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Simple Closure and Rhomboid Flap Closure for Pilonidal Sinus Disease

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ABSTRACT

Background: sacrococcygeal pilonidal disease is a common and frustrating problem, surgical and nonsurgical methods have been described for treatment of pilonidal disease, however the optimal treatment has yet to be found. There's variety of surgical procedures for managing this disease such as simple primary closure and rhomboid flap closure.
Aim of the Study: to compare the outcome of simple excision with primary closure vs. excision and closure with rhomboid flap.
Methodology: prospective study conducted at Shar Educational hospital/ Sulaymaniyah/ Iraq and involved 50 patients that were randomly divided into two equal groups: Group A: undergo simple primary closure, Group B: submitted to rhomboid flap closure.
Results: the mean age of the study sample (n=50) was 28.67 ± 6.29 years with male predominancy, the mean operative times was 40.34 minutes for group A and 53.91 minutes for group B, Patients who undergo rhomboid flap procedures reported lower postoperative pain, earlier surgical drain removal, shorter post operative hospital stays, quicker return to daily activities with lower post operative complication and recurrence rate compared to group A patients.
Conclusions: rhomboid flap procedures offer several potential advantages over simple closure surgeries despite longer operative time including lower postoperative pain levels, shorter hospital stays, quicker return to daily activities, and lower rates of postoperative complications.

Keywords: pilonidal sinus, rhomboid flap, sacrococcygeal surgery.

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INTRODUCTION

The sacrococcygeal pilonidal sinus is a prevalent condition among young adults, primarily affecting individuals aged 15 to 30, with a male-to-female ratio of 3:1. It typically develops after puberty due to the influence of sex hormones on the pilosebaceous gland, which alters normal body hair growth. Pilonidal disease is uncommon in individuals over the age of 40 (Doll *et al.*, 2008).

Various treatment options are now available that offer a high cure rate, reduced recurrence, and fewer hospital visits. While numerous randomized clinical trials have assessed different approaches, there is still no definitive agreement on the best medical or surgical treatment for pilonidal disease. (Kober, Alapati and Khachemoune, 2018).

Approach Considerations

Surgical management is customized according to the classification of the condition. Despite the variety of treatment options available for each category of pilonidal disease, they share common objectives, including: (Varnalidis *et al.*, 2014)

- Achieving wound healing with minimal risk of recurrence
- Minimizing hospital stay duration
- Ensuring maximum patient comfort
- Reducing morbidity with minimal wound-management challenges

Excision with primary closure

The excision of a pilonidal sinus involves removing the midline pits and lateral openings down to the presacral fascia, while preserving as much surrounding skin as possible. Typically, it is sufficient to remove only about 0.5 cm of skin around the sinus opening. Proper wound curettage is crucial to eliminate hair, granulation tissue, and skin debris, promoting effective healing. While this procedure can be carried out using local anesthesia alone, combining it with mild sedation ensures a more thorough excision and enhances patient comfort (McCallum, King and Bruce, 2008).

The two main surgical approaches for treating a chronic pilonidal sinus are primary wound closure and healing by secondary intention. These methods differ in terms of wound healing and the likelihood of recurrence. Primary closure offers the advantage of faster wound healing

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if no infection develops; however, it requires patients to limit their activities significantly until the wound fully heals (Petersen *et al.*, 2002).

Excision and closure with a flap

Many surgeons now utilize plastic surgical flap techniques to reposition adjacent skin and subcutaneous tissue over the surgical site, enabling tension-free healing(Mahdy, 2008).

A rhomboid is a parallelogram with unequal adjacent side lengths and oblique angles. In the rhomboid flap technique, the flap is first outlined over the operative site, and the excision is then carried out. The resulting defect is covered using the rhomboid flap, avoiding closure under tension (Urhan *et al.*, 2002).

