Surgical risk factors of breast reconstruction and their clinical implications

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Extended deepithelialization to secure double-breasted closure of the skin

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Introduction

Double-breasted or ‘vest-over-pants’ closure of the skin is achieved by deepithelialization of one edge of a wound and advancement of the opposite edge over this deepithelialized area. The advanced skin edge is fixed over the deepithelialized area using a deeper layer of sutures anchoring the deepithelialized edge under the advanced skin, and a superficial layer of sutures anchoring the edge of the advanced skin to the edge of the skin of the deepithelialized flap. Double-breasted skin closure may be used to correct a deficit of subcutaneous tissues, to strengthen the wound closure and prevent widening of the resulting scar, or to prevent subcutaneous sinus formation.

Moreover, it may prevent fistulation in case of partial dehiscence of one of both suture lines or contamination of superimposed suture lines. As such, it was applied for urethra reconstruction and for the closure of pharyngeocutaneous fistulae. Double-breasted skin closure may also prevent contamination or exposure of the implant in cases where immediate breast reconstruction with prosthetic material is obtained after skin sparing mastectomy.

The deepithelialization routinely extends as far as the incision to be closed (Figs 1A - C). This way, however, the skin suture at the end of the incision immediately overlies the deep subcutaneous suture without any interposing subcutaneous tissues. Alternatively, no deep suture is used. In both these situations, wound dehiscence or infection of the skin suture may result in contamination of the underlying implant. To prevent this, we extend the deepithelialization beyond and around the limit of the skin incision.

Surgical Technique

After excision of the nipple-areola complex the skin incision is extended caudo-laterally to allow for sufficient exposure and resection of breast tissue. Following the skin sparing mastectomy and detachment of the inferio-medial part of the origin of the pectoralis major muscle, either a tissue expander or a definitive prosthesis is inserted subpectorally. The pectoralis major is draped over the implant and its caudal edge is sutured onto the subcutaneous aspect of the inferior skin flap caudal to the areolar defect. Hence, the caudal part of the
Figure 1A: To allow for double-breasted closure of the skin over an implant the deep epithelialization routinely extends as far as the incision to be closed (shaded area).

Figure 1B and 1C: This way, contamination of the skin suture may result in infection of the underlying implant in cases where this suture immediately overlies the deep subcutaneous suture or where no deep subcutaneous suture is used (arrow). Note the vaguely retracting skin where the deep sutures were applied.
Figure 2A: To prevent infection of the implant or the deep subcutaneous suture immediately overlying the implant, we extend the deep epithelialization approximately 2 cm beyond and around the limit of the skin incision (shaded area).

Figure 2B and 2C: This way, the skin sutures will solely overly intact dermal and subcutaneous tissues and none of the superficial sutures immediately overly the deeper ones.
Implant is covered solely by the skin flap. The skin laterally to the infra-areolar incision is deepithelialized to allow for double-breasted closure of the wound where no muscle is available. Rather than restricting the deepithelialization to the full length of the infra-areolar incision, it is extended approximately 2 cm beyond and around the incision. This way the terminal skin suture solely overlies intact dermal and subcutaneous tissues, while all other superficial sutures do not overly the deeper ones (Figs 2A - C). As a result, none of the deeper subcutaneous sutures, nor the underlying implant is exposed in case of contamination of any skin suture or dehiscence of the skin suture line (Fig 3). Since April 2000, we have used this technique in over 350 skin sparing mastectomies combined with immediate prosthetic breast reconstruction.

**Figure 3:** As a result of extended deepithelialization and double-breasted skin closure, the breakdown of the skin suture line and resulting superficial contamination of the wound does not result in infection of the deeper sutures or the underlying implant. Healing was subsequently uneventful in this patient (same patient as shown in Figures 1 and 2).
Discussion

Combined skin-sparing mastectomy and immediate prosthetic reconstruction is oncologically safe and psychologically beneficial to the patient.\textsuperscript{9,11} Reducing the amount of excised skin enhances the final aesthetic appearance, as most of the normal breast contour is intact even before the insertion of the implant. Although selective preservation of the areolar complex is increasingly being advocated, most surgical oncologists still agree that this complex must be excised. To allow for improved access to the anatomical borders of the breast glandular tissues however, we caudally add a curved extension to the peri-areolar incision. Like the B-mammaplasty originally described by Regnault,\textsuperscript{12} this approach allows us to correct possible preoperative ptosis and to inconspicuously confine the scar to the inferio-lateral aspect of the breast without loss of projection of the lower pole of the breast. Finally, the modified B-mammaplasty approach prevents the inclusion of a T-junction of the Wise pattern that is notorious for wound breakdown.\textsuperscript{10}

Rather than covering the implant completely by the pectoralis major, serratus anterior, and rectus abdominis muscles, we prefer a subpectoral positioning with draping of the pectoralis over the cranial aspect of the implant and leaving the caudal aspect covered solely by the skin flap. We agree with Hammond et al.,\textsuperscript{9} Noone,\textsuperscript{13} and Spear et al.\textsuperscript{14} that such positioning allows for quicker, less painful surgery, with improved lower breast projection and better inframammary fold definition. Although some authors argue that the risk of implant exposure, contamination, and loss may be greater when the implant is partially left subcutaneously,\textsuperscript{13,15} such limited increased risk may not outweigh the benefits of combined subpectoral and subcutaneous implant insertion.\textsuperscript{10,16}

Because the pectoralis major muscle usually is not long enough to seal off the full length of this extension, we de-epithelialize the lateral edge of the extension to allow for double-breasted closure the wound. Extending the deep epithelialization beyond and around the caudal limit of the full thickness incision allows for complete and secured double-breasted closure of the entire wound.\textsuperscript{17} This way no part of the suture lines are superimposed, thus lessening the risk of implant contamination or exposure. Small areas of delayed healing or necrosis of the skin edges can be treated conservatively because of the healthy and complete underlying soft-tissue cover over the implant. Our preliminary results in the first 350 breasts operated this way indicate that extended double-
breasted skin closure immediately over the implant, in terms of postoperative complications and surgical outcome, is comparable to direct skin closure over the pectoralis major muscle overlying the implant. The advantages of extended double breasted closure, then, are the more favorable projection of the lower pole of the reconstructed breast and the restriction of the mastectomy scar to its inferio-lateral aspect.
References

Risk of immediate breast reconstruction after skin sparing mastectomy

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