International Surgery Journal
Rajendra N et al. Int Surg J. 2021 Oct;8(10):3064-3068
http://www.ijsurgery.com
pISSN2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20213996

Original Research Article

D-shape asymmetric excision with primary closure versus limberg flap surgery for sacrococcygeal pilonidal sinus

Naveen Rajendra*, Venugopal Karigowda, Girish Honnavara Raju, Nitish Suresh

Department of Surgery, Kempegowda Institute of Medical Sciences, Bangalore, Karnataka, India

Received: 15 June 2021
Accepted: 16 July 2021

***Correspondence:**
Dr. Naveen Rajendra,
E-mail: naveenrajendra@gmail.com

Copyright:© the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Treatment of sacrococcygeal pilonidal disease with off-midline closure after excision has been suggested to improve surgical outcomes. The aim of this study was to compare the short-term outcomes in patients with sacrococcygeal pilonidal disease, who underwent D shaped asymmetrical excision with flap reconstruction and Limberg flap reconstruction.
Methods: An analysis of 50 patients was done; 25 were treated with D shaped asymmetrical excision with flap reconstruction and 25 with Limberg flap reconstruction procedure from September 2015 to Feb 2017 and were followed up for six months to 1 year.
Results: There were significant difference between group 1 and group 2 with respect to operation time (mean: 40.20±3.19 min and 49.24±3.76 min, p<0.001), blood loss (mean: 45.64±2.93 mland 61.04±3.34 ml, p<0.001). Visual analog scale score was evaluated on postoperative day 15 and 30. On postoperative day 15, VAS score was 2.52±0.77 in group 1 and 3.12±0.97 in group 2. On day 30, VAS score was 1.56±0.77 in group 1 and 2.16±0.94 in group 2, and the differences were statistically significant. The complications were lesser I patients with D shaped asymmetric excision when compared to Limberg flap.
Conclusions: The D-shape procedure is an easier and safer treatment option when compared to Limberg flap for the surgical treatment of sacrococcygeal pilonidal sinus disease owing to the associated low complication rate, short duration to return to normal activity, faster healing, and a high patient satisfaction rate and an easier learning curve.

Keywords: Sacrococcygeal pilonidal disease, D-shaped asymmetric excision, Limberg flap

INTRODUCTION

The term 'sacrococcygeal pilonidal sinus' describes a condition found in the natal cleft overlying the coccyx, consisting of one or more, usually non-infected, midline openings, which communicate with a fibrous track lined by granulation tissue and containing hair lying loosely within the lumen.[1] The origin and the pathogenesis of pilonidal disease has long been a subject of debate. It ranges from the long debated congenital theory to the more recently accepted hormonal and acquired theory.[2] Despite the fact that there are numerous non-operative and operational therapy options, no single therapy has been found to entirely cure the problem and prevent recurrence.[3-5] Various flap procedures have revolutionised the care of pilonidal illness, based on the concept that recurrences are caused by the presence of a wound in the mid line and a deep gluteal furrow. These operations have reduced recurrence rates because they minimize the depth of the cleft and move the suture line away from the inter gluteal sulcus. Better technique, less recurrences, less morbidity, reducded duration of hospital stay and good patient compliance have made these procedures popular and acceptable with minimal cosmetic disfigurement.[3,6] The aim of this study was to compare the short-term outcomes in patients with sacrococcygeal pilonidal

disease, who underwent D shaped asymmetrical excision with flap reconstruction and Limberg flap reconstruction.

METHODS

A prospective study of all patients treated for sacrococcygeal pilonidal disease between September 2015 and Febraury 2017 in our institute was analyzed. Patients with nonrecurrent disease were included in this study. Patients with acute pilonidal abscesses, recurrent and extensive gluteal involvement requiring full-thickness flaps (sinus opening >3 cm from the intergluteal sulcus unilaterally or sinus openings >1.5 cm away from the intergluteal sulcus bilaterally) were excluded. 50 patients were included in the study after ethical committee approval. Demographic, operative and post-operative data were analysed.