This procedure effectively addresses many issues associated with traditional wound closure. By reducing tension on the wound, it significantly decreases the high rate of wound failure previously observed. Additionally, the gluteal cleft is not only removed but also eliminated, which contributes to a lower recurrence rate. Reported recurrence rates are among the lowest in the literature, ranging from 2% to 7%, with infection rates similarly low at 2% to 10%. Patients can often undergo this as a same-day procedure, benefiting from faster healing, simpler wound care and dressing changes, and quicker return to work and daily activities (Jan *et al.*, 2015).

It has been observed through literature that rhomboid excision with flap is more effective in early healing and discharge from hospital than simple excision with primary closure. Moreover, very few literatures are available to compared both of these techniques. So, to get local evidence and applicability of rhomboid excision with flap in local setting, this study was conducted.

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Study Design: comparative a prospective study

METHODOLOGY

The study was conducted at Shar Educational hospital for a period of one year from June 2023 till June 2024 and involved 50 patients that were randomly divided into two groups:

- Group A: treated with excision and simple primary closure
- Group B: treated with excision and closure with rhomboid flap

Inclusion criteria:

1. patients of both genders who are diagnosed to have pilonidal sinus disease by senior surgeon decision and sent to the hospital for surgical repair.
2. Operated for surgical repair by either excision and simple primary closure or excision and closure with rhomboid flap
3. Adult age group: (18–65) years.
4. Agree to participate in the study.

Exclusion criteria:

1. Extremes of age: Pediatric and geriatric age groups
2. Cases of recurrent pilonidal sinus disease after previous surgical repair.
3. Loss of follow up.
4. Acute pilonidal abscess

After admission to the surgical ward preoperative preparation for general anesthesia is done by performing the required investigations (CBC, viral screen, CXR, ECG, RFT, LFT), Medical consultation for GA fitness is also established.

formal consent is also taken prior to surgery after preoperative preparations.

Technique

Under general anaesthesia, the patient is positioned on their abdomen in the prone position with elevated hips and the table split in the middle. Two adhesive tape strips are securely anchored symmetrically approximately 10 cm from the midline at the level of the sinus. These strips are then pulled down and fastened beneath the table to widen the intergluteal

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fold, enhancing visualization of the operative area. Following this, routine skin preparation using povidone iodine is carried out. Patients are instructed to fast and thoroughly shave the area before surgery.

An oval-shaped incision is made around the sinus tract opening, positioned off the midline about 1 cm away from each side, firm pressure and outward traction are applied to tense the skin and control bleeding.

An Allis forceps is positioned at the upper angle of the skin to be excised, and the sinus tract is removed as a single block. Subcutaneous tissue is excised downward and laterally to the fascia underneath.

Special attention is given to preserving this fascia during incision, as it serves as the primary defence against deeper infection spread. Small pointed hemostats are utilized to clamp bleeding vessels to minimize tissue reaction. Electrocoagulation may be employed for bleeding control and to minimize buried suture material. Dissection of the lower end of the incision requires extreme care due to frequent encounters with small, troublesome vessels.

After that the wound is thoroughly cleaned with normal saline with ensuring good haemostasis, a surgical drain is used to evacuate any future collection and left in place for 7-10 days after the surgery, after placing the drain the wound is closed in one of the following methods:

- In simple closure for group A patients, the wound edges are brought together and closed using stitches and the wound is sutured in layers.

- using a rhomboid flap for group B patients, additional incisions adjacent to the wound in a rhomboid (diamond) shape are made, the skin in this rhomboid-shaped area is then lifted and rotated into place to cover the wound, the flap is sutured into place.

The wound is then cleaned and covered with surgical dressing, and the patient is left for anastatic recovery and later discharged to the surgical ward.

After completing the procedure broad-spectrum antibiotics are given to all the patients and analgesic are used according to the pain scale of each patient, patients are then discharged home and followed accordingly.

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Instructions for wound care and hygiene post-surgery by keeping the surgical site clean and avoiding activities that may strain the wound during the healing process.

