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ORIGINAL ARTICLE

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Sacrococcygeal pilonidal sinus disease with Limberg flap repair

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Abstract Sacrococcygeal pilonidal sinus disease affects younger persons, resulting in long-term loss of productive power. It also has a high rate of morbidity because there is no standard treatment approved by all surgeons. In this study, early and late results of 85 cases treated with excision and Limberg flap in our clinic were investigated. The patients were followed for 9–120 months. The complication rate was 4.7% and the long-term relapse rate was 3.5%. Insufficient personal hygiene and inadequate excision were the main causes for recurrence. On the basis of the literature and our previous experiences, we conclude that the Limberg flap is the ideal treatment for sacrococcygeal pilonidal sinus disease with low morbidity, mortality and recurrence rates.

Key words Sacrococcygeal pilonidal sinus disease • Limberg flap technique • Recurrence

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Introduction

Sacrococcygeal pilonidal sinus disease (SPSD) is a frequently seen chronic and intermittent disease resulting from penetration of hair follicles into the intergluteal sulcus to the peripheral tissues and causing foreign body reaction in these regions. It attacks younger subjects more frequently resulting in loss of productive power. Its origin is accepted to be acquired by now. The disease is still important because there is no standard treatment approved by all surgeons and because it provokes many problems depending on postoperative recurrences [1–8].

In this study, 85 patients treated in our clinic with excision and Limberg flap technique [9] over a period of 9–120 months (mean, 5.81 years) were investigated retrospectively regarding early postoperative complications (4.71%) and long-term recurrences (3.53%). Causes of recurrences were evaluated [10, 11].

Materials and methods

A total of 85 patients with sacrococcygeal sinus disease were treated with rhomboid excision and fasciocutaneous flap (Limberg) in the 10-year period between January 1991 and January 2001. In cases with advanced infection, preoperative simple drainage and antibiotic therapy were performed. Extended local hair removal was performed to all cases on the day of operation. Prophylactic antibiotics were administered to all cases in the operating room. After general or spinal anesthesia, patients were positioned in a jack-knife position and glutei were separated using wide adhesive bands. Methylene blue was injected through the opening of the sinuses so all the cavities were filled and exposed. Then, extent of the excision and flaps were determined by drawing on the glutei (Fig. 1). After full thickness rhomboid excision of the lesion to the presacral fascia (Fig. 2), the fasciocutaneous flap was rotated (Fig. 3) and sutured to the

fascia with separate Vicryl suture material (coated Vicryl, violet polyglactin 910, braided absorbable suture, Ethicon, Johnson & Johnson) passing through the flap and the edge of the defect with at least 4 sutures per each edge of the flap. A vacuum drainage tube was inserted beneath the flap. The operation was completed after the skin was closed with separate mattress or continuous mattress sutures (Fig. 4).

Patients were asked to lie in prone position for 2 days in order to avoid mechanical stress to the flap. Drainage tubes were removed on second or third postoperative day and patients were discharged from the hospital. Sutures were removed on the tenth postoperative day. The patients were followed up periodically for 9–120 months and evaluated according to postoperative short-term complications, duration of hospital stay and long-term recurrence rates.



Fig. 1 Extent of excision and flaps was determined by drawing on the glutei after injection of methylene blue into the cavities

