MODIFIED LIMBERG FLAP COVER FOR RECURRENT SACROCOCCYGEAL PILONIDAL SINUS: OUR EXPERIENCE AT A MEDICAL COLLEGE IN NEPAL

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Abstract
Pilonidal sinus is an inflammatory disease seen mostly in the intergluteal region of young males. Although any treatment strategy of this condition is generally free of life-threatening complications due to its superficial nature, it is still a feared disease because of recurrence which greatly increases the morbidity.

Objective
To investigate the results of wide rhomboid excision and modified Limberg transposition flap reconstruction to treat recurrent pilonidal sinus.

Methodology
Well-documented records of all patients with recurrent sacrococcygeal pilonidal sinus who underwent wide excision and a modified Limberg transposition flap at our center during the past 3 years and followed up for longer than 12 months were analyzed. The modification primarily consisted of an asymmetrically rotated rhomboid excision and lateralization of the lower midline. Patient demographics, days of hospitalization, complications, patient satisfaction and recurrence rates were evaluated.

Result
Most patients in the study were overweight. No relationship was detected between BMI and number of sinus openings, hospital stay, drain placement or recurrences but an association with infection was noted. The number of pilonidal sinus orifices did not have a correlation with age, number of previous surgeries, duration of hospital stay or drains placement. The mean duration of hospitalization was 7.89 ± 3.41 days and the mean duration of suction drainage was 6.33±2.87 days. Half of our patients developed complications in the postoperative period. The only patient who developed superficial wound infection stayed the most in the hospital. All patients had some complaints regarding the operation site; however, they were satisfied with the result of the operation and had no recurrence at 12 months of follow-up.

Conclusion
Rhomboid excision of recurrent sacrococcygeal pilonidal sinus with modified Limberg flap closure is a promising surgical technique with advantages of a good patient satisfaction and no recurrence after a year of surgery.

Keywords
Modified limberg flap (mLF), pilonidal sinus, pilonidal cyst, recurrent pilonidal disease, rhomboid excision.
INTRODUCTION
Chronic pilonidal sinus is a common acquired disease usually found in the midline of the sacrococcygeal region of young hirsute men.

The management of pilonidal sinus disease remains controversial, and gold standard treatment modality has yet to be established. Among different surgical modalities, flap reconstruction technique is desirable as it not only eradicates the etiology of the disease by flattening the intergluteal sulcus but also shortens the overall healing time. It also has better outcome in terms of postoperative pain, recurrence rate and the patient’s return to everyday activities. The classic Limberg flap is still considered the best available surgical modality for pilonidal sinus, as it can be used to tackle larger involved areas and is easy to design and execute. The presence of the lower pole at the intergluteal sulcus, however, increases the risk of wound maceration and recurrence.

To tackle this problem, Mentes et al. in 2004 introduced the modified Limberg flap (mLF) technique by moving the lower half of the rhomboid laterally by 1-2 cm (B in Figure 2) and obtained 0% recurrence rate and 0.8% wound infection rate without any dehiscence or flap necrosis.

The word modified in “Modified Limberg flap”, however, has not been used uniformly (mainly 5 main groups of modifications exists as illustrated and explained in Figure 2) and is being utilized by various authors to denote a Limberg flap with either sides or angles not corresponding to a classical midline rhomboid. Tekin’s modification (C in Figure 2) consisted of altering the left lower limb to keep the final scar off the midline. Kaya et al (D in Figure 2) symmetrically shifted the whole flap laterally while Afsarlar et al (E in Figure 2) tilted it to the side. Leaving aside these major modifications, other modifications such as the ones described by Abdelnaby et al and Yoldas et al may represent confusion in describing or naming the flap.

The purpose of this study was to analyze the results of modified Limberg flap (mLF) done at our center for recurrence of pilonidal sinus.

METHODOLOGY
In this study, data of all 9 patients with a follow-up period of more than 12 months who had previously undergone the mLF for recurrent pilonidal sinus at our center during the last 3 years were retrospectively analyzed. All of our patients were healthy adults without any major coexisting diseases. Informed consent was taken from all subjects and Ethical clearance was obtained from the Institutional review board.

