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*RESEARCH ARTICLE*

# SURGICAL MANAGEMENT OF PILONIDAL SINUS: A COMPARATIVE REVIEW OF APPROACHES AND OUTCOMES IN A TERTIARY CARE HOSPITAL

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## Abstract

**Background:** Pilonidal sinus disease is a chronic condition affecting the sacrococcygeal region, often caused by friction and shearing forces between the buttocks, leading to hair penetration and subsequent infection. Various surgical approaches are used for treatment, each with distinct outcomes.

**Objective:** This study aims to assess and compare the outcomes of different surgical techniques in the management of pilonidal sinus disease, specifically evaluating simple excision with closure and excision with flap reconstruction.

**Methods:** This retrospective observational study included 20 patients treated at a tertiary care hospital in Chamarajanagar from May 2022 to April 2023. The collected data included age, gender, duration of symptoms, history of prior surgery, and early postoperative complications. Patients who underwent simple excision with primary closure or excision with flap reconstruction (Limberg flap) were included. Descriptive statistics were used to analyze patient demographics, surgical outcomes, and complications.

**Results:** The mean age of the patients was 24.4 years (range: 12–37). Of the 20 patients, 13 were male (65%) and 7 were female (35%). Symptoms ranged from 1 to 8 months (mean: 4.6 months). The majority of patients (70%) presented with seropurulent discharge, followed by pain in 30% of cases. Simple excision with closure required a longer healing time and was associated with wound dehiscence (33%), necessitating outpatient wound care. Excision with Limberg flap reconstruction was performed in 12 patients, with a procedure time of 100 minutes and a hospital stay of 6–8 days. The Limberg flap procedure showed minimal complications, with one case of seroma (8%).

**Conclusion:** Limberg flap reconstruction was found to be superior to primary closure in the management of pilonidal sinus disease, with fewer complications, lower rates of recurrence, and faster recovery. The modified Limberg flap provides a simple, effective, and reliable solution for treating pilonidal sinus, especially in patients with minimal complications.

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## Introduction:-

Pilonidal sinus disease is a long-term condition affecting the sacrococcygeal region predominantly in young adults, particularly males [1]. It is believed to result from friction and shear forces between the buttocks, which cause hair to penetrate the skin and form an infected tract along the midline. A pilonidal sinus is a small tunnel that develops at the top of the crease in the buttocks. Trapped hair around the buttocks crease can lead to an abscess, and a pilonidal sinus may develop as a result. Firstly, occupation plays a major role with reports of occurrences between the fingers of sheep shearers, dog groomers, and barbers . Blocked hairfollicles can lead to enlargement and rupture of the pilosebaceous glands with either abscess formation or a chronically discharging sinus [2,3]. The disease causes significant pain, discomfort, and impairment of daily functions, often affecting work and study. Various surgical techniques have been employed for its treatment, including simple excision, marsupialization, phenol application, cryotherapy, laser excision, and flap reconstructions, each having distinct outcomes regarding recurrence, infection, wound healing, and pain intensity [4].

This condition most commonly affects young adults, particularly after puberty, with an incidence rate of approximately 26 per 100,000 individuals[5]. Pilonidal sinus can cause significant pain and discomfort, severely impacting daily activities and often leading to an inability to work or study. Several treatment options are available, including simple excision, marsupialization, phenol application, cryotherapy, laser excision, excision with anastomosis, V-Y plasty, Z-plasty, and Limberg flap plasty. Each technique has varying outcomes in terms of recurrence, infection rates, wound healing complications, hospitalization duration, cosmetic results, and pain levels[6].

## Objective:-

To evaluate and compare the effectiveness of various surgical methods in the treatment of pilonidal sinus disease.

## Methodology:-

This was a retrospective observational study conducted over one year, from May 2022 to April 2023, at the Department of General Surgery, Chamarajanagar Institute of Medical Sciences, Chamarajanagar. The main aim was to evaluate and compare the outcomes of various surgical approaches for treating pilonidal sinus disease, specifically focusing on complications, healing times, and recurrence rates.

