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Case Report

Acellular dermal substitute use in the reconstruction of axillary hidradenitis suppurativa

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ABSTRACT

Hidradenitis suppurativa (HS) is a chronic recurrent debilitating condition that affects the skin near to the follicular glands. The disease manifests with the formation of abscesses that can be complicated by rupture, sinus tracts, and scarring leading to pain, chronic discharge, malodor, and scar contractures. The management of HS is multidisciplinary, involving general lifestyle modification, medical treatment, and surgery. A wide range of surgical interventions has been described for HS disease control and management. However, surgical management strategies are highly variable. We describe the case of a 33-year-old female with refractory HS which was reconstructed with Matriderm® and an immediate split-thickness skin graft. Acellular dermal skin substitutes may be an alternative to conventional means of HS reconstruction, producing subtle, pliable, and durable skin.

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Introduction

Hidradenitis suppurativa (HS) is a chronic recurrent debilitating condition that affects the skin near to the follicular glands. It has a reported prevalence of 1% in the global population, more common

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in females with an average age of onset of 20 years¹. The disease manifests with the formation of abscesses that can be complicated by rupture, sinus tracts, and scarring leading to pain, chronic discharge, malodor, and scar contractures. It localizes to apocrine-bearing skin of flexural regions including the axilla, groin, perineal, and intermammary fold. In long-term refractory cases, malignant transformation has been described¹. Although the pathogenesis of the disease remains uncertain, the occlusion of the folliculopilosebaceous unit leads to rupture of the sebofollicular canal, giving way to perifollicular lymphohistiocytic inflammation². Numerous modifiable comorbidities are associated with HS, including obesity, smoking, and uncontrolled type 2 diabetes².

The management of HS is multidisciplinary, involving general lifestyle modification, medical treatment, and surgery². However, the management strategies are highly variable¹. The British Association of Dermatologist (BAD) guidelines for the treatment of HS¹. Lifestyle modification is recommended, including the cessation of smoking and weight loss. Medical management strategies include antiseptic washes, steroid injections, topical and oral antibiotics, retinoids, dapsone, oral contraceptive agents, oral immunomodulators, and anti-TNF therapies¹. Finally, radiotherapy, phototherapy, and laser have been shown as effective adjuncts in refractory disease¹. Surgery is reserved for high-grade Hurley II or III disease.

A wide range of surgical interventions has been described for HS disease control and management. These are tailored to the disease stage, extent of disease, degree of bacterial contamination, anatomical location, and failed previous surgical interventions, ranging from simple incision and drainage to wide excision and reconstruction^{2,3}. Reconstructive approaches include healing by secondary intention, primary closure, local and regional flaps, staged closure with negative pressure wound therapy, split-thickness skin grafting, and dermal substitute with a subsequent skin graft. We describe the case of a 33-year-old female with refractory HS which was reconstructed with Matriderm® (Skin and Health Care AG, Billerbeck, Germany), acellular dermal matrix, and a split-thickness skin graft.

Case report

A 33-year-old female presented with an 11-year history of refractory, chronic, and debilitating HS. The disease was localized to the bilateral axillae, groin, perineum region, and left breast. She had an otherwise unremarkable past medical history, was a non-smoker, and was not a diabetic. She reported high levels of pain and also reported severe interruptions in her quality of life. Similarly, she had long-standing depression and anxiety secondary to her disease. On examination, she had extensive erythematous, oozing nodules, and cysts in the axillae, mons pubis, gluteal cleft, and perineum. She demonstrated restricted abduction of her arms as a result of long-standing scarring and contractures.

The patient was optimized over a decade with multimodal self-management strategies including topical washes, soaks, and dressings. Medical therapies included analgesia, oral antibiotics, and monthly infliximab infusions. However, her axillary disease was refractory and deteriorated significantly due to a lack of available resources during the COVID-19 pandemic. Following multidisciplinary action, she was deemed a suitable candidate for wide excision and formal reconstruction.