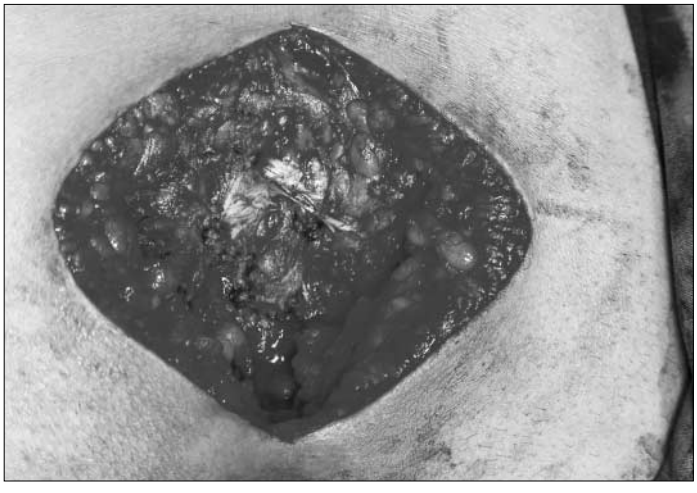


Fig. 2 Full thickness rhomboid excision of the lesion

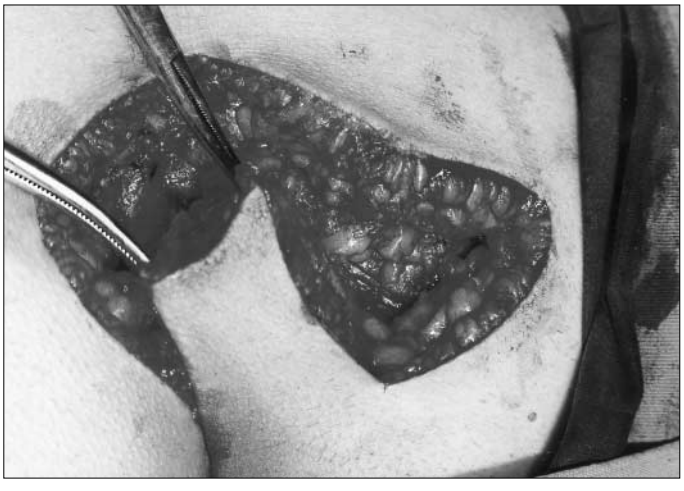


Fig. 3 Fasciocutaneous flap was rotated to the defect

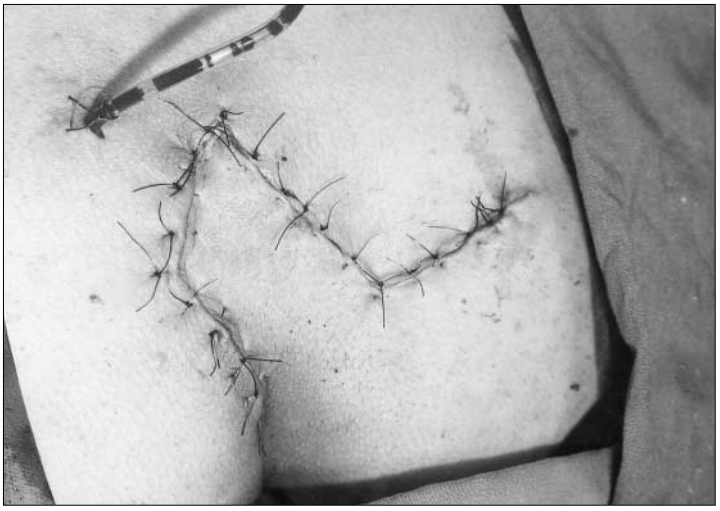


Fig. 4 Skin was closed with separate mattress sutures after a vacuum drainage tube was inserted beneath the flap

Table 1 Postoperative short-term complications and type of treatments

Cases, n	Complications	Treatment
1	Flap edema	Spontaneous resolution
2	Hematoma beneath the flap	Aspiration Drainage between the sutures
1	Purulent infection beneath the flap	Drainage between the sutures

Results

A total of 85 patients with SPSD were treated with excision and Limberg technique between January 1991 and January 2001. Seventeen of the cases were female (20%) and 68 were male (80%). The youngest patient was 16 years old and the oldest was 56 years old; the mean age was 24.8±0.9 years (mean ± SE). Patients were treated with Limberg technique by the same team under general or regional anesthesia. Postoperative hospital stay was between 3 and 12 days; a mean 5.3±0.2 days. Postoperative short-term complications were edema of the flap in 1 case (1.2%), infection of the flap in 1 case (1.2%) and hematoma underneath the flap in 2 cases (2.3%). Postoperative complications and their treatments are summarized in Table 1.

