

**A COMPARATIVE RETRO-SPECTIVE STUDY BETWEEN EXCISION FOLLOWED BY SECONDARY HEALING AND LIMBERG'S FLAP SURGERY FOR PILONIDAL SINUS**

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**ABSTRACT:**

**Objective:** The study was undertaken to compare the operative time, wound related complications, hospital stay, wound healing time and rate of recurrence between the two techniques of pilonidal sinus surgery. **Methodology:** This was a comparative retrospective study carried out at a tertiary care hospital of patients operated from June 2017 to January 2019. 40 patients were studied who were equally divided into 2 groups, Group A – excision followed by secondary healing group and Group B – Limberg's flap group. **Results:** The outcomes were compared between both groups. In Group A, mean operative time was 28.75 min while in Group B, it was 56.25min. In Group A, 6(30%) patients developed redness and induration of the surrounding skin while in Group B, 2(10%) patients developed discharge from the wound with surrounding redness followed by gaping and other 3(15%) patients had flap necrosis. In Group A, mean hospital stay and wound healing time were 7.15 days and 31.75 days respectively while in Group B, it was 5.75 days and 14.05 days respectively. In Group A, 2(10%) patients had recurrence during the follow up period of 6 months while in group B there was no recurrence.

**Conclusion:** Limberg's flap surgery has significantly longer operative time and shorter wound healing time as compared to the excision followed by secondary healing but there is no significant difference between both techniques in terms of hospital stay, wound related complications or rate of recurrence. Limberg's flap may be a good alternative to the secondary healing technique as it has lesser hospital stay and lesser recurrence but a larger randomized study & long term follow up are required for definitive conclusions and recommendation.

**Key Words:** - pilonidal sinus, Limberg' flap, hospital stay, operative time, recurrence

**INTRODUCTION:**

The term pilonidal is derived from the Latin word Pilus (hair) and Nidus (nest) and this term was coined and described by Hodges in 1880. It is diagnosed by the finding of a characteristic epithelial tract (the sinus) located in the natal cleft, a short distance behind the anal verge and generally containing hair[1]. It is a common disorder among young adults, in the age group 15-30 years, after puberty when sex hormones are known to affect pilo-sebaceous glands and lead to healthy body hair growth. Congenital theory suggests that a developmental abnormality around the sacro coccygeal region leads to the formation of an epithelial lined sinus which grows hairs at puberty. Origin of the coccygeal sinus might be from the remnant of the neuroenteric canal.

It can be associated with considerable morbidity and have significant socio-economic impact on affected individuals[2].During the Second World War ,pilonidal disease very commonly appeared in jeep drivers, leading to the disease being known as, “jeep disease” [3]. Pilonidal disease can appear as an acute abscess along with sinus tract formation. A more complex manifestation can be characterized by chronic or recurrent abscesses with extensive, branching sinus tracts [4].

Today pilonidal sinuses are widely accepted to be acquired abnormalities [5,7] as a result of the drainage of a hair follicle [8] that ruptured in the subcutaneous fat, producing acute or chronic inflammation [9] resulting in an abscess or a tract [7].

The management of pilonidal sinus is variable and problematic. Principles of treatment require eradication of the sinus tract; complete healing and prevention of recurrence [10]. Several techniques such as cryosurgery [11], Z-plasty procedure[12], lancing under local anesthesia, vacuum assisted closure[13], excision with secondary healing, excision with primary closure [14,15] local flap surgery [16-19] , Limberg’s flap and Bascom Procedure [20] have been described by various authors. Rhomboid flap was described first by Limberg in 1963.

This study was undertaken to compare the results of excision of sinus followed by dressing the wound regularly versus primary closure of the wound by Limberg’s flap technique.

## **MATERIALS AND METHODS:**

The present study is a retrospective study carried out with 40 patients at the Department of Surgery at GCS Medical College, Hospital and Research Centre, Ahmedabad from June 2017 to January 2019.

### **Inclusion Criteria:**

1. Pilonidal sinus in the natal cleft of the sacro-coccygeal area.
2. Patients aged between 14 and 60 years of both sex.

### **Exclusion Criteria:**

1. Pilonidal abscess.
2. Patients having diabetes mellitus.
3. Human immunodeficiency virus positive patients.
4. Patients on cancer chemotherapeutic drugs.
5. Patients on immunosuppressant therapy.
6. Recurrent pilonidal sinus.
7. Age <14 or >60 years.
8. Pregnant females.