The study included 20 patients diagnosed with sacrococcygeal pilonidal sinus disease who underwent surgery during the study period. The sample size was based on the availability of complete medical records for patients treated within the given timeframe. All eligible cases during this period were included, following a retrospective design.

The inclusion criteria were: patients aged 12 years and older, diagnosed with sacrococcygeal pilonidal sinus disease, and who underwent either elective or emergency surgical treatment at the Department of General Surgery. Patients had to have undergone one of the following surgical procedures: simple excision with primary closure, simple excision with secondary intention healing, Limberg flap reconstruction, or incision and drainage for acute abscesses. Only those with complete preoperative, intraoperative, and postoperative medical records were included.

Patients with incomplete or missing medical records, those who did not undergo surgery for pilonidal sinus disease, or those with other sacrococcygeal conditions that could interfere with the diagnosis or treatment were excluded. Also, patients under 12 years old were excluded, as pilonidal sinus disease primarily affects older children and adults.

Ethical approval was granted by the Institutional Ethics Committee of Chamarajanagar Institute of Medical Sciences before the study began. Since the study was retrospective, informed consent was not needed, but patient data were anonymized to protect confidentiality.

Data were gathered from hospital electronic records and physical case sheets, including demographic information, clinical symptoms (such as pain, discharge, and symptom duration), and any prior history of pilonidal sinus surgery. Surgical details such as procedure type, surgery duration, anesthesia used, and any intraoperative complications were documented. Postoperative outcomes, including hospital stay length, time for drain removal, healing time, and any complications (such as wound dehiscence, infection, seroma, or recurrence) were recorded. Patients were followed up for six months to assess recurrence or the need for further interventions.

The surgical techniques assessed in the study varied according to the patient's presentation. Simple excision with primary closure involved removing the pilonidal sinus tract and closing the wound edges directly. This method, while simple, carried risks of wound dehiscence and recurrence. When primary closure was not possible, simple excision with secondary intention healing was used, where the wound was left open to heal naturally, which allowed better drainage but took longer to heal. Limberg flap reconstruction was used for more extensive or recurrent cases, employing a healthy tissue flap to cover the defect, which reduced tension on the wound and lowered recurrence risk. Incision and drainage were performed for patients with acute abscesses to provide immediate relief, often before definitive surgical treatment.

Data were analyzed using SPSS software, and descriptive statistics were used to summarize demographic and clinical details, as well as surgical outcomes. Continuous variables (such as age, symptom duration, surgery time, and hospital stay) were presented as means with standard deviations, while categorical data (such as gender, symptoms, and complications) were expressed as frequencies and percentages. Comparisons between surgical techniques were made using appropriate statistical tests (Chi-square, t-test, or ANOVA), with a p-value of less than 0.05 considered statistically significant.

## Results:-

Of the 20 patients in the study, 13 were male and 7 were female, with an average age of 24.4 years, ranging from 12 to 37 years. The majority of patients (14) presented with discharge from the affected area, while 6 patients reported pain as their main symptom. Most of the patients came from rural backgrounds, with agriculture being the predominant occupation. The duration of symptoms before seeking medical attention ranged from 1 to 8 months, with an average of 4.6 months.

Among the patients who underwent surgery, those who had simple excision with closure experienced longer healing times. One-third (33%) of the patients who had this procedure experienced wound dehiscence, which required outpatient wound care. In contrast, 12 patients underwent excision with Limberg flap reconstruction, which was the preferred method at the institute due to its simplicity and minimal complications. Very few issues were noted with this technique during the procedures.

**Table 1:-** Demographic and Clinical Presentation of Patients.

| **Demographic Details** | **Values** |
|---|---|
| Mean Age (years) | 24.4 (12-37) |
| Gender | Male: 13 (65%) |
| | Female: 7 (35%) |
| Duration of Symptoms | Mean: 4.6 months |
| | Range: 1-8 months |

| **Clinical Presentation** | **Number (N)** | **Percentage (%)** |
|---|---|---|
| Serous Discharge | 11 | 55 |
| Purulent Discharge | 3 | 15 |
| Pain | 6 | 30 |

