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REVIEW ARTICLE

Contralateral Limberg flap reconstruction for pilonidal disease recurrence

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Summary To identify surgical techniques applied in case of recurrence in patients with pilonidal sinus, who have undergone primary treatment with Limberg flap, and to present our cases treated with Limberg flap reconstruction prepared from the contralateral gluteal region. Nine patients with recurrence out of 219 patients who underwent Limberg flap reconstruction between 2009 and 2016 at our clinics, and 6 patients who have been referred to our clinics with total 15 recurrence after primary Limberg flap reconstruction at other institutes were included in the study. Total excision and primary repair was applied in 3 patients while 2 patients underwent excision with lay open procedures. The remaining 10 patients underwent rhomboid excision of the recurrence area and Limberg flap repair from the contralateral gluteal area. All patients who underwent primary repair or excision-lay open procedures recurred again. These two patients also underwent contralateral Limberg flap reconstruction as their second revision surgery. There were no complications or recurrences in the study group. We believe that reconstruction with contralateral Limberg flap is an effective and feasible method in recurrent pilonidal sinus cases who have been initially treated surgically by the Limberg flap.

1. Introduction

Intergluteal pilonidal sinus disease is a common chronic disorder especially encountered in young males.[1,2] It interferes with daily activities and ability to work due to its high rate of recurrence.[2,3] Although various surgical methods have been used in its treatment, the gold standard method has not yet been defined.[4–7] Rhomboid excision and Limberg flap reconstruction has an advantage over other techniques due to its low recurrence rate (0.8–6%).[8–10] However, the extent of the created defect and the presence of a wide scar associated with reconstruction constitute disadvantages of this method. A standard surgical procedure has not yet been established in

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case of recurrence after Limberg flap reconstruction, as is the case with recurrences occurring after other surgical procedures used in pilonidal sinus disease.[11–13]

Our purpose was to determine an effective method to be used in case of recurrence in patients who have previously been treated with Limberg flap. This is a descriptive study aiming to identify surgical techniques applied in recurrent pilonidal sinus patients who have undergone primary treatment with rhomboid sinus excision and Limberg flap reconstruction, and to present our cases treated with Limberg flap reconstruction prepared from the contralateral gluteal region.

2. Materials and methods

Within 219 patients who underwent rhomboid sinus excision and Limberg flap reconstruction for primary treatment of pilonidal disease between 2009 and 2016 at our clinics, 9 patients with recurrence were identified. Six patients who were referred to us with recurrence at the same period following primary surgery with Limberg flap from other centers were also included in the study, yielding a total of 15 cases with recurrence following primary treatment with Limberg flap were evaluated retrospectively. Data on patient demographics, operative time, recurrence rates, complications and time to resume daily activities and work were extracted from files. Patients with procedures other than Limberg flap, and recurrent cases secondary to these surgeries were not included in this study.

2.1. Surgical procedure and technique

All patients had bowel cleansing before the operation. Depilation procedures neither before nor after the surgeries was not performed to recurrent areas. Patients were placed in the prone position under general or spinal anesthesia. Intravenous 1 g of ceftriaxone was administered for antibiotic prophylaxis 30 min prior to the operation. All patients underwent standard Limberg flap reconstruction at their first operation. Patients with recurrence after procedures other than Limberg flap surgery were not evaluated in the study. It was determined that the recurrence area was in the mid-low (inferior-midline) part of the Limberg flap scar in all patients (Fig. 1). The new flap was created from the contralateral gluteal side of the previous flap. When this flap was rotated, attention was paid especially to the contralateral gluteal area to ensure that sufficient tissue is provided and that the flap area was not in proximity to the anus. In the case of relapses very close to the anus, revision with a superior-pedicled Limberg flap was preferred due to lack of adequate tissue in the contralateral side and the risk of infection. In this procedure, the recurrence area was marked in the shape of a rhomboid and the rotation (Limberg) flap was drawn to the contralateral side of the scar tissue, in such a way that the pedicle remained superiorly (Fig. 2). The rhomboid excision was carried down to the gluteal muscles or pre-sacral fascia to involve the entire recurrence area. This recurrence area explored during the operation (preoperative evaluation of this area with MRI, Sinogram, etc, was not performed routinely) and then the flap was raised with a superior

Figure 1 Recurrens area of Limberg Flap reconstruction.

