Limberg Flap Versus Primary Closure in the Treatment of Primary Sacrococcygeal Pilonidal Disease; A Randomized Clinical Trial

Parwez Sajad Khan · Humera Hayat · Gazala Hayat

Received: 7 October 2011 / Accepted: 11 December 2011 / Published online: 16 March 2012
© Association of Surgeons of India 2012

Abstract Pilonidal sinus is a chronic intermittent disease, usually involving the sacrococcygeal area. This study was undertaken to compare the results of rhomboid excision followed by Limberg flap with that of excision and primary closure in patients with primary pilonidal sinus. A total of 120 patients with pilonidal disease were randomly divided into group A who underwent excision and primary closure ($n=60$) and group B who underwent the rhomboid transposition flap procedure ($n=60$). Length of hospital stay and postoperative complications in two groups were compared. Duration of hospital stay ($P<0.001$) and time to resumption of work ($P<0.001$) was less for group B, and postoperative complications were fewer in group B ($P<0.05$). During follow-up of 2 years, no recurrence was detected in patients in group B, whereas five patients developed recurrence in group A ($P=0.02$). Limberg flap procedure is better than the simple excision and primary closure for the management of sacrococcygeal pilonidal disease.

Keywords Pilonidal disease · Simple closure · Limberg flap

Introduction

Pilonidal sinus is a chronic intermittent disease, usually involving the sacrococcygeal area. It commonly affects young and middle-aged male patients [1]. For more than hundred years, surgeons have been treating this disease by various treatment modalities, including simple incision and drainage, laying open, marsupialization, excision and primary closure, or rhomboid excision with Limberg flap procedure [2]. There have been many studies reporting a recurrence rate of 7–42 % following excision and primary closure; however, a recurrence rate of about 3 % has been reported following Limberg flap repair [3]. The aim of this study was to compare the Limberg flap procedure and the primary closure in the treatment of sacrococcygeal pilonidal sinus.

Patients and Methods

The study was conducted between year 2007 and 2010, whereby 120 patients with pilonidal sinus in the sacrococcygeal area were seen and included in the study. After obtaining written informed consent, patients were randomly (using table of random numbers) allocated to undergo either excision and primary closure (group A, $n=60$) or rhomboid excision and the Limberg flap procedure (group B, $n=60$). All patients were operated under spinal anesthesia.

Methylene blue dye was used intraoperatively to stain the sinus so as to delineating the course and extensions of the sinus and thus achieving thorough debridement by excising all stained tissue to prevent recurrence. The debridement

P. S. Khan (✉)
General Surgery, Department of Health and Medical Education,
New Colony Mughal Mohalla Chattabal Srinagar,
Kashmir, India
e-mail: parwezsajad@yahoo.co.in

P. S. Khan
e-mail: parwezsajad@rediffmail.com

H. Hayat
Department of Community Medicine,
Sheri Kashmir Institute of Medical Sciences,
Soura Srinagar, India

G. Hayat
SKIMS Medical College Hospital,
Bemina Srinagar, India

Fig. 1 A rhomboid shaped incision made around pilonidal sinus extending into gluteal area for limberg flap

was adequate and comparable in both the groups, and further the defect sizes in both treatment groups were more or less comparable and there was no difficulty in primary closure of the defects. Suction drain was routinely used in both groups. Patients were given IV antibiotics for first 24 h followed by oral antibiotics for next 9 days.

In group A, a vertical elliptic incision was made that was deepened to reach up to the sacrococcygeal fascia and the lesion was excised. After achieving hemostasis, a suction drain was put in and wound was closed back primarily.

In group B, a rhomboid-shaped incision was made, with each side equal in length, around the mouth of the sinus. The incision was deepened and the lesion was excised (Figs. 1 and 2). The rhomboid flap was then rotated from the gluteal fascia to the excised area without tension (Fig. 3). Using interrupted sutures, the subcutaneous tissue and the skin were sutured.

Skin sutures were removed on the tenth postoperative day. Length of hospital stay, duration of inability to work, postoperative infection, wound dehiscence, and postoperative recurrence were recorded. Duration of inability to work was defined as the time from the date of surgery to the date on which the patient returned to normal activities, including employment. The patients were regularly followed up for a period of 2 years.

Fig. 2 Rhomboid flap made in gluteal area

Fig. 3 Rhomboid flap rotated and sutured to cover the area of excised lesion

All statistical analyses were performed with the Statistical Package (SPSS) version 15.0. The results were expressed as mean value $\pm$ standard deviation. The chi-square test was applied for comparison between frequencies. All tests were two-sided. The level of significance was set at $P < 0.05$.

