Case Series

EVALUATION OF ACELLULAR DERMAL MATRIX INCORPORATION OUTCOMES IN THE SETTING OF MASTECTOMY FLAP NECROSIS

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Evaluation of Acellular Dermal Matrix Incorporation Outcomes in the Setting of Mastectomy Flap Necrosis

INTRODUCTION

Mastectomy flap necrosis is a significant clinical challenge for breast reconstruction.[1, 2, 3] (**Figure 1**) To help minimize perfusion issues and wound healing, a staged reconstruction with immediate tissue expander and human acellular dermal matrix (ADM) is often performed. Areas of full-thickness flap necrosis are still possible from thin flaps or aggressive retraction pressure injury. This often necessitates an unplanned return to the operating room for excision and attempted salvage of the reconstruction. Typically, in this situation, existing ADM is often removed due to poor incorporation.

This paper presents three cases in which AlloMend® ADM (AlloSource, Centennial, CO) allograft was used for coverage of a pre-pectoral tissue expander in breast reconstruction that showed incorporation of the ADM, despite an unfavorable environment due to mastectomy flap necrosis.

Figure 1. *Mastectomy flap necrosis (not from case series)*

CASE ONE

A 58-year-old female patient with newly diagnosed left breast infiltrating ductal carcinoma underwent a left breast skin sparing mastectomy with immediate tissue expander and pre-pectoral reconstruction utilizing ADM. The plan was for a delayed deep inferior epigastric perforator (DIEP) flap reconstruction. The tissue expander (Mentor Worldwide, Irvine, CA) was a medium height profile, 550 ml, filled with 100 ml of air. The tissue expander was wrapped circumferentially, prior to insertion on the back table, with a 16x20 cm, 1.0-2.0 mm thick, meshed AlloMend ADM.

The initial plan was for Wise pattern/inverted "T" mastectomy flap closure, but SPY (Stryker, Portage, MI) fluorescence angiography demonstrated an area of very poor perfusion along the medial flap, so excision and closure in a modified transverse fashion was performed. Two 15 French JP drains were inserted. The first drain was removed at one week post-op and 100 ml of air injected into the tissue expander. The remaining drain backed out and lost suction shortly thereafter and was removed. She had issues with recurrent seroma and cellulitis and was taken back to the operating room seven weeks following initial surgery.

The expander was removed, and seroma fluid was cultured. Inspection of the pocket showed great integration of the ADM, aside from one area under the focal mastectomy flap necrosis. An antibiotic plate was fashioned with 3.0 g of vancomycin and 2.4 g of tobramycin and placed behind a new 550 ml expander. Subsequent cultures had no growth. The patient healed well, and had further expansion and delayed DIEP flap reconstruction two months later. The AlloMend ADM was well incorporated, as evidenced by signs of revascularization, and provided good support for the DIEP flap reconstruction (**Figure 2**).