pedicle with the guidance of preoperative markings, including the fascia of the gluteal muscles (fascia-cutaneous flap). The subcutaneous tissue was approximated with absorbable sutures. First, the angles of the flap were fixed by polypropylene sutures and the remaining skin edges were primarily closed with skin staplers. On the other hand, patients with a recurrence at the inferior midline

Figure 2 Superiorly pedicled flap after reconstruction.

sulcus that was not very close to the anus (Fig. 3) underwent inferior-pedicled Limberg flap procedure (Fig. 4). Suction drains were placed in all patients. All drains were withdrawn on the first postoperative day and the patients were discharged. Skin sutures were removed at the 2nd week out-patient visit. Patients were scheduled for follow-up visits at the 2nd week, 3rd and 6th months after contralateral flap application.

3. Results

A total of 15 patients who presented with a recurrence following Limberg flap reconstruction were evaluated. All patients were male. The mean age was 28 (20—46) years. In all cases, the recurrence area was at the intergluteal sulcus of the flap scar in the midline near the anal region. Three out of 15 patients underwent total excision and primary repair of the recurrent area. Two patients underwent excision followed by lay open procedures. Rhomboid excision of the recurrent area and Limberg flap reconstruction from the contralateral gluteal area was applied to the remaining 10 patients. All patients with primary repair and excision-lay open procedures had recurrence within a mean of 9 (2—17) months. In these patients, Limberg flap with either a superior or inferior pedicle was created from the contralateral side in their second revision surgery (Table 1). The mean operative time for contralateral Limberg flap procedure was 58 min (42—67), and time to resume work was determined as 12.1 days.[8—15] The mean follow-up period was 21 months (8—37 months). There were no complications such as flap ischemia and infection, and no recurrences in the long-term follow-up of 15 patients with contralateral Limberg flap.

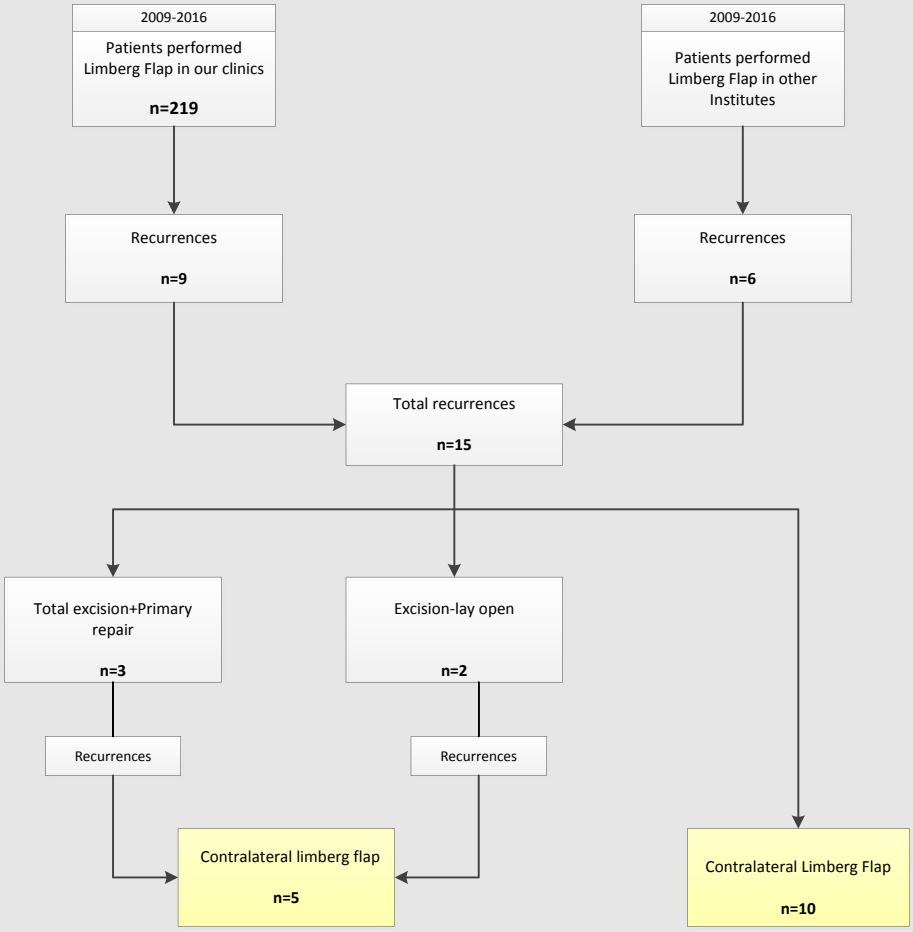
Figure 3 Inferiorly pedicled reconstruction.

