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Promising long-term outcomes of the reused skin graft technique for chronic gluteal hidradenitis suppurativa

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Abstract

Background: The reused skin graft technique can be used to treat chronic gluteal hidradenitis suppurativa, but long-term outcomes and the reliability of the technique have not been reported.

Methods: In a retrospective review of 18 men with chronic gluteal hidradenitis suppurativa (age range, 18–68 years) treated with a reused skin graft between June 2004 and March 2012, we evaluated disease severity (Hurley classification system), skin graft thickness, need for an additional normal skin graft, histological findings, and recurrence rate at the surgical site.

Results: Mean duration of follow-up was 61.3 months (range, 17–113 months). 5 cases were classified into severity group I, 12 cases into severity group II, and 1 case into severity group III. The range of skin graft thicknesses was 0.013–0.020 inches. An additional donor site was unnecessary in 10 cases (3 cases in group I [60%] and 7 cases in group II [58.3%]). Histological examination indicated that a buried epidermal cyst could cause chronic gluteal hidradenitis suppurativa recurrence, although none of the patients experienced recurrence at the surgical site during follow-up.

Conclusion: The reused skin graft technique is reliable for chronic gluteal hidradenitis suppurativa resection and shows promising long-term outcomes.

KEY WORDS: Reused skin graft technique, chronic gluteal hidradenitis suppurativa, recurrence, long-term outcomes, Hurley classification system

Introduction

Hidradenitis suppurativa is a chronic, recurrent, deep-seated folliculitis resulting in the development of abscesses and the formation of sinus tracts and scarring[1,2]. It commonly involves the axilla, groin, external genitalia and the gluteal–perianal region. Conservative therapy such as antibiotics is one choice of treatment[3,4] but in most cases, lesions are vulnerable to repeated infection, necessitating wide and complete surgical excision. Skin grafting is conventionally used to cover the skin defect after radical surgical excision[5-7]. In 2002, Yamada et al.[8] and Honda et al.[9] reported the use of the reused skin graft technique for chronic gluteal hidradenitis suppurativa to cover such skin defects with skin harvested from the resected affected area, obviating the need for a donor site; they referred to the procedure as the "ideal skin graft" and "recycled skin graft", respectively. In 2003, Kuo and Ohara reported the utility of the technique in a group of 6 patients who were followed up for 36 months[10]. However, the long-term outcomes of the technique for chronic gluteal hidradenitis suppurativa in a case series have not been reported in the English literature. Herein we retrospectively review the long-term outcomes of 18 cases that underwent the reused skin graft technique and discuss the reliability of the procedure.

Patients and methods

Subjects were 18 men (age range, 18–68 years) with chronic gluteal hidradenitis suppurativa who were treated with a reused skin graft at Hakodate General Central Hospital from June 2004 to March 2012. The diagnosis of chronic gluteal hidradenitis suppurativa was made based on the patient's history and clinical features at the initial consultation, and was confirmed by histological examination. Severity (Hurley classification system), skin graft thickness, need for an additional normal skin graft, histological findings, and recurrence rate were investigated.

Operative procedure

As shown in Figure 1, first, an excision line was marked to include as much of the lesion as possible. A split-thickness skin graft of 0.013–0.020 inches in thickness was harvested from the skin overlying the lesion using a freehand knife or electrical dermatome and expanded 1.5 times using a mesh-grafting device. Radical surgical excision of the lesion was performed, removing all fistulas and any area of infected lesion. The depth of the

excision was usually to the level of the muscle fascia. The ridge of the defect was sutured to reduce the total defect size and in most cases, the ridge close to the anus was sutured to minimise contamination by faeces. An additional skin graft was harvested from normal skin of the thigh when the total defect size was large, which was used to cover the defect. To achieve stable skin graft attachment to the tissue, a tie-over dressing using a sponge was applied. Postoperatively, the patient lay on an airflow bed for at least 1 week.

Results

Patient characteristics and results are summarised in Table 1. Mean age was 41.7 years (range, 18–68 years). Mean duration of follow-up was 61.3 months (range, 17–113 months). With respect to severity, 5 cases were classified into severity group I of Hurley classification system, 12 cases into severity group II, and 1 case into severity group III (Figure 2 and 3). Although 4 specimens were not accurately measured, skin graft thickness was 0.013–0.020 inches in all 18 cases (Figure 4). An additional donor site was unnecessary in 10 cases (3 cases in group I [60%] and 7 cases in group II [58.3%]) (Figure 3). None of the patients experienced severe skin contracture limiting lower limb

motion or underwent an operation for releasing contracture. No recurrence was noted in any case at the surgical site during follow-up.

