International Surgery Journal
Khan N et al. Int Surg J. 2021 Feb;8(2):699-703
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20210388

Case Series

Is limberg flap better than excision and primary closure for treatment of sacrococcygeal pilonidal sinus: a prospective randomised study of 30 cases

Nida Khan[1]*, Pragati Singhal[2], Shantanu Chandrashekhar[1], Dipesh Goel[3], Khyati Patel, Nandini Deshpande

[1]Department of General Surgery, D.Y. Patil University, School of Medicine, Mumbai, Maharashtra, India
[2]Department of Surgical Oncology, Tata Medical Center, Kolkata, India
[3]Department of General Surgery, Columbia Asia Hospital, Patiala, Punjab, India
Consultant Anesthesiologist, Surat Institute of Medical Sciences, Ahmedabad, Gujarat, India
Department of Anesthesia and Palliative Care, Bhagwan Mahaveer Cancer Hospital and Research Centre, Jaipur, Rajasthan, India

Received: 16 November 2020
Revised: 11 January 2021
Accepted: 12 January 2021

***Correspondence:**
Dr. Nida Khan,
E-mail: khannida08@yahoo.com

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ABSTRACT

Sacrococcygeal pilonidal sinus is a common presentation to the office of both the General Surgeon and Coloproctologist. Over time various treatment modalities have evolved for the same. Older methods such as excision with or without closure have been associated with higher complications in the post-operative period, recurrence rates and hospital stay. Flap procedures have a longer operative period and a steep learning curve but a better overall post-operative course and lower recurrence rates. Our study was done to compare the outcomes of primary excision and closure to a Limberg flap for treatment of sacrococcygeal pilonidal sinus. The objective of the study was to determine whether Limberg flap was superior to excision and primary closure for treatment of pilonidal sinus. 30 patients presenting with chronic pilonidal sinus where randomly assigned to two groups of 15 patients each. Both the groups were compared in terms of age of presentation, sex prediliction, duration of surgery, post-operative resumption of work, complications and recurrence. We concluded that Limberg flap is superior to excision and primary closure for treatment of pilonidal sinus.

Keywords: Pilonidal sinus, Sacrococcygeal pilonidal sinus, Limberg flap, Bascom procedure, Karyadakis procedure

INTRODUCTION

Pilonidal sinuses are a rather common affliction of the anorectum, with an incidence of 26 cases per 100,000. Men tend to be affected more often than women because of their hirsute nature.[1,2] Obesity, sedentary lifestyle and local irritation have been associated with it.[3] It is also referred to as 'Jeep Disease' as it was seen among Jeep drivers during Second World War.[4] Patients may present with an acute or recurrent abscess or a chronic sinus tract. Presentation may vary from asymptomatic pits to painful lesions. Many methods have been described for the treatment of pilonidal sinus. Conservative techniques such as phenol injection have a high failure rate.[5] Surgical options include simple incision and drainage, excision and unroofing, excision with primary closure and flap procedures such as Bascom cleft lift, Karyadakis procedure and Limberg/modified Limberg flap.[6] There has been no conclusive evidence to prove that any one method is suprior over the others.

CASE SERIES

Study design

Total 30 patients presenting with sacrococcygeal pilonidal sinus were assigned to two groups- group 1: patients who underwent excision and primary closure, group 2: patients who underwent excision and closure with a Limberg Flap.

Study period

Study period was June 2017 to June 2019.

Statistical analysis

Chi square test and Mann Whitney U test, with p value of <0.01

Sample size

Sample size was 30 patients.

Inclusion criteria

Inclusion criteria was patients presenting with chronic sacrococcygeal sinus.

Exclusion criteria

Exclusion criteria were 1) infected cases 2) secondary opening more than 2 cm from primary opening.

All patients were operated under spinal anesthesia in jack knife position. Methylene blue was injected in the sinus to mark the course and track extensions. Patients in Group 1 had an elliptical and vertical incision that was deepened up to sacrococcygeal fascia and excision was done. Suction drain was kept in situ and primary closure was done. For group B, Rhomboid was marked on the skin around the pilonidal sinus with all sides of equal length. Excision of rhomboid, followed by rotation of marked flap to excised area, and closure with interrupted sutures after keeping a suction drain in situ was done.

RESULTS

Group 1 had 15 patients, out of which 2 were females whereas 13 were males. Group 2 had 15 patients out of which 1 was female and 14 were males. The duration of surgery, post-operative day of drain removal, day of return to work, presence of post-operative wound infection and maceration were compared. Sutures were removed on post-operative day 10. Patients were followed up for six months to look for any recurrence.