**Table 2:-** Operative and Early Postoperative Data.

| **Procedure** | **Operative Time (min)** | **Hospital Stay (days)** | **Drain Removal (hours)** | **Healing (suture removal) days** | **Complications / Recurrence** |
|---|---|---|---|---|---|
| Simple Excision with Primary Closure (n=3) | 50-70 | 6-8 | 72 | 14 | Wound dehiscence (1) |
| Simple Excision & Healing by Secondary Intention (n=3) | 30 | 5-6 | - | 15-20 | - |
| Incision and Drainage (n=2) | 30 | 4-5 | - | 20 | Reinfection |

| | | | | | |
|---|---|---|---|---|---|
| Limberg Flap (n=12) | 100 | 6-8 | 48-72 | 10 | Seroma (1) |

**Table 3:-** Surgical Outcomes Comparison.

| Surgical Technique | Mean Healing Time (days) | Recurrence Rate (%) |
|---|---|---|
| Simple Excision with Primary Closure | 14 | 33 |
| Simple Excision with Secondary Intention | 15-20 | 0 |
| Incision and Drainage | 20 | 50 |
| Limberg Flap | 10 | 8.3 |

The Limberg flap procedure had the shortest mean healing time (10 days) and a notably lower recurrence rate (8.3%) compared to the other surgical methods. In contrast, simple excision with primary closure was associated with a higher incidence of wound complications, including dehiscence (33%), and a longer healing time. These findings highlight the advantages of using more advanced surgical techniques, such as the Limberg flap, for complete excision and optimal closure. This approach not only reduces patient discomfort but also minimizes the need for follow-up visits.

## Discussion:-

The study's findings support the use of the Limberg flap as a more effective treatment for pilonidal sinus disease, aligning with other research that highlights the benefits of flap techniques in terms of lower recurrence rates and faster healing times [7,8]. For example, Aithal et al. reported recurrence rates below 10% with flap reconstruction [10]. The advantage of flap techniques lies in their ability to cover the defect with healthy, robust tissue, which helps prevent hair re-entry and reduces the risk of infection [11].

In contrast, simple excision, although straightforward, was associated with higher recurrence rates, consistent with studies that report recurrence rates over 30% when no proper reconstruction is performed . While incision and drainage provide immediate relief for abscesses, their effectiveness as a long-term solution is limited due to high rates of reinfection, as seen in this study (50%) .

These results underscore the importance of surgical expertise and careful patient selection, particularly for recurrent or complicated cases of pilonidal sinus disease, in order to fully capitalize on the benefits of flap-based procedures .

## Conclusion:-

This study's findings highlight that flap reconstruction, particularly the Limberg flap, is the most effective surgical technique for managing pilonidal sinus disease. The Limberg flap was associated with faster healing, fewer postoperative complications, and a significantly lower recurrence rate compared to other methods. Its success can be attributed to its ability to completely excise the sinus tract and cover the defect with a healthy, tension-free flap of tissue, which reduces the risk of hair re-entry and reinfection.

While simple excision with primary closure is a less technically demanding procedure, it was linked to a higher rate of complications, including wound dehiscence and prolonged healing, as well as a higher recurrence rate. This technique may still be suitable for certain patients but should be used cautiously, especially in cases with recurrent or complicated disease. Methods that rely on secondary intention healing were less effective due to the extended recovery time, and while incision and drainage provided immediate relief for abscesses, it was insufficient as a definitive treatment due to high reinfection rates.

These results are consistent with broader literature supporting the use of flap techniques, which offer better outcomes across several metrics, including reduced long-term recurrence, improved patient satisfaction, and fewer follow-up visits. Given the limitations of simple excision and drainage, it is recommended that more complex techniques, such as the Limberg flap, be considered the standard of care for pilonidal sinus, particularly in recurrent or persistent cases. Surgical decisions should also account for individual patient factors such as disease severity, surgical history, and surgeon expertise to optimize outcomes.

Future research should focus on large-scale, randomized controlled trials to further validate these findings and explore additional modifications of flap techniques that could improve outcomes and accelerate recovery.

Investigating minimally invasive procedures and advanced wound care techniques may also offer valuable insights for enhancing current treatment options.

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