Brief Communication

Pathological Findings at the Skin Graft Site after Excision of Hidradenitis Suppurativa

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ABSTRACT

Hidradenitis suppurativa is a chronic recurrent folliculitis that results in the development of abscesses and the formation of sinus tracts and scarring. Studies identifying the optimal surgical technique in patients with hidradenitis suppurativa are lacking, but the reused skin-graft technique is a reliable approach for the resection of chronic hidradenitis suppurativa. Among the advantages of this technique is that it minimizes or even eliminates the need for a donor site for harvesting normal skin. We performed a pathological study of areas with graft survival, graft loss, and no graft in a patient with hidradenitis suppurativa who underwent the reused skin-graft technique. Our results demonstrate the effectiveness of this surgical technique in the treatment of hidradenitis suppurativa as it avoids donor site pain and scar formation in addition to promoting healthy granulation and early epithelialization.

Key words : hidradenitis suppurativa, pathological findings, reused skin-graft technique, skin graft

Introduction

Hidradenitis suppurativa is a painful inflammatory skin disease with a chronic intermittent course¹⁾. Its clinical features include recurrent painful nodules and abscesses, fistulas, sinus tracts, and scarring involving the skin folds of the axilla, groins, and buttocks. These manifestations negatively affect the quality of life of affected patients^{2, 3)}. Wide surgical excision is necessary and effective in preventing complications and recurrence and improving the quality of life^{4, 5)}. Primary closure, healing by secondary intention, and skin grafting are currently among the most widely used procedures after excision⁶⁾. We frequently perform the reused skin-graft technique in patients with hidradenitis suppurativa to cover skin defects that are difficult to address by primary closure using skin harvested from the resected area of involvement. The advantage of this technique is that it minimizes or even eliminates the need for a donor site for harvesting normal skin⁷⁾. However, a drawback is the loss of part of the graft during the development stage. In these cases, it is difficult to assess the necessity of a second

skin graft, considering that the area of graft loss may finally undergo epithelialization. We report a case of a patient with hidradenitis suppurativa and compare the pathological findings in the areas of graft survival, graft loss, and no graft. We suggest that the remaining epidermal cells in the area of graft loss promote epithelialization.

Report

The patient was a 32-year-old overweight (body mass index: 30.3) man diagnosed with chronic hidradenitis suppurativa in the right gluteal area. He had been treated for the past 3 years with antibiotics and sometimes with incision and drainage. However, the disease had gradually worsened and spread (Fig. 1A). The disease in this patient was classified as stage II of the Hurley classification system. We performed excision and reused the skin-graft technique. A split-thickness skin graft of 0.013 inch in thickness was harvested from the skin overlying the lesion using a freehand knife. Next, radical surgical excision of the lesion was performed with the excision depth reaching the level of the subcutaneous fat (Fig. 1B). The defect was

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Fig. 1. Excision and reused the skin-graft technique for chronic hidradenitis suppurativa.

- A: Initial presentation.
- B: The defect after excision.
- C: Immediately after the reused skin-graft technique.
- D: At 15 postoperative days, the graft was partially lost.
- E: At 68 postoperative days, the defect was completely epithelialized.
- F: At 3 postoperative years.

covered with a patch graft (Fig. 1C) and fixed by the tie-over method using a sponge. At 15 days after surgery, the graft was partially lost (Fig. 1D). The areas of graft survival, graft loss, and no graft were biopsied (Fig. 2A). Histological findings of the area of graft survival showed homogeneous healthy granulation with vascularization that stained α -smooth muscle actin (α -SMA) as well as epithelialization of sufficient thickness. There was less granulation at the area of graft loss compared to that of graft survival. Although there was no epithelialization at the area of graft loss, cytokeratin 5/6 staining revealed that epidermal cells remained and were scattered. The area of no graft also had less granulation, but it had neither epithelialization nor epidermal cells (Fig. 2B). After the biopsy, epithelialization at the area of graft loss progressed early compared to that at the area of no graft and had completely epithelialized at 40 days postoperatively. At 68 postoperative days, the wound was completely epithelialized, including the area of no graft (Fig. 1E). No recurrence occurred

postoperatively, and good results were evident at the follow-up examination 18 months postoperatively (Fig. 1F). The Hokkaido University Hospital Institutional Review Board approved this study (016-0363).

Discussion

The optimal surgical technique or timing of surgery in patients with hidradenitis suppurativa has yet to be determined⁹. We frequently perform the reused skin-graft technique in which skin is harvested from the resected affected area thus obviating the need for a donor site⁷. In the case presented herein (whose lesion was located in the superficial fat layer), the surgical excision extended to the level of the subcutaneous fat and a split-thickness skin graft was used in the reused skin-graft technique. The histological findings revealed healthy and thick granulation at the area of graft survival, whereas in the absence of graft, the granulation tissue was not uniform and

Fig. 2. Histological appearance at 15 postoperative days.

A: Biopsy site of the lesions.

a: The area of graft survival.

b: The area of graft loss.

c: The area of no graft was biopsied.

B: Histological appearance.

a: HE: Homogeneous healthy granulation. α -SMA: Progression of the myofibroblast stained with α -SMA. Cytokeratin 5/6: Epithelialization with enough thickness.

b: HE: Less granulation. α -SMA: Progression of the myofibroblast. Cytokeratin 5/6: No epithelialization and scattered epidermal cells.

c: HE: Less granulation. α -SMA: Less myofibroblast. Cytokeratin 5/6: No epithelialization and no epidermal cell.

HE: Hematoxylin and Eosin, α -SMA: α -smooth muscle actin.

was sparse in the adipose tissue. Considering that the lesions in all areas were excised down to the fat layer, we assumed that the graft promoted healthy granulation.

It is well known that activation of the transforming growth factor- β (TGF- β) signaling pathway increases α -SMA protein expression in fibroblasts and contributes to healthy granulation. We previously reported that fibroblasts showed more proliferation and TGF- β protein expression when treated with a conditioned medium from keratinocytes or when co-cultured with keratinocytes than the control group⁸⁾. This study suggests that the addition of keratinocytes, such as skin grafts, promotes the activation of fibroblasts through the TGF- β signaling pathway due to paracrine secretions from keratinocytes and contributes to healthy granulation, including myofibroblasts, which are stained with α -SMA. Thus, we considered that the graft in the reused skin-graft technique might have the same effect as the promotion of granulation at the area of the skin graft.

Although the skin graft was partially lost, the histological findings at the area of graft loss revealed scattered epidermal cells. We assumed that these remaining epidermal cells may have initiated earlier epithelialization. In the treatment of hidradenitis suppurativa, excision of the lesion and secondary intent wound healing are often performed⁹⁾. However, if the graft leads to epithelialization and granulation, the reused skin-

graft technique may be a more effective form of treatment that promotes healthy granulation and early epithelialization as there is no need for a donor site.

The histological findings thus demonstrated the utility of the reused skin-graft technique in the treatment of hidradenitis suppurativa. Its advantages include the avoidance of donor site pain and scar formation while allowing healthy granulation and early epithelialization compared to excision of the lesion and secondary intent wound healing.

Conflicts of interest

None.

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