



Aesthetic Breast Reconstruction

Case Report

Novel Use of Wound Matrix in Mastopexy Complicated by Pyoderma Gangrenosum

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Abstract

Pyoderma gangrenosum (PG) is a relatively uncommon inflammatory skin disorder that is characterized by rapid onset, ulcerative lesions, and often triggered by trauma or surgery. Although rare, PG of the breast has been well described in the plastic surgery literature, most often reported following breast reductions and reconstructions. The authors present a case of PG that developed in a 56-year-old patient, with a history of essential thrombocytosis, following mastopexy. Her significant full-thickness skin loss was successfully treated with steroids and then reconstructed via serial applications of porcine placental extracellular matrix grafts. Her wounds were completely healed in 3.5 months for the left, and 5 months for the right breast. To the best of the author's knowledge, this is the first published case in which placental grafts have been successfully used to reconstruct pyoderma wounds of the breast. Given their advantageous scarring and lack of donor-site morbidity, placental grafts should be considered for all breast surgery patients afflicted by PG.

Level of Evidence: 5

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Pyoderma gangrenosum (PG) is a relatively uncommon inflammatory skin disorder characterized by rapid-onset, ulcerative lesions, often triggered by trauma or surgery. Although rare, PG of the breast has been well described in the plastic surgery literature, most often reported following breast reductions and reconstructions. To date, the majority of literature remains focused on the often challenging diagnosis of PG itself, and little has been published regarding reconstruction of the breast following treatment of the disease. We present a case of PG that developed in a

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Figure 1. Initial appearance of the 56-year-old female patient's breasts on postoperative day 8.

patient with essential thrombocytosis following mastopexy and was successfully reconstructed using porcine placental extracellular matrix grafts.

CASE PRESENTATION

A 56-year-old female with a medical history notable for essential thrombocytosis and ptotic breasts presented for bilateral Wise pattern mastopexy in August 2022 (Video). Given the patient's hematologic history, preoperative clearance by hematology-oncology was obtained prior to surgery. As the patient had previously undergone blepharoplasty without complication and had stable disease on hydroxyurea, there was low concern about proceeding with further elective surgery. She underwent bilateral mastopexy as planned, and her surgery was without intraoperative complication. Following, the patient was discharged home with 7 days of Augmentin and was scheduled for standard follow-up on postoperative day (POD) 5. At her initial postoperative appointment, the patient reported intermittent malaise and was found to have mild erythema of the right breast. She was afebrile and without other signs or symptoms consistent with infection; thus, she was instructed to continue her postoperative antibiotics and was scheduled for follow-up in 1 week.

On POD 8, the patient developed a fever of 101°F, bilateral breast erythema, and purulent-appearing drainage from the right breast (Figure 1). Given her high concern for postoperative cellulitis and abscess formation, she underwent in-office incision and drainage of the bilateral breasts. Wound cultures were taken, and her



Video. Watch now at <http://academic.oup.com/asj/article-lookup/doi/10.1093/asj/ojad085>

initial 7 day course of Augmentin was extended in duration. She was discharged home with plans for daily nursing calls and close outpatient monitoring. The final cultures from her initial incision and drainage were without growth.

Two days later (POD 10), she developed new-onset epidermolysis of the bilateral breasts and continued to have fevers and breast drainage. The decision was made to proceed to the operating room for formal washout and debridement that day (Figure 2). Upon exploration of her breasts, no clear abscess or undrained fluid collections were found. One of 4 intraoperative cultures grew *Achromobacter xylosoxidans*; the remainder of the operative culture was without growth. Given the *Achromobacter*-positive cultures and unusual presentation, infectious disease was consulted and treatment began with zosyn, daptomycin, and micafungin.

While receiving inpatient antibiotics, the patient's wounds continued to rapidly progress, ultimately resulting in full-thickness skin loss of the entire anterior aspect of her bilateral breasts. There was sharp demarcation of the involved skin, with sparing of her bilateral nipple-areolar complexes. At this point, there was increasing suspicion for PG, and dermatology was consulted.

Five days following her initial inpatient debridement (POD 15), the patient returned to the operating room for a wound vac exchange and tissue biopsy. Surgical pathology was notable for dense dermal neutrophilic infiltrates, and special stains were negative for microorganisms. Given the biopsy results consistent with pyoderma, the patient's antibiotics were discontinued, and she was started on methylprednisolone (1 mg/kg) with rapid stabilization of her symptoms and wounds following. She was formally

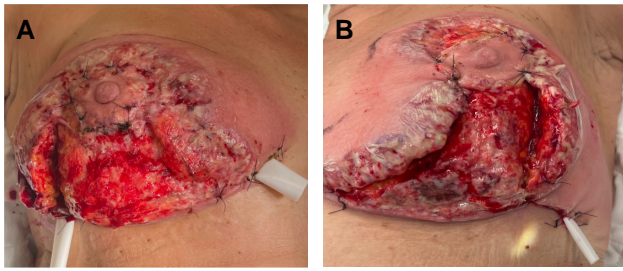


Figure 2. A 56-year-old female's (A) right and (B) left breasts following initial debridement, 10 days after mastopexy.

diagnosed with PG and discharged home on high-dose prednisone (60 mg/day) with plans for serial outpatient wound vac exchanges.

