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Tumescent mastectomy technique in autologous breast reconstruction



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ABSTRACT

Background: Use of the tumescent mastectomy technique has been reported to facilitate development of a hydrodissection plane, reduce blood loss, and provide adjunct analgesia. Previous studies suggest that tumescent dissection may contribute to adverse outcomes after immediate implant reconstruction; however, its effect on autologous microsurgical reconstruction has not been established.

Methods: A retrospective review was conducted of all immediate microsurgical breast reconstruction procedures at a single academic center between January 2004 and December 2013. Records were queried for age, body mass index, mastectomy weight, diabetes, hypertension, smoking, preoperative radiation, reconstruction flap type, and autologous flap weight. Outcomes of interest were mastectomy skin necrosis, complete and partial flap loss, return to the operating room, breast hematoma, seroma, and infection.

Results: There were 730 immediate autologous breast reconstructions performed during the study period; 46% with the tumescent dissection technique. Groups were similar with respect to baseline patient and procedural characteristics. Univariate analysis revealed no significant difference in the incidence of mastectomy skin necrosis, complete or partial flap loss, return to the operating room, operative time, estimated blood loss, recurrence, breast hematoma, seroma, or infection in patients undergoing tumescent mastectomy. Multivariate analysis also demonstrated no significant association between the use of tumescent technique and postoperative breast mastectomy skin necrosis ($P = 0.980$), hematoma ($P = 0.759$), or seroma ($P = 0.340$).

Conclusions: Use of the tumescent dissection technique during mastectomy is not significantly associated with adverse outcomes after microsurgical breast reconstruction. Despite concern for its impact on implant reconstruction, our findings suggest that this method can be used safely preceding autologous procedures.

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1. Introduction

Tumescent dissection technique during mastectomy has been reported to aid in the development of native skin flaps, speed dissection, decrease blood loss, and provide adjunct anesthesia [1–6]. In the plastic surgery literature, it has also been criticized as a potential contributor to the risk of postoperative complications after immediate reconstruction, including mastectomy skin necrosis, flap compromise, breast hematoma, and breast seroma [7–9]. Each of these complications can result in substantial clinical morbidity, potentially requiring additional surgery, prolonged wound care, poor aesthetic result, delayed oncologic treatment, and decreased patient satisfaction [10].

Use of the tumescent dissection technique during mastectomy involves injection of a mixture of crystalloid and local anesthetic with epinephrine into the subcutaneous breast tissue to facilitate the development of a hydrodissection plane [2,6,11]. Typically, this is performed via several small stab wounds in the skin using a high-pressure infusion system and extends beneath the entire anatomic breast—from the clavicle superiorly, the sternum medially, the inframammary fold inferiorly, and the latissimus dorsi muscle laterally. This method produces a relatively bloodless plane and is usually followed by sharp dissection and elevation of the native breast skin flaps and subsequent removal of the breast tissue from the underlying muscle with cautery.

Despite conflicting reports of its association with postoperative complications, such as mastectomy skin necrosis, use of the technique has become more widespread in recent years. Recently published studies reported the use of tumescent technique in 25%–60% of mastectomies with breast reconstruction [5–7,9]. In light of the popularity of this technique and its potentially significant impact on clinical outcomes after immediate autologous reconstruction, further investigation is needed. This study aims to evaluate the impact of tumescent mastectomy technique on outcomes of autologous microsurgical breast reconstruction.

2. Methods

2.1. Study design and data collection

A retrospective review was conducted, using a prospectively maintained database, of all immediate autologous microsurgical breast reconstruction procedures performed after skin-sparing mastectomy at a single academic center between January 2004 and December 2013. Electronic patient records were queried for age at reconstruction, body mass index (BMI), diabetes mellitus, active smoking, prereconstruction radiation therapy (XRT), prophylactic versus therapeutic mastectomy, tumor stage, mastectomy weight, operative time, estimated blood loss (EBL), postreconstruction cancer recurrence, reconstructive flap type, autologous flap weight, and tumescent technique during mastectomy. Use of tumescent technique was documented in the breast surgeon's operative note. Outcomes of interest included postoperative occurrences of mastectomy skin necrosis, complete flap loss, partial flap loss,

return to the operating room, breast hematoma, breast seroma, and infection. Mastectomy skin flap loss was defined as any full-thickness eschar in the postoperative period as documented in the primary plastic surgeon's postoperative clinical documentation. Breast hematoma, seroma, and infection were also defined in the postoperative clinical documentation. Partial flap loss was defined as full-thickness necrosis of a portion of the transferred autologous tissue. EBL was obtained from the surgeon's operative note and the anesthesia records. Operative time was determined from the plastic surgeon's operative note and comprises the start of mastectomy to the end of reconstruction. Return to the operating room was defined as reoperation during the same admission.

2.2. Statistical analysis

Univariate analyses were conducted using Pearson χ^2 or Fisher exact tests for dichotomous variables and two-sample t-tests for continuous variables. Multiple logistic regression was performed for the final analysis using generalized estimating equations including adjustment (clustering) for repeated measures inherent in bilateral reconstructions. Independent variables were chosen for inclusion in the final model based on *a priori* confounders. A P value <0.05 was considered statistically significant. In addition, we report odds ratios (OR) and 95% confidence intervals. Statistical analysis was performed using SPSS 22.0 (IBM Corp, Armonk, NY).

3. Results

There were a total of 730 skin-sparing mastectomies performed in 504 patients with immediate autologous microsurgical reconstruction during the study period. Of these, 336 (46.0%) were performed using tumescent dissection technique during mastectomy and 394 (54.0%) were performed using standard electrocautery without tumescent solution. Mean patient age was 49.4 y (standard deviation [SD] 8.3), average BMI was 28.2 (SD, 5.7), and average mastectomy weight was 769.5 g (SD 413.9); these were not significantly different between tumescent and nontumescent groups (Table 1). Mean follow-up was 62.5 mo (range, 5.3–129.2 mo).

Univariate analysis of patient comorbidities revealed significantly more active smokers among those in the tumescent group relative to the nontumescent group (14.6% versus 8.4%, $P = 0.008$). The groups were otherwise similar with respect to coexisting diabetes, hypertension, and pre-reconstruction XRT (Table 1). No significant difference in tumescent use was found for prophylactic versus therapeutic mastectomies. Tumescent and nontumescent groups were not significantly different based on type of reconstructive flap or autologous flap weight (Table 1). Operative time and EBL were also similar between groups. Postreconstruction cancer recurrence was not different between groups, despite the use of tumescent in significantly more patients with stage 3 tumors (Table 1). The frequency of adverse outcomes including mastectomy skin necrosis, complete flap loss, partial flap loss, return to the operating room, breast hematoma, breast

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