### **Variables studied :-**

1. Age & sex
2. Operative time
3. Wound related complications
4. Hospital stay
5. Wound healing time
6. Recurrence rate

Group A (20) – excision followed by secondary healing,

Group B (20) – excision and Limberg's flap closure

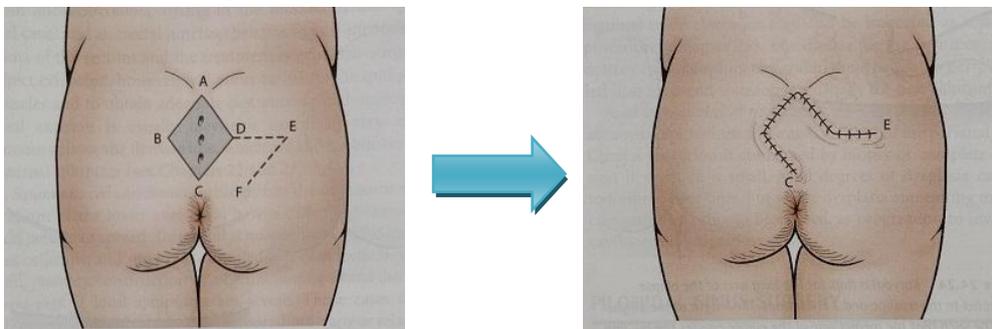
All cases were operated under spinal anesthesia and in prone position. Shaving of the natal cleft area and back was done. The natal cleft was mechanically exposed by strapping buttocks apart using adhesive tapes. The natal area was thoroughly cleaned with 10% povidone-iodine. Prior to incision methylene blue was instilled using infant feeding tube into the sinus opening to map the sinus cavity and its lateral extensions if any and hence that the whole sinus and ramifications were fully demarcated.

#### **Excision followed by secondary healing:-**

Wide excision of the pilonidal sinus tract was done with vertical elliptical incision and healing by secondary intention with daily dressing in post-operative period was done.

#### **Limberg's Flap Procedure**

In Limberg flap procedure, the patient is placed in prone and the pilonidal sinus, marked as a rhombic area, with the long axis of the rhombus aimed to include all of the diseased area. The long axis is incised to excise all of the pilonidal sinus and its extensions. While the other axes are rotated to cover the midline defect as shown in the figure, a vacuum drain is placed and the subcutaneous tissue and skin were closed.



*(B-D is 60% of length of A-C. D-E is direct continuation of B-D and is equal to A-B. E-F and C-D lines are parallel and equal. The tissue within A-B-C-D is excised. A flap of C-D-E-F is mobilized and rotated on the pedicle of C-F.)*

Patients were nursed in the prone position post-operatively for the first 48 hrs. The wound was examined for any signs of surgical site infection, such as swelling, redness, induration, discharge, wound gaping or flap necrosis.

Patients were followed up for 6 to 12 months in OPD for recurrence of the disease.

The findings were tabulated and appropriate statistical tests were applied to arrive at the conclusion.

#### **Statistical Methods:-**

Mean and standard deviation were used as descriptive statistics. For Inferential statistics chi-square test and paired t-test were used. A P-value of  $\leq 0.05$  was considered statistically significant.



### **OBSERVATIONS AND RESULTS:-**

In our study, out of total 40 patients, 90% (n=36) patients were males and 10% (n=4) were females. In group A Mean age was  $30.36 \pm 5.39$  years and in group B, it was  $28.52 \pm 8.77$  years. This difference between the two groups as regard to age was statistically not significant ( $P > 0.05$ )

#### **Operative Time:-**

In Group A, mean operative time was  $28.75 \text{ min} \pm 5.56$  (standard deviation).

In Group B, mean operative time was  $56.25 \text{ min} \pm 8.7$  (standard deviation).

It clearly revealed that the operation time of Limberg's flap group was longer than the secondary healing group.

#### **Wound related complications:-**

In Group A, 6(30%) patients developed redness and induration of the surrounding skin.

In Group B, 2(10%) patients developed discharge from the wound with surrounding redness followed by gaping and other 3(15%) patients had flap necrosis.

#### **Hospital stay:-**

In Group A, mean hospital stay was  $7.15 \pm 3.46$  (SD) days.

In Group B, mean hospital stay was  $5.75 \pm 2.27$  (SD) days.

In the Limberg's flap group, the patients were discharged earlier as compared to the secondary closure group but as the p-value was  $> 0.05$ , it was statistically not significant.

#### **Wound healing time:-**

In Group A, Wound healing time was  $31.75 \pm 8.46$  (SD) days.

In Group B, Wound healing time was  $14.05 \pm 4.27$  (SD) days.