Figure 4 Appearance after reconstruction.

4. Discussion

One of the main problem in pilonidal sinus disease treatment is its propensity to recur. Recurrence is associated with the type of surgery in addition to other factors.[14] The standard surgical method for pilonidal sinus disease has not yet been identified since various surgical methods with different recurrence rates have been reported.[4—7,15,16]

Table 1 Flow chart showing patients included in this study.



Studies that have been published until recently reported the lowest recurrence rate (0.5—5%) with methods such as rhomboid excision and Limberg flap reconstruction.[5,8—10] The rate detected in our series was compatible with the literature (9 recurrences in 219 patients, 4.1%). Reconstruction with Limberg flap is a widely accepted technique especially for recurrent and complicated pilonidal sinus disease due to its low recurrence rate.

Limberg flap applications have undergone modification over time.[4,17—19] The most important reason for this pursuit is the unexpected recurrence rates in some series. The common and most important feature of modified procedures is the alteration they create on the "intergluteal sulcus".[17,19] Modified Limberg flap procedures aim to lateralize the intergluteal sulcus with the expectation to decrease the recurrence rate. The recurrence rates in the modified Limberg flap series have been reported as 0% and 4.2%.[4,17—19]

The most important inadequacy we have observed in the literature review was the lack of data on "Limberg Recurrences". It has been very difficult to find isolated series on patients with recurrences after Limberg flap reconstruction. Obviously, it has been challenging to find out the method to be used in such circumstances.

The literature review revealed that studies have generally focused on pilonidal sinus relapses but not specifically Limberg Flap recurrences.[11—13,20—24] Most of these studies included recurrent cases after primary repair, and the revision operations of these patients mainly consisted of flap techniques (Limberg flap, V—Y advancement flap ...).[11,13,20,21,23,24]

It may be expected that factors such as concerns on cosmetic results of a recurrence following flap reconstruction and patient anxiety influence the surgeon's decision, which in turn gives rise to a tendency to prefer more conservative methods in the second operation.[12]

Several studies reported that surgeons who favored a conservative method like primary repair in the first cases and experienced recurrence preferred more aggressive methods such as flap reconstruction in the second operation, while the surgeons who applied a flap in the first surgery and encountered recurrence were more conservative in the second operation and generally preferred excision-marsupialization or excision-primary repair.[11—13,20—24]

Despite its limitation in the number of patients, this study indicates that flaps can still be used in case of flap failure in the first operation without being limited to conservative methods. The type of flap we chose again was the Limberg method due to its ease of application, good vascularization, improved transposition abilities and cosmetic results. Additionally, by using the Limberg flap the

newly created surgical site was kept away from the anus in an attempt to reduce probable contamination risk. Finally we wanted to contribute to the problem of recurrence by "eliminating the sulcus and removing the suture line as far away from the anus as possible". These seem to contribute to the success achieved in recurrence rates. Nevertheless, it should be kept in mind that rotation and advancement flaps could also be used.

5. Conclusion

Surgical procedures for the treatment of pilonidal sinus disease have been modified throughout history. An overview of this evolution reveals that reconstructive surgery is an integral part of treatment. The acceptable recurrence rates after such surgeries (0—5%) intercept the search for alternative procedures.

Nevertheless, the "recurrence of a recurrence" problem is a major issue for both patients and surgeons. These patients require individualized treatment protocols. Our study offers an alternative to this problem with a limited number of patients.

The contralateral Limberg flap reconstruction emerges as a compulsory surgery against Limberg flap Based on these results, we believe that the feasibility of this technique should be evaluated with larger populations.

Conflict of interest

Author's provide that no relationships/conditions/circumstances potential conflict of interest.

Author contributions

Research design; BÖ, Öİ.
Data acquisition and collection; BÖ.
Analysis and interpretation of the results; BÖ, Öİ.
Research writing; Oİ, BÖ.
Critical review; Oİ, BÖ.
Final version approval; BÖ, Oİ.