Case reports

Case no. 18, severity group I

A 33-year-old man had chronic gluteal hidradenitis suppurativa of the bilateral buttocks (Figure 5). He had been treated conservatively with antibiotics for the past 10 years, but repeated infection of the lesion due to chronic gluteal hidradenitis suppurativa was difficult to control and he decided to undergo surgical treatment. Skin grafts were harvested from the surface of the lesions, and radical excision was performed to the level of the muscle fascia. Two small defect areas could be sutured on the left side. The ridge of the defect was sutured to reduce the total defect area. The mesh skin grafts harvested from the lesions were expanded 1.5 times and placed over the defect areas. No additional conventional skin grafting was needed. A tie-over dressing with sponge was applied bilaterally. Histological findings of the resected tissue were consistent with chronic gluteal hidradenitis suppurativa (Figure 6). Chronic inflammation extended from the

deep tissue to the epidermis, but the upper part of the dermis was not involved; thus, the shaved-off superficial skin layer was intact. In addition, histological examination showed that an epidermal cyst associated with the chronic gluteal hidradenitis suppurativa was partially exposed after harvesting the graft, indicating that the graft contained part of the chronic gluteal hidradenitis suppurativa lesion (Figure 6). However, the postoperative course was uneventful and no recurrence occurred after the operation. Good results were evident at follow-up at 18 postoperative months, and the patient had no complaints or signs of contracture of the operative site.

Case no. 7, severity group I

A 30-year-old man presented with chronic gluteal hidradenitis suppurativa of the bilateral buttocks (Figure 7). He had been treated conservatively with antibiotics for the past 10 years, but the lesion had worsened and spread. Repeated infection of the lesion due to chronic gluteal hidradenitis suppurativa was difficult to control. He also had diabetes mellitus controlled with medication. Skin grafts were harvested from the surface of the lesions, and radical excision was performed. The total defect area could be sutured on the

left side. The mesh skin grafts harvested from the lesions were expanded 1.5 times and placed over the defect areas on the right side. No additional conventional skin grafting was needed. The postoperative course was uneventful and no recurrence was evident at 74 months after the operation.

Case no. 15, severity group II

A 32-year-old man had bilateral chronic gluteal hidradenitis suppurativa (Figure 8). He had been treated with antibiotics and sometimes incision and drainage for the past 15 years, but the disease gradually worsened and had spread. Skin grafts were harvested from the surface of the lesions, and radical excision was performed. The caudal ridge of the defect was sutured to reduce the total area of the defect at the right buttock. The mesh skin grafts harvested from the lesions were expanded 1.5 times and placed over the defects. At the left buttock, direct closure was possible. No additional conventional skin graft was needed. The postoperative course was uneventful and no recurrence was evident at 39 months after the operation.

Discussion

This study highlights two important clinical issues: this technique is reliable for hidradenitis suppurativa resection with good long-term outcomes including no recurrence at the surgical site, and this technique is applicable to both severity group I and II cases.

In regard to the first clinical issue, the reliability of the technique is based on the pathophysiology of the disease and the concept of the reused skin graft technique. The chronic inflammation associated with the disease annoys patients because of its physical and psychological burden[11,12]. Studies have reported malignant tumours such as squamous cell carcinoma arising in chronic gluteal hidradenitis suppurativa[13-16]. Thus, the treatment strategy should be chosen according to the disease presentation[7]. Acute lesions require abscess drainage, intensive cleansing, and the use of systemic antibiotics. Chronic lesions, on the other hand, can be treated in a number of ways, including antibiotics[3,4,17,18], hormones[19] and biologics[20,21]. However, non-surgical approaches provide only temporary improvement and relief. When conservative treatment is ineffective, complete resection of the area of chronic gluteal hidradenitis suppurativa is

necessary[5]. Small lesions can be managed easily with primary closure and a simple local flap, but comparatively large lesions require skin grafting to cover the defect left by radical resection. While simple treatment of large defects by secondary healing over time has been reported[22], primary closure of the wound is advisable to minimise postoperative morbidity. The skin graft is typically normal skin taken from areas such as the thigh. However, it is possible to reuse skin harvested from the lesion itself to cover the defect, without needing a separate donor site[8-10]. The concept of replantation of the intact part of the affected skin—the "reused" or "recycled" skin graft technique—was adopted from the autografting of avulsed skin in degloving injury[23,24]. The degloved skin itself can be used as donor tissue for the skin defect generated by degloving injury even if soft tissue is severely damaged. Similarly, the intact part of the skin overlying chronic gluteal hidradenitis suppurativa can be used to cover the defect without sacrificing normal skin from an additional donor site.