The patient was placed supine with both arms abducted to the maximum allowed by the axillary contractures. The area was infiltrated with local anesthesia with adrenaline and prepped with bethe-dine. All affected axillary tissue was excised to normal tissue with a 2 cm margin. Normal skin and subcutaneous tissue were preserved where possible. The axillary veins were preserved at the base of the wounds. Care should be taken while dissecting the axillary vein during excision, as it may be involved in the disease. Microbiological swabs were taken from the wound to confirm a sterile wound bed. To temporize the wounds, negative pressure vacuum-assisted dressings (VAC) were applied to both axillae. The patient was placed on the appropriate intravenous antibiotics. One week later, 1 mm sheets of Matriderm® were applied (Figure 1). Matriderm® must be rehydrated in physiologic saline solution. We prefer to syringe saline over the wound bed and apply the Matriderm® to the moistened bed to rehydrate it. Small pockets of air can hinder diffusion and graft take should be avoided. Matriderm® 1 mm sheets were used as a single-stage reconstruction. However, 2 mm sheets are available and recommended in two-stage procedures. The dermal substitute was covered with a meshed split-thickness skin graft (Figure 2). A VAC dressing was used to bolster the skin graft in place. On day five,



Figure 1. Left axilla post-wide excision of HS and application of Matriderm®.



Figure 2. Application of the split-thickness skin graft over the Matriderm®.

the skin grafts were inspected. The patient was discharged and followed up in the plastic surgery dressing clinic.

At 8-week post-operatively, the patient demonstrated no restriction in shoulder abduction, extension, or flexion (Figure 3). She had improved pain and reported increased levels of self-esteem, anxiety, and overall increase in quality of life.

Discussion

The treatment of HS remains a challenge and must be guided by disease severity¹. However, the lack of a clear pathogenic mechanism has prevented the development of an effective and consistent strategy¹. In advanced cases of the disease manifestation, radical surgical excision may be the only curative option⁴. Ideally, this should only be approached if the acute phase of inflammation is mitigated with optimal medical multimodal management³. Effective education and open communication with the patients are the major principles in the treatment pathway to management expectations. Reconstructive options include healing by secondary intention, primary wound closure, local and regional flaps, negative pressure therapy, and skin grafts.



Figure 3. Left axilla at 8-week post-operatively.

Vacuum-assisted wound closure may potentiate HS wound healing before reconstruction and may enhance patient comfort, minimize anxiety, and mitigate unnecessary narcotic analgesia use⁵. The closed suction over the sponge collapses the wound cavity. Several studies report HS delayed wound closure with the adjunct of VAC therapy bridging between excision and formal reconstruction with split-thickness skin grafting^{5,6}. Our case report supports its use in temporizing the wound until formal reconstruction is suitable. The surgeon must be aware that on initial graft review, there may be ‘ghosting’ of the skin graft over the Matriderm® blanket. Although it may appear that the graft has not adhered appropriately, with reapplication of the VAC dressing, these appearances improve⁷.

Split-thickness skin grafts have been described for the reconstruction of moderate axillary HS defects^{8,9}. However, these can be complicated by undesirable functional and cosmetic outcomes, including excessive scarring, limited elasticity, and potential scar contracture⁴. A certain amount of these cases will require scar revision and contracture release at a secondary later stage. Various skin substitutes have been developed to overcome these challenges. Matriderm® is a single layer durable skin substitute that is derived from a highly porous bovine dermal matrix containing collagen and elastin⁹. The matrix provides support for the ingrowth of vessels and the regeneration of cells. It is then absorbed as the fibroblasts that secrete the extracellular matrix as part of the healing process. Matriderm® is therefore considered a bridging tool with significant improvement in long-term functional outcomes preserving elasticity and mobility of the new tissue^{8,9}. It can accommodate an immediate split-thickness skin graft in one-step reconstruction, thus reducing the duration of hospitalization and the cost of treatment^{8,9}. We opted to use a meshed split-thickness skin graft to reduce donor site burden due to the large surface area of the defect. However, there is case report evidence that sheet graft may yield better long-term skin elasticity⁹. In our case, negative growth on microbiological swab cultures was obtained prior to skin graft application. This avoids partial or total graft loss.

Skin substitute use in the reconstruction of HS is sparsely reported to date. There is case report evidence of Integra® (Integra LifeSciences, North Billerica, Massachusetts, USA) to close axillary HS with satisfactory functional and cosmetic outcomes¹⁰. To the authors’ knowledge, there are no reported cases of Matriderm® use in HS reconstruction to date. At 8-week post-operatively, the patients’ wounds were fully healed. Her shoulder range of movement was adequate, with overall lower levels of pain. However, the authors recognize that these results must be interpreted with caution due to the lack of long-term outcomes. Overall, our case supports the use of Matriderm® to create a reconstruction that is pliable and durable enough to recreate the neo-axillary fold⁸.

Conclusion

Acellular dermal skin substitutes are an effective alternative to conventional means of HS reconstruction. It was adopted with no complications and was demonstrated as safe and effective, producing subtle, pliable, and durable skin over the axillae.

Conflict of Interest

None

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