Patients were admitted after diagnosis by history and clinincal examination. Patients were divided into two groups based on the surgery done (Figure 1). All operations were performed under spinal anesthesia. Patients were placed in jack-knife position. Parts preparation was done on the day prior to the operation. Operation site was cleaned with 10% povidone-iodine. One milliliter of methylene blue was injected through the external opening to know the extent. Third generation cephalosporin and metronidazole was given intravenously before 30 min of the operation and was given for 3 days after surgery. Patients were used oral form of third generation cephalosporin and metronidazole for 5 days postoperatively. Patients were dressed daily until suture removal. Drain was removed when the discharge was less than 20 ml in 24 hours. Sutures were removed on post operative day 12-14. Patients were followed up on a regular basis. Group 1: D-Shape asymmetric excision with primary closure (DS). An asymmetric excision is carried out with a D-shaped incision of 7 to 8 cm in length, 3 to 4 cm in width. The excision, including the pilonidal sinus and surrounding tissue, is performed down to the periosteum and gluteal fascia laterally. An adequate flap is raised on the curve of the D and advanced towards the arm of the D. The surgical field is washed with hydrogen peroxide and iodopovidone, and a 14 fr suction drain is positioned inside the cavity (Figure 2-5). Meticulous hemostasis is done. Wound closure is done by suturing of vicryl 2/0 through the epidermal, subepidermal, and presacral fascia. Skin is carefully sutured with non-absorbable monofilament material. Pressure wound dressing is applied and removed on the 3rd postoperative day. Group 2: Limberg flap (LF). A wide rhomboid excision including the post sacral fascia, taking care to remove all sinus tracts en bloc is done. A right or left sided fasciocutaneous transposition flap, incorporating the gluteal fascia, fully mobilized on its inferior edge and transposed medially to fulfill the rhomboid defect without tension (Figure 6-8). The skin was closed with skin staples absorbable sutures, to include fascia and fat, were placed over a 14 fr suction drain and skin was closed with interrupted non absorbable monofilament sutures.

Statistical analysis

Results on continuous measurements were presented on Mean±SD and results on categorical measurements were presented in number (%). Significance was assessed at 5% level of significance ($p<0.05$). Student t-test (two tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (inter group analysis) on metric parameters. Chi-square/Fisher Exact test was used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

D-shaped asymmetric exciosion was carried out in 25 (50%) of 50 patients and Limberg flap reconstruction was carried out 25 (50%) of 50 patients with pilonidal sinus disease (Table 1).

Table 1: Demographic and clinical characteristics.

Variables	Treatment group		P value
	D-shaped	Limberg	
Age (years) (mean±SD)	32.24±9.84	28.92±8.15	0.2
Gender (male/female)	22/3	22/3	1.0
BMI (mean±SD)	22.95±1.66	23.02±1.72	0.888
Duration of symptoms	26.64±19.30	24.48±15.52	0.665
Pain N (%)	15 (60)	16 (64)	0.771
Discharge N (%)	21 (84)	20 (80)	1.000
Swelling N (%)	2 (8)	3 (12)	1.000

The mean age of presentation in group 1 was 32.24±9.84 and group 2 was 28.92±8.15. 22 males and 3 females were studies in each group. The mean basal metabolic rate (BMI) and duration of symptoms between group 1 and group 2 were (22.95±1.66/ 23.02±1.72) and (26.64±19.30/24.48±15.52), which were not statistically significant. Discharge was the most predominate symptom in both the groups followed by pain and swelling, but none of them were statistically significant. There was significant difference between group 1 and group 2 (Table 2) with respect to operation time (mean: 40.20±3.19 minand 49.24±3.76 min, $p<0.001$), blood loss (mean: 45.64±2.93 ml and 61.04±3.34 ml, $p<0.001$). Visual analog scale (VAS) score was evaluated on postoperative day 15 and 30. On postoperative day 15, VAS score was 2.52±0.77 in group 1 and 3.12±0.97 in group 2. On day 30, VAS score was 1.56±0.77 in group 1 and 2.16±0.94 in group 2, and the differences were statistically significant. The post operative complications

(Table 3) were not significant between the two groups, two patients had seroma in group 1 and 4 patients in group 2 (8% and 16%, p=0.6), three patients had infection in group 1 and 4 patients in group 2 (12% and 16%, p=1.0). One patient had dehiscence in group 1 and 2 patients in group 2 (4% and 8%, p=1.0). One patient had flap necrosis in group 1 and 2 patients in group 2 (4% and 8%, p=1.0). In group 1 the mean duration to return to work was 11.52±2.66 and in group 2 it was 12.52±3.43, which was not significant.