Histological examination of chronic gluteal hidradenitis suppurativa lesions has shown hyperplasia and irregular acanthosis of the epidermis, sinus and abscess formation,

fibrosis, and diffuse infiltration of inflammatory cells into the dermis[13,25]. The epidermis and the upper part of the dermis are not involved until extensive destruction of the subcutis and sinus and abscess formation in the middle and lower parts of the dermis occur[25]. This is why it is possible to use the epidermis and the upper part of the dermis as donor tissue for skin grafting. Based on histological findings, Yamada et al. reported that this reused skin graft technique was safe for avoiding recurrence[8]. However, the long-term outcomes of patients with chronic gluteal hidradenitis suppurativa after undergoing the reused skin graft technique have not been reported in the English literature. Therefore, we investigated the histological pattern in 18 cases and in 1 case, the histological findings confirmed that part of an epidermal cyst due to chronic gluteal hidradenitis suppurativa was present in the graft tissue. In this 1 case, the disease was not severe (severity group I). When discussing the recurrence of the disease—or the lack of it in this 1 case—we have to consider whether recurrence is due to inadequate resection or disease that is present in the reused skin graft itself. As chronic gluteal hidradenitis suppurativa in all our cases was excised to the level of the muscle fascia, recurrence due to inadequate resection was extremely unlikely. The skin graft thickness was 0.012–0.20

inches, which was too thin to include the whole cyst caused by chronic gluteal hidradenitis suppurativa in that case. We therefore suggest that although epidermal cysts may present in chronic gluteal hidradenitis suppurativa, the possibility of recurrence caused by the skin graft itself is very low when the thickness of the graft is 0.012-0.20 inches.

The thickness of reused skin grafts differs among reports. Honda et al. set the thickness to 0.02 inches to avoid leaving microfistulas or pilosebaceous units, and to make the grafts tolerable as buttock skin[9]. Yamada et al. set the thickness from 0.012 to 0.017 inches[8], and Kuo and Ohara performed this technique in 6 cases with a skin thickness of 0.012 to 0.020 inches[10]. However, no studies reported that priority should be given to skin thickness. In our series, we set the thickness to 0.013 to 0.02 inches. Since no hypertrophic scarring or graft contracture was noted during the follow-up period, this supports our suggestion that a thickness of 0.012 to 0.020 inches is acceptable.

The second clinical issue highlighted by this study was related to severity. When

discussing the treatment of the disease, it is important to consider the severity of the disease. In 1989, Hurley first described a classification system for hidradenitis suppurativa that is still used today, with separation into severity groups I, II and III. Mild hidradenitis suppurativa (Hurley I) is managed by topical or systemic treatment, sometimes combined with surgery. In patients with Hurley stage II and III disease, where normal skin architecture has been permanently destroyed by epithelialized sinus tracts and fibrotic scars, more extensive surgery such as block excision is necessary[26,27]. Observational data showed a substantially lower risk of recurrence among patients who underwent more extensive excision of all hair-bearing skin in the affected region than those who underwent excision of inflamed lesions only[26]. The reused skin graft is categorized as extensive. In this study, no recurrence was seen, which was consistent with previously reported data. We believe that this was because enough tissue was excised to the level of the muscle fascia.

In general, greater surface area of the epidermis is damaged as the disease progresses. Therefore, it is assumed that it is more difficult to apply this reused skin graft technique in

severe cases with a wide area of damaged epidermis. The percentage of cases requiring an additional skin graft from normal skin in severity group II was approximately the same as that in severity group I, which do not usually have damaged skin. Therefore, it is possible to obtain sufficient amount of reused skin graft from the lesion in patients who are in severity group II. Severity group II patients who generally need surgical treatment were thought to be good candidates for the reused skin graft. On the other hand, we speculate that it was difficult to take skin grafts from the skin overlying chronic gluteal hidradenitis suppurativa because of severe disease in severity group III cases. In practice, the reused skin graft was taken from the skin overlying chronic gluteal hidradenitis suppurativa to some extent. However, only 1 case was in severity group III, so we are unable to discuss the application of this technique in group III cases. As for severity group I, which is generally managed by topical or systemic treatment, the reused skin graft technique is thought to be applicable for treating the damaged skin before the disease gradually worsens. This technique is applicable for severity group II cases, and is also applicable for severity group I cases as preventive treatment.

Our study has some limitations. The number of the cases was limited; only 1 case was in severity group III. The use of the technique was possible for that case; however, we could not discuss the necessity of an additional skin graft from normal skin because of the lack of cases in severity group III. We speculate that the necessity for an additional skin graft from normal skin is greater in severity group III than that in severity groups I and II. Another limitation is the lack of evaluation of the difference in quality between the reused skin graft and skin graft taken from normal skin. It is very difficult to compare the quality between the reused skin graft and the skin graft taken from normal skin in the clinical setting. In this study, none of the patients suffered from contracture of the reused skin graft. We did not evaluate whether there is a difference between the reused skin graft and the skin graft taken from normal skin, although there is a report describing that conventional skin grafting is similar to the reused skin graft in histological examination[8].