Intraoperative variables are recorded including intraoperative time and complications. Patients are then discharged to the surgical word and followed up to determine the outcome of management in term of the rate of complications and duration of hospital stay.

Statistical analysis

The data analysis was conducted using SPSS-27 statistical software. Results were expressed through simple measures such as frequency, percentage, mean, standard deviation, and range (minimum-maximum values). The significance of differences between means was evaluated using the Student's t-test for independent samples or the Paired t-test for paired observations. The Chi-square test was applied to analyze categorical variables. A P-value of ≤ 0.05 was considered statistically significant.

RESULTS

The mean age of the study group (n=50) was (28.67 ± 6.29) years, ranging from 18 years to 42 years, the mean age for patients undergoing simple closure was 29.51 ±7.42 years, while for rhomboid flap, it is 27.83 ± 5.16 years.

with a significant predominance of male patients across both surgical techniques, comprising the majority of cases in each group, there were 24 males and one female in group A and 21 males and 4 females in group B.

Totally male to female ratio was 9:1.

Table 1: D*emographic variables of the study sample patients.*

Variable		Group A	Group B	Total
		Simple Closure	Rhomboid Flap	
Age	Mean ± SD	29.51 ± 7.42	27.83 ± 5.16	28.67 ± 6.29

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	Range	19 - 42	18 - 39	18 - 42
Gender	Male	24 (96%	21 (84%)	45 (90%)
	Female	1 (4%)	4 (16%)	5 (10%)

Operative times vary significantly between patients undergoing simple closure and rhomboid flap procedures, as evidenced by the mean operative times of 40.34 minutes and 53.91 minutes, respectively.

The majority of simple closure procedures (34%) are completed in less than 40 minutes, whereas a significant proportion of rhomboid flap procedures (52%) require more than 50 minutes.

The statistical analysis reveals a highly significant difference in operative times between the two techniques (P= 0.001).

Table 2: *intraoperative time required to complete the surgery.*

Operative Time	Group A (25) Simple Closure		Group B (25) Rhomboid Flap		Total (50)	
	N	%	N	%	N	%
<40 min.	17	34	1	4	18	36
41-50 min.	3	12	11	44	14	28
>50 min.	5	20	13	52	18	36
Mean ± SD	40.34 ± 10.32		53.91 ± 6.47		47.12 ± 8.39	
P value	0.001				sig.	

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Patients who undergo rhomboid flap procedures generally report lower postoperative pain levels according to VAS score compared to those undergoing simple closure, with a statistically significant difference (P-value = 0.004).

Rhomboid flap patients also experience earlier surgical drain removal (P-value < 0.001), shorter post operative hospital stays (P-value = 0.031), and quicker return to daily activities (P-value = 0.002) compared to patients undergoing simple closure.

Table 3: post operative variables comparison between both study groups.

Post Operative Variables	Group A	Group B	P Value
	Simple Closure	Rhomboid Flap	
	Mean ± SD	Mean ± SD	
Post operative pain score (1-10)	7.9 ± 2.4	4.3 ± 4.9	0.004
Drain-duration (Days)	10.4 ± 3.2	7.3 ± 4.7	<0.001
Hospital-stay (Days)	3.7 ± 2.8	2.3 ± 1.5	0.031
Return to normal activities (Days)	34.2 ± 12.7	21.3 ± 10.9	0.002

Patients undergoing simple closure have a higher incidence of wound infection, wound disruption, poor cosmetic appearance, numbness at the site of surgery, and recurrence compared to those undergoing rhomboid flap procedures, with all differences being statistically significant (P-values < 0.05).

Recurrence was not reported after the 25 rhomboid flap surgeries at 6 months of follow up, while 3 cases who had simple closure procedures had recurrent sinus disease, P value was highly significant (P<0.001)

Table 4: complications comparison between both surgical techniques at the end follow up.

