

Report of an unusually large, surgically excised squamous cell carcinoma successfully treated with porcine transitional epithelium

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INTRODUCTION

Xenograft transplantation, first performed in the early 20th century, has been used successfully in traumatic wounds, burns, chronic ulcers, and surgical defects. Xenografts should be considered when facing not only limited donor skin or multiple patient comorbidities that may preclude successful full thickness skin grafting, but also unusually large surgical defects. Xenografts are commonly used for enhanced granulation in preparation for full-thickness skin graft placement especially over avascular areas such as cartilage or bone. Xenografts reduce the inherent tension of a wound, initiate proper epithelialization, reduce postoperative complications, and allow for acceptable outcomes.¹ Traditionally, porcine xenografts are split-thickness skin grafts harvested with a dermatome under aseptic conditions. Newer xenografts, derived from other components besides dermal material, can be used as a biologic dressing to both facilitate and accelerate wound healing with decreased scar contraction. The MatriStem xenograft (ACell, Columbia, MD) is an extracellular matrix derived from porcine urinary bladder. Porcine transitional epithelium, currently the most widely used, provides optimum results in full-thickness wound remodeling because of its resemblance in histologic structure to human skin. We report an unusually large, surgically excised squamous cell carcinoma (SCC) managed successfully with the MatriStem xenograft.

CASE REPORT

A 57-year-old Hispanic man presented with a 45- × 20-cm biopsy-proven SCC, extending from the right pretibial area to the ankle. After excision of the tumor

with Mohs surgery, the final defect measured 900 cm² (Fig 1). After 2 full-thickness abdominal skin grafts, the remaining upper three-quarters of the defect was dressed with 700 cm² 3-layered MatriStem Wound Matrix fenestrated sheets and 100-mg MatriStem MicroMatrix (ACell) particles (Fig 2). Two additional one-layered MatriStem xenograft wound sheets were placed on postoperative weeks 2 and 4 to the wound after resorption of the previously placed grafts. Partial granulation was noted at 1 week postoperatively and full-thickness remodeling at 4 weeks (Fig 3). Complete postsurgical remodeling was seen at the 3-month follow-up visit (Fig 4). The patient was prophylactically placed on a 7-day course of levofloxacin, 750 mg daily, on the day of surgery. No complications were seen. Outcomes of healing with the xenografts serving as biologic dressings were equivalent to the full-thickness skin grafts, which can serve as an internal control for comparison within the same patient.

DISCUSSION

Biologic dressings, xenografts, and allografts, are an integral part of modern wound care. Various case reports have surfaced in the dermatology and reconstructive surgery literature on the use of human cadaveric allografts and other biologic dressings, offering a useful alternative to granulation for postoperative management of surgical wounds. Although there is no approved indication in dermatology, the use of porcine xenografts, porcine acellular dermal matrix (ADM), or porcine extracellular matrix from urinary epithelium for the management of postoperative Mohs micrographic surgery wounds and other nonhealing ulcers has been described in the

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Fig 1. Final 900 cm² defect of squamous cell carcinoma treated with Mohs micrographic surgery.



Fig 2. Intraoperative placement of the MatriStem xenograft.



Fig 3. Full-thickness remodeling of defect managed with xenograft superior to the ongoing healing of full-thickness skin graft at 4-week follow-up visit.

dermatology literature for granulation or delayed repairs.^{2,3} Specifically, porcine urinary transitional epithelium has a role in providing the standard



Fig 4. Complete wound healing seen at 3-month follow-up.

dressing for partial-thickness defects and temporary coverage for full-thickness defects. From our experience, porcine xenografts have proven reliable in full-thickness wound remodeling as well.

The MatriStem system is formulated as dry particles or sheets of non-cross-linked, completely resorbable, acellular matrix material, replete with naturally occurring collagens, laminins, and glycosaminoglycans and numerous growth factors.^{4,5} The extracellular surface of MatriStem is hypothesized to contribute to epithelial and progenitor cell attachment and proliferation, while the lamina propria surface may be conducive for integration into the wound bed and host connective tissues. No synthetic material has been able to promote wound healing as effectively and quickly or constructively remodel site-specific tissues where scarring would be expected. ADM has been found to accelerate the regeneration of epithelial and stem cells, thus, shortening the healing time of wounds. By aiding in the remodeling of skin structure, it consequently has the added benefit of controlling hypertrophic scar at inception.⁶ In addition, because of MatriStem's ability to maintain an intact epithelial basement membrane, it provides further protection by providing antimicrobial activity, thereby reducing the potential for postoperative wound infections and further retarding wound healing.⁷ It should be noted that in clean wounds, the porcine skin will adhere and can be left intact after an initial inspection after 2 to 3 days. Dirty wounds, particularly sites on the lower

extremities, require regular dressing change, preferably weekly in the initial stages.

From our experience, the porcine transitional epithelium xenograft system functions as an efficient dressing material in preparation for full-thickness skin grafts and deep partial-thickness postoperative wounds, allowing for adequate epithelialization during the postoperative treatment course. At this time, MatriStem is approved for the management of partial- and full-thickness wounds including chronic pressure ulcers, venous ulcers, diabetic ulcers, tunneled/undermined wounds, traumatic wounds including burns, and surgical wounds. We now report that porcine xenografts should also be considered in unusually large surgical defects not amenable to surgical repair. These xenografts allow more rapid, safe, and effective healing than granulation alone with fewer complications such as hypertrophic scarring or postoperative infections.

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