



Review of management of sacro-coccygeal pilonidal sinus by Limberg flap – A prospective study

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ABSTRACT

Introduction: Sacro-Coccygeal Pilonidal Sinus (SCPS)¹ is a common affliction seen mostly in young slightly obese hirsute males. There are many ways to manage this, most commonly being excision and leaving a raw area to heal by secondary intention. This procedure necessitates long periods of dressing which causes much distress and inconvenience to patients. Also, this method does not address to one of the basic causes of the Sacro-coccygeal pilonidal sinus (SCPS) which is the suction effect of a deep natal cleft. The other procedures are difficult to master and have their own set of issues for successful management.

Methods: This was a prospective study was carried out in the Department of Surgery of a secondary care government hospital for a period of 18 months (July 2016 to December 2017). The total number of cases of SCPS surgery was 50.

Here the focus is on the management of SCPS by complete excision of infected tissue and on table primary coverage of defect using a Limberg flap with a follow up for 12 months.

Results: Of the 50 patients operated there was a seroma, wound infection and partial necrosis of flap in 13 patients. However, there was no recurrence. When the wound was large and wound infections too were common in large wounds > 6cms transversely and 7cms vertically.

Conclusions: SCPS disease can easily be managed by rhomboid excision and reconstruction by Limberg flap as it addresses the cause of sinus and has low complication rates, short hospitalization, no recurrence rates, earlier healing and shorter time off work. The surgery can be easily mastered. However the dimensions of defect must be < 6cms, the lower end should be away from anal verge and preoperatively the sinus must be lavaged to have low infection rates and flap tip necrosis. We recommend Limberg flap as preferred surgery for cases of Sacro-coccygeal Pilonidal sinus.

Keywords: Sacro-coccygeal pilonidal sinus, Limberg flap.

1. INTRODUCTION

Pilonidal Sinus is a common affliction. It is most frequently seen in the sacrococcygeal region. However, it has also been described in the axilla, suprapubic area, periumbilical zone and between the fingers of the hand in the barbers.²⁻³ Why Pilonidal sinus is seen in areas other than sacrococcygeal region is still not known.

SCPS usually presents as a cyst, abscess, or multiple sinus tracts with or without a discharge in the natal cleft. In about 60% of the cases hair, tufts are seen. Important predisposing factors for the development of SCPS are the existence of pilonidal pits, a deep natal cleft with the suction action of buttocks and the presence of hair. A deep natal cleft is a favorable environment for sweating, maceration, bacterial contamination, and penetration of hairs⁴. Hence any successful management of SCPS must address to these issues. Male gender, obesity, smoking, a family tendency, poor body hygiene, sinus size, and the surgical procedures performed are other factors which influence the outcome.

There are many ways to manage this, most commonly being excision and leaving a raw area to heal by secondary intention. This procedure necessitates long periods of dressing which causes much distress and inconvenience to patients. Also, this method does not address one of the basic causes of SCPS which is the suction effect of a deep natal cleft. The other procedures are difficult to master and have their own set of issues for successful management⁵.

2. AIM

This study looks in detail the management of Sacro-coccygeal Pilonidal sinus by Excision of sinus and reconstruction by Limberg flap prospectively. It also aims to study the procedure in relation to the size of the wound to be closed and its relation to complications such as pain, wound infection, flap necrosis, and recurrence with time to return to work and study factors which can reduce complication rates

3. MATERIALS AND METHODS

This study was carried out in the Department of Surgery of a secondary care government hospital for a period of 18 months (July 2016 to December 2017). The total number of cases of SCPS surgery was 50.

Primary outcomes studied included

- Operative time
- Post-op pain severity by Wong Baker Faces pain rating scale
- The rate of surgical site infection (SSI)
- Wound dehiscence
- Time to wound healing (Full epithelialisation (healing) of the wound was considered as the definition of wound healing).
- Length of hospital stay

And Secondary outcomes included

- Time to return to work (RTW)
- Rate of recurrence
- Quality of life
- Participant (patient) satisfaction

Participants were anyone over 14 years of age undergoing surgery to treat pilonidal sinus disease. No distinction was made between new (initial presentation of the disease) and recurrent presentation of pilonidal sinus disease

All patients were offered this surgery after counseling and obtaining a full informed consent.

Patients with florid infection were managed by lavage of the sinus with normal saline after taking pus for culture and sensitivity.