Hair of the gluteal and sacral region was shaved a day before the operation and rectal cleansing with an enema was performed four hours before the operation. Patients were operated under spinal anesthesia in the prone jackknife position. Appropriate cleansing of the operation area was performed with 10 percent povidon-iodine. One gm of Cefazolin was given intravenously as a prophylactic antibiotic. The surgical area was exposed by lateral traction of the buttocks with adhesive tapes. The extent of the sinus tract was determined with methylene blue injection through the sinus orifices. The excision area was delineated according to the sinus orifice localizations and the expanse of natal cleft.
sutures passing through the flap and the defect margins at a similar level. The subcutaneous layer was approximated with 3-0 polyglactin-910 interrupted sutures, and the skin was closed with 3-0 polypropylene or nylon sutures.

Postoperatively, oral intake was started after 4 hours. Patients were encouraged to ambulate after 8 hours following the surgery, but were advised to limit sudden movements of the sacral region. The suction drain was removed after the drainage decreased to 10 cc/day for at least 2 days; patients received Cefazolin (1 g per dose IV, three times a day) and Metronidazole (500 mg per dose IV, three times a day) during this period. The skin stitches were removed on postoperative day 14, and patients were advised not to sit directly on their buttocks until the third postoperative week. Additionally, patients were instructed for maintaining self-hygiene, using depilatories and avoiding contact sports for three months.

All patients were asked to report immediately for any local pain, redness, swelling or discharge or to follow up routinely at 3 months, 6 months and at the end of 12 months. The patients were also reminded to keep the perineal and gluteal region clean and dry during every visit to the clinic. Patients unable to report at 6 and 12 months were asked about their well-being via telephone contact.

Figure 2: Immediate postoperative picture of a modified Limberg Flap.

The data were presented as means ± standard deviation or medians and interquartile ranges. The clinical and demographic variables were compared using the Student’s t test for continuous variables with a normal distribution and the Wilcoxon rank sum test for non-parametric variables or the Chi-square test (or Fisher’s exact test) for categorical variables. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 9 adults, including 8 males (88.89%) and 1 female (11.11%), comprised the study group. Individual patient demographic details are tabulated below in Table 1.

All the patients were young with a mean age of 25.55 ± 4.4 years. The mean Body Mass Index (BMI) of the patients was 27.37 ± 1.8 years. Of the patients, none were underweight or healthy (BMI < 18.5 and 18.5 - 24.5 respectively), 88.89% (n = 8 with BMI 18.5–24.9) were overweight and 11.11% (n = 1 with BMI > 30.0) were obese. No relationship was detected between BMI and number of sinus openings (p = 0.061), hospital stay (p = 0.230), number of days the drain was kept (p = 0.289) or recurrences (p = 0.405) but association with infection was noted (p = 0.02 and f value on regression analysis = 20.69).

The mean number of previous operations was 1.37 ± 0.48 days. The mean duration of hospitalization was 7.89 ± 3.41 days and the mean duration of suction drainage placement was 6.33 ± 2.87 days.

All the patients have had a previous history of surgery elsewhere; most patients, however, were not aware of the name or nature of the procedure done. Local examination, however, showed that 7 patients had midline longitudinal scars, 1 had a longitudinal scar on the left side while 1 had multiple irregular scars.

Four (44.44%) of our patients developed complications in the postoperative period—each of infection, seroma, dehiscence and maceration of the wound.

All the patients were satisfied with the overall result of the surgery; however, each patient had a complain regarding the operation site-2 each had numbness, occasional pain/discomfort and tingling whereas 1 patient had dimpling at the lower left side of the flap. All the patient have been recurrence free for more than a year now.

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Age (yr)</th>
<th>Sex</th>
<th>BMI (kg/m²)</th>
<th>No. of previous operations</th>
<th>Time gap of previous operation (months)</th>
<th>Number of openings</th>
<th>Hospital stay (days)</th>
<th>Drain kept (days)</th>
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<td>28.7</td>
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<td>23.2</td>
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Table 1: Demographic details of individual patients

Table 2: Surgical outcome of individual patients

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DISCUSSION

Pilonidal disease (PD) is a chronic inflammatory disease, usually located on the intergluteal region and seen mostly in the younger population. The estimated incidence is 26 per 1,00,000 population and the disease is observed at a rate of 0.7% in the general population. It generally presents as a cyst, abscess or sinus tracts with or without discharge. Men are affected more often than women, it is rare both before puberty and after the age of 40 years.