Table 2: Operative and post operative characteristics studies.

Parameters (mean±SD)	Treatment group		Total
	D-shaped	Limberg	
Operative time	40.20±3.19	49.24±3.76	<0.001
Blood loss	45.64±2.93	61.04±3.34	<0.001
POD 15	2.52±0.77	3.12±0.97	0.019
POD 30	1.56±0.77	2.16±0.94	0.017

Table 3: Post-operative complications (n=25).

Complications	Treatment group		P value
	D-shaped N (%)	Limberg N (%)	
Infection	3 (12)	4 (16)	1.000
Seroma	2 (8)	4 (16)	0.667
Dehiscence	1 (4)	2 (8)	1.000
Flap necrosis	1 (4)	2 (8)	1.000

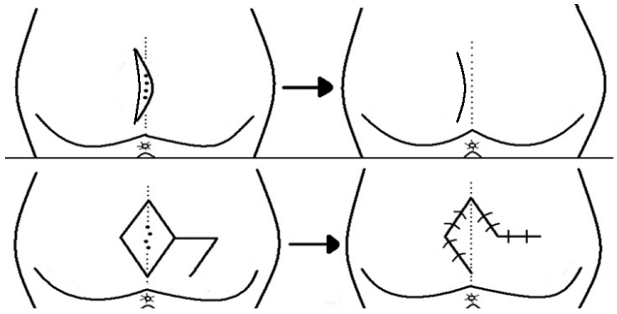

Figure 1: diagrammatic representation of D- shape asymmetric excision (upper) and Limberg flap (lower) surgery.

DISCUSSION

Sacrococcygeal pilonidal disease affects mainly young adults after puberty and occurs predominantly in men.[7] There is still no consensus about the best treatment of pilonidal sinus disease. Therapy should ideally be associated with a short hospital stay, less postoperative pain, quick healing and early return to work, short term wound care and a low recurrence rate.[8] Several techniques have been reported so far but no technique fulfills all of these criteria. The most difficult complication after sinus excision is a persistently nonhealing midline wound.[9] Wide local excision with primary closure has been suggested by some authors because of shorter healing time, but it causes an increased incidence of recurrent disease, likely due to midline scar.[10,11]

Figure 2: Incision of D-shape asymmetric incision.

Figure 3: Incision deepened and tissue excised uptopresacral fascia.

Figure 4: Mucocutaneous flap raised and advanced.

Skin flaps to cover the sacral defect after wide excision have also been suggested. The rhomboid flap technique involves the creation of a flap to achieve primary closure and obliterate the deep natal cleft. This technique relocates hair follicles away from the midline and prevents the frictional forces in the natal cleft. Initially reserved for difficult or recurring pilonidal disease not responding to basic conservative operational methods, the rhomboid flap procedure has since been suggested as first-line surgery of chronic sacrococcygeal pilonidal

disease.[12] Conversely, some authors have reported no clear benefit for surgical management by Limberg flap or primary closure.[9]

Figure 5: wound closed in layers after placing a drain.

Figure 6: Incision of Limberg flap marked.

Figure 7: Rhomboid excision of the diseased tissue followed by preparation of the flap on the gluteal area and transposition of the flap.

Asymmetric excision of the sinus was first described by Karydakis as an eccentric elliptical incision with a flap mobilization from the medial side of wound and closure to 1 side of the midline. This technique keeps the incision away from the natal cleft, previously flattened to reduce buttock friction.[9,13] In this study, a combination of a D-shaped asymmetric excision, suction drains, and primary multilayer closure resulted in the effective surgical treatment of sacrococcygeal pilonidal disease, providing roughly comparable intra- operative and postoperative results with those of symmetric excision. The mean operative time was significantly low in the patients who underwent D- shaped surgery when compared to Limberg flap in our study, which was comparable to the study done by Limongelli et al and Ates et al.[14,15]

Figure 8: Wound closed in layers over a drain.