Surgery was performed under Spinal anaesthesia. Patients were placed in prone position with buttocks strapped after applying tincture benzoin to open up the natal cleft. After standard preparation of skin and draping, the area to be excised marked. A Rhomboid incision was made to the sinus and all its openings making sure to take all indurated portion of the skin. The incision was made till the presacral / gluteal fascia.

A Limberg flap was planned by constructing first by drawing a line A–C and its length measured. C should be adjacent to the perianal skin, and A is placed so that all diseased tissue can be included in the excision. The line B–D transects the midpoint of A–C at right-angles and is 60 per cent of its length. It is this ratio of lengths which determines the correct shape to the rhomboid. The flap is planned so that D–E is a direct continuation of the line B–D and is of equal length to the incision B–A to which it will be sutured after rotation. E–F is parallel to D–C, and of equal length. After rotation, it will be sutured to A–D.

The incision laterally was down to the fascia of the gluteus maximus muscle (making sure that side $AB = DE$, $AD = EF$ and $BC = DC$) (Figure 1). Haemostasis is secured. The flap is transposed bringing DE to AB / CD to BC / EF to AD to cover the rhomboid defect created by excision of the sinus. A suction drain 20 F is placed in the wound cavity through a separate stab incision. Subcutaneous tissue is approximated with interrupted polyglactin 3-0 suture. The skin is closed with interrupted nylon 2-0 suture (Figure 3). The drain is removed after 24–48 hours. The patient is encouraged to sleep in the supine position to put pressure on the flap and negate any dead space and seroma formation Sutures are removed on the 12th–14th POD.

Limberg flap was constructed as shown below

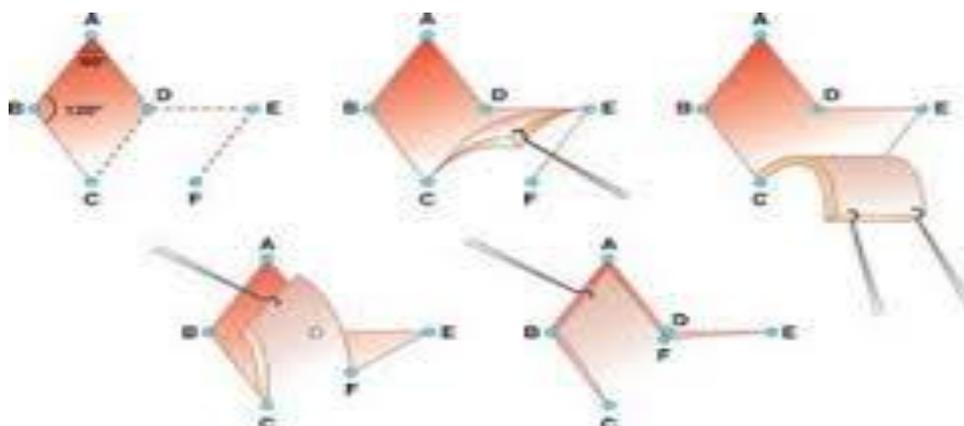


Figure 1 (courtesy www.slideshare.net/ShamendraSahu/basic-principles-of-local-flap)

Postoperatively patients' are advised to maintain local hygiene and to rub coconut oil after stitch removal to keep the stitch line supple. Patients were followed up in OPD monthly for 6 months (42 patients) to 1 year (27 patients). 8 patients were lost to follow up after 2 to 6 weeks. Abstinence from intercourse was advised for 2 weeks

Intra and post op features as noted in primary outcome while features of secondary outcome were noted on follow up

4. RESULTS

50 patients of SCPS were operated for 18 months by rhomboid excision and repair by Limberg flap.

Of the 50 patients, there were 45 males (90%) and 5 females (10%). The mean age of presentation was 26 years (range 16–37 years) of which mean age of presentation in men was 24 and females was 30 years. The mean age of presentation is 21 and 19 years in men and women respectively in a study by Notaro 2003 [5]

20 patients presented with recurrent sinus (40%). 49 patients (98%) presented with discharge, 35(70%) presented with pain, 15 (30%) with infection, in 10 (20%) patients hair could be seen protruding from the sinus and 5 (10%) with pilonidal abscess and fever.