Complications	Group A	Group B	Total	P Value

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	Simple Closure		Rhomboid Flap				
	N	%	N	%	N	%	
Wound infection	7	28	3	12	10	20	<0.001
Wound disruption	4	16	1	4	5	10	0.003
Poor cosmetic appearance	8	32	1	4	9	18	<0.001
Numbness	6	24	2	8	8	16	0.001
Recurrence	3	12	0	0	3	6	<0.001

DISCUSSION

The current study results show that the mean age of the study group was 28.67 years, with male predominance, similar articles on pilonidal sinus disease also demonstrated that pilonidal sinus is a disease mainly affecting young males. Luedi et al., (2021) conducted a large meta-analysis study involved 104 055 patients from different articles and various ethnicities and observed a peak prevalence of pilonidal sinus disease in young male adults, particularly in the 20-30 years age group (Luedi *et al.*, 2021).

The current study results show that the mean operative time for Group A (Simple Closure) is 40.34 minutes, while for Group B (Rhomboid Flap), it's 53.91 minutes this indicates that, on average, rhomboid flap surgeries take longer compared to simple closure surgeries this can be explained by rhomboid flap surgeries involve a more complex technique compared to simple closure surgeries. the rhomboid flap technique requires the creation of a flap of tissue to cover the wound, which involves additional steps such as tissue mobilization, rotation, and suturing. these steps may take more time compared to the relatively straightforward closure technique used in simple closure surgeries.

Patients who undergo rhomboid flap procedures generally report lower postoperative pain levels according to VAS score compared to those undergoing simple closure, which can be explained by less wound tension, the also experienced faster healing and return to daily

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activities, the improved blood supply and better anastomosis to the wound area may also contribute to quicker recovery times, researches show the same conclusion like Hosam et al., (2010) study in Egypt on 140 patients who were treated for PNSD, a total of 140 patients (131 men and 9 women) were randomized into two groups: Group I underwent the Rhomboid flap procedure, while Group II underwent excision with primary closure, their results show that post operative pain scores were higher among patients in group II, which required longer duration of analgesics use, they also found that patients required 15.9± 2.3 days to return to their activities after rhomboid flap surgeries while they took 22.6± 3.3 days after simple closure, hospital stay after surgery was also shorter after rhomboid flap surgeries (2.3±1.4 vs. 3.5±1.8 days, P=0.009) (Hosam *et al.*, 2010).

Similarly, Abu Galala et al., (1999) conducted a study comparing primary closure using a transposed rhomboid flap with simple suturing in 46 patients with chronic pilonidal sinus disease. Among these, 24 patients were treated with rhomboid flap transposition, and 22 with the simple suturing technique. The results showed that all patients in the rhomboid flap group achieved primary wound healing, compared to 17 patients in the simple suturing group, yielding a 77% success rate ($p \geq 0.02$). Five patients in the simple suturing group experienced wound breakdown due to hematoma and infection (23%). The average hospital stay for the rhomboid flap technique was 6 days, compared to 9 days for the simple suturing group. Additionally, patients in the rhomboid flap group returned to work approximately nine days earlier on average (23 days total) than those in the simple suturing group. Notably, there were no recurrences in the rhomboid flap group, while two recurrences (9%) occurred in the simple suturing group (Abu Galala *et al.*, 1999).

The current study results show that patients undergoing simple closure have a higher incidence of wound infection, wound disruption, poor cosmetic appearance, numbness at the site of surgery, and recurrence compared to those undergoing rhomboid flap procedures,

A study by El-Khadrawy et al., (2009) at Tanta University Hospital in Egypt evaluated the use of rhomboid flap closure in 60 patients with recurrent sacrococcygeal pilonidal sinus. The study included 46 males and 14 females, with a median age of 18 years (range: 16–38 years). The average hospital stay was 6 days (range: 5–11 days), although four patients required hospitalization for 1–2 weeks due to superficial wound infections, which was the most common complication. Patients returned to work an average of 15 days after hospital discharge (range: 12–26 days). Postoperative complications included superficial wound infections in 9 patients

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(15%), six recurrences (10%), numbness over the flap in 11 patients (18.3%), and dissatisfaction with the cosmetic appearance of scars in 12 patients (20%). Despite these complications, the authors recommend the rhomboid flap technique for recurrent sacrococcygeal pilonidal sinus, particularly in cases involving complex sinuses (el-Khadrawy *et al.*, 2009).

