Zagazig University Medical Journal
www.zumj.journals.ekb.eg
https://doi.org/10.21608/zumj.2025.364676.3858 Volume 31, Issue 5, May. 2025
Manuscript ID: ZUMJ-2503-3858
DOI: 10.21608/ZUMJ.2025.364676.3858

ORIGINAL ARTICLE

Vacuum Assisted Versus Open Alone Technique for Treatment of Sacrococcygeal Pilonidal Sinus Disease

Ahmed Hamdy Hamad Daghash*, Wessam Mohammed Amr, Amr Abdelbaset Abdelaziz, Said Mohamed Negm
General Surgery Department, Faculty of Medicine, Zagazig University, Zagazig, Egypt

***Corresponding author:**
Ahmed Hamdy Hamad Daghash

Email:
Ahmedhamdydoc4545@gmail.com

Submit Date: 01-03-2025
Accept Date: 27-03-2025

ABSTRACT

Background: Since many cases of pilonidal disease end in an open wound following extensive excision, many techniques have been developed over time to aid in the healing of intricate open pilonidal wounds. Long-term daily dressings and a delayed return to regular life are linked to open wounds. The use of vacuum-assisted wound healing equipment has been one of the other tactics. This method is linked to a quicker recovery period and a shorter time frame before returning to a regular life. In this study, we therefore sought to evaluate the effectiveness and safety of the vacuum-assisted open approach in the treatment of pilonidal disease.

Methods: This prospective, randomized comparative clinical trial was carried out at the Department of General Surgery in Zagazig University Hospitals and Elmbra Insurance Hospital, from Jan 2024 to Jan 2025 on 26 symptomatic simple chronic sacrococcygeal pilonidal sinus. Patients were divided into: group I; conventional open technique, packing wound with gauze and lay open to heal with secondary intention, and group II; vacuum assisted open technique.

Results: Postoperative follow up showed clinically better outcome (no infection of recurrent) in vacuum group than open alone, while statistically no significant differences between studied group.

Conclusions: Sinus resection combined with closed negative pressure drainage of the wound is more effective in the treatment of sacrococcygeal pilonidal sinus than simple sinus resection and suture. It can effectively return time of patients, reduce the incidence of postoperative complications, and result in small postoperative scars, good aesthetic effects, and higher patient satisfaction.

Keywords: Vacuum Assisted; Open Alone Technique; Sacrococcygeal Pilonidal Sinus.

INTRODUCTION

One of the most prevalent surgical conditions that is frequently seen in routine general surgical practice is sacrococcygeal pilonidal disease (SPND). The Latin terms pilus and nidus, which imply hair and nest, respectively, are the sources of the phrase "pilonidal" [1]. The prevalence of pilonidal sinus illness varies greatly around the world. According to a thorough analysis of research conducted between 1833 and 2023, incidence rates in communities larger than 200,000 people varied between 7 and 300 instances per 100,000 people, and men are two to four times more likely than women to get it [2].

Its etiology is influenced by three primary factors: the existence of hair, skin

susceptibility, and a force that directs the hair into the skin [3]. Infection, trauma, and hair being lodged in the deep tissues of the coccyx region are the main causes of pilonidal sinus. This issue is particularly prevalent during puberty, when sebaceous gland activity and hair development are at their highest [4].

It is regarded as a debilitating illness that significantly impairs quality of life. Only the history and physical examination are used to make the diagnosis [5]. Acute or chronic infection of the subcutaneous fatty tissue, primarily in the natal (inter-gluteal) cleft, is known as pilonidal illness. Redness, edema, and discomfort are possible symptoms. A fever is uncommon, although fluid drainage is another possibility. Some pilonidal cyst sufferers have no symptoms [6].

Infections are usually treated by making an incision and draining it just off the midline. Recurrence may be avoided by shaving the affected area. If the illness returns, more involved surgery might be needed. Usually, antibiotics are not required. The illness could persist for a long time if treatment is not received [7]. Although there is disagreement on the ideal degree of excision, methods, and preferences for attempted primary closure, as well as the management of open wounds after excision, wide full excision of the aberrant tissue continues to be the most common treatment [8].

Wound closure carries a higher risk of postoperative recurrence, despite the fact that it is frequently linked to a superior healing rate than the open approach. In order to improve patient outcomes, a lot of work has been done to improve the wound healing process in open techniques [9]. Negative pressure wound therapy, which includes vacuum drainage, is thought to improve circulation and oxygenation to the wound edges, reduce bacterial colonization, reduce wound edema, drain the exudate from the open wound, and speed up wound healing [10].

METHODS

The Department of General Surgery at Zagazig University Hospitals and Elmbra Insurance Hospital conducted this prospective, randomized comparative clinical trial on 26 patients with simple chronic sacrococcygeal pilonidal sinus symptoms between January 2024 and January 2025. Group I of patients had the conventional open technique. Using group II: Vacuum aided open technique and secondary intention, the wound is packed with gauze and left open to heal. Approval was obtained from Zagazig University Hospitals Institutional Review Board (IRB). IRB#:11355-31-12-2023. Informed written consent was obtained from all patients.

