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ORIGINAL ARTICLE

Is the cleft lift procedure for non-acute sacrococcygeal pilonidal disease a definitive treatment? Long-term outcomes in 74 patients

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Abstract
Purpose No definitive surgical treatment for non-acute pilonidal disease has been established thus far. We herein report the short-term and long-term outcomes of 74 consecutive patients who underwent the cleft lift procedure for non-acute pilonidal disease.
Methods A total of 74 consecutive patients who underwent the cleft lift procedure for the treatment of non-acute pilonidal disease were evaluated.
Results Complete healing was achieved in 54 patients (73 %). Wound seroma was observed in 12 patients (15 %) in the first week, and this persisted until the second week in 10 patients (13 %). Partial dehiscence was found in eight patients (11 %). One patient presented with complete wound dehiscence (1 %), and another experienced early postoperative bleeding (1 %). Wound infection was observed in one patient (1 %). The median follow-up period was 51.5 months (range 15–88 months). Three cases of recurrences were observed, which occurred after 51, 42 and 12 months of follow-up.
Conclusions If longer-term follow-up is achieved, definitive conclusions may be obtained. However, the present results suggest that the cleft lift procedure may become the gold standard technique for the surgical management of non-acute pilonidal disease.

Keywords Pilonidal disease · Surgical treatment · Cleft lift · Cleft closure

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Introduction

Pilonidal disease (PD) is an acute or chronic painful inflammatory disease originating in the gluteal cleft. It affects an estimated 26 per 100,000 individuals, occurring primarily in young adults between the age of 15 and 35 years, with a 3:1 male predominance. The risk factors described include a family history, sedentary occupation, local trauma and obesity [1, 2].

The etiology of the disease remains controversial, but it is generally accepted that it is an acquired condition caused by several factors, with its main etiological factor being hair found in the cyst. Moreover, the skin status at the site of entry (maceration, scar and humidity) and the depth of the natal cleft are important factors related to its development [3].

The appropriate choice of treatment depends on the patient, the extent of the disease and the acute or chronic form of the disease. However, most often, no single treatment fulfills the following most basic requirements in terms of suitability: simple, short hospital stay, minimal postoperative pain, low recurrence rate, easy wound care, early return to activities of daily life and cost-effectiveness [4]. Therefore, PD presents many therapeutic challenges to surgeons worldwide. When Bascom and Bascom [5] described the cleft lift technique (CLT), they suggested that the hair follicle itself was the source of local sepsis, and consequently, damage to the epidermis in the deep natal cleft by bacteria and moisture was directly related to its development. In addition, the authors advocated pit excision and lateral drainage for refractory PD, thus resulting in two different procedures that can be combined for better efficacy [6].

In the present study, we report the prospective short- and long-term outcomes after CLT in patients with various non-acute PD disorders.

Patients and methods

Since February 2006, a total of 74 patients with primary or recurrent PD without acute infection underwent the CLT performed electively in our general surgery department. The patients' data were prospectively collected, such as the demographic characteristics, previous treatments, postoperative course, complications and recurrences. We used the classification system introduced by Tezel et al. [7] to determine the clinical stage of PD in our study population. Since we only included patients with non-acute PD, those who presented with an acute abscess (Tezel type II) were not considered to be suitable for this procedure.

Surgical technique

Intravenous prophylactic antibiotics were routinely administered with the induction of general anesthesia. The procedure was previously described by Bascom and Bascom [5]. With the patient in the prone position, the buttocks were pushed together, and the line of contact between both sides was marked. The cleft was maintained open by tape strapping apart the buttocks, and an asymmetric ellipse was marked at the right or left side, depending on the location of the pits or sinus openings. The marked skin was removed, including all the sinus tracts and pits. If an abscess cavity was found, it was curetted or excised. The post-sacral fascia was conserved in all cases. A contralateral flap was designed, releasing the attachments to the sacrum and coccyx to ensure a tension-free closure and lateralization of the suture line. The subcutaneous tissue was closed in two layers by absorbable sutures, and a suction drain was placed between the layers. This drain was removed on the first postoperative day in all cases. The skin incision was closed by intradermal absorbable running sutures.

