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# Use of tumescent mastectomy technique as a risk factor for native breast skin flap necrosis following immediate breast reconstruction

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**KEYWORDS:**
Breast reconstruction;
Mastectomy;
Tumescent;
Flap necrosis

**Abstract**

**BACKGROUND:** Native breast skin flap necrosis is a complication that can result from ischemic injury following mastectomy and can compromise immediate breast reconstruction. The tumescent mastectomy technique has been advocated as a method of allowing sharp dissection with decreased blood loss and perioperative analgesia. This study was performed to determine whether the technique increases the risk for skin flap necrosis in an immediate breast reconstruction setting.

**METHODS:** Three hundred eighty consecutive mastectomies with immediate reconstruction over a 6-year period were reviewed and divided into 2 cohorts for comparison: 100 tumescent and 280 nontumescent mastectomy cases. The incidence of minor and major skin flap necrosis was evaluated.

**RESULTS:** The use of tumescent mastectomy (odds ratio [OR], 3.93; $P < .001$), prior radiation (OR, 3.19; $P = .011$), patient age (OR, 1.59; $P = .006$), and body mass index (OR, 1.11; $P = .004$) were significant risk factors for developing postoperative major native skin flap necrosis.

**CONCLUSIONS:** The use of the tumescent mastectomy technique appears to be associated with a substantial increase in the risk for postoperative major skin flap necrosis in an immediate breast reconstruction setting.



Native skin flap necrosis in breast reconstruction is a complication seen especially in the immediate reconstruction setting and can compromise postsurgical recovery and final reconstructive outcome. Several factors may potentially contribute to this complication, including vascular compromise associated with the mastectomy procedure itself, flap thickness, smoking, radiation therapy, and the mastectomy technique. Some oncologic breast surgeons advocate the use of tumescent solution during mastectomy because it allows native breast skin flaps to be easily and quickly developed using sharp dissection with minimal blood loss, as well as decreased operative time and perioperative pain.[1] This study was performed to evaluate whether the tumescent mastectomy technique increases the risk for native breast skin flap necrosis in immediate breast reconstruction.

The first 2 authors contributed to this project equally.

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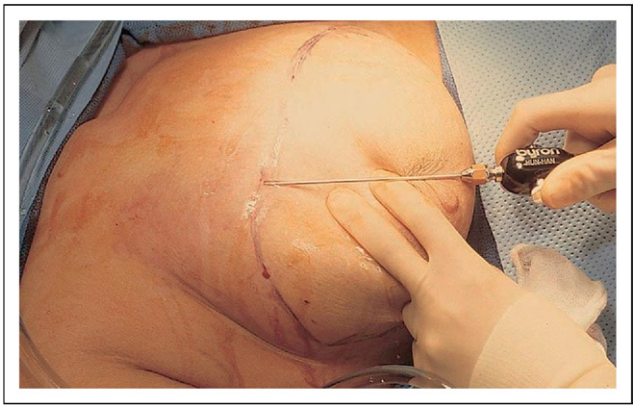

**Figure 1** Intraoperative photograph showing the tumescent mastectomy technique.

Worland[2] first described the use of the tumescent technique to perform a mastectomy in 1996 after observing the successful use of the technique to perform abdominoplasties. In general, for mastectomies, tumescent solution is prepared by mixing Lactated Ringer's solution, 1% lidocaine or .5% bupivacaine hydrochloride, and 1:1,000 epinephrine. After a standard skin-sparing mastectomy skin incision is made in the breast, the tumescent solution is injected into the subcutaneous space, and this facilitates the development of the native breast skin flap through hydrodissection (Fig. 1). Following injection, sharp dissection is more easily performed because of the increased tension in the breast created by tumescent fluid. Furthermore, the vasoconstrictive effect of epinephrine in the tumescent solution minimizes bleeding of the skin flap, thereby reducing the need for electrocautery.

However, despite these potential advantages, it remains unclear whether the use of tumescent solution during mastectomy adversely affects postoperative skin flap viability. Experimental data suggest that an intraoperative decrease in dermal blood flow is a reliable predictor of future ischemia-induced tissue necrosis.[3] Although the vasoconstrictive effect of the epinephrine-containing tumescent solution may prove to be useful in minimizing intraoperative bleeding, it may contribute to ischemic compromise of the native breast skin flaps and various degrees of native breast skin flap necrosis.

Native skin flap necrosis presents a significant reconstructive challenge: treatment for partial thickness necrosis can involve prolonged local wound care, while full-thickness necrosis generally involves sharp debridement of all devitalized tissue and local wound care for healing by secondary intention, secondary surgical closure, or skin grafting (Fig. 2). This complication can lead to delay in initiation of postoperative adjuvant therapy for treatment of breast cancer such as adjuvant chemotherapy and/or radiation therapy. Moreover, the overall breast reconstructive outcome may be compromised with unfavorable scarring, contour deformity, and breast asymmetry, which may lead to additional surgical revisions.

## Methods

A retrospective medical record review was performed of 275 consecutive patients who underwent mastectomy with immediate breast reconstruction by 3 plastic surgeons at the Brigham and Women's Hospital and Faulkner Hospital between 2002 and 2008. The study methods and design were reviewed and approved by the institutional review board of Brigham and Women's Hospital/Faulkner Hospital. A total of 380 consecutive mastectomies with immediate breast reconstructions were performed during the 6-year period and were divided into 2 cohorts for comparison: tumescent mastectomy versus nontumescent mastectomy, both followed by immediate reconstruction. A total of 22 oncologic surgeons and 3 reconstructive surgeons were in the study. Among the oncologic surgeons, 8 performed both tumescent and nontumescent mastectomies. A careful review of all medical records was performed to collect detailed data on patient demographics, comorbidities (hypertension, diabetes mellitus, coronary artery disease), cancer stage, adjuvant or neoadjuvant therapy, breast reconstructive modality, and incidence of postoperative hematoma. Native breast skin flap necrosis was the primary outcome of interest. Factors potentially contributing to skin flap necrosis were examined including age at the time of

**Figure 2** Examples of native breast skin flap necrosis.