



A Comparison of the Excision Procedure and Flap Repair for the Pilonidal Sinus

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ABSTRACT

BACKGROUND:

The sacrococcygeal region is where a pilonidal sinus (PNS), a tiny opening in the subcutaneous tissue, most frequently forms. Making the optimum surgical treatment choice for PNS in terms of postoperative results is still difficult for a surgeon. The main objectives of treatment might be categorised as preventing the disease from returning and enhancing quality of life. It is regarded as an acquired lesion, and numerous hypotheses exist about its aetiology and pathogenesis. The main risk factors are a deep birth cleft, poor cleanliness, high hairiness, and local trauma in the sacrococcygeal area. The hair shafts that are shed when walking are forced into the skin abrasions in the gluteal sulcus. The formation of an acute or persistently infected location is caused by these hair shafts, which behave as a foreign body. The intergluteal sulcus is moist and fragile in obese patients, and this process is more apparent.

AIM: This study compared different surgical and postsurgical problems in pilonidal sinus treated with broad excision and Limberg flap repair techniques.

MATERIAL AND METHOD:

In the Surgery Department, the study has been carried out. 35 patients made up the experimental group, who received primary closure of the pilonidal sinus utilising the Limberg flap technique, and 35 patients made up the control group, who underwent excision of the pilonidal sinus with primary closure only. To be determined appropriate for inclusion in this study, each case underwent a thorough examination and investigation. Patients were informed of the nature of surgical operations before giving their consent. Under spinal anaesthesia, every procedure was carried out. The research group had primary closure using the Limberg flap technique while the control group simply underwent excision with primary closure.

RESULTS:

The operative time period for the two procedures; was a mean of 39.4 ± 4.5 (range 30-42) minutes for the Limberg flap procedure against a mean of 27.97 ± 4.08 (range 20-30) minutes for primary midline closure. Infection at the stitch line occurs in a total of 12 patients out of which 1 patient is from the study group and patients are from the control group. This means infection at stitch line comparison was statistically significant. Seroma formations occur in a total of 10 patients out of which 1 patient is from the study group and patients are from the control group. This means seroma formation comparison was statistically significant. Wound dehiscence occurred in a total of 11 patients out of which 1 patient is from the study group and patients are from the control group. Means wound dehiscence comparison was statistically significant

CONCLUSION:

With particular emphasis on operating time, postoperative problems, hospital stay, and recurrence, the current study was created to compare the results of the two distinct approaches of pilonidal sinus surgical excision with primary closure and Limberg flap. While more research with a bigger volume sample and longer follow-up is required, we advise the Limberg flap approach for primary pilonidal illness due to its reduced morbidity rates compared to primary closure. Pilonidal sinus condition can be effectively treated with the Limberg flap technique.

KEYWORDS: Limberg flap, Pilonidal sinus, Visual analog scale, Direct suture, Surgical flaps

INTRODUCTION

The term "pilonidal sinus" refers to a condition that develops in the natal cleft that covers the coccyx and consists of one or more, typically non-infected, midline openings that connect to a fibrous track that is lined with granulation tissue and has hair that is loosely positioned within the lumen. It has been called "jeep sickness." The term "pilonidal," which derives from the Latin words for hair (pilus) and nest (nidus), was first used by Hodge in 1880, even though Herbert Mayo initially characterised the illness in 1883.¹ An environment that is conducive to perspiration, maceration, bacterial contamination, and hair penetration is a deep natal cleft. Therefore, these contributing elements need to be removed for both therapy and prevention.² Men are affected twice as frequently as women by the estimated incidence of 26 per 100000 people.³ Due to the impact of sex hormones on pilosebaceous glands and alterations in the growth of healthy body hair, it is more prevalent in people aged 15 to 30 years following puberty.⁴ Young people are most commonly affected by the acquired ailment known as pilonidal sinus. On the basis of the high rate of recurrences and the sporadic emergence of the disease in other parts of the body (inter-digital folds in the barber's hand), Patey and Scarff established the idea of an acquired disease not long after the Second World War.⁵⁻⁶ The hair causes an inflammatory reaction that leads to abscess formation, subsequent infection, and prolonged sinus and tract drainage.⁷ The fact that the illness is acquired and brought on by local trauma, poor cleanliness, excessive hairiness, or the presence of a deep natal cleft is now universally accepted.⁸ Males, people in their early 20s, people who are overweight or hirsute, people who are young, and people with a favourable family history are more prone to develop this benign condition.⁹ The condition affects Caucasians more frequently than Asians or Africans because of differences in hair characteristics and growth patterns.¹⁰ Some specialists believe that congenital pilonidal dimples may contribute to PNS. Under a microscope, the visible pits in the middle of natal clefts that are indicative of pilonidal illness resemble bigger hair follicles. Gravity pulling on the buttocks causes the follicular openings to stretch, which causes the enlargement. Excessive sweating may also contribute to PNS development. Stretched hair follicles that are filled with moisture can produce a low-oxygen environment that promotes the growth of anaerobic bacteria, which are widespread in the PNS. Low oxygen levels and bacteria speed up the

