys, strength and functional tests, and the short form 36 (SF36). Data was collected preoperatively and at early (<90d), intermediate (90–365d), and late (>365d) follow-up. We stratified patients by presence or lack of preoperative anemia (hemoglobin < 12 g/dL).

Results: Of 399 patients undergoing reconstruction, 179 enrolled in the study. Anemic patients ($n = 31$, 17%) had higher rates of preoperative chemotherapy ($p = 0.02$) and lower rates of radiation ($p = 0.001$). Preoperatively, anemic patients reported worse physical ($p < 0.001$), mental ($p = 0.003$) and overall health ($p = 0.0003$). These scores worsened postoperatively for anemic and nonanemic patients, though anemic patients had lower average scores in all SF36 categories. This was significant only for early follow-up physical health ($p = 0.02$). Change in SF36 scores and objective physical exam assessments did not differ between the two cohorts.

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Conclusions: Though preoperative anemia may not impact surgical outcomes, it adversely impacts the recovery of breast reconstruction patients. Subjective physical health differences were significant in early follow-up, though this did not translate to differences in mental health or satisfaction. We advocate for preoperative optimization of hemoglobin to enhance the early recovery potential of breast reconstruction patients.

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Introduction

Anemia impacts a significant proportion of the breast cancer population, with estimates ranging from 18 to 75%.^{1–3} Our group has recently demonstrated that preoperative anemia does not impact major surgical outcomes after autologous reconstruction,⁴ a finding which has been echoed in other recent studies.^{2,5} However, there is a dearth of literature exploring the impact of anemia on postoperative recovery.

This question is particularly important in autologous breast reconstruction, which involves large incisions and considerable involvement of the abdominal musculature. Patients undergoing this procedure would benefit greatly if they could be identified and counseled in advance about their risk for longer postoperative recovery. The purpose of our study was to assess the impact of anemia on postoperative functional recovery in patients undergoing autologous breast reconstruction via objective and subjective functional assessments.

Methods

This study was part of a prospective, blinded, cohort study assessing abdominal strength, physical health, mental health, and patient satisfaction in patients undergoing abdomen-based free flap breast reconstruction.^{15,16} All patients scheduled for autologous free flap breast reconstruction utilizing abdominal tissue by the senior author (JMS) between 2005 and 2010 were eligible to enroll in this IRB approved prospective study. Enrolled patients completed a preoperative evaluation, which included an abdominal strength functional assessment, a version of the Short Form 36 (SF-36). The abdominal evaluation examined three aspects of the abdominal wall: upper abdominal strength, lower abdominal strength, and a measure of functional independence, which assessed a patient's ability to sit up from a supine position (Figure 1). This current study limited analysis to upper abdominal strength and functional independence. The SF-36 is a health survey asking thirty-six questions to produce eight scales, which are then aggregated to produce a summary physical health score and a summary mental health score. Following surgery, participants were examined at each subsequent postoperative visit by abdominal strength exam and SF-36. Patients also completed a satisfaction survey in order to assess postoperative cosmetic and functional satisfaction.

Data was obtained at preoperative, early follow-up (<90 days), intermediate follow-up (90–365 days), and long-term follow-up visits (>365 days). Patients who had

multiple visits within a given follow-up interval had their data averaged for that timeframe. All enrolled women who underwent deep inferior epigastric artery perforator flap (DIEP), superficial inferior epigastric artery flap (SIEA), or muscle-sparing free transverse rectus abdominis myocutaneous flap (msfTRAM) procedures between September 2005 and August 2010 in addition to preoperative and follow-up data were included in this analysis. Patients without follow-up were excluded.

A detailed review of hospital and office records was performed for each enrolled patient and included the following: preoperative history and physical, operative reports, discharge summaries, outpatient clinic notes, and laboratory data. An institutional hospital database was queried for medical complications associated with each patient's initial reconstructive hospitalization. Additionally, we limited the study cohort to patients undergoing operations at the main teaching hospital of the health system.

Patients were divided into two cohorts based on the WHO classification of anemia: those with HgB \geq 12 g/dL and those with HgB < 12 g/dL. These patients were subsequently analyzed by unilateral and bilateral reconstruction. Three analyses were performed on the data collected: intercohort comparisons of mental and physical health measures for each follow-up time interval; intracohort comparisons of mental and physical health measures over time; and intercohort comparisons of those changes in scores over time.

All data were entered into an Access database and an Excel workbook (Microsoft Corp., Redmond, WA). Statistical analysis included Chi Square and Fisher's exact tests (where appropriate) for categorical variables and the Wilcoxon Rank Sum test and Wilcoxon Signed Rank tests (where appropriate) for continuous variables. All tests were two-tailed, and statistical significance was defined as $p < 0.05$. All analyses were performed using STATA IC 10.0 (Stata-Corp, College Station, TX).

Table 1 Demographics.

	HgB < 12 n = 31	%	HgB \geq 12 n = 143	%	p value
Age	48.2 (9.9)		51.5 (7.6)		0.08
Race					
White	26	83.9%	120	83.9%	0.43
Black	4	12.9%	18	12.6%	
Hispanic	1	3.2%	0	0.0%	
Asian	0	0.0%	1	0.7%	
Other	0	0.0%	2	1.4%	

HgB – hemoglobin.

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