Mean period for returning to daily activities was 3 weeks. Patients were followed with periodical controls for 9–120 months; mean, 69.3±3.5 months (5.8 years). During the follow-up period, 3 recurrences (3.5%) were observed. These recurrences occurred in postoperative months 24, 26 and 30.

Discussion

Sacrococcygeal pilonidal sinus disease is still an important disease, occurring in young and working age subjects and resulting in loss of productive power. It also has a high morbidity rate because of possible infectious complications and the rare complication of carcinoma development in the long-term [9, 11–15]. The type of carcinoma that develops has a squamous cell type. The period of carcinoma development is 23 years according to Davis et al. [12]. Moreover, there are also uncommon but fatal complications such as necrotising fasciitis and toxic shock syndrome as defined by Velitchkov et al. [16].

Pilonidal disease is commonly accepted to be an acquired, chronic, intermittent and inflammatory event rarely occurring in congenital cases as extensions of sinus and dura to neural canal [2, 6–8, 16]. It is seen more frequently in adolescent or young males. In our study mean age was 24.8 years with a male/female ratio of 4:1. In a study by Sondenaa et al. [18], mean age was 19 years in women and 21 years in men, with a male preponderance of 2.2- fold. The higher mean age in our study can be explained by neglectfulness of the patients to seek therapy.

SPSD has a familial characteristic with increased incidence in Caucasians and decreased incidence in African and Asian races, depending on hair characteristics and growth. It is also seen more frequently in obese patients due to increased perspiration and gluteal friction as well as in patients with local hirsutism and poor hygienic care [6, 17].

There is no standard treatment approved by all surgeons. Some authors suggested conservative treatment methods such as phenol injection into the cyst or electrocauterization

of the cyst. These treatments seem to have acceptable recurrence and cure rates, and are simple and uncomplicated techniques that can be performed in outpatient clinic [5, 18–20]. We do not have any experience with these techniques. Surgical interventions are preferred against conservative treatment.

In surgical treatment of the disease, different methods are performed. Primary methods are excision with primary closure, excision with open packing, excision with semi-open packing, marsupialization, excision and various types of flaps (e.g. V-Y, Karydakis, Fish-bein, Limberg). Since the understanding that the disease has an acquired origin, methods for the wide excision of the cyst with all of the tracts and sinuses followed by various types of flap reconstruction became more popular. These methods eradicate the etiology via flattening of intergluteal sulcus with much less hairy fasciocutaneous flaps and less perspiration [2, 6, 17, 21–24].

Excision and primary closure can be performed in uncomplicated and uninfectious cases, but while postoperative hospital stay decreases, wound infection and recurrences occur in 14% and 20%, respectively, due to this technique [2, 6, 17, 21, 22]. Panov et al. [23] reported a fatal anaerobic streptococcic myonecrosis in one case treated with excision and primary repair.

The primary problem in excision and open packing technique is the long-term requirement for dressing and loss of productive power. Main complication that rarely occurs is bleeding. Nevertheless, the technique can be performed safely in advanced complicated and infectious cases. Recurrence rate for these cases is 4% [17, 21, 22]. Similarly semi-open techniques require long-term dressings and cause loss of productive power but recurrence rate is as low as 1.5% [25].

Recurrence rate in marsupialization technique is 4% [6]. The technique is preferred in patients with uncomplicated solitary cysts.

Repair of the defect with various types of flaps shortens the duration of hospital stay and lowers recurrence rates. Recurrence rates are 0%–5% in all flap techniques. According to Khatri et al. [2] the disease is eradicated with flattening of the intergluteal sulcus which prevents the negative pressure that occurs during hip movements. Results are similar to those of other flap techniques. Repair with flap techniques prevents tension of the wound as well as midline scar formation [21, 26].

The complication rate was low in our study. Mean hospital stay was 5.3 days and mean dressing requirement was 3. Duration for returning to daily activities was approximately 3 weeks. In one series treated by Karydakis flap and another series treated by V-Y flap, mean hospital stays were 4 and 5 days, respectively [2, 21]. In one of our cases complicated with flap edema, the edema resorbed spontaneously; two cases with hematoma formation beneath the flap were treated with aspiration and drainage between sutures; one case with purulent infection beneath the flap was treated by aspiration and drainage between sutures as well as antibiotic therapy with third-generations cephalosporins. It is possible to avoid these complications with a tension-free flap procedure and careful homeostasis over the presacral fascia regarding surgical principles.