development of the PNS and delay wound healing.¹¹

After primary excision, the surgical wound may be left open to heal or may be initially closed to heal (primary intention).^{12,13} However, the incision frequently occurs in a deep midline cleft where there is tension and a propensity for hair to accumulate. The advancement flap, local advancement flap, and rotational flap are some of the 12 skin flap procedures that are accessible.^{14,15} Rare are the well-designed, randomised, controlled, prospective studies contrasting various approaches for this pathology.¹⁶ The major goal of treatment is to prevent recurrence and produce the least amount of perioperative morbidity, thus they are crucial for the surgeon to decide how to treat the condition. The recurrence rate in the Limberg flap group, however, was lower than the recurrence rate in the other flap techniques, and it provides a more effective flattening of the natal cleft, including the most inferior part that is inclined to invert towards the anal region. Lateralization of the inferior apex of the classic Limberg flap also reduces the possibility of recurrence in the inferior midline.^{17,18} This prospective study of ours aims to distinguish between them in order to select the most effective technique for pilonidal sinus surgery. In order to compare flap repair following pilonidal sinus excision with the laying open approach with secondary healing or median direct closure techniques in patients with chronic pilonidal sinus disease, this study performed a meta-analysis of published, randomised, controlled trials.

MATERIAL AND METHODS

In the Surgery Department, the study has been carried out. In the study group, 35 patients had pilonidal surgery by primary closure using the Limberg flap technique, whereas 35 patients in the control group had pilonidal sinus surgery by excision with primary closure only. To be accepted as appropriate for this study, every case underwent a thorough examination and investigation. Patients were given a thorough explanation of the nature of surgical operations before giving their informed permission.

Inclusion criteria

All patients presenting to the surgical outpatient department with pilonidal sinus disease require surgical management.

Exclusion criteria

Patients with severe hirsutism in female patients, psychiatric illness, poor hygiene, abscess formation, immunodeficiency, diabetes mellitus, hypertension,

patients younger than 12 years of age, those with recurrent disease or prior surgery in the sacrococcygeal region, patients with severe hirsutism, and patients for whom spinal anaesthesia or the prone position are contraindicated.

Method

Following the inclusion and exclusion criteria, all patients received normal exams before being deemed fit for anaesthesia.

Randomization

Patients were divided into the two groups using sealed, sequentially opened envelopes with numbers, and consent was obtained. Each patient is subsequently submitted to pilonidal sinus surgery using the Limberg flap technique or excision with primary closure.

Operative procedure

Under spinal anaesthesia, every procedure was carried out. The research group had primary closure using the Limberg flap technique while the control group simply underwent excision with primary closure.

Excision and primary closure

One centimetre out from the sinus was identified as the excision site. Then, an elliptical incision that reached the post-sacral fascia was created. Electrocautery was used to complete hemostasis after the tissue was removed. After the hemo-vacuum drain was positioned in the subcutaneous plane, the incision was then stitched up in layers using interrupted 2-0 Vicryl string for the deep tissue, 3-0 Vicryl string for the superficial soft tissue, and 2-0 nylon thread for the skin. The standard dressing was applied and taken off the next day after the procedure.