Inclusion criteria were; patients older than eighteen, simple chronic sacrococcygeal pilonidal sinus with symptoms, intricate pilonidal sinus and recurrent pilonidal sinus.

Exclusion criteria were; acute abscess of the sacrococcygeal pilonidal sinus, individuals suffering from coagulation and bleeding issues, patients that were uncooperative or mentally ill and patients that declined to take part in the research.

Every patient who was part of the study had their complete medical history taken, including whether they had a primary or recurrent PNS. They also had a comprehensive examination. All participants underwent a thorough physical examination that included a general condition assessment, laboratory tests including complete blood count (CBC), international normalized ratio (INR), liver and kidney functions, random blood sugar, and viral markers, as well as local examination and vital signs like blood pressure, temperature, heart rate, and respiratory rate.

Surgical Procedures:

Preoperative shaving was done within 2 hours to avoid skin abrasions, surgical clippers, not razors, are used throughout the surgery. On the surgical table, patients received preventive antibiotics (1 gm. ceftriaxone IV) while under spinal anesthesia. After putting the patients in the prone position, the buttocks were separated using strips of adhesive tape that were secured to the sides of the operating table. Short pieces of adhesive tape were then applied at a right angle to the underlying layer to reinforce the strip's attachment site to the buttock skin,

creating a T-shaped pattern that exposed the natal cleft and anal verge. A 10% povidone iodine solution was used to disinfect the skin of the back and buttocks. Surgical curtains were used to keep the anus out of the operating field.

To properly remove the sinus and all of its ramifications without unintentionally contaminating the wound by opening the track, methylene blue dye was injected into the sinus orifices to aid in determining the length of the sinus.

In order to allow the wound to granulate from its base, a wide excision of an elliptical wedge of skin and subcutaneous tissue down to the pre-sacral fascia is intended to eliminate all inflammatory tissue and debris. Both the mouth and the base of the incision were wide enough in the excised dimensions to provide easy packing. The base itself was about the same size as the wound mouth and was comparatively flat.

To prevent skin irritation, a black foam dressing was inserted into the wound cavity, followed by an airtight adhesive dressing that was attached to a device that continuously applied 125 mmHg of negative pressure.

Post-operative follow-up:

Group I (conventional open technique) underwent removal of gauze pack on the 2nd or 3rd day, daily dressing, weekly follow-up till closure occurs and follow-up of recurrence within 6 months. Non-healing cases were reported.

Group II (vacuum assisted open technique) underwent immediate VAC in cases with complete hemostasis, application of VAC with 1st dressing if complete hemostasis not applicable, two times/weekly change of VAC, weekly follow-up till closure occurs and follow-up of recurrence within 6 months. Non-healing cases were reported.

Statistical analysis:

SPSS statistical software, version 27 (IBM, Chicago, Illinois, USA), was used to conduct statistical analysis. The Kolmogrov-Smirnov test was used to determine whether the data was normal. The Fisher exact test was used to compare qualitative data, which were presented as numbers and percentages, and the independent t test was used to compare quantitative data, which were presented as means and standard deviations. Consequently, the p-value was deemed significant at the <0.05 level.

RESULTS

Group I's age ranged from 21 to 40 years, while Group II's ranged from 18 to 41 years, with respective means of 28.7 and 25.9 years. In group I, the vast majority of participants were male, and all of the cases had main PNSD (Table 1). Studied groups showed comparable prevalence of HTN and DM obesity (Table 2). In the current study, stage 2 and stage 3 were the most common stages, and hair density was similar in both groups (Table 3).

Perioperative data showed that the average operating duration was 35.5 minutes, with a range of 30 to 42 minutes. Group I's hospital visits lasted between one and two days, with an average of 1.3 days, but Group II's hospital stays lasted between two and three days, with an average of 2.1 days. Group II's hospital stays were statistically significantly longer (Table 4).

Although there were no statistically significant differences between the groups under study, postoperative follow-up revealed that group II had a clinically better outcome (no infection or recurrence) than group I (Table 5).

Group II in the current study displayed a much lower number of dressings than Group I, although at a significantly higher expense (Table 6). Group II demonstrated a noticeably quicker return to daily activities and a significantly shorter healing period (Table 7).

Table 1: Comparison of demographic data of studied groups

		Group I		Group II		P-Value
		mean	SD	Mean	SD	
Age in years **Range**		28.7 21-40	6.5	25.9 18-41	6.9	0.3
		N	%	N	%	
Sex	**Male**	12	92.3	8	61.5	0.08
	Female	1	7.7	5	38.5	
Occupation	**Long time setting**	9	60.2	10	76.9	0.1
	Short time setting	4	30.8	3	23.1	

Independent t-test; Fisher exact test

Table 2: Comparison of co-morbidity in studied groups

	Group I		Group II		P-Value
	N	%	N	%	
HTN	2	15.4	1	7.7	0.5
DM	3	23.1	2	15.4	0.5
Obesity	5	38.5	7	53.8	0.5