We adopted the Mentes modification of the Limberg flap and, like them, have had no recurrences in our follow-up period which was at least 1 year in all cases. Other authors who adopted similar modification with the lower end 1 cm off-midline had recurrence rates ranging from zero to 2.5%. The recurrence rates seemed to increase to a range of zero to 13.3% for cases undergoing the same modification but with longer lateralizing distance of 1.5 to 2.5 cm. Patients in various other studies rarely stayed in the hospital for more than 5 days except for a mean 6.5 days in 94 cases reported by Abdelnaby et al. The average duration of hospital stay in our study was 7.89 ± 3.41 days. The seemingly longer duration is something unique to our population who wish to stay longer in the hospital. People seem to believe that staying longer in the hospital would decrease the risk of infection and that infection would be detected earlier at the hospital bed.

Ischemia of the flap tip has been reported in up to 6.6% cases in the Mentes modification. Gandhi et al encountered 11% tip ischemia in their Kaya like Limberg flap modification. Their 27 cases included 13 recurrent cases with much scarring and extension; this, rather than the type of modification would explain the high rate of vascular insufficiency of those flaps. We did not encounter any ischemia of the flap tip which is a welcome sign probably due to wider base of the flap and taking care while dissection the inferior aspect of the flap to avoid damaging the feeding arteries.

Ischemia has been less frequently reported as a complication of the operative procedure; we encountered it in a single case (~11%). It has been, however, reported in upto 27% of cases with Mentes modification. Kaya et al noted it in 8.5% cases in their modification. Kerakas et al encountered more maceration with Mentes modification utilizing the 1 cm lateralization as compared to 2 cm (35% Vs 20%); but the difference was not found to be statistically significant. Only 2.7% cases utilizing Tekin modification and 7.4% cases of Gandhi et al utilizing the Kaya modification had seroma. In the Mentes variation, seroma was not mentioned in the original series. Bessa et al in their 60 cases as well as Gaber et al in their 15 cases of recurrent pilonidal sinus encountered no cases of postoperative seroma. Others had seroma in 3.3–13.9% of their cases.

We encountered a single case (11.1%) of seroma in our series. It was the case (Case 2) where extensive dissection and liberal use of cautery was done; the presence of recurrent cases with extensive scarring may be a reason for the high incidence of seroma.

Mentes et al in their study did not note wound dehiscence in any of their 198 cases of mL. Cihan et al adopting the Mentes variation, had mixed results with zero cases in their 44 cases included in their 2004 series and a single case in their 33 cases included in their 2005 series. Other series utilizing the Mentes modification had seroma in zero to upto 15.9% of cases. Bayham et al utilizing the Kaya modification had it in 1% of their cases. Afsarlar modification by Elshazy et al had it in 1.67%; and Kaya like modification by Yildiz et al had it in 6.25% whereas Gandhi et al had it in 3.7% of their cases. We also encountered a single case of wound dehiscence. This 24 years old gentleman (case 7) was previously operated twice, had an extensive disease with 3 external openings and was discharged in a week. Early ambulation and not paying attention to perianal hygiene were probably other contributors to his complication.

None of our cases had hematoma as a post-operative complication. The literature review of Mentes modification shows incidence of hematoma to be 2.78% for Arslan et al, 2.5% for Karakas et al, 4.76% for Hussain et al and 18% for Bayham et al. Afsarlar et al as well as Abdelnaby et al in their modification encountered a single case of hematoma in 15 and 94 cases respectively. Liberal use of cautery and repeated checking of flap may be the reason for the absence of hematoma in our patients.