TREATMENT

Following the initiation of high-dose steroids, the patient's symptoms rapidly improved and her wounds stabilized. Wound vac therapy was continued until the wound bed had adequate granulation tissue at ~4 weeks following hospital admission (Figure 3). At this time, the patient was deemed ready to undergo reconstruction, and an extensive discussion was had regarding her surgical options. She was offered conventional wound care management and healing by secondary intent vs serial porcine placental graft application. She was counseled that the grafts may confer no benefit whatsoever and that a paucity of literature existed regarding their application for pyoderma. Given the cosmetic nature of her initial operation and desire to minimize scarring, the patient decided to pursue treatment with porcine placental extracellular matrix grafts (InnovaMatrix AC; Convatec Triad Life Sciences; Memphis, TN). The grafts were provided at no cost by the manufacturer, and her serial applications began 6.5 weeks after her initial operation. The patient then underwent a total of 15 graft applications timed 1 week apart. All were performed on an outpatient basis.

The surface area of her wounds decreased significantly with each graft application (Figure 4). Her left breast wounds (initial measurements 12 × 10 cm) were completely healed after 3.5 months of serial graft application, and the right breast (initial wound measurements 13 × 10 cm) after 5 months. Her wounds showed little contraction with relative preservation of the nipple-areolar complex position. Her scars remained relatively soft, flat, and were a good color match compared to her surrounding, unaffected tissue (Figures 5, 6).

While undergoing serial porcine placental graft application, the patient was followed closely by dermatology. She underwent a final steroid taper of 60 mg/day for 19 days, 50 mg/day for 1 month, 40 mg/day for 1 month,

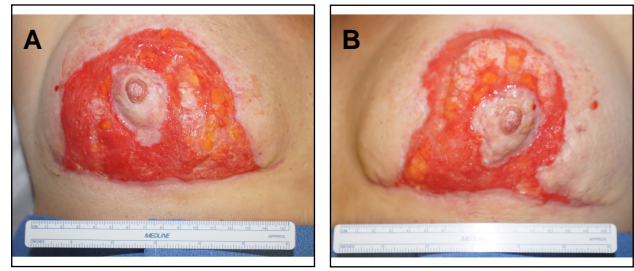


Figure 3. A 56-year-old female's (A) right and (B) left breasts following full demarcation, 6.5 weeks after mastopexy.

10 mg/day for 1 month, 5 mg for 1 month, and 5 mg qOD for 1 month.

Following completion of graft applications and medical management, the patient agreed to have her post-operative course shared as a case report, with the intent of helping other patients also afflicted by PG of the breasts. Written consent was provided, by which the patient agreed to the use and analysis of her medical data.

DISCUSSION

PG is a noninfectious condition that is characterized by ulcerative skin lesions following trauma or surgery. PG is a relatively rare diagnosis with a reported incidence of ~3 in 1 million patients in the United States.¹ Breast surgery is the most common etiology of postoperative PG and accounts for 25% of all reported cases.² Nevertheless, pyoderma is all too often misdiagnosed as a postoperative infection, given its presentation. Mismanagement with surgical debridement exacerbates the skin loss of pyoderma due to pathergy, which is the development of skin ulceration or lesions following trivial trauma, and the initiation of postoperative antibiotics only serves to delay diagnosis.^{2,3}

Although rare, pyoderma of the breast should remain in the differential for all plastic surgeons managing postoperative breast infections. In 2004, Su et al published diagnostic criteria to assist clinicians in the rapid diagnosis of pyoderma. Major criteria include: (1) rapid progression of a painful necrolytic cutaneous ulcer with an irregular, violaceous, and undermined border and (2) exclusion of other causes of cutaneous ulceration. Minor criteria include: (1) history suggestive of pathergy or clinical finding of cribriform scarring (atrophic, uneven scarring which is classically described as similar to cigarette paper in appearance); (2) systemic diseases associated with PG; (3) histopathologic findings (sterile dermal neutrophilia, ±mixed inflammation, ±lymphocytic vasculitis); and (4) treatment response (rapid response to systemic steroid treatment).⁴ Additionally, pyoderma is unique compared to other necrotic infections of the breast in that it spares the nipple-areolar complex.²