The Limberg flap technique can be performed in complicated sacrococcygeal pilonidal sinus cases by simple modifications. In cases inconvenient for classic rhomboid excision with sinus openings far from each other, elliptic excision connected to rhomboid excision can be performed. After primary closure of these elliptic excisions, wide rhomboid flaps can be used for closure of defect and flattening of intergluteal sulcus. Postoperative outcomes of two cases with complications are shown in Figs. 5 and 6. No complication nor recurrence occurred over 84 months of follow up in these cases.

The recurrence rate in the present study was 3.5% and is in line with that reported in the literature. Kitchen [21] reported a recurrence rate of 4% in patients treated with Karydakis flap, although the follow-up period in this study was limited to 22 months. However, our recurrences occurred 24, 26 and 30 months after surgery. Roth and



Fig. 5 Limberg flap technique with simple modification performed in a sacrococcygeal pilonidal sinus case complicated with extra fistula tracts. Postoperative day 1

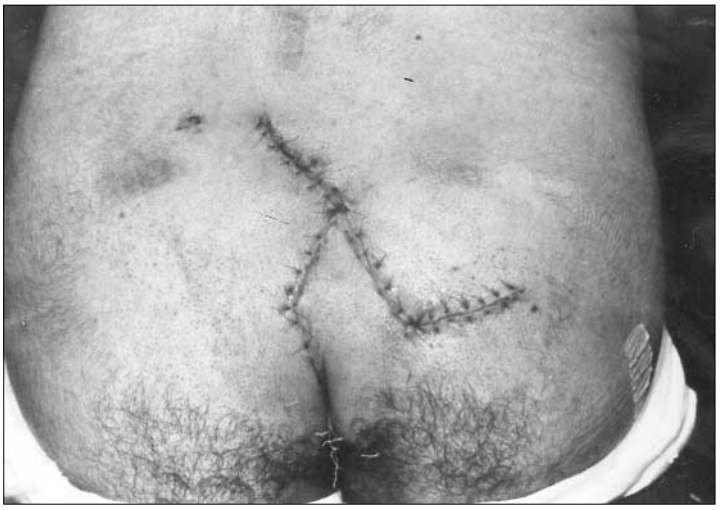


Fig. 6 Primary closure and repair with rhomboid flap of the defect following elliptic excisions outside the intergluteal sulcus in addition to rhomboid excision. Postoperative day 3

Moorman [27] reported a recurrence rate of 8.33% in 12 cases treated with W-flap, but the follow-up period was also limited to 36 months. Mansoory and Dickson [28] treated 120 patients with pilonidal sinus disease with excision and Z-plasty. Recurrence occurred in only two cases and the complication rate was low. But in another study, Tschudi and Ris [29] treated 21 cases with pilonidal sinus disease with Z-plasty and reported a recurrence rate of 10%; one-third of the patients suffered from discomfort when sitting and practicing sports. Moreover, 25% of the patients were not satisfied with the cosmetic results. The follow-up period of this series was 28 months.

We evaluated the common characteristics of recurrences to determine how to prevent them. In 3 cases with recurrences, one problem was insufficient personal hygienic care. Another problem was inadequate excision with small flaps, causing ineffective flattening of the sulcus. Limited excision and small flap repair of the defect in uncomplicated solitary cysts with single sinus opening allows treatment of the disease but does not prevent long-term recurrence. Recurrences usually occur close to the incisional scars, especially from the upper end of the flap. As a result, we decided that to eradicate the etiological factors and to prevent recurrences, repair of the defect with gluteal fasciocutaneous flaps including much less hair of sufficient size is the mainstay of treatment.

In conclusion, the Limberg procedure seems a safe and reliable technique in the treatment of sacrococcygeal pilonidal sinus disease, with low complication and recurrence rates if performed according to appropriate surgical principles.

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