Table for Bacteriology of pus culture

Organism	No	Mixed growth	No
Pure growth		With anaerobes	20
Anaerobes	7	Without anaerobes	6
E. coli	5		
Staphylococcus aureus	5		
Proteus	3		
B3-haemolytic streptococci	2		
Pseudomonas	1		

Presenting Symptoms	No of Patients
Pain when sitting or standing	35 (70%)
Pilonidal abscess	15 (30%)
Reddened, the sore skin around the area	44 (88%)
Pus or blood draining from the abscess, causing a foul smell	49 (98%)
Hair protruding from the lesion	20 (40%)
Recurrent Sinus	20 (40%)
Fever	5 (10%)

Early operative Data	Excision and repair using Limberg flaps (50 patients)
Operative time (incision to closure)	45–75 minutes (Avg. 60 mins)
Drain removal	48–72 hours (Avg. 48 hrs)
The average size of length & breadth of rhomboid	5.5 cms x 4 cms
Post op Pain as per Wong Baker Faces pain rating scale	4 to 6 (Avg. 5.5)
Pain and discomfort while sitting	15 (Avg. 30 %)
Time to walk without pain	2 to 4 days (Avg. 3 days)
Hospital stay	24 to 48 hrs (Avg. 30 hrs)
Surgical site infection	6 (12%)
Wound Dehiscence	3 (6%)
Healing (removal of stitches)	12 – 14 days
Late complications	

Time to return to work	7 to 30 days (Avg. 12 days)
Recurrence	0
Patient satisfaction	Satisfied 47 (94%) Not Satisfied 3 (6%)

Postoperative complications

All patients tolerated the procedure well with minimal postoperative discomfort and were discharged in 24 – 72 hours depending on when the drain was removed.

Of 50 cases of Limberg flap repair in 4 (8%) case the drain was removed 24 hours after surgery and 4 patients subsequently developed a serous collection after 24 hours after removal of the drain. In one case this seroma drained spontaneously from a suture site without compromising the flap. This resulted in gaping of the wound in a small area which healed spontaneously. The other 3 patients developed seroma 3 days after discharge from hospital which was aspirated without any consequences.

There was an infection in 6 (12%) patients. Of this 3 patients were managed by local hygiene and antibiotic ointment application locally while in 2 patients infection resulted in partial (about 50%) necrosis of the flap. This was managed by vigorous dressing and wound left to heal by secondary intention

Blackening of the tip was seen in 3 (6%) patients where it was excised and left to heal by secondary intention.

All 13 patients who developed some form of complication (4 seroma, 6 infections, 3 tip necrosis) had an average size of rhomboid > 6cms x 5.5.cms.

There were 7 (14%) cases of the hypertrophied scar with itching but this improved with local steroid ointment and coconut oil application

In this study, there were no recurrences till 6months follow up.

Clinical outcomes	Days
Time off-work	10 – 20 days
Time to walk without pain	2 to 4 days (Avg. 3 days)

Comparison between other studies and this study when SCPS managed by Limberg flap

Author/s	Patients (no.)	Hospital stay (days)	Complication (%)	Recurrence (%)
Katsoulis et al. ⁶	25	4.0	16	-
Akin et al. ⁷	411	3.2	15.75	2.91
Urhan et al. ⁸	102	3.7	7	4.9
Mentes et al. ⁹	238	2–3	2	1.26
Aslam et al. ¹⁰	110	3.0	5	1
El-khadrawy ¹¹	40	5–11	40	10
Jethwani et al ¹²	67	2–3	11.94	1.49
Vijaykumar et al ¹³	52	2-3 days	11.4%	0
This study	50	2 – 4 days	13 (13 of 50)	0

5. DISCUSSION

There are many theories regarding the formation of Sacrococcygeal Pilonidal sinus is debatable. Some believe it begins as a congenital pilonidal dimple or pits which are present in some individuals at the top of the crease between the buttocks, about 5-9 cm from the anal orifice or may be an acquired condition beginning with rupture of a hair follicle in the dermis of sacrococcygeal region¹⁴. These people are potential candidates for pilonidal sinus disease. Why this happens at that location more than other locations, and what predisposes certain people (male sex, a second or third decade of life, hirsute habitus, Mediterranean skin type) to develop pilonidal sinus is unclear¹⁵

At adolescence, the pits or dimples enlarge and became wide enough to create a portal of entry for cellular debris or free hairs. Loose hairs are drilled and sucked into these pilonidal pits by friction and movement of the buttocks which create a suction whenever a patient stands or sits.

Hair enters tip first and the barbs on the hair prevent it from being expelled so that the hair becomes entrapped. This trapped hair stimulates a foreign body reaction, infection and abscess formation later leading to discharging sinus.