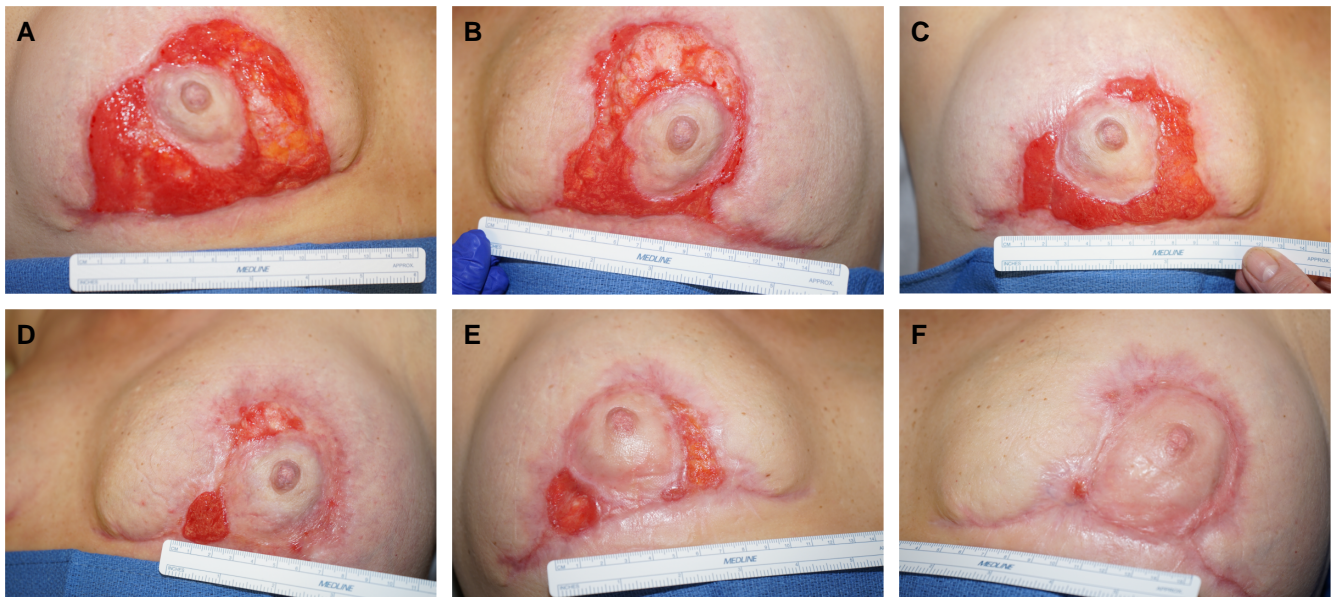


Figure 4. Progression of a 56-year-old female's breasts as follows: (A) right breast after 1 month of graft applications, (B) left breast after 1 month of graft applications, (C) right breast after 2 months of graft applications, (D) left breast after 2 months of graft applications, (E) right breast after 3.5 months of graft applications, and (F) left breast after 3.5 months of graft applications.

Our patient's presentation, disease course, and pattern of epidermal involvement were consistent with the prior literature.

Approximately 50% of pyoderma cases reported in the literature occur in patients with a history of autoimmune disease or hematologic malignancy. Despite the clear connection with these comorbidities, the etiology remains poorly understood at this time.⁵ Although exceedingly rare, pyoderma has been associated with a history of essential thrombophilia in 5 previously published cases.⁶⁻¹⁰ This is the sixth reported case in the literature and the first case of PG in a patient with essential thrombocytosis to involve the breast.

While pyoderma following breast surgery has been well described, a paucity of literature focuses on the surgical reconstruction of the resultant defects patients endure. Of that which exists for postmastopexy pyoderma, most report letting the wounds heal by secondary intent, full or split thickness skin grafting, or with dermal analogues such as Integra (Johnson and Johnson Medical).^{3,11-15} Given the cosmetic nature of this patient's initial surgery, we wished to optimize her reconstructive result and chose to use serial applications of porcine placental grafts (InnovaMatrix AC) after recommendation by colleagues in burn surgery and podiatry and discussion with the patient. Placental grafts have been long used in wound care due to their inherent antimicrobial, angiogenic, and anti-inflammatory properties. The extracellular matrix of these grafts retains high levels of hyaluronic acid, glycosaminoglycans, and elastin,¹⁶ all of which have been shown to promote, and expedite, wound healing.¹⁷ By using this graft, the authors achieved