In conclusion, the long-term outcomes in our case series demonstrated the reliability of the reused skin graft technique for chronic gluteal hidradenitis suppurativa in severity groups I and II. The advantage of this technique is that it minimises or even eliminates the

need for a donor site for harvesting normal skin, thereby avoiding donor site pain and scar formation. In addition, the procedure does not require special operative skills and can be performed by an operator skilled in plastic surgery.

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Figure legends

Figure 1. Surgical procedure of the reused skin graft technique

(a) A split-thickness skin graft of 0.013–0.020 inches in thickness was harvested from the skin overlying the lesion using a freehand knife or electrical dermatome. (b) Appearance after harvesting the skin. (c) Radical surgical excision of the lesion, with the excision depth usually to the level of the muscle fascia. (d) The ridge of the defect was sutured to reduce the total defect size, and the defect was covered by a mesh skin graft.

Figure 2. Hurley stages of lesions in hidradenitis suppurativa. (a) Case 7 (severity group I) (b) Case 8 (severity group Ⅱ) (c) Case 17 (severity group III).

Figure 3. Severity; an additional skin graft from normal skin was not needed.

Figure 4. Skin graft thickness.

Figure 5. Case 18: A 33-year-old man with bilateral pyodermia chronica (severity group I,

no additional skin graft from normal skin was required.)

(a) Initial presentation. (b) Marked incision lines. (c, d) Immediately after the procedure.

(e) Tie-over dressing with a sponge. (f) At 18 postoperative months.

Figure 6. Case 18: Histological appearance of the buttock lesion.

(a) Chronic inflammation extending from the deep tissue to the epidermis but not involving the upper part of the dermis (haematoxylin and eosin, original magnification ×10). (b) Findings consistent with chronic gluteal hidradenitis suppurativa (haematoxylin and eosin, original magnification ×40). (c) Histological findings of part of an epidermal cyst exposed by skin harvesting (haematoxylin and eosin, original magnification ×40).

Figure 7. Case 7: A 30-year-old man with bilateral pyodermia chronica (severity group I, no additional skin graft from normal skin was required.)

(a) Initial presentation. (b) Marked incision lines. (c) Immediately after the procedure. (d) At 12 postoperative month

Figure 8. Case 15: A 32-year-old man with bilateral chronic gluteal hidradenitis suppurativa (severity group II, no additional skin graft from normal skin was required). (a) Initial presentation. (b) Marked incision lines. (c) Immediately after the procedure. (d) At 39 postoperative month

Case	Age (years)[1]	Previous treatment	Complications	Hurley Classification	Additional skin graft	Follow-up period (months)	Recurrence
1	43	Antibiotics, I&D[2]	Diabetes mellitus	Ⅱ	＋	113	None
2	42	Antibiotics, I&D	Diabetes mellitus	Ⅱ	＋	112	None
3	41	Antibiotics, I&D	Diabetes mellitus	Ⅱ	＋	118	None
4	30	Antibiotics, I&D	－	Ⅰ	＋	94	None
5	58	Antibiotics, I&D	Hepatic carcinoma	Ⅱ	－	61	None
6	32	Antibiotics, I&D	Gout	Ⅱ	＋	73	None
7	30	Antibiotics, I&D	Diabetes mellitus	Ⅰ	－	74	None
8	38	－	－	Ⅱ	－	72	None
9	58	Antibiotics, I&D	Diabetes mellitus	Ⅱ	－	51	None
10	33	－	－	Ⅱ	－	52	None
11	18	Antibiotics	－	Ⅰ	－	56	None
12	40	Antibiotics, I&D	Schizophrenia	Ⅰ	＋	56	None
13	68	Antibiotics, I&D	－	Ⅱ	＋	40	None
14	53	Antibiotics	－	Ⅱ	－	36	None
15	32	Antibiotics, I&D	－	Ⅱ	－	39	None
16	34	Antibiotics, I&D	Diabetes mellitus	Ⅱ	－	20	None
17	68	Antibiotics, I&D	－	Ⅲ	＋	17	None
18	33	Antibiotics	Hypertension	Ⅰ	－	18	None[3]

Table 1. Patient characteristics and outcomes

[1]All cases were men

[2]I&D: Incision and drainage

[3]Histological examination revealed part of an epidermal cyst buried in the skin graft

Figure(s)