Results

Group A consisted of 51 male and 9 female patients with a mean age of 26 (16–40) years, and group B comprised 53 male and 7 female patients with a mean age of 24 (17–42) years. There were no significant differences between the two groups with respect to age and sex ($P > 0.05$). The operating time was longer in group B. Morbidity developed in 11 patients in group A (infection in 7 patients; wound dehiscence in 4 patients) and in 1 patient in group B (infection in 1 patient) ($P < 0.05$). The median duration of hospital stay was longer in group A ($P < 0.001$). The median duration of inability to work was 20 days in group A and 9 days in group B ($P < 0.001$) (Table 1). Recurrence was detected in 5 patients (8.3 %) in group A, with time to recurrence between 5 and 12 months. No recurrences were identified in patients in group B.

Table 1 Comparison of procedure outcome

	Group A	Group B	<i>P</i> value
Operation time (minutes)	55	70	$<0.001^*$
Total hospital stay (days)	5	2	$<0.001^*$
Wound infection	7	1	0.028^{**a}
Dehiscence of wound	4	0	0.042^{**b}
Duration of inability to work (days)	20	9	$<0.001^*$
Recurrence	5	0	0.022^{**c}

*Mann–Whitney *U* test

**Chi-square test

Confidence interval: ^a 0.54–0.97, ^b 0.51–1.0, and ^c 0.57–1.0

Discussion

The best surgical technique for sacrococcygeal pilonidal disease is still controversial [4]. The treatment for sacrococcygeal pilonidal disease aims to provide cure but with a low rate of complications and recurrence and further to avoid prolonged hospitalization and ensure early return to work [3].

Muzi et al. studied 260 patients with sacrococcygeal pilonidal disease who were assigned randomly to undergo Limberg flap procedure or tension-free primary closure and concluded that there was no clear benefit for surgical management by Limberg flap over primary closure. Limberg flap showed less convalescence and wound infection, while the technique of tension-free primary closure was a day case procedure, less painful, and shorter than Limberg flap [4].

Although in the present study the operation time was longer in Limberg flap group, the hospital stay, inability to return to work, wound-related complications, and disease recurrence were significantly less compared to primary closure group. These findings were comparable with the study by Akca et al. [3].

Akin et al. studied the records of 411 patients with pilonidal sinus disease, who underwent rhomboid excision and Limberg flap, and concluded that the Limberg flap procedure is effective and has a low complication rate, short time for returning to normal activity, and short hospitalization [5].

Further studies have been undertaken whereby the classical Limberg procedure has been compared with the modified Limberg procedure. The modified procedure has shown better clinical results than in the classical procedure. The recurrence rate and the time to return to work have been statistically higher in the classical group. The maceration and wound infection rates have been statistically higher in the classical procedure than in the modified Limberg procedure [6].

As far as the complications are concerned, in the present study wound infection and dehiscence were observed in 11.6 and 6.7 %, respectively, in the primary closure group and 1.6 and 0 % in the Limberg flap group. Further, none of

the patients had a recurrence in the Limberg flap group. Comparable findings were observed in the study by Mahdy [7].

Conclusion

Rhomboid excision and Limberg flap closure is preferable to simple excision and primary closure in the treatment for sacrococcygeal pilonidal disease.

Conflict of Interest None to declare.

References

1. Keighley MRB (1993) Pilonidal disease. In: Keighley MRB, Williams NS (eds) *Surgery of anus, rectum and colon*. W.B. Saunders, London, pp 467–489
2. Al-Hassan HK, Francis IM, Neglen P (1990) Primary closure or secondary granulation after excision of pilonidal sinus. *Acta Chir Scand* 156(3):695–699
3. Akca T, Colak T, Ustunso B, Kanik A, Aydin S (2005) Randomized clinical trial comparing primary closure with the Limberg flap in the treatment of primary sacrococcygeal pilonidal disease. *Brit J Surg* 92:1081–1084
4. Muzi MG, Milito G, Cadeddu F, Nigro C, Andreoli F, Amabile D, Farinon AM (2010) Randomized comparison of Limberg flap versus modified primary closure for the treatment of pilonidal disease. *Am J Surg* 200(1):9–14
5. Akin M, Gokbayir H, Kilic K, Topgul K, Ozdemir E, Ferahkose Z (2008) Rhomboid excision and Limberg flap for managing pilonidal sinus: long-term results in 411 patients. *Colorectal Dis* 10(9):945–948
6. Akin M, Leventoglu S, Menten BB, Bostanci H, Gokbayir H, Kilic K, Ozdemir E, Ferahkose Z (2010) 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* 40(8):757–762
7. Mahdy T (2008) Surgical treatment of the pilonidal disease: primary closure or flap reconstruction after excision. *Dis Colon Rectum* 51(12):1816–1822