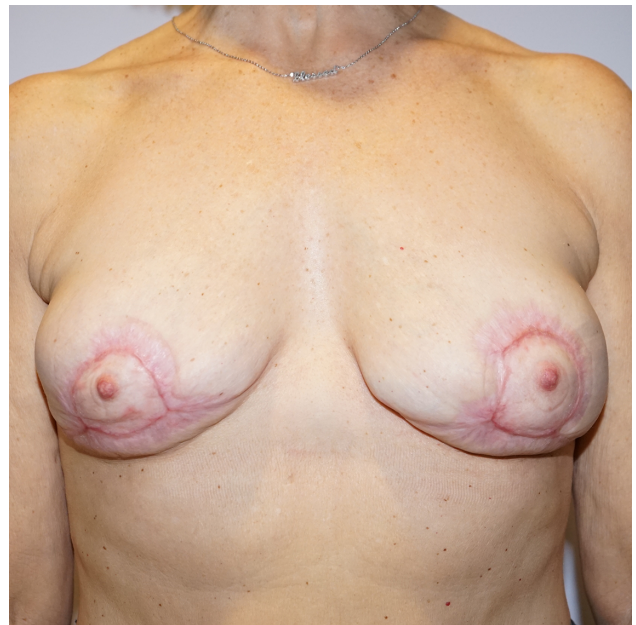


Figure 5. Healed breasts of a 56-year-old female after 5 months of graft applications.

near-complete healing of the patient's wounds in ~3 months. Use of these grafts avoided the donor-site morbidity and color mismatch of a skin graft, while minimizing the wound contracture of healing by secondary intent.

Although the use of a porcine placental graft requires serial applications and frequent office visits, we feel that

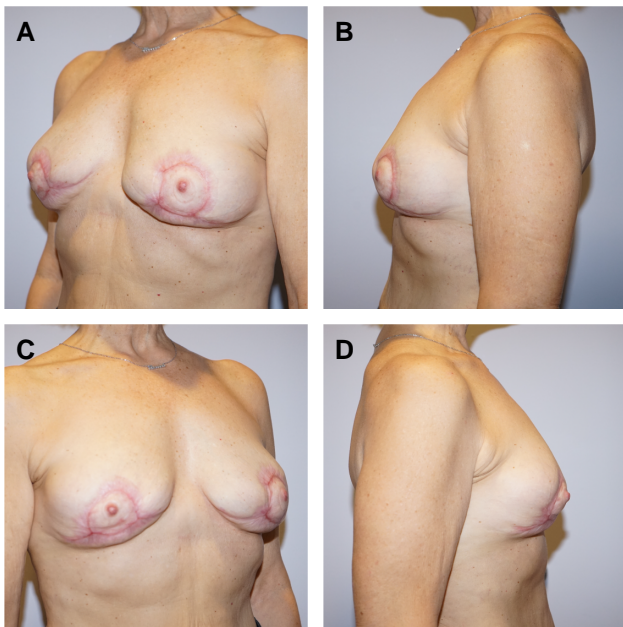


Figure 6. Healed breasts of a 56-year-old female after 5 months of graft applications shown at (A) left oblique, (B) left, (C) right oblique, and (D) right views.

the patient's results are far superior to alternative reconstruction options. These grafts can easily be applied in the clinic, are painless, and are easy to customize to the ever-changing wound bed. Furthermore, no specialized preparation, storage, tissue tracking, or orientation of the graft is required. The authors' postgraft application protocol is simple—after the graft is applied to the prepared wound bed, it is moistened with sterile saline. Then, the wound is dressed with a thin layer of Solosite wound gel (Smith & Nephew, Durham, NC), Adaptic nonadherent dressing (3M, Saint Paul, MN), and nonstick gauze. The morning of her next application (7 days later), the patient simply removed her dressing, showered, and cleansed her wounds with soap and water to prepare the wound bed for its next graft. In regard to cost, InnoMatrix AC is currently reimbursable through CPT codes 15271-15278 and HCPCS code A2001. Preparation of the wound bed prior to graft application can be billed through CPT 15002-15005.

To the best of the author's knowledge, the only other reported pyoderma reconstruction that used a placental graft was for wounds of the lower extremity.¹⁸ Our patient is exceptionally pleased with her cosmetic result given the circumstances (Figures 5, 6), although we do plan for formal operative revision to improve symmetry in several months time.

CONCLUSIONS

PG is an uncommon skin disorder that can cause devastating wounds in cosmetic breast surgery patient. Although

treatment guidelines are well established for the acute management of this condition, little consensus exists regarding the proper reconstruction of these patients. Placental grafts should be considered in this population given their advantageous scarring and lack of donor-site morbidity.

Supplemental Material

This article contains [supplemental material](http://www.asjopenforum.com) located online at www.asjopenforum.com.

Disclosures

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