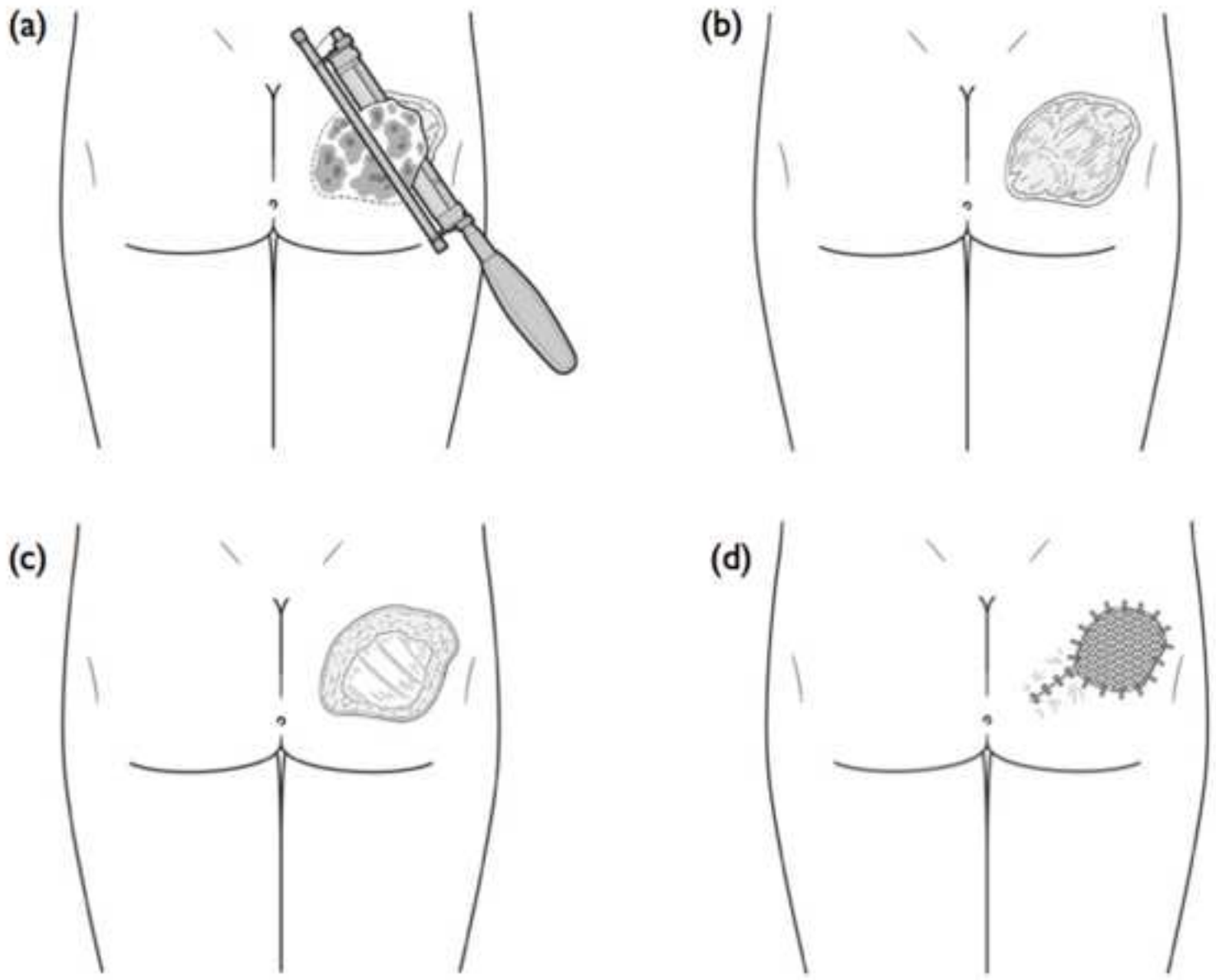


Fig. 1

Figure(s)



Fig. 2

Figure(s)