In the Limberg's flap group, the wound healing time was shorter as compared to the secondary closure group and as the p-value was  $< 0.0001$ , it was statistically significant.

#### **Rate of Recurrence:-**

In Group A, 2(10%) patients had recurrence during the follow up period of 6 to 12 months.

In Group B, no patient had recurrence during the follow up period of 6 to 12 months.

The difference was statistically not significant between both the groups. ( $p > 0.05$ )

### **Table**

Variables	Group A (n=20)	Group B (n=20)	P value(95% CI)
Mean operative time(min)	28.75± 5.56	56.25±8.7	<0.0001
Wound related complications	6(30%)	5(25%)	0.7266
Wound healing time(days)	31.75 ± 8.46 (SD)	14.05 ± 4.27 (SD)	<0.0001
Mean hospital stay(days)	7.15 ± 3.46	5.75 ± 2.27	0.1386
Recurrence Rate	2(10%)	0	0.1519

(CI=Confidence Interval)

From the above observations, only the difference in operative time and wound healing time of two groups was statistically significant ( $p < 0.05$ ), rest of the variables didn't differ statistically between both the groups ( $p > 0.05$ ).

## **DISCUSSION:**

The published studies so far suggest that there is still some controversy regarding the best method for treatment of pilonidal sinus disease. There is universal agreement in the published literature that on pathological basis, sacro-coccygeal sinus disease is an acquired condition. There is a long list of procedures that are advocated for the treatment of chronic pilonidal sinus disease and this range from total conservative treatment and non-surgical approach, to extensive surgical procedures involving extensive full thickness flaps techniques. Despite this broad range of surgical methods, the ideal treatment of pilonidal sinus disease remains a topic of debate and controversy. The ideal surgery should be simple, aiming to remove all the sinus tract as well as the predisposing factors that contribute in the formation of the pilonidal sinus. It should result in a low recurrence rate, a short hospital stay associated with minimum pain and wound healing problems, allowing the patient to resume his routine activities as soon as possible and it should have a less economic burden on the system and patient as well. However, despite extensive research there is still no seamless surgical procedure for pilonidal sinus with respect to the results of early and late complications.

In our study, 90% of patients were male and 70% of patients were in the age group of 20-30 years. In a study done by Khan, maximum number of patients (52.9%) was in the third decade of life [21] and male to female ratio was 34:0, which is comparable with our study suggesting male preponderance due to more hair growth and it occurs at younger age.

Though other factors like obesity, occupation, life style of the patients were not observed in this study, those might also be the causative factors.

In our study hospital stay was considered as the time from the day of surgery to the day of discharge. Mean hospital stay and wound healing time in secondary healing was longer as compared to the Limberg's flap group, which also compares favorably with study carried out by Fazeli et al. where return to normal activity was 17.5 days for open group and 11.9 for flap group [22].

In our study, 30% in secondary healing and 25% in Limberg's Flap procedure exhibited wound related complications. Over international reports, McCallum IJ et al. conducted a systemic review and meta-analysis on all studies on pilonidal sinus, in which only Five trials (559 participants) assessed the rate of surgical site infection after open healing compared with primary closure (all techniques) and although infection rates were somewhat higher after open healing but it did not expose any statistical significance [23]. Another study comparing open healing with Z-plasty, there was, likewise, no considerable increase in infection rates after open healing [24]. Recurrence was found in 10% in secondary healing group and there was no recurrence in Limberg's flap group. Praveen et al. where flap technique was employed noted 5%

recurrence [25] and Tolba et al. noted recurrence in one patient when open technique was employed [26], which is comparable to our study.

#### **LIMITATIONS:-**

The comparison was only between two methods of Pilonidal sinus surgery, other procedures were not included in study.

Most patients were from Ahmedabad district and surrounding areas so the sample does not represent the entire Indian population.

The cost-effectiveness issue and post-operative pain are not addressed in the current study and will have to be evaluated separately.

#### **CONCLUSION:**

- Operative time was significantly longer in case of Limber's flap surgery but the wound healing is earlier as compared to the excision followed by secondary healing.
- Though Limberg's flap surgery has lesser hospital stay and no recurrences in any patients, the difference is statistically not significant. These facts favour the use of flap surgery.
- Results of both the techniques are comparable in terms of wound related complications, so any of the technique can be used for pilonidal sinus excision as per the experience and choice of the surgeon.
- A larger randomized study & long term follow up are required for definitive conclusions and recommendations regarding the superiority of one technique over the other.

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Conflict of interest: Nil