The mean blood loss and mean post operative pain was significantly low is the patients who underwent D-shaped surgery when compared to Limberg flap which shows that asymmetric excision fares better in theses aspects. The mean post operation pain is significantly lesser in D-shaped surgery when compared to study conducted by Ates et al.[15] Our findings are in line with a literature review that found that off-midline closure should be the considered as one of the standard managements when primary closure is the desired surgical option. D shaped asymmetric excision and primary closure procedure is a safe treatment alternative for the surgical treatment of sacrococcygeal pilonidal sinus disease because of associated low blood loss, operation time and post operative pain but the complication rate was similar to Limberg flap surgery which was comparable to Limongelli et al.[14] No recurrences were seen in our study owing to the fact that it was of a short duration, and recurrences usually occur at a later stage.

CONCLUSION

The D-shape procedure is an easier and safer treatment option when compared to Limberg flap for the surgical treatment of sacrococcygeal pilonidal sinus disease owing to the associated low complication rate, short duration to return to normal activity, faster healing, and a high patient satisfaction rate and an easier learning curve.

ACKNOWLEDGEMENTS

Authors would like to thanks Dr. S. P. Sharma for his valuble support during study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional EthicsCommittee

REFERENCES

1. Norman SW. The anus and anal canal. In: Bailey & Love's short practice of surgery. 26th ed. India: Arnold Publishers; 2013;73:1244-5.
2. Kosaka M, Kida M, Mori H, Kamiishi H. Pilonidal cyst of the scalp due to single minor trauma. Dermatologic Surg. 2007;33(4):505-7.
3. Aslam MN, Shoaib S, Choudhry AM. Use of Limberg flap for pilonidal sinus–a viable option. Journal of Ayub Medical College Abbottabad. 2009;21(4):31-3.
4. Fatih A, Enis D, Yusuf A, Taner O, Gokhan A, Nuri DO. Comparision of the Limberg flap with the VY flap technique in the treatment of pilonidal disease. Annl Surg Treat Res. 2013;85(2):63-7.
5. Mentes O, Bagci M, Bilgin T, Ozgul O, Ozdemir M. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. Langenbeck's Arch Surg. 2008;393(2):185-9.
6. Hodges RB. Limberg flap Suegrey. Med Surg J. 1946;103:485.
7. Spivak H, Brooks VL, Nussbaum M, Friedman I. Treatment of chronic pilonidal disease. Lancet. 1996; 39(10):1136-9.
8. Sharma PP. Multiple Z-plasty in pilonidal sinus-a new technique under local anesthesia. World J Surg. 2006;30(12):2261-5.
9. Muzi MG, Milito G, Cadeddu F, Nigro C, Andreoli F, Amabile D, et al. Randomized comparison of Limberg flap versus modified primary closure for the treatment of pilonidal disease. Am J Surg. 2010; 200(1):9-14.
10. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. Aust J Surg. 1992;62(5):385-9.
11. Anyanwu AC, Hossain S, Williams A, Montgomery AC. Karydakis operation for sacrococcygeal pilonidal sinus disease: experience in a district general hospital. Annl Royal College Surg Eng. 1998;80(3):197.
12. 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. British J Surg. 2005;92(9):1081-4.
13. 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(11):1928-34.
14. Limongelli P, Brusciano L, Di Stazio C, del Genio G, Tolone S, Lucido FS, et al. D-shape asymmetric and symmetric excision with primary closure in the treatment of sacrococcygeal pilonidal disease. Am J Surg. 2014;207(6):882-9.
15. Ates M, Dirican A, Sarac M, Aslan A, Colak C. Short and long-term results of the Karydakis flap versus the Limberg flap for treating pilonidal sinus disease: a prospective randomized study. Am J Surg. 2011; 202(5):568-73.

Cite this article as: Rajendra N, Karigowda V, Raju GH, Suresh N. D-shape asymmetric excision with primary closure versus limberg flap surgery for sacrococcygeal pilonidal sinus. Int Surg J 2021;8:3064-8.