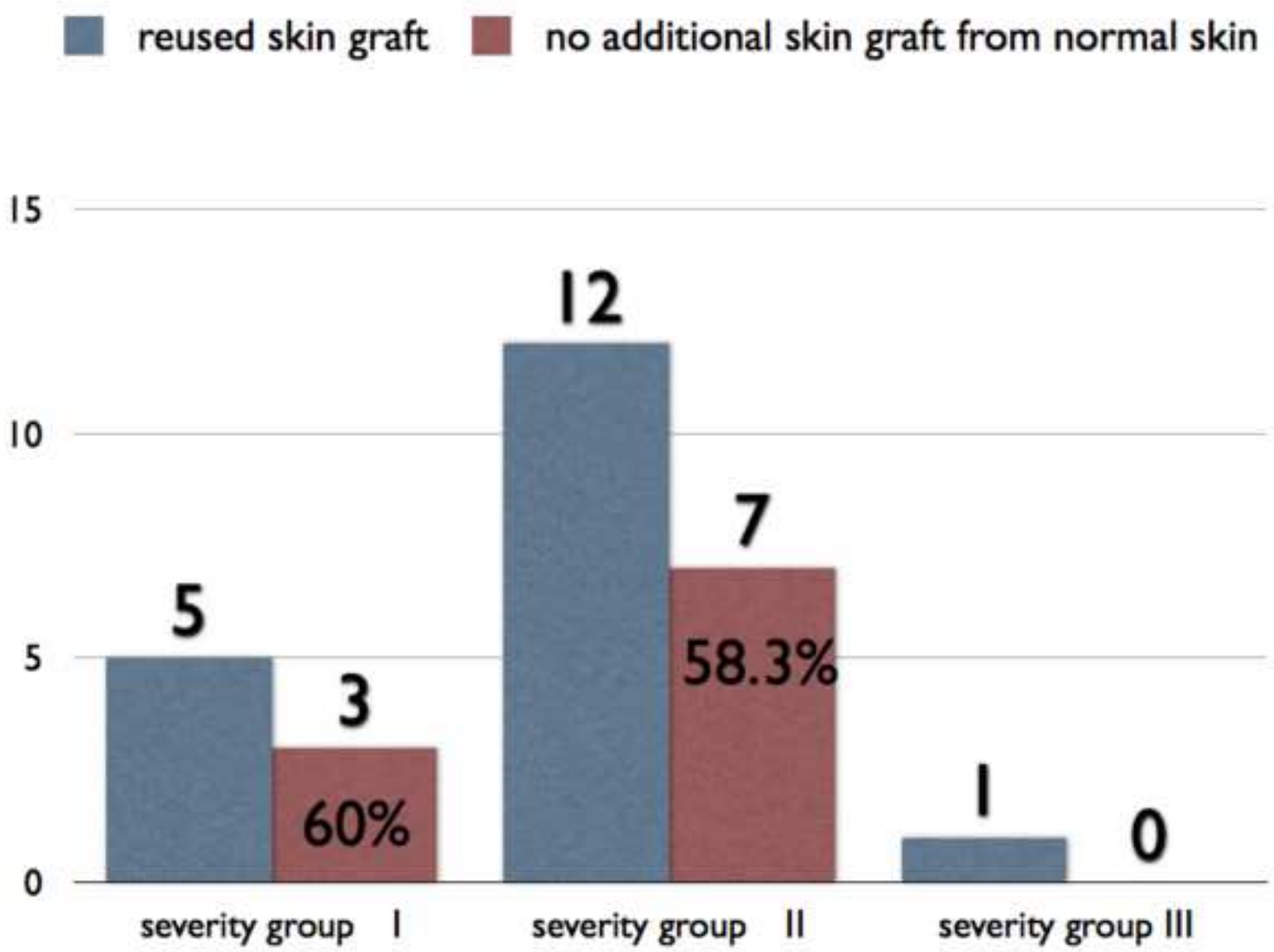


Fig. 3

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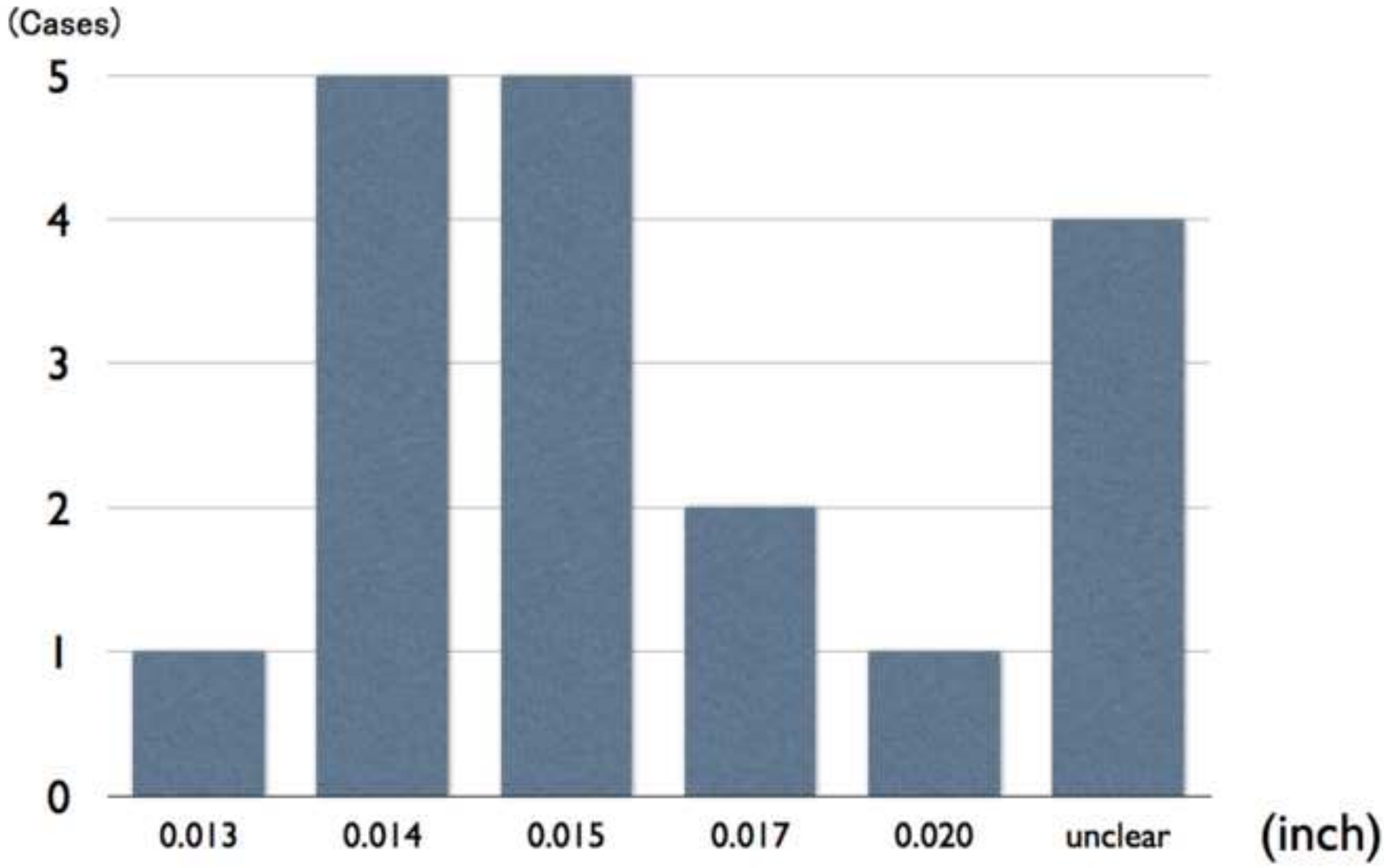


