Surgical site infection following any prosthetic device is a devastating complication, often leading to device removal. In expander-based breast reconstruction, the infection rate varies from 2.5% to 24%, despite “best practices” guidelines. Failure of the breast reconstruction is emotionally draining to such patients at an already vulnerable time. Repeated surgery to replace the device is required, with further financial and emotional cost.

In the 1890s, Lane developed “no-touch” surgical techniques in the treatment of fractures. This involved meticulous coverage of the skin and skin edges with towels and long instruments to physically separate the surgeon’s hands from the tissue being manipulated. Other surgical disciplines have reduced infections with no-touch, especially during implantation of orthopedic, urologic, or plastic surgical prosthetic devices. In 1993, Mladick reported on the no-touch technique for breast augmentation, reporting no device infections in 2863 cases. More recently, in the urologic literature, Eid et al reported a reduction of infection in penile implants from 2% to 0.46% with the addition of no-touch techniques in 2347 patients.

In immediate breast reconstruction using tissue expanders, the surgical field is less controlled and more contaminated than either breast augmentation or penile prosthesis placement. The surgical field is open for 1–3 hours depending on the ablative surgeon’s speed, whether it is a unilateral or bilateral mastectomy, and other factors such as sparing the nipple or difficulty locating lymph nodes. There is frequently surgical team rotation for breaks or to bring in the reconstructive surgical team. Additionally, the nipple and areola may retain bacteria despite adequate surgical preparation. With these challenges, expander or implant-based immediate breast reconstruction would seem to be an appropriate application for the principles of no-touch technique. Literature search reveals this to be the first application of “no-touch” principles to implant or expander-based breast reconstruction.

**Summary:** Infection is a common complication of immediate breast reconstruction that often leads to device removal, a result emotionally devastating to the patient and frustrating for her surgeon. “No-touch” techniques have been used in other surgical disciplines and plastic surgery, but they have not been reported for breast reconstruction with tissue expanders or implants and acellular dermis. We report a novel technique of tissue expander and acellular dermis placement using no-touch principles with a self-retaining retractor system that holds promise to decrease infectious complications of breast reconstruction. (Plast Reconstr Surg Glob Open 2015;3:e317; doi: 10.1097/GOX.0000000000000294; Published online 5 March 2015.)

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TECHNIQUE

Following mastectomy, the surgical site is irrigated with a triple antibiotic solution. We use rifampin, Bactrim, and gentamycin because they ensure broad coverage of expected skin organisms. Cultures of the surgical site are taken before reconstruction. Preliminary surgical steps (elevating the subpectoral plane, measuring, and marking the chest wall) are performed with a limited number of previously unused instruments. These instruments, the electrocautery, light handles, and suction are removed from the field. The chest wall skin is freshly prepared with ChloraPrep (Carefusion, San Diego, CA). The entire reconstructive team changes gloves; the reconstructive surgeon then places a sterile transparent drape (3M, Saint Paul, Minn.) that completely covers the exposed skin (Fig. 1). This drape is stapled to the everted wound edges to hold it in place. Around this, a new set of surgical drapes is applied.

A slit is made in the transparent drape between the mastectomy skin edges and a self-retaining retractor is placed. The retractor system consists of a peripheral retractor ring to which low profile, blunt hooks on elastic bands are affixed (Fig. 2). For nipple-sparing mastectomies, an existing retractor ring (Abeon Medical, Brecksville, Ohio) developed for urologic applications (Figs. 3, 4) will work; the company is developing a larger ring for use after mastectomy. Absent this larger ring, a sterile 26-cm-diameter wash basin may be used by cutting out its bottom half and making slits in its side wall (Fig. 2). The hooks (Abeon Medical) simultaneously retract the skin edge and gather the transparent drape such that it wraps inward and completely covers the cut edge of the skin. Notably, the hooks used have a large diameter, lie flat, and are blunt-tipped to minimize the risk of prosthesis damage. The surgeon then performs the breast reconstruction using acellular dermal matrix and an implant or expander, changing gloves before touching either graft or prosthesis. The acellular dermal matrix used in all patients was FlexHD Pliable (MTF, Edison, N.J.), which is sterile to United States Pharacopeia 71 standards. Because the fresh drape covers the skin and the hooks ensure it also covers the cut skin edge, neither the graft nor the prosthesis can become contaminated by the skin or instruments that have touched the patient’s skin. We complete closure of the subcutaneous layer after removal of the retaining hooks, leaving the transparent drape stapled to the skin edge.
Wilson • No-touch Technique for Immediate Breast Reconstruction

METHODS

We compared our no-touch group of 25 breasts to an earlier group of 16 breasts reconstructed before instituting the no-touch enhancement. The average age, body mass index, and comorbidity profile between the patient groups are similar (Table 1).

RESULTS

With the no-touch enhancement, there have been no surgical site infections or chronic seromas (minimum 60 days follow-up). One patient (4%) developed cellulitis that was treated successfully, but no implant required removal for infection. Previously, our rate of reconstructive failure due to infection (2 of 16) or chronic seroma (1 of 16) was 19% (3 of 16 breasts). Improvement in the no-touch group is statistically significant with a \( P = 0.025 \) (Z-test of proportions).

DISCUSSION

Application of the “no-touch” technique adds only 5–10 minutes to each breast reconstruction. Preoperative markings can be easily visualized through the transparent drape. The self-retaining retractor system provides excellent access without the frequent repositioning (and risk of drape disruption and skin exposure) that occurs when an assistant uses handheld retractors. It also basically eliminates the need for a skilled assistant and reduces any assistant’s job to that of merely a suture cutter.

CONCLUSIONS

Our numbers are small and the series is ongoing. Nevertheless, this application of “no-touch” principles to immediate breast reconstruction using a unique self-retaining retractor system holds promise to decrease the infectious complication rate of this common reconstructive procedure.

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REFERENCES

1. Francis SH, Ruberg RL, Stevenson KB, et al. Independent risk factors for infection in tissue expander breast reconstruction. Plast Reconstr Surg. 2009;124:1790–1796.
2. Khansa I, Hendrick RG Jr, Shore A, et al. Breast reconstruction with tissue expanders: implementation of a standardized best-practices protocol to reduce infection rates. Plast Reconstr Surg. 2014;134:11–18.
3. Fu KTL. William Arbuthnot Lane (1856–1943) and Kenelm Hutchinson Digby (1884–1954): a tale of two universities. J Med Biogr. 2008;16:7–12.
4. Mladick RA. “No-touch” submuscular saline breast augmentation technique. Aesthetic Plast Surg. 1993;17:183–192.
5. Eid JF, Wilson SK, Cleves M, et al. Coated implants and “no touch” surgical technique decreases risk of infection in inflatable penile prosthesis implantation to 0.46%. Urology 2012;79:1310–1315.

**Table 1. Patient Series Comparisons**

| No. Breasts/ Patients | Median Age | Median Body Mass Index | Comorbidities |
|-----------------------|------------|------------------------|---------------|
| Earlier series (before no-touch) | 16/10 | 45 | 28.0 | 2 smokers*, 2 hypertension |
| Current series (no-touch) | 25/15 | 45 | 25.9 | 3 smokers*, 2 hypertension |

*Smoking patients quit at least 30 days before reconstruction.

**Fig. 4.** No-touch system in place during expander-acellular dermis breast reconstruction following a bilateral nipple-sparing mastectomy. The retractor size is appropriate for this small patient with limited-length incisions.