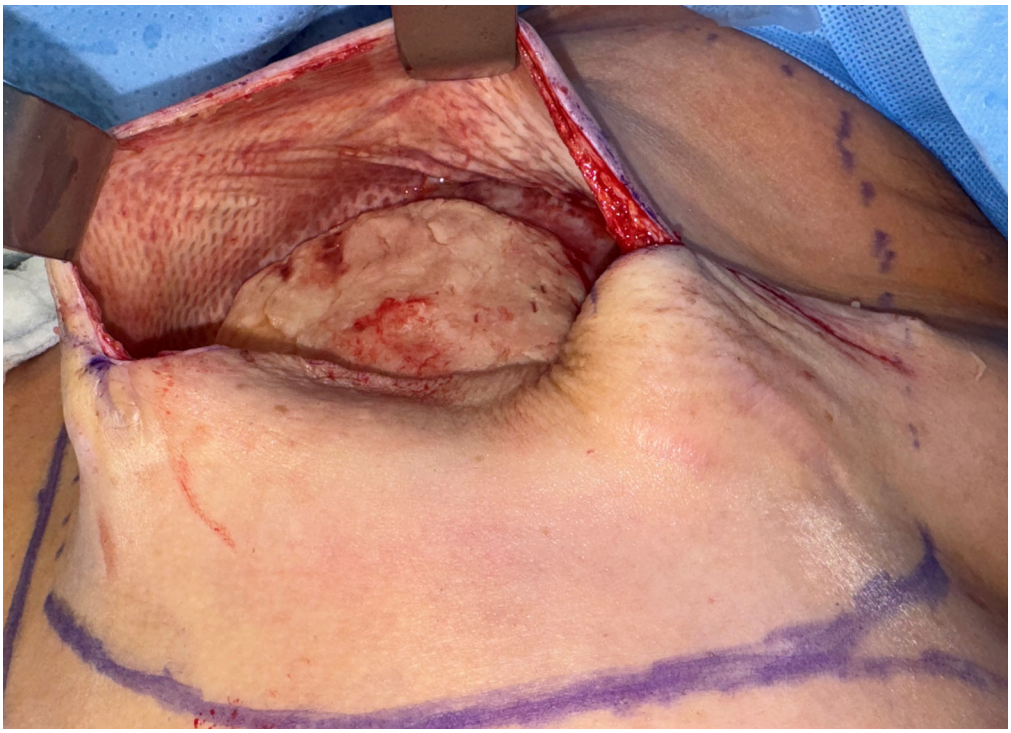

Figure 2. *AlloMend ADM incorporation (with antibiotic plate in place)*

CASE TWO

A 56-year-old female patient with history of breast reduction surgery was found to have a genetic mutation, with a predisposition to breast cancer. She desired bilateral prophylactic nipple-sparing mastectomies and implant-based reconstruction with staged pre-pectoral tissue expanders. The tissue expanders used were Mentor CPX 4 medium height profile, 550 ml. They were filled initially with 100 ml of air and were wrapped circumferentially prior to insertion on the back table, with a 16x20 cm, 0.5-1.0 mm thick, meshed AlloMend ADM.

The mastectomies were performed through a prior inframammary fold scar. SPY fluorescence angiography demonstrated very poor perfusion at the vertical scar area of both breasts, worse on the right than on the left side. Therefore, further mastectomy flap skin had to be excised. Two 15 French JP drains were inserted at each breast. The first drain, at each breast, was removed at one week post-op and no expansion was performed secondary to the area of mastectomy flap healing concerns at each breast. The final drains were removed two and a half weeks post operatively. There was impending full-thickness mastectomy flap necrosis at the T-junctions of both breasts, therefore, operative debridement was recommended. Her revision surgery was performed three weeks after her initial surgery.

Debridement of a 2x1.5 cm dry eschar excision at left breast vertical incision and 5x3 cm necrotic tissue at right breast vertical incision was performed. Some thin serous seroma fluid occurred in the breast pocket, but no purulence or fibrinous tissue was present. The ADM had begun incorporating very well, aside from the areas underlying the non-viable mastectomy tissue. The left breast was closed easily, given the small wound, however the right breast required further skin mobilization from the lateral aspect to be able to close. A new, completely deflated, 550 ml tissue expander was placed at the right breast and the incorporated ADM was left in place, sparing the necessity of ADM replacement. The patient went on to heal and received further expansion. She returned to the operating room, three months later, for removal of the tissue expanders and reconstruction with silicone gel implants and concurrent fat grafting. The AlloMend ADM was well incorporated on both sides and provided a good pocket for the implants, as well as a suitable plane for fat grafting.

CASE THREE

A 45-year-old female patient had right multicentric breast cancer and positive lymph node metastasis. She underwent a right breast skin-sparing mastectomy with axillary lymph node dissection with planned staged DIEP flap reconstruction. The patient then underwent immediate pre-pectoral reconstruction, with a Mentor CPX4 medium height profile, 650 ml, expander filled with 250 ml of air.

The tissue expanders were wrapped circumferentially prior to insertion with a 16x20 cm, 0.5-1.0 mm thick, meshed AlloMend ADM allograft. Two 15 French JP drains were inserted. The first drain was removed at one week post-op and the final drain at three weeks post-op. She developed a focal area of mastectomy flap necrosis at the superolateral area and returned to the operating room four weeks later for excision of the full thickness tissue loss. Other than the ADM directly beneath the skin loss, the remaining allograft was very well incorporated and therefore could be left in place. The pocket was irrigated, the tissue expander left in place, and the mastectomy skin mobilized to allow closure of the defect. The patient went on to heal well and receive subsequent expansions. She completed radiation therapy and was scheduled for reconstruction with a DIEP flap.

CONCLUSION

Mastectomy flap necrosis can present a complex reconstructive problem. Without appropriate blood flow to areas of the mastectomy flap, there is risk that the underlying ADM cannot properly incorporate. Lack of incorporation will increase seroma incidence, infection risk and need to alter the reconstructive plan.[4, 5, 6] A surprising finding in each case was incorporation of the AlloMend ADM, with the exception of underlying focal areas of mastectomy flap necrosis, despite limitations in tissue expansion and early return to the operating room. This allowed salvage of the reconstruction and avoidance of removal of all the AlloMend ADM allograft. This has not been the author's experience in prior cases associated with mastectomy flap necrosis, when using other types of ADMs. The allograft integration may be partially attributed to the unique meshing pattern of AlloMend ADM and the resulting increased surface area available for incorporation[7], or other properties of AlloMend ADM processing. Further studies studies would be needed to validate this conclusion.

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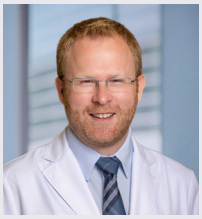

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