Fig. 4

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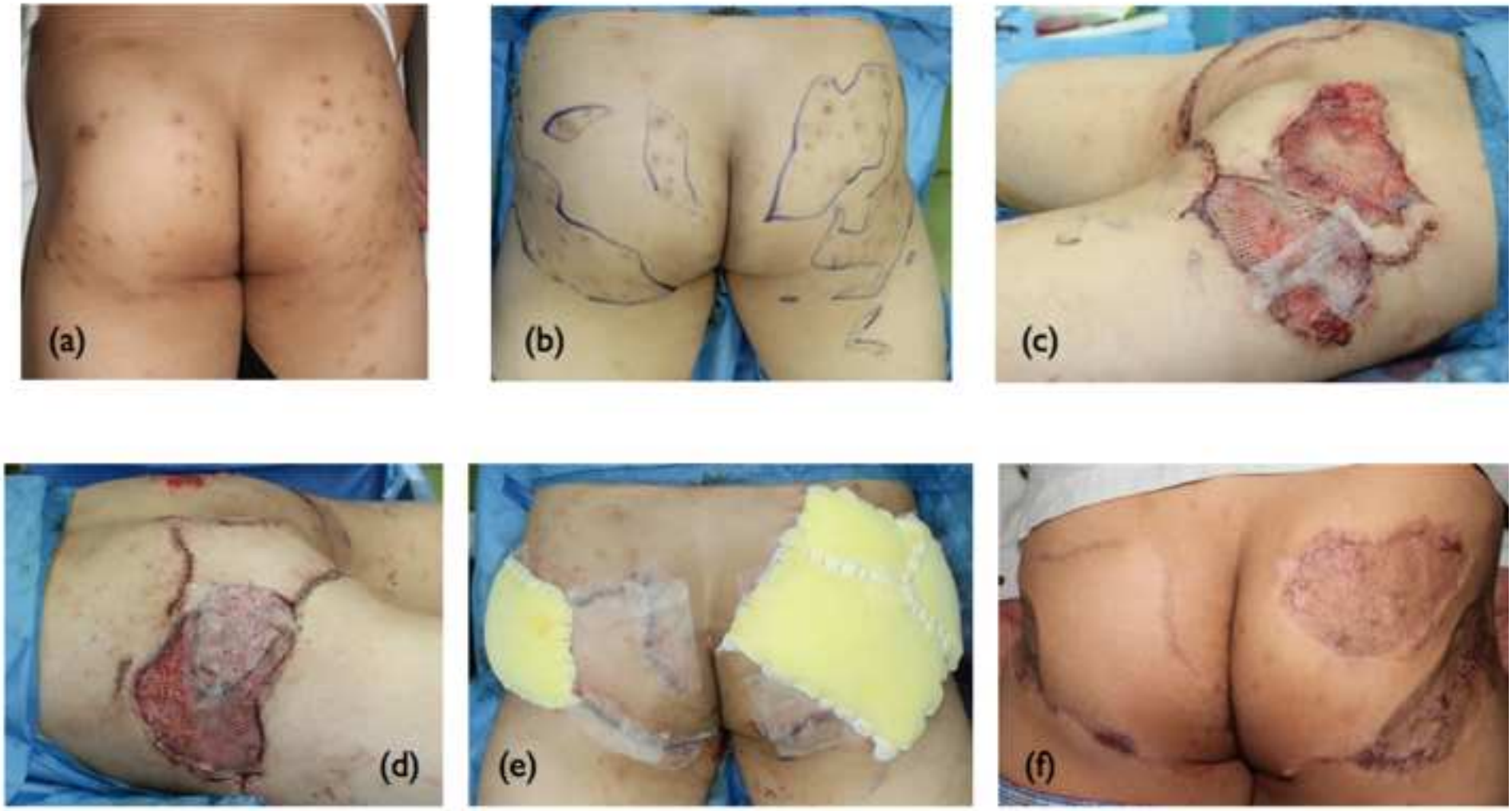