Follow-up

The patients attended systematic follow-up examination at seven, 14 and 30 days and 6 months after surgery. All the individuals were contacted by telephone to answer specific questions. The interviews were conducted by the same trained nurse and included noticed recurrences by the patient or a physician, the time interval to the recurrence, other treated recurrences, slight tenderness in the treated region and the esthetic satisfaction (excellent, very good, good, fair or poor). Any complicated wound was examined once a week until complete healing was achieved. Complete healing was defined as complication-free wound healing along its length. Partial dehiscence was defined when two or three stitches were not completely healed, and complete dehiscence was defined as when more than 50 % of the length of the incision was not healed. A seroma was defined as a subcutaneous tumor-like collection of serum that required needle drainage. A wound infection was recorded as a persistent purulent discharge that required antibiotic treatment and frequent dressing. Bleeding was characterized by a subcutaneous entrapped hematoma that needed reopening of the wound for clot removal.

Statistical analysis

The patients' data were collected and analyzed using the IBM SPSS Statistics for Windows, Version 21.0 software program (Armonk, NY, USA: IBM Corp). Complete descriptive statistics were used for continuous and nominal variables, and are presented as the medians and ranges or frequency counts and percentages. A *t* test and Chi squared test were used to compare the data between the subgroups with and without complications. The univariate and multivariate analyses were performed using linear and logistic regression, respectively. The time-to-event analysis of recurrence was performed with the Kaplan–Meier method. A value of $P < 0.05$ was considered to be significant.

Results

Seventy-four patients underwent the CLT procedure, 65 of whom (88 %) were male. The median age of the patients was 27.5 years (range 16–76 years). The mean body mass index was 25.3 kg/m^2 (range 19.8–36; Table 1).

Thirty individuals (40 %) had undergone previous drainage of an acute abscess, and eight (11 %) experienced recurrence, for which they had undergone more than one operation (between two and four). Most of the cases were classified as Tezel types III (55 %) and IV (35 %).

With respect to the short-term outcomes (Table 2), the median length of the operation was 54 min (range 25–86 min), and the median duration of the hospital stay was 2 days (range 1–6 days). The most common postoperative complication was a wound seroma, which was found in 12 patients (15 %) during the first week, and

Table 1 The patient characteristics

Characteristic	Total ($n = 74$)
Age	27.5 years old (16–76)
Sex	
Male	65 (88 %)
Female	9 (12 %)
BMI	25.3 kg/m^2 (19.8–36)
Previous drainage	30 (40 %)

which persisted until the second week in 10 patients (13 %). Partial dehiscence was the second most frequent complication, which was found in eight patients (11 %), most of whom had dehiscence in the caudal part of the wound (a combination of complications was also observed in some patients). One patient presented with complete wound dehiscence (1 %), and another had early postoperative bleeding (1 %). A wound infection was found in one patient (1 %). Complete healing was observed in 54 patients (73 %). The mean time to complete healing was 15.3 days (range 10–45 days), and the mean time to return to work was 16.4 days (range 11–30 days). The age, sex, body mass index, length of the operation and recurrence rates were not significantly different between patients who experienced and those who did not experience complications, as indicated by a univariate regression analysis. The logistic regression analysis did not identify any predictive variables for surgical complication or recurrence.

Table 2 Short-term outcomes

Outcome	Mean (range)/frequency (%)
Length of surgery (min)	54 (25–86)
Hospital admission (days)	2 (1–6)
Complete healing	54 (73 %)
Time to complete healing	15.3 (10–45)
Time to return to work (days)	16.4 (11–30)
Wound healing (1st week)	
Complete dehiscence	1 (1 %)
Partial dehiscence	3 (4 %)
Seroma	12 (15 %)
Infection	1 (1 %)
Bleeding	1 (1 %)
Wound healing (2nd week)	
Complete dehiscence	0 (0 %)
Partial dehiscence	5 (7 %)
Seroma	10 (13 %)
Infection	0 (0 %)
Bleeding	0 (0 %)

The median follow-up period was 51.5 months (range 15–88 months). For this period, the cumulative non-recurrence rate was 94 % (Fig. 1). A total of three recurrences were observed, two of which were long-term recurrences that, respectively, were noted at 51 and 42 months after the procedure, and one recurrence developed 12 months after the surgical procedure. The first two patients presented with partial wound dehiscence in the early postoperative course, whereas the other patient had an uneventful recovery. The recurrence presentation consisted of a small acute abscess, which was managed by drainage at other institutions.