References

1. Sondenaa K, Andersen E, Nesvik I, et al. Patients characteristics and symptoms in chronic pilonidal sinüs disease. *Int J Colorectal Dis*. 1995;10:39—42.
2. Harlak A, Mentes O, Kilic S, et al. Sacrococcygeal pilonidal disease: analysis of previously proposed risk factors. *Clinics*. 2010;65:125—131.
3. Spivak H, Brooks VL, Nussbaum M, et al. Treatment of chronic pilonidal disease. *Dis Colon Rectum*. 1996;39:1136—1139.
4. Mentes BB, Leventoglu S, Cihan A, et al. Modified Limberg transposition flap for sacrococcygeal pilonidal sinus. *Surg Today*. 2004;34:419—423.
5. Kapan M, Kapan S, Pekmezci S, et al. Sacrococcygeal pilonidal sinus disease with Limberg flap repair. *Tech Coloproctol*. 2002; 6:27—32.
6. Can MF, Sevinc MM, Yilmaz M. Comparison of Karydakis flap reconstruction versus primary midline closure in sacrococcygeal pilonidal disease: results of 200 military service members. *Surg Today*. 2009;39:580—586.
7. McCallum IJ, King PM, Bruce J. Healing by primary closure versus open healing after surgery for pilonidal sinus: systematic review and meta analysis. *BMJ*. 2008;336:868—871.
8. Daphan C, Tekelioglu MH, Sayilgan C. Limberg flap repair for pilonidal sinus disease. *Dis Colon Rectum*. 2004;47:233—237.
9. Topgul K, Ozdemir E, Kilic K, et al. Long-term results of Limberg flap procedure for treatment of pilonidal sinus: a report of 200 cases. *Dis Colon Rectum*. 2003;46:1545—1548.
10. Mentes O, Bagci M, Bilgin T, et al. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. *Langenbecks Arch Surg*. 2008;393:185—189.
11. Bali İ, Aziret M, Sözen S, et al. Effectiveness of Limberg and Karydakis flap in recurrent pilonidal sinus disease. *Clinics*. 2015;70:350—355.
12. Uçar AD, Cartı EB, Oymacı E, et al. Recurrent pilonidal disease surgery: is it second primary or reoperative surgery? *Turkish J Surg*. 2016;32:162—167.
13. Öz B, Akcan A, Emek E, et al. A comparison of surgical outcome of fasciocutaneous V_Y advancement flap and Limberg transposition flap for recurrent sacrococcygeal pilonidal sinus disease. *Asian J Surg*. 2015;15:121—129.
14. Onder A, Girgin S, Kapan M, et al. Pilonidal sinus disease: risk factors for post operative complications and recurrence. *Int Surg*. 2012;97:224—229.
15. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. *Aust N Z J Surg*. 1992;62:385—389.
16. Bascom J. Surgical treatment of pilonidal disease. *BMJ*. 2008; 336:842—843.
17. Cihan A, Ucan BH, Comert M, et al. Superiority of asymmetric modified Limberg flap for surgical treatment of pilonidal disease. *Dis Colon Rectum*. 2006;49:244—249.
18. Akin M, Leventoglu S, Mentes BB, 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—762.
19. Kaya B, Eris C, Atalay S, et al. Modified Limberg transposition flap in the treatment of pilonidal sinus disease. *Tech Coloproctol*. 2012;16:55—59.
20. el-Khadrawy O, Hashish M, Ismail K, et al. Outcome of the rhomboid flap for recurrent pilonidal disease. *World J Surg*. 2009;33:1064—1068.
21. Katsoulis IE, Hibberts F, Carapeti EA. Outcome of treatment of primary and recurrent pilonidal sinuses with the Limberg flap. *Surgeon*. 2006;4:7—10.
22. Yoldas T, Karaca C, Unalp O, et al. Recurrent pilonidal sinus: lay open or flap closure, does it differ? *Int Surg*. 2013;98: 319—323.
23. Elalfy K, Emile S, Lotfy A, et al. Bilateral gluteal advancement flap for treatment of recurrent sacrococcygeal pilonidal disease: a prospective cohort study. *Int Surg*. 2016;29:1—8.
24. Madbouly KM. Day-case Limberg flap for recurrent pilonidal sinus: does obesity complicate the issue? *Am Surg*. 2010;76: 995—999.