Fig. 5

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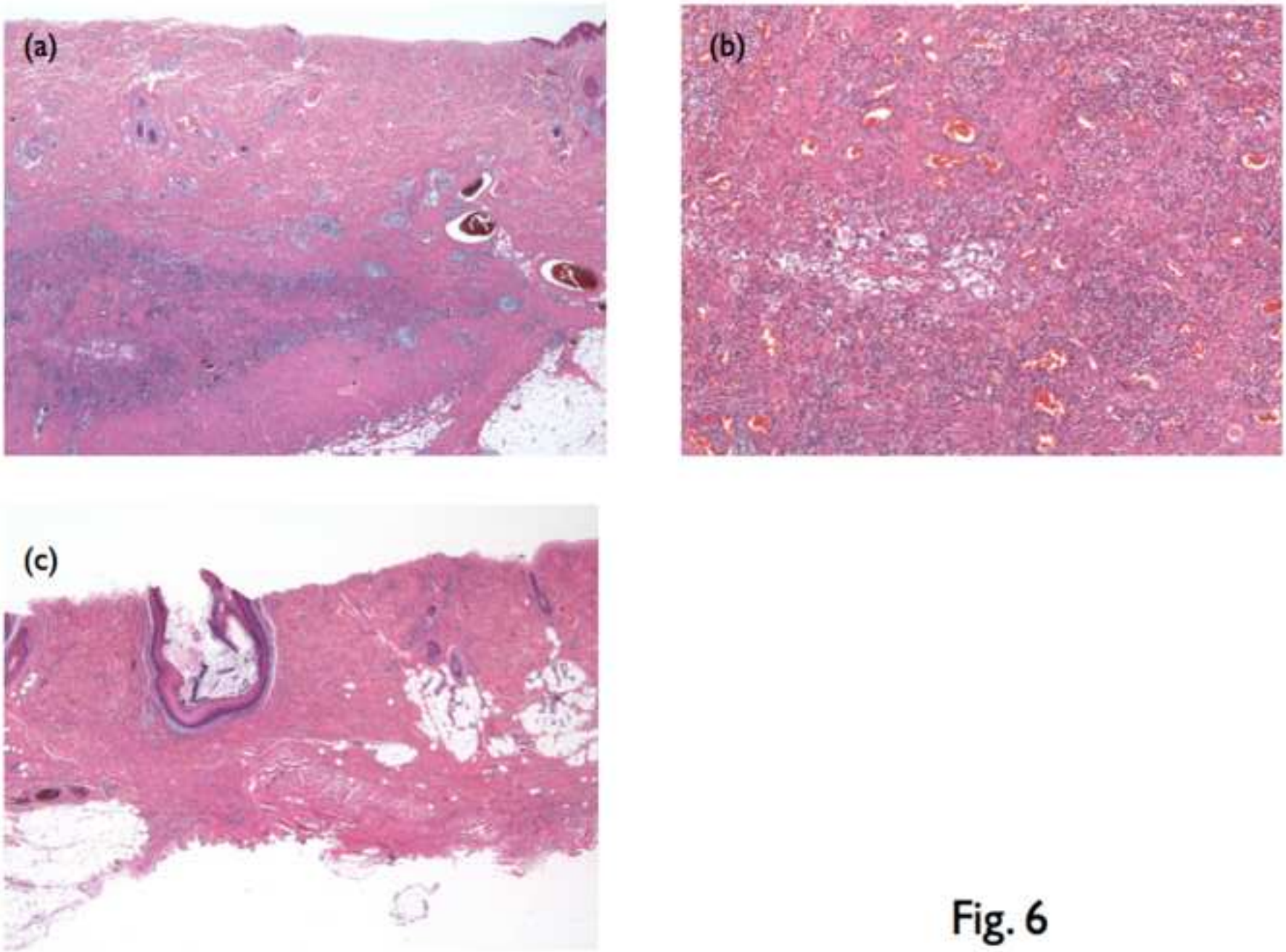


Fig. 6

Figure(s)



Fig. 7

Figure(s)



Fig. 8