Outcome measures

The recurrence rate served as the key outcome indicator. It was described as the recurrence of

symptoms following total recovery and asymptomatic time. Secondary outcome measures were the amount of time it took for a wound to heal completely, how long it took the patient to recover from being unable to work, how satisfied the patient was with their quality of life, how long they stayed in the hospital, and how painful they were after surgery. The time it takes for a wound to fully heal, with wound care ceasing in the event of an open excision, and the time it takes for stitches to be removed in the case of a direct closure or flap repair. The number of postoperative days used to describe the length of the absence from work correlates to the time required to resume employment. Complications from skin wounds might include entire or partial skin necrosis as well as any disruption of sutures.

STATISTICAL ANALYSIS

The total number of participants in the flap procedure compared to the laying open technique or direct closure (using intention to treat or full analysis set), the number of occurrences of recurrence or postoperative complications, and the mean along with SD for continuous endpoints were tabulated in the study results. For reported P-values, missing SDs were evaluated based on the sample size and mean. With their respective 95% confidence intervals (95% CI), we estimated the risk ratio (RR) of recurrence (and postoperative problems) with flap vs. the laying open procedure or direct closure.

RESULT: -

This study was conducted in the Department of General Surgery. 70 patients were included in this study, 35 patients were in the study group who underwent excision with Limberg flap and 35 patients were in the control group who underwent excision with primary closure on a randomized basis.

Table 1: Distribution of patients according to the duration of surgery in the study and control group.

Duration of surgery (min)	Study group (n=35)	Control group (n=35)
	N (%)	N (%)
<25	0 (00)	20 (60)
26-35	14 (43.33)	13 (40)
>35	18 (56.67)	0 (00)
Meantime	39.4±4.5	27.97±4.08

The operative time period for the two procedures; was a mean of 39.4±4.5 (range 30-42) minutes for the Limberg flap procedure against a mean of 27.97±4.08 (range 20-30) minutes for primary midline closure. Although the near similar values of these parameters for two procedures should render them a less important factor in determining the superiority of one procedure over the other.

Table 2: Post-operative complications and their significance.

Post-operative complication	Total frequency	Study group frequency	Control group frequency
Infection at the stitch line	12	1	10
Seroma formation	10	1	9
Wound dehiscence	11	1	10
Recurrence	9	1	9

Table 2 it is clear that since the p-value in all the complications is significant, the complications are more related to the control group (primary closure) than the study group. Measurement of the post-operative pain as per VAS for patients of both groups on postoperative day 1, day 2, 1 week, 1 month, 3 months, 6 months, and comparison and statistical analysis is done using the student-t test. Infection at the stitch line occurs in a total of 12 patients out of which 1 patient is from the study group and patients are from the control group. This means infection at stitch line comparison was statistically significant. Seroma formations occur in a total of 10 patients out of which 1 patient is from the study group and patients are from the control group. This means seroma formation comparison was statistically significant. Wound dehiscence occurred in a total of 11 patients out of which 1 patient is from the study group and patients are from the control group. Means wound dehiscence comparison was statistically significant

DISCUSSION

In the current study, there was no statistically significant difference in the length of hospitalisation between the groups when viewed from this angle; however, the Limberg flap method significantly reduced the amount of time needed to resume daily activities like pain-free walking after surgery, using the restroom, and returning to work. However, the effectiveness of a technique in preventing sinus recurrence is likely largely dependent on its capacity to completely eliminate the depth of the natal cleft. Given this information, one may anticipate that flap methods would prevent disease recurrence better than simple closure after excision. Montes et al have documented a recurrence rate of 0-3% for Limberg flap whereas Sondenaa et al¹⁹⁹⁵¹⁸ have documented a high recurrence of 7-42% for primary closure.¹⁵ So far, a wide range of procedures, from simple currettes to sophisticated flap techniques, have been documented for PNS. An ideal surgery, in addition to clearing the disease, should also remove the natal cleft, removing the anatomical inclination for the sinus to recur. However, none of the

strategies has been proven to be superior to others in every way. PNS is most frequent after puberty in males, typically in the second and third decades of life.¹⁹