The duration of surgery was longer in group 1 compared to group 2, however patients in group 1 returned to work earlier and had lower incidence of post-operative infection, wound maceration and recurrence.

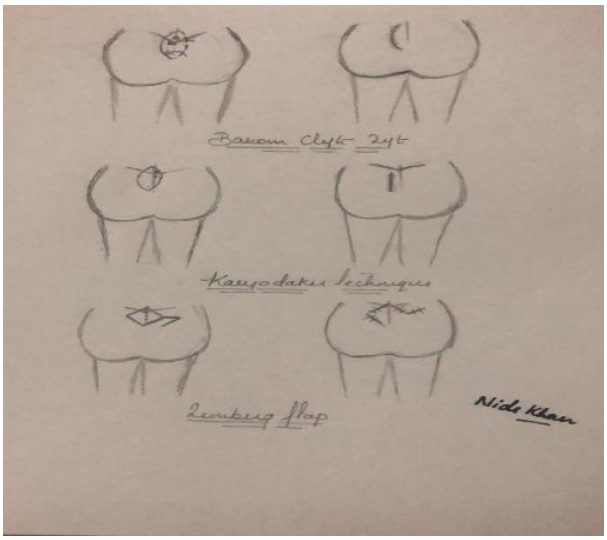

Figure 1: Comparision of various flap procedures.

Figure 2: Pre-operative image of pilonidal sinus.

Figure 3: Limberg flap preoperative skin marking.

Table 1: Excision an primary closure and Limberg flap.

Variables	Group 1 (excision an primary closure)	Group 2 (excision and Limberg flap)	P value
Duration of surgery	45 minutes	90 minutes	<0.0001*
Return to work on POD	8	14	<0.0001*
Post-operative infection	6	3	0.23#
Post-operative Maceration	1	2	0.54#
Recurrence(6 months follow up)	4	1	0.14#

#- Chi square test, *- Mann Whitney U test

Figure 4: Excision of rhombus.

Figure 5: Transposition of Limberg flap.

Figure 6: Post-operative picture.

DISCUSSION

The term pilonidal sinus refers to one or more midline openings that connect with a fibrous track lined by granulation tissue, with hair contained loosely within the lumen and in the region of the natal cleft overlying the coccyx.[6] This condition was initially described over a century ago, first being reported by Anderson in 1847 in his paper titled, 'Hair extracted from an ulcer'.[7] It was further described by Warren in 1854 in 'abscess containing hair on the nates'.[8] However, it was not until 1880 that the term 'pilonidal sinus' was coined by Hodges. In the nineteenth century, numerous theories concerning the origin of a pilonidal sinus were postulated. These included, Fere's theory of fault of development, theory of cystic remnant of medullary canal by the likes of Tourneaux and Hermann (1887), Mallory (1892) and Gage (1935) among others. Some other opinions included ideas such as faulty development of median raphe leading to dermal inclusions which later become pilonidal cysts and later sinuses which was put forward by Fox (1935) and Lannelongue (1882). Alternative hypotheisis such as Stone's (1931) theory of pilonidal sinuses being homologous to vestigeal structure, preen gland in birds or a vestigeal sex gland as described by Kallet (1936) were also put forward.9. Over the years it was debated whether it is a congenital or aquired sinus. However, the work of Georgios Karyadakis shifted the concept to an aquired one. Karyadakis highlighted three causative factors, loose hair, external factor and underlying vulnerability of natal cleft skin that are responsible for the emergence of a pilonidal sinus.[10] This is the most widely accepted explanation for etiology and pathogenesis of pilonidal sinus. Pilonidal sinuses are also found in other locations such as interdigital area, axilla and umbilicus. It is a disease of hairy men, with peak incidence in 2nd and 3rd decade. The hair projecting from the sinus are dead hairs with their pointed end directed towards the blind end of the sinus.[11] Combination of buttock friction and shearing forces allow shed hair or broken hair to drill through the midline skin or in infection in relation to hair follicle enters the skin by suction created by movement of buttocks, thereby creating a subcutaneous, chronically inflammed, midline track. Patients present with pain, swelling and intermittent discharge at the base of the spine or repeated abscesses at said site. Rarely patient may present with squamous cell carcinoma.[12] Various treatment modalities have been described for pilonidal sinus including wide

