

Single Stitch Vicryl Mesh Wrap for Prepectoral Implant Breast Reconstruction

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Summary: Acellular dermal matrices are commonly used in prepectoral breast reconstruction for implant coverage and support, but they are associated with significant costs. The authors describe a technique for prepectoral breast reconstruction in which the implant is completely wrapped in a knitted Vicryl mesh and then positioned on the chest, without the need for any tacking sutures. A retrospective review was performed on all consecutive prepectoral breast reconstructions, using this technique at a single institution. A separate cohort undergoing prepectoral reconstruction with a conventional acellular dermal matrix technique was also reviewed for comparison. Patient demographics, oncologic and reconstruction characteristics, outcomes, complications, and materials cost were analyzed. Twelve patients (23 breasts) underwent prepectoral reconstruction with Vicryl mesh, and 34 patients (55 breasts) underwent prepectoral reconstruction with acellular dermal matrices. Overall complication rates in the Vicryl group were low (two infections, one case of skin necrosis, one hematoma) and did not differ statistically from the acellular dermal matrix group. Operative time per breast was nearly twice as fast (35.7 versus 68.0 min, $P < 0.01$). Calculated materials cost savings was \$8273 per breast. Prepectoral breast reconstruction with Vicryl mesh only is a safe technique that is much faster and significantly cheaper compared with conventional reconstructive techniques utilizing acellular dermal matrices. (*Plast Reconstr Surg Glob Open* 2023; 11:e5058; doi: [10.1097/GOX.0000000000005058](https://doi.org/10.1097/GOX.0000000000005058); Published online 12 June 2023.)

INTRODUCTION

The use of acellular dermal matrices (ADM) in prepectoral breast reconstruction is touted to help control the pocket and reduce pressure on mastectomy flaps,¹⁻¹⁰ improve tissue integration,¹¹⁻¹³ and protect against the negative effects of radiation such as capsular contraction.^{14,15} However, results are variable and the quality of existing data is low; a recent systematic review suggested that rates of implant loss, infection, and flap necrosis were actually higher when ADM was used versus no additional implant material.¹⁶

The cost of ADM remains one of its largest drawbacks,^{17,18} and cost has been identified specifically in the

setting of prepectoral reconstruction as a major barrier to a positive fiscal model.¹⁹ Because a larger size or several pieces of ADM are required compared with subpectoral reconstruction,²⁰ cost is multiplied. Accordingly, efforts have been made to identify alternatives that are more affordable and accessible. Vicryl mesh (Ethicon, Inc., Somerville, N.J.) has been used by several groups with favorable outcomes and complication rates.²¹⁻²⁴ However, its use has been limited mostly to subpectoral or dual-plane reconstruction; one group has described its use in combination with ADM for prepectoral reconstruction.²⁵

We describe a single stitch Vicryl mesh wrap technique for prepectoral breast reconstruction, in which the implant is encased in Vicryl mesh and then affixed to the chest without the need for any tacking sutures. The purpose of this study was to analyze outcomes with a Vicryl mesh wrap technique as a means of reducing materials cost and operative time in prepectoral breast reconstruction.

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METHODS

A review was performed of patients who underwent prepectoral breast reconstruction at a single institution. All prepectoral implant reconstructions using the described Vicryl mesh technique were included. Additionally, all prepectoral reconstructions using a conventional ADM coverage technique [AlloDerm Select Ready-to-Use (LifeCell Corp., Branchburg, N.J.) or Flex HD (Musculoskeletal Transplant Foundation Biologics, Edison, N.J.)] were included for comparison.

The single stitch mesh technique begins with assessing mastectomy flap viability by inspecting tissue quality and bleeding. A sizer is placed to assess appropriate device size. Next, one sheet of knitted Vicryl mesh (30×30 cm) is wrapped completely around the device and secured with a single 3-0 Monocryl suture in a purse-string fashion (Fig. 1). Redundant material is trimmed to achieve a smooth contour. The device is immersed in betadine and placed on the chest. Two drains are placed subcutaneously, and the breast is closed in three layers.