With regard to the satisfaction scores at the last follow-up visit, most of the patients reported an excellent satisfaction grade with the final result in terms of functionality, residual discomfort and esthetic appreciation (range 67–90.5 %), followed by very good (6–8.1 %) and good (1–1.3 %) satisfaction outcomes. Only seven patients

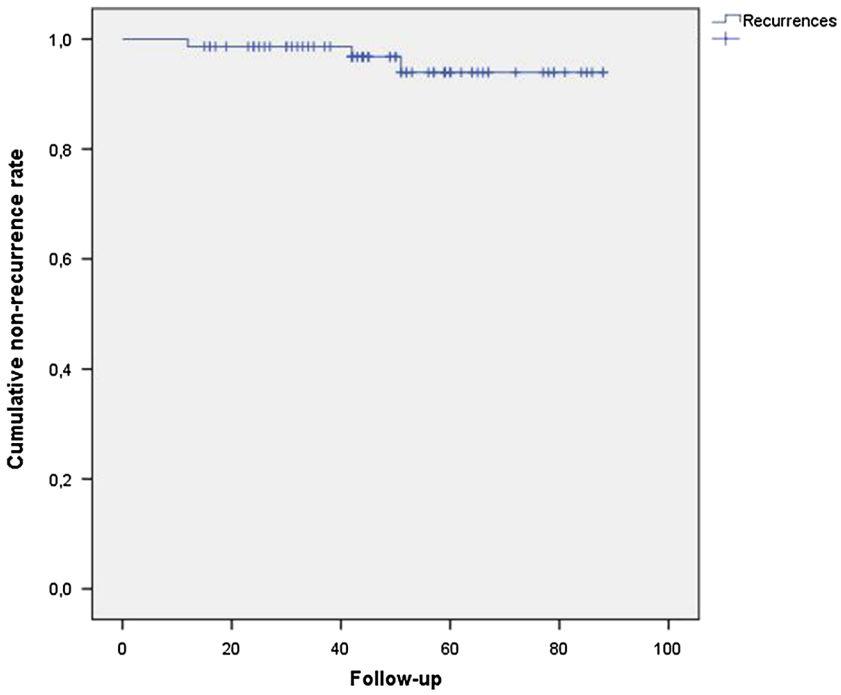

Fig. 1 The time-to-event analysis of recurrence. At the 51-month follow-up, three recurrences had been observed

(range 9–4 %) reported minimal tenderness in the sacral region.

Discussion

Despite being a benign entity, PD limits the patient's lifestyle, resulting in a loss of productive man-hours. Various noninvasive and surgical methods have been performed to treat PD, but these are frequently associated with postoperative complications and recurrences. Thus, efforts are being made to identify the ideal technique for treating symptomatic disease [8].

Most of the standard techniques for treating PD have a significant failure rate because they fail to address the underlying factors that cause persistent non-healing or recurrence [4]. Complete excision of PD and healing by secondary intention remains a common treatment option because of the lower recurrence and healing complication rates compared to primary closure; this is because recurrence rates of up to 40 % have been reported within 20 years after the first surgery [4, 9–11]. These procedures are easy to perform and have acceptable outcomes, but the price of such healing is high. Patients do not deserve to be subjected to seemingly endless wound healing periods that are associated with discomfort, especially considering that recent reports show a 20 % recurrence rate after long-term follow-up [11].

The flap techniques used for PD treatment, such as the Karydakis procedure or the Limberg flap technique, provide good results with recurrence rates <1 % [12–15]. However, these procedures are technically more laborious than other techniques and not very suitable for complicated PD with opened sinuses and caudal/lateral pits. Most surgeons prefer performing procedures that are easier and less time-consuming. A survey conducted among the members of the Association of Coloproctology of Great Britain and Ireland [16] reported that Limberg and rhomboid flaps were the preferred choice of only 2–3 % of respondents.

Given their off-midline closure tendency and their having the lowest recurrence rates among the various procedures [17, 18], it seems that the CLT fulfills the criteria for a flap technique that provides advantages such as simplicity and reproducibility, few complications and a short hospital stay. It creates a thinner flap than those created by the other methods and does not require a wide excision of deep tissues, showing excellent results in both complicated and non-complicated PD cases [19–22]. Previous randomized controlled trials such as the study by Nordon et al. [23] demonstrated that the CLT offered more predictable healing, less need for reoperation and lower recurrence rates than the simple surgical technique reported by Bascom and Bascom. A recent prospective randomized trial conducted by Guner et al. [24] concluded that the CLT presents a better early quality of life and a shorter operation than the Limberg flap technique. Although our median length of the operation was slightly longer than those in other series, we believe that our results reflect appropriate outcomes, because the procedures in all patients were performed by the same surgical team, so no bias owing to technical differences was introduced. Regarding the median hospital stay, we did not perform any outpatient procedures because most of our patients came from more than 100 km away from our hospital, and we ourselves dressed the wound and performed drainage removal; thus, it was easier for all the patients to be admitted rather than being discharged on the day of surgery.

