AESTHETIC BREAST RECONSTRUCTION

CASE REPORT

Novel Use of Wound Matrix in Mastopexy Complicated by Pyoderma Gangrenosum

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Level of Evidence: Therapeutic V
Pyoderma gangrenosum (PG) is a relatively uncommon inflammatory skin disorder which 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 which 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 pyoderma gangrenosum.

CASE PRESENTATION

A 56-year-old female with a past medical history notable for essential thrombocytosis and ptotic breasts presented for bilateral Wise pattern mastopexy in August of 2022 (Video Abstract). 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 from either her plastic
surgeon or hematologist. 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) five. 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 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 initial 7 day course of Augmentin was extended in duration. She was discharged home
with plans for daily nursing calls and close outpatient monitoring. Final cultures from her initial incision
and drainage were without growth.

Two days later, (POD10) 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 four intraoperative cultures grew achromobacter
xylosoxidans—the remainder of operative cultures were without growth. Given the achromobacter positive
cultures and unusual presentation, infectious disease was consulted and began treatment 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 pyoderma gangrenosum and dermatology was consulted.
Five days following her initial inpatient debridement (POD15), the patient returned to the operating room for wound vac exchange and tissue biopsy. Surgical pathology was notable for dense dermal neutrophilic infiltrate 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 (1mg/kg) with rapid stabilization of her symptoms and wounds following. She was formally diagnosed with pyoderma gangrenosum and discharged home on high dose prednisone (60mg/day) with plans for serial outpatient wound vac exchanges.

TREATMENT

Following 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 approximately four 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 versus 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 12x10 cm) were completely healed after 3.5 months of serial graft application, and the right breast (initial wound measurements 13x10 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 60mg/day for 19 days, 50mg/day for 1 month, 40mg/day for 1 month, 10mg/day for 1 month, 5mg for 1 month, then 5mg qOD for 1 month.

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

DISCUSSION

Pyoderma gangrenosum is a non-infectious condition which is characterized by ulcerative skin lesions following trauma or surgery. PG is a relatively rare diagnosis with a reported incidence of approximately 3 in 1 million patients in the United States. Breast surgery is the most common etiology of postoperative pyoderma gangrenosum and accounts for 25% of all reported cases. 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.

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 necrotic cutaneous ulcer with an irregular, violaceous, and undermined border 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). Treatment response (rapid response to systemic steroid treatment). Additionally, pyoderma is unique compared to other necrotic infections of the breast in that it spares the nipple-areolar complex. Our patients presentation, disease course, and pattern of epidermal involvement was consist 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. Although exceedingly rare, pyoderma has been associated with a history of essential thrombophilia in five previously published cases. This is the sixth reported case in the literature and the first case of pyoderma gangrenosum 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 post-mastopexy 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). 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 hyaluronic acid, glycosaminoglycans, and elastin, all of which have been shown to promote, and expedite, wound healing. By using this graft, the authors achieved near complete healing of the patient’s wounds in approximately 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 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’ post graft application protocol is simple—at 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 non-adherent dressing (3M; Saint Paul, MN), and non-stick 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, InnovaMatrix 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 which used a placental graft was used for wounds of the lower extremity. 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

Pyoderma gangrenosum is an uncommon skin disorder which can cause devastating wounds in the 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 located online at www.asjopenforum.com.
REFERENCES


Figure Legends

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

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

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

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 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.

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

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.
Figure 3A

353x282 mm (x DPI)
Figure 3B
353x282 mm (x DPI)
Figure 4B
435x290 mm (x DPI)
Figure 4D
Figure 6C
435x290 mm (x DPI)