Horwood J. et al., (2012) conducted a systematic review on articles searching on Primary closure of PNSD using different surgical techniques and their study involved data from Six studies included for pooled analysis, The study found that rhomboid flap excision surgeries had the lowest rates of disease recurrence (P = 0.07), as well as significantly lower rates of wound infection (P = 0.001) and wound dehiscence (P = 0.01). However, there was no significant difference observed in pain scores, length of hospital stay, or time to return to daily activities compared to other surgical methods (Horwood *et al.*, 2012).

CONCLUSION

1. Rhomboid flap procedures generally take longer than simple closure surgeries, with significant differences in operative times observed between the two techniques.
2. Rhomboid flap procedures are linked to lower postoperative pain levels, as indicated by patients' VAS scores, as well as shorter drain durations, reduced hospital stays, and faster recovery times for returning to daily activities compared to simple closure surgeries.
3. Rhomboid flap procedures demonstrate lower rates of postoperative complications, including wound infection, wound disruption, poor cosmetic appearance, numbness around the wound, and recurrence, compared to simple closure surgeries.

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REFERENCES

Abu Galala, K. H. *et al.* (1999) 'Treatment of pilonidal sinus by primary closure with a transposed rhomboid flap compared with deep suturing: a prospective randomised clinical trial', *The European journal of surgery*, 165(5), pp. 468–472.

Doll, D. *et al.* (2008) 'Time and rate of sinus formation in pilonidal sinus disease', *International journal of colorectal disease*, 23, pp. 359–364.

el-Khadrawy, O. *et al.* (2009) 'Outcome of the rhomboid flap for recurrent pilonidal disease', *World journal of surgery*, 33, pp. 1064–1068.

Horwood, J. *et al.* (2012) 'Primary closure or rhomboid excision and Limberg flap for the management of primary sacrococcygeal pilonidal disease? A meta-analysis of randomized controlled trials', *Colorectal Disease*, 14(2), pp. 143–151.

Hosam, R. *et al.* (2010) 'Rhomboid flap versus primary closure after excision of sacrococcıgeal pilonidal sinus (a prospective randomized study)', *EJS*, 29, p. 4.

Jan, H. *et al.* (2015) 'Rhomboid Flap and the Pilonidal Sinus Disease', *Pak J Surg*, 31(1), pp. 16–19.

Kober, M.-M., Alapati, U. and Khachemoune, A. (2018) 'Treatment options for pilonidal sinus', *Cutis*, 102(4), pp. E23–E29.

Luedi, M. M. *et al.* (2021) 'Gender-specific prevalence of pilonidal sinus disease over time: A systematic review and meta-analysis', *ANZ journal of surgery*, 91(7–8), pp. 1582–1587.

Mahdy, T. (2008) 'Surgical treatment of the pilonidal disease: primary closure or flap reconstruction after excision', *Diseases of the colon & rectum*, 51, pp. 1816–1822.

McCallum, I. J. D., King, P. M. and Bruce, J. (2008) 'Healing by primary closure versus open healing after surgery for pilonidal sinus: systematic review and meta-analysis', *Bmj*, 336(7649), pp. 868–871.

Petersen, S. *et al.* (2002) 'Primary closure techniques in chronic pilonidal sinus: a survey of the results of different surgical approaches', *Diseases of the colon & rectum*, 45(11), pp. 1458–1467.

Urhan, M. K. *et al.* (2002) 'Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases', *Diseases of the colon & rectum*, 45, pp. 656–659.

Varnalidis, I. *et al.* (2014) 'Pilonidal sinus: a comparative study of treatment methods', *Journal of medicine and life*, 7(1), p. 27.

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