The development of recurrence after surgical treatment of PD is the true Achilles' heel of the procedure. Recent long-term examinations have demonstrated that the

Table 3 Reported cleft lift studies

References	No. of patients	Follow-up (months)	Patients with follow-up	Long-term recurrence
Bascom and Bascom [5]	31	20 (1–180)	28 (90)	0
Theodoropoulos [27]	72	10	72 (72)	0
Bascom and Bascom [19]	69	30	52 (75)	0
Abdelrazeq et al. [20]	70	24 (2–42)	47 (67)	0
Rushfeldt et al. [28]	33	17 (10–27)	29 (33)	0
Tezel et al. [21]	76	16.4 (5–34)	76 (76)	0
Senapati et al. [22]	150	13.5 (0.5–62)	150 (150)	0
Nordon et al. [23]	26	36 (6–48)	26 (26)	0
Gendy et al. [29]	39	19 (16–21)	39 (39)	0
Dudink et al. [30]	25	Not reported	21 (25)	0
Guner et al. [31]	140	14 (6–22)	141 (141)	0
Guner et al. [24]	61	13	61 (61)	0
This study	74	51.5 (18–86)	74 (74)	2

Long-term recurrence indicates recurrence that developed after more than 40 months of follow-up

recurrence rate is a function of time. In the report by Guner et al. [24], PD recurrences can occur from the time of surgery up to 20 years and longer after the procedure. However, 60 % of all the recurrences will occur within 5 years. They proved that this was the case in a series of >500 patients who were surgically treated, regardless of the type of surgical procedure, and who received a long-term follow-up of two decades [25]. Most published series reporting CLT have shown good outcomes and low recurrence rates; however, as noted above, a short-term follow-up will result in a low recurrence rate. Therefore, the minimal follow-up period required to ensure that a technique is effective needs to be determined. Doll et al. [26] have recently ascertained that as a baseline, a new gold standard technique should have at least a reported 5 year recurrence rate. In comparison with other CLT series (Table 3), the present manuscript reports the longest median follow-up period, which was longer than 4 years. In addition, our late recurrence rates, which are the highest compared with other analyses, support the above-mentioned function of time. If 66 % of our recurrences develop after more than 40 months of follow-up, we cannot assert that this relatively novel procedure is the definitive treatment for PD, because the 5- and 10-year recurrence rates are not yet known.

The relatively small size of our sample, the lack of a control group and the single institution experience were the main limitations of our work. However, the outcomes in our study were consistent with those in reported series in which the CLT and its modifications were performed as a single elective surgery. We believe that this study provides evidence of the potential of the CLT to fulfill most of the criteria to become the standard treatment of non-acute PD.

Conclusion

Although we cannot consider the CLT as the definitive treatment for non-acute PD yet due to the brevity of the follow-up, we believe in this procedure, and strongly encourage other authors to continue performing it. If very long-term follow-up periods can be reported, categorical conclusions will be drawn, and this surgical procedure might become the treatment of choice.

Conflict of interest The authors declare that they have no conflicts of interest.