The infection rates for the Mentes modification ranged from 0 to 11.4%, 2,5,7,10–15,17,18,21,23,24,27. We had encountered a single case (11.1%) of infection. Similar modifications had infections in upto 18.1% of cases. The patient (Case 1) who developed superficial wound infection had it started from the middle part of the wound; no organisms could be grown and it healed spontaneously with conservative management within 2 weeks. This was also the patient who stayed longest (15 days) at our hospital for wound care. Alptekin et al. found that the volume of the excised specimen in pilonidal disease procedures correlates with surgical site infection. Due to the wide en bloc excision, he advised using an empiric broad-spectrum antibiotic (extended post-discharge) as a preventive measure.

There is a lack of strong data that would support the routine use of drainage in all patients; the decision should be based at the discretion of the surgeon and patient related factors. Due to the extensive nature of dissection and excision, we chose to use it for all cases. The mean duration of its removal was 6.33 ± 2.87 days.

All of our patients were satisfied with the overall result of the operation. Absence of recurrence, quicker healing, lesser pain and complete relief of the disease could be the reason for the same. Surgeries involving selective excision or the use of the newer minimally invasive techniques may decrease the overall length of the resultant scar and improve the overall cosmetic result, but the extent of resection may not suffice for recurrent cases or cases with...
extensive diseases like most of our cases. Youssef et al noted better patient satisfaction with tensionless primary closure as compared to the mLF. Similarly, Tavassoli et al also noted more completely satisfied patients in the primary closure group as compared to the cLF group. Topgul et al reported that satisfaction was higher in the primary repair group as compared to the rhomboid group whereas patients were satisfied more with the Karydakis flap as compared to the primary group in the study group by Can et al. Sabry et al noted significantly better cosmetic (rather than overall) satisfaction in patients undergoing lateral advancement flap as compared to those undergoing m LF. However, Ertan et al cautioned against using primary closure under tension or in inappropriate cases as it may cause more postoperative problems and lesser patient satisfaction.

Each patient in our study had a complaint regarding the operation site-2 each had numbness, occasional pain/discomfort and tingling whereas 1 patient had dimpling at the lower left side of the flap. El-Khadwary et al reported numbness over the operative site in 18.3% of their 60 cases. They postulated that it may be due to interference with the nerve supply of the flap, especially large ones. Akin et al reported decreased sensation in 8.65% of their cases. Eryilmaz et al reported numbness in 19% of their 63 cLF cases. 60% of the patients had postoperative numbness in a study of 50 m LF cases from Nepal by Thapa et al.

Duman et al considered tingling as a symptom of anxiety and showed that patients undergoing the cLF had less anxiety scores than those undergoing primary closure. They also noted lesser pain while walking and sitting on toilet in cLF group as compared to primary closure group. Aithal et al noted very less postoperative pain in 30 patients undergoing cLF. As compared to primary closure, Youssef et al found better pain scores with mLF on 1st day, 7th day as well as on 2nd and 4th week as compared to primary closure group but it showed statistical significance only for day 1.

The single patient with the dimple would like to remove it to decrease the chances of recurrence. Considering his compliance and adherence to strict post-surgical care as well as regular follow-up, revision of the area has not been done till date.

CONCLUSION

The Mentes modification of the Limberg flap is a promising surgical technique for the treatment of recurrent pilonidal sinuses with few manageable complications, no recurrence and a good patient satisfaction. In the future, proper randomized studies comparing various techniques including surgical or non-surgical methods for sacrococcygeal PD are required to determine the most appropriate treatment option. Till then, newer flaps and better modifications would continue to evolve in a quest to achieve better results in recurrence, complications and postoperative morbidities.

LIMITATIONS OF THE STUDY

This is a retrospective study of a small number of cases in which a pilonidal sinus was operated on at various other center previously by different surgeons. Thus the amount of tissue to be removed varied greatly between individual cases and the wide excision was performed in an area already having volume deficit. It may have been an overtreatment as well for recurrent cases with smaller sinus, single midline opening and limited lateral extensions. Any recommendations could not be given as this is a small study which does not truly compare different flap techniques. Follow up period of few patients was just over a year. Recognition of asymptomatic cases could have been missed as some of our late follow-ups were made via telephone conversation. Other confounding or co-factors which may have been associated with the complications were not evaluated as well.

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CONFLICT OF INTEREST

None to disclose.

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REFERENCES