Data on patient demographics, oncologic details, operative characteristics, and reconstructive outcomes were collected. Materials cost for Vicryl mesh and ADM were collected based on per-unit pricing, and average cost per breast was calculated. Variables were compared using Fisher exact test and unpaired *t* test.

RESULTS

Twelve patients (23 breasts) underwent prepectoral reconstruction with Vicryl mesh, and thirty-four patients (55 breasts) underwent prepectoral reconstruction with ADM. All patients received smooth, round, silicone implants. Demographics were similar between cohorts, except a higher proportion (75%) of Vicryl mesh patients underwent neoadjuvant chemotherapy ($P < 0.01$).

Both cohorts had average follow-up of approximately 3 months. Complication rates in the Vicryl group were comparable to the ADM group. (See table, Supplemental Digital Content 1, which shows demographics, treatment characteristics, complications, and materials cost of breast

Takeaways

Question: Acellular dermal matrices are commonly used in prepectoral breast reconstruction for implant coverage and support, but they are associated with significant costs.

Findings: We describe a technique for prepectoral breast reconstruction in which the implant is completely wrapped in a knitted Vicryl mesh and then positioned on the chest. We compare outcomes to an internal control group undergoing conventional reconstruction using acellular dermal matrices. The Vicryl mesh technique is significantly faster and cheaper, with similar complication rates.

Meaning: Prepectoral breast reconstruction with Vicryl mesh is a safe technique that is much faster and significantly cheaper compared with conventional reconstructive techniques utilizing acellular dermal matrices.

reconstruction patients. <http://links.lww.com/PRSGO/C611>.) There were two infections and one case of skin flap necrosis that required implant removal. There was one hematoma that required a return to the operating room. There were no patients who were unsatisfied with their breast cosmesis.

Operative time was almost twice as fast compared with the ADM group (35.7 versus 68.0 min, $P < 0.01$). Materials cost per breast was \$760 using Vicryl mesh and \$9033 using ADM, resulting in a 91.6% materials cost savings (\$8273) per breast.

DISCUSSION

The purported advantages of Vicryl mesh include wide availability, low inflammatory responses, and decreased rates of biofilm formation, whereas disadvantages include a theoretical concern for bottoming-out and capsular contracture.²¹⁻²⁴ Previous groups have demonstrated that substituting Vicryl for ADM in breast reconstruction can significantly reduce costs.^{22,25} For prepectoral

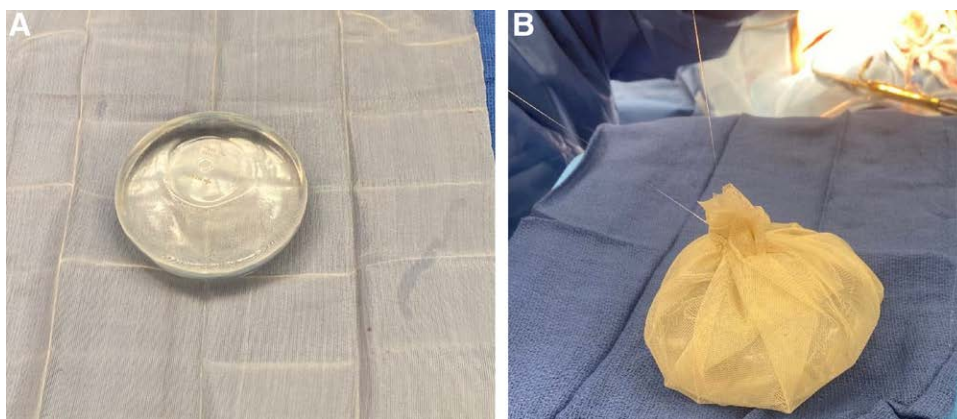


Fig. 1. A, Vicryl mesh on a sterile back table. B, The purse-string suture knot is tied on the posterior surface of the implant.