excision without closure, wide excision with closure, Bascom procedure, Limberg technique, Karyadakis technique among others. An ideal procedure must have less hospital stay, early resumption of daily activities and work and low complication and recurrence rate. It is largely believed that lateral approach gives best results.[13] Earlier surgeons used the technique of marsupalisation of edges of the wound to decrease wound size and healing time, however the wound lasted for 4-5 weeks and the technique was largely abandoned.[14] In Bascom's procedure also known as Bascom's asymmetrical cleft lift technique, incision is taken lateral to midline to gain access to sinus cavity which is rid of hair and granulation tissue with excision and closure of midline pits and lateral wound is left open.[15] Methods designed to avoid midline closure include Karyadakis procedure and Limberg Flap. Patients with chronic pilonidal sinus are believed to be better candidates for a flap procedure. Karyadakis technique consist of an asymmetric elliptical excision of affected area, with upper and lower poles of ellipse placed 2 cm to the side of midline. This is followed by full thickness mobilisation of contralateral surgical margin and fixation of base of flap to sacral fascia with skin edge sutured off midline. Modified Karyadakis technique doesn't require fixation of sacral fascia.[16] Limberg flap on the other hand is a symmetrical rhomboid with its apices on the midline.[17] It consist of a rhomboid shaped excision of affected area, down to the sacral fascia with the creation of fasciocutaneous flap that can be transposed to cover the defect without any tension. Professor Limberg of Leningrad designed the rhombus flap.[18] He described a parallelogram of two angles measuring 120 degrees and two angles measuring 60 degrees. All sides of the parallelogram are equal in size. Base of the flap is adjacent to the defect and it is closed directly. Flap survival depends on two factors, blood supply at the base of the flap and the growth of new vascular channels between flap and recipient wound bed. Neovascularisation typically occurs 3-7 days after flap transfer, before which flap is supplied by perfusion pressure from base of flap and imbibition of nutrients from wound bed.[19] Adequate laxity of the flap and a proper evaluation of relaxed skin tension line are essential to maximize scar camouflage and minimize tension during closure.[20] Studies have favored rhomboid excision with Limberg flap for recurrent cases and extensive involvement.[21] A metanalysis by Gavriilidis et al found no significant difference in the comparative surgical outcome of Limberg flap vs Karyadakis procedure in the treatment of Sacrococcygeal pilonidal sinus.[22] A study by Ersoy et al found higher infection rates with Karydakis procedure compared to Limberg flap.[23] Another study by Arslan et all found lower complication and recurrence rates in patients with Limberg and modified Limberg flap compared to Karyadakis procedure.[24] Karyadakis also has limited application when the orifice is laterally situated.[25] In the recent years, Endoscopic pilonidal sinus treatment using a Meinero fistuloscope has shown favorable results.[26]

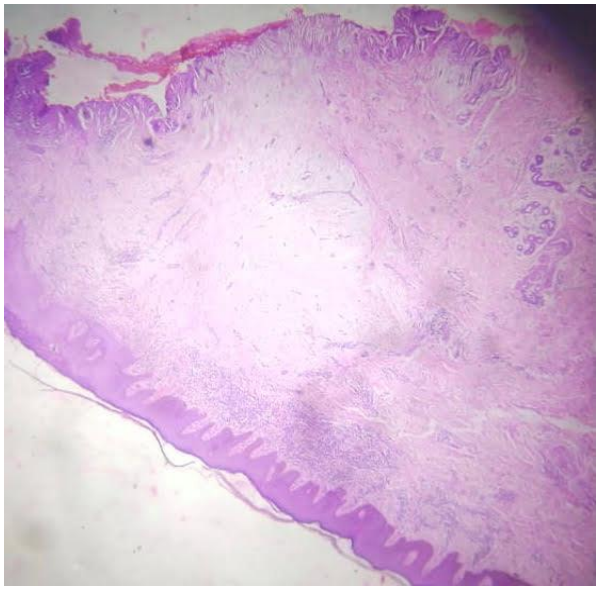

Figure 7: Tract lined by keratinized stratified squamous epithelium.

In our observation, although Limberg flap had a longer operative period compared to primary excision and closure, it had shorter hospital stay and wound related complications. Similar results were seen by Muzi et al and also by Acka et al.[27,28]

Limitations

Sample size being relatively small, significance of association between the results could not be appreciated. We would like to continue this study and compare the data for a larger sample size.

CONCLUSION

Excision with Limberg flap construction has a shorter hospital stay, post-operative complication and recurrence rate compared to excision and primary closure for treatment of sacrococcygeal pilonidal sinus.

ACKNOWLEDGMENTS

The Author would like to acknowledge Dr Vibhuti Kumar, Junior Resident, Department of Pathology, Dr D.Y. Patil University, School of Medicine for providing Histopathology Image.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Khan N, Singhal P, Chandrashekhar S, Goel D, Patel K, Deshpande N. Is limberg flap better than excision and primary closure for treatment of sacrococcygeal pilonidal sinus: a prospective randomised study of 30 cases. Int Surg J 2021;8:699-703.