References

1. Sondenaa K, Andersen E, Nesvik I, Soreide JA. Patient characteristics and symptoms in chronic pilonidal sinus disease. Int J Colorectal Dis. 1995;10:39–42.
2. Aysan E, Ilhan M, Bektas H, Kaya EA, Sam B, Buyukpinarbasili N, Muslumanoglu M. Prevalence of sacrococcygeal pilonidal sinus as a silent disease. Surg Today. 2013;43:1286–9.
3. McCallum I, King PM, Bruce J. Healing by primary versus secondary intention after surgical treatment for pilonidal sinus. Cochrane Database Syst Rev. 2007.
4. Khanna A, Rombeau JL. Pilonidal disease. Clin Colon Rectal Surg. 2011;24:46–53.
5. Bascom J, Bascom T. Failed pilonidal surgery: new paradigm and new operation leading to cures. Arch Surg. 2002;137:1146–50.
6. Bascom J. Pilonidal disease: long-term results of follicle removal. Dis Colon Rectum. 1983;26:800–7.
7. Tezel E. A new classification according to navicular area concept for sacrococcygeal pilonidal disease. Colorectal Dis. 2007;9:575–6.
8. Harlak A, Mentes O, Kilic S, Coskun K, Duman K, Yilmaz F. Sacrococcygeal pilonidal disease: analysis of previously proposed risk factors. Clinics (Sao Paulo). 2010;65:125–31.
9. Kronborg O, Christensen K, Zimmermann-Nielsen C. Chronic pilonidal disease: a randomized trial with a complete 3-year follow-up. Br J Surg. 1985;72:303–4.
10. Mahdy T. Surgical treatment of the pilonidal disease: primary closure or flap reconstruction after excision. Dis Colon Rectum. 2008;51:1816–22.
11. Sievert H, Evers T, Matevossian E, Hoenemann C, Hoffmann S, Doll D. The influence of lifestyle (smoking and body mass index) on wound healing and long-term recurrence rate in 534 primary pilonidal sinus patients. Int J Colorectal Dis. 2013;28(11):1555–62.
12. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. Aust N Z J Surg. 1992;62:385–9.
13. Mentes O, Bagci M, Bilgin T, Ozgul O, Ozdemir M. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. Langenbecks Arch Surg. 2008;393:185–9.
14. Akca T, Colak T, Ustunsoy B, Kanik A, Aydin S. Randomized clinical trial comparing primary closure with the limberg flap in the treatment of primary sacrococcygeal pilonidal disease. Br J Surg. 2005;92:1081–4.
15. Akin M, Leventoglu S, Mentes BB, Bostanci H, Gokbayir H, Kilic K, et al. Comparison of the classic Limberg flap and modified Limberg flap in the treatment of pilonidal sinus disease: a retrospective analysis of 416 patients. Surg Today. 2010;40:757–62.
16. Shabbir J, Chaudhary BN, Britton DC. Management of sacrococcygeal pilonidal sinus disease: a snapshot of current practice. Int J Colorectal Dis. 2011;26:1619–20.
17. Petersen S, Koch R, Stelzner S, Wendlandt TP, Ludwig K. Primary closure techniques in chronic pilonidal sinus: a survey of the results of different surgical approaches. Dis Colon Rectum. 2002;45:1458–67.
18. Thompson MR, Senapati A, Kitchen P. Simple day-case surgery for pilonidal sinus disease. Br J Surg. 2011;98:198–209.
19. Bascom J, Bascom T. Utility of the cleft lift procedure in refractory pilonidal disease. Am J Surg. 2007;193:606–9.
20. Abdelrazeq AS, Rahman M, Botterill ID, Alexander DJ. Short-term and long-term outcomes of the cleft lift procedure in the management of nonacute pilonidal disorders. Dis Colon Rectum. 2008;51:1100–6.
21. Tezel E, Bostanci H, Anadol AZ, Kurukahvecioglu O. Cleft lift procedure for sacrococcygeal pilonidal disease. Dis Colon Rectum. 2009;52:135–9.
22. Senapati A, Cripps NPJ, Flashman K, Thompson MR. Cleft closure for the treatment of pilonidal sinus disease. Colorectal Dis. 2009;13:333–6.
23. Nordon IM, Senapati A, Cripps NP. A prospective randomized controlled trial of simple Bascom's technique versus Bascom's

cleft closure for the treatment of chronic pilonidal disease. Am J Surg. 2009;197:189–92.
24. Guner A, Boz A, Ozkan OF, Ileli O, Kece C, Reis E. Limberg flap versus Bascom cleft lift techniques for sacrococcygeal pilonidal sinus: prospective, randomized trial. World J Surg. 2013;37(9):2074–80.
25. Doll D, Krueger CM, Schrank S, Dettmann H, Petersen S, Duesel W. Timeline of recurrence after primary and secondary pilonidal sinus surgery. Dis Colon Rectum. 2007;50:1928–34.
26. Doll D. 5- and 10-year recurrence rate is the new gold standard in pilonidal sinus surgery benchmarking. Med Princ Pract. 2010;19:216–7.
27. Theodoropoulos GE, Vlahos K, Lazaris AC, Tahteris E, Panoussopoulos D. Modified bascom's asymmetric midgluteal cleft closure technique for recurrent pilonidal disease: early experience in a military hospital. Dis Colon Rectum. 2003;46:1286–91.
28. Rushfeldt C, Bernstein A, Norderval S, Revhaug A. Introducing an asymmetric cleft lift technique as a uniform procedure for pilonidal sinus surgery. Scand J Surg. 2008;97:77–81.
29. Gendy AS, Glick RD, Hong AR, et al. A comparison of the cleft lift procedure vs wide excision and packing for the treatment of pilonidal disease in adolescents. J Pediatr Surg. 2011;46:1256–9.
30. Dudink R, Veldkamp J, Nienhuijs S, Heemskerk J. Secondary healing versus midline closure and modified bascom natal cleft lift for pilonidal sinus disease. Scand J Surg. 2011;100:110–3.
31. Guner A, Ozkan OF, Kece C, Kesici S, Kucuktulu U. Modification of the bascom cleft lift procedure for chronic pilonidal sinus: results in 141 patients. Colorectal Dis. 2013;15(7):e402–6.