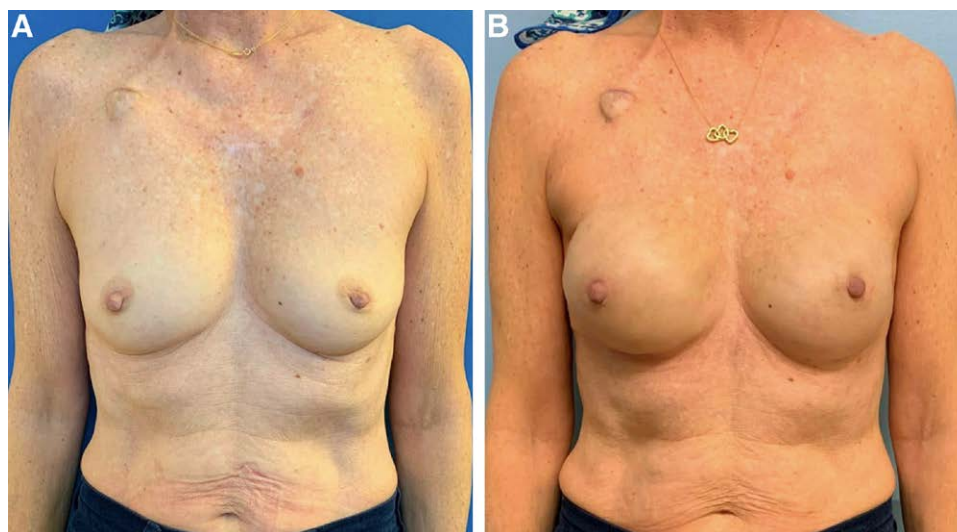


Fig. 2. A 65-year-old BRCA1-positive woman with right breast cancer who underwent bilateral nipple-sparing mastectomies and prepectoral immediate implant reconstruction with 255-ml smooth, round implants and single stitch coverage with Vicryl mesh. A, Preoperative. B, Postoperative.

reconstruction, combination techniques have been described, such as using Vicryl mesh with an additional layer of ADM for support.^{26,27} A recent study described using ADM for the inferolateral portion of the implant and Vicryl for the superior portion.²⁵

Our method builds on prior prepectoral techniques by eliminating the use of any ADM. Vicryl can be presoaked in customized solutions, and due to its adsorption capacity, it can potentially serve as a vehicle for the delivery of antimicrobials, chemotherapeutics, or radioactive seeds. We completely wrap the device in Vicryl and then place it onto the chest wall, without any additional ADM for support.

Due to the cohesiveness of the mesh, the device maintains its position on the chest without any suturing. (See **Video [online]**, which demonstrates implant mobility within the mastectomy pocket prior to single stitch Vicryl mesh wrap, followed by secure implant position after placement of Vicryl mesh.) This is one of the key improvements of this technique because it significantly decreases operative time while simplifying the overall procedure. We use knitted Vicryl mesh, which is more porous than the woven variety and theoretically promotes increased tissue integration.²⁸ Patients wear a surgical bra postoperatively to help hold the implant position, and given the resorption time of the Vicryl mesh,²⁹ we assume that scar formation will maintain the position. We have not observed any signs of implant displacement within our mean 115.6 days of follow-up. Although possible deformity related to direct contact with the mesh is a concern in thin-skinned patients, no patients thus far have had irregular breast appearance, texture, or firmness (**Fig. 2**). Our complication rates are comparable to our internal control group as well as those reported in the literature.^{16,21–25}

Limitations of this study include a small sample size, which limited the power of our findings. Each cohort was

treated by a different surgeon, and patient review was not blinded. Costs were based on our organization's purchase prices, which vary across institutions. Finally, longer follow-ups are needed to analyze important outcomes such as long-term implant position and capsular contracture; we plan to update our results to include 1-year follow-up timepoints. However, our preliminary findings support the use of the single stitch Vicryl mesh wrap technique as a faster, simpler, and cheaper option for prepectoral breast reconstruction compared with conventional ADM techniques.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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