As believed by Karydak¹⁶ three factors have to present to initiate this condition

- Presence of Pilonidal dimples or pits making the skin vulnerable to insertion of the skin
- Deep natal cleft which causes a suction force
- Presence of an 'invader' (hair / cellular debris)

Any treatment which addresses the above three factors will be successful. As the amount of hair cannot be dealt with easily by the surgeon the only options left are to remove the Pilonidal dimples meticulously and close the wound in such a manner so as to make the cleft shallow. (Basscomm)¹⁷⁻¹⁸

Azab¹⁷ first adopted this trans positional flap for the treatment of pilonidal sinus disease.

17 studies compared open wound healing with surgical closure. Healing times were faster after surgical closure compared with open healing. Surgical site infection (SSI) rates did not differ between treatments; recurrence rates were lower in open healing than with primary closure (RR 0.60, 95% CI 0.42 to 0.87)²⁰.

Six studies compared surgical midline with off-midline closure. Healing times were faster after off-midline closure (MD 5.4 days, 95% CI 2.3 to 8.5). SSI rates were higher after midline closure (RR 3.72, 95% CI 1.86 to 7.42) and recurrence rates were higher after midline closure (Peto OR 4.54, 95% CI 2.30 to 8.96).²¹

Karydak¹⁶ attributed the extremely low recurrence rate of 1% of his surgery to two facts. These are:

- the whole wound is placed away from the midline (recurrences always occur in the midline)
- the resulting new natal cleft is shallower (so hairs do not collect so readily and suction pressure of buttocks is absent)

Recurrence is the main problem associated with all surgeries described which ranged from 21.4% to 100% for incision and drainage, 5.5%–33% for excision and open packing, 8% for marsupialisation, 3.3%–11% for Z plasty²². Flap techniques have been associated with lower complication and recurrence rates. With the Limberg flap technique, the natal cleft can be flattened and this eliminates the 'suction' capability of buttocks preventing hairs from being sucked into the natal cleft.

In this study, 50 patients with sacrococcygeal pilonidal disease were managed with rhomboid excision and Limberg flap reconstruction. Recurrence was nil (0%). Akin et al.⁷ operated on 411 patients and reported recurrence rates of 2.91%, so our results were better than theirs.

Seromas, wound infection and flap tip necrosis was seen in 13 patients (26%), which may be due to inadequate excision of infected tissue, the large size of rhomboid defect (> 6cms) and preoperative local wound infection, Systemic disease such as diabetes may also have contributed to this. El-khadrawy^[11] operated on 40 patients and had superficial necrosis at the tip of the flap in four patients (10%). Time off-work in our study patients was 12–22 days. This was similar to that reported by Abu Galala et al.^[23].

6. CONCLUSION

A Limberg flap meets the entire requirement for being the ideal procedure for sacrococcygeal pilonidal sinus.

The advantages of Limberg flap reconstruction are:

- Flattens the natal cleft with a large well-vascularised pedicle that can be sutured without tension.
- Midline dead space and scar is avoided.
- Useful in complex sinuses with multiple pits where radical excision leaves large defect.
- Easy to perform, learn and design.
- Useful in recurrent pilonidal disease.
- Reduces hospital stay and time to resume normal activities.
- Healing time is 2 weeks compared to 3 to 8 weeks for other methods

Complications such as seroma can be avoided by reducing dead space and making the patient sleep in a supine position so that there is no space for a collection of discharge.

Wound infection can be managed by pre-operative lavage of sinus, preoperative optimization of blood sugar and meticulous removal of all infected tissue. Wounds with vertical lengths >7cms usually lay close to the anal margin hence prone to contamination and infection.

Necrosis of flap tip was seen in wounds >6cms, This may be due to long flap length or tension on the flap and can be reduced by proper mobilization of the flap and preoperative counseling that large wounds and flaps may be prone to this complication.

Early recurrence is usually due to failure to identify one or more sinuses during surgery.

Late recurrence is usually due to secondary infection caused by residual hair or debris in the pilonidal dimple that was not removed at operation, as well as inadequate wound care or insufficient attention to depilation and most importantly large defects (>6cms). [19]

Excision and primary closure was associated with a short healing time and shorter hospital stay but the stitch line was under tension and this did not eliminate the suction effect of buttocks into the natal cleft hence higher incidence of recurrence approximately 5 to 7%

The results of this study favor rhomboid excision and Limberg flap reconstruction for pilonidal disease.

Conflict of Interest: None to disclose

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