McCallum et al. in 2008²⁰ The lack of randomized prospective studies comparing the laying open technique vs flap repair makes it difficult to rule in favor of either of these two surgical techniques. Nevertheless, our subgroup analysis showed a benefit in favor of the advancement flap vs the laying open technique. Although It involved only the results of one study,²¹ included a significant number of patients (321 patients), which gives it significant statistical importance. The wound-healing time was shorter in flap procedure vs open excision, but there was no significant difference vs direct closure. These results appear logical because open excision involves a secondary intention of healing by granulation, which is much slower than the usual healing time for a closed scar. Healing by secondary intention can take up to several months. Akca et al²⁰⁰⁵²² published a median operative time of 60 min for the Limberg flap group against 45 min for the primary midline closure group and the difference has been found to have a p-value of 0.001. While Ertan T et al²⁰⁰⁵²³ found an insignificant difference in the operative time periods of the two techniques.

Daphan et al in 2004²⁴ reported 2% seroma formation with the Limberg flap procedure. In our study post-operative seroma formation occur in 3.33% of patients in the Limberg flap group as compared to 26.67% in the primary closure group which is statistically significantly high in primary closure as compared to Limberg flap procedure with the p-value of 0.026. Lee et al²⁰⁰⁰⁴ reported post-operative wound dehiscence is 5- 10% in primary closure as compared to 0.9-3.9% in the Limberg flap procedure by Daphan et al²⁰⁰⁴²⁴ and Bascom.

Accidental drain removal on the first postoperative day was noticed in one patient in the wide excision group, which also contributed to seroma formation. Similar results were obtained by Akin et al.²⁰⁰⁸²⁵ in 411 patients with pilonidal sinus managed with the

Limberg flap method and they reported seroma formation in 2.1% of patients. Thus, it is concluded that seroma formation is more common in the Limberg flap method due to more tissue handling than in wide excision, but its incidence can be decreased by keeping the tube drain patent till the drain volume reaches less than 30 ml. Mahdy et.al.2008²⁶ reported a mean hospital stay of 2.9 days in Limberg flap group and 4.8 days in wide excision group. Similar results were reported by Mendes et al.2008²⁷ who reported a mean hospital stay of 4.51±2.85 days in patients managed by the Limberg flap method. In both groups, all patients were followed up for 12 months

A careful examination of the immediate postoperative complication profiles of the two surgeries reveals that wide excision techniques are more likely to cause suppurative wound infections than Limberg flaps do to cause wound collections (seroma). The extensive dissection for the flap technique and the strained wound at the basin of the natal cleft for the large excision are responsible for these divergent tendencies between the two surgeries. A seroma is an accumulation of fluid that develops beneath the skin's surface. Tissue damage or removal is the reason why seromas form. We installed a vacuum suction tube to drain all patients in order to prevent seroma formation. A seroma is indicated by a wound with a clear discharge. The extra tissue that is handled during the Limberg flap technique, which results in increased seroma production, explains why there are such distinct patterns between the two surgeries. To avoid infection, abscess formation, delayed wound healing, wound dehiscence, and flap necrosis, which could result in a lengthy hospital stay, seroma was externally drained.

The fundamental technical challenge of pilonidal surgery is the repair of the remaining faulty area, not the excision of the cyst and all of the sinuses.²⁸

The midline incision scar, the natal cleft's inability to be flattened, and the tissue tension are the causes of the main closure method's poor outcomes.

CONCLUSION:

With particular emphasis on operating time, postoperative problems, hospital stay, and recurrence, the current study was created to compare the results of the two distinct approaches of pilonidal sinus surgical excision with primary closure and Limberg flap. While more research with a bigger volume sample and longer follow-up is required, we advise the Limberg flap approach for primary pilonidal illness due to its reduced

morbidity rates compared to primary closure. When compared to the wide excision approach, the Limberg flap method produces better results. So, for the treatment of pilonidal sinus illness, we advise Limberg flap. Rhomboid excision with Limberg flap is a favoured treatment for pilonidal sinus illness due to its low rates of recurrence and relatively few problems, despite the prolonged operating time and rigorous surgical skills. Pilonidal sinus condition can be effectively treated with the Limberg flap technique.

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