Fisher exact test; * significant

Table 3: Comparison of hair density between studied groups

		Group I		Group II		P value
		N	%	N	%	
Local hair density and distribution	**Stage 0**	1	7.7	1	7.7	0.98
	Stage 1	2	15.4	2	15.4	
	Stage 2	4	30.7	3	23	
	Stage 3	5	38.5	6	46.2	
	Stage 4	1	7.7	1	7.7	

Fisher exact test

Table 4: Comparison of perioperative data of studied groups

	Group I		Group II		P-Value
	mean	SD	Mean	SD	
Hospital Stay (days) **Range**	1.3 1-2	0.5	2.1 2-3	0.3	**0.01***

Independent t-test; * significant

Table 5: Comparison of post-operative complications

	Group I		Group II		P-Value
	N	%	N	%	
Infection	3	23.1	0	0	0.1
Bleeding	0	0	2	15.4	0.2
Recurrence	2	15.4	0	0	0.2

Fisher exact test

Table 6: Comparison of cost and number of dressings between studied groups

	Group I		Group II		P-Value
	mean	SD	Mean	SD	
Number of dressings	32 26-37	3.8	10 8-12	1.7	**0.001***
Cost (L.E)	4800	570	7000	1190	**0.001***

Independent t-test; * significant

Table 7: Comparison of healing time between studied groups:

	Group I		Group II		P-Value
	Mean	SD	Mean	SD	
Time to healing (Wks) **Range**	8.3 7-10	1.3	4.7 4-6	0.8	**0.001***
Time to return to daily activity (Wks)	5.2	1.1	3.6	0.7	**0.001***

Independent t-test; * significant

DISCUSSION

26 pilonidal sinus patients were randomly assigned to two groups of 13 each in the current study. The patients' ages and genders were matched, and there were no statistically significant differences between the groups.

Because most Egyptian guys are hairy, the majority of participants were men [8]. The fact that El Mbara Hospital only accepts patients who have full-time jobs (i.e., all females are workers) may also account for the higher number of females in this study.

The operating time ranged from 30 to 42 minutes with an average of 35.5 minutes for the open group and from 45 to 65 minutes with an average of 52.1 minutes for the vacuum group.

Because of the time difference for applying the vacuum dressing, our data showed that the operation time in the vacuum group was significantly longer than in the open ordinary approach. Contrary to our findings, Banasiewicz et al., [11] discovered no variation in operative time between the two groups. This was because it took a while for our group to set up the vacuum aided closure (VAC) set, which prolonged the operating time.

In the vacuum group, hospital visits were statistically significantly longer, ranging from 2 to 3 days with a mean of 2.1 days, whereas in the open groups, hospital stays varied from 1 to 2 days with a mean of 1.3 days. In contrast to our findings, a study by Gabor et al. [12] found that some patients in the vacuum group were discharged 6 hours after the initial pain assessment, which was a significantly shorter length of stay than those who received postoperative incisional care with gauze dressings, where the length of hospital stay following the excision procedure ranged from 18 to 30 hours. Additionally, Abdu et al., [13] found that the average hospital stay for the vacuum group was one day, with a range of one to two days.

In the current investigation following surgery, the vacuum group had a clinically better outcome (no recurring infection) than the open group, but there were no statistically significant differences between the groups under study.

There was no significant difference (P > 0.05) in the postoperative recurrence rate between the two groups, which may be related to the limited sample size in our study.

According to the study's findings, the vacuum group experienced a 0% occurrence ratio of postoperative infection, which was much lower than the open group's 23%. This implies that, in comparison to simple sinus resection, sinus resection in conjunction with wound-closed negative pressure drainage might effectively reduce the incidence of postoperative infection in the treatment of sacrococcygeal pilonidal sinus. Strugala & Martin, [14] discovered that, in accordance with our findings, VAC therapy reduces post-operative infectious complications in pilonidal illness more than the open surgical approach. López et al., [15] discovered that a recurrence rate of roughly 10% and surgical site infection made open surgery for pilonidal disease considerably more difficult, which was consistent with our findings. Bianchi et al., [16] discovered that, in accordance with our findings, the use of NPWT in pilonidal disease considerably reduces complications such seroma and infections as compared to the conventional open surgical approach.

Chmielecki et al., [17] discovered that using NWPT after surgery reduces the rate of complications in patients of pilonidal illness, which is consistent with our study's findings. In agreement with our results Yousef et al., [8] revealed in their research that a typical open group was linked to infections and repeated cases.

A previous systematic review conducted by Ubbink et al., [18] observed that, according to the data from the 13 trials that were included, open vacuum drainage did not result in quicker wound healing as compared to controls. According to Biter and colleagues, there was no discernible improvement in other postoperative outcomes or a significant acceleration of wound healing when vacuum drainage was used to open PND wounds. When compared to open excision alone, a prior meta-analysis has demonstrated that vacuum treatment is effective in accelerating the healing process of open PND wounds, which contrasts with earlier studies [19]. The vacuum group in our study required less time (4.7 weeks) to fully recover than the open group (8.3 weeks). Banasiewicz et al., [11] discovered that VAC therapy required less postoperative time for full healing, which is consistent with our findings.

Unlike our finding Biter et al., [20] discovered that the VAC group and the normal open approach did not differ in the amount of time needed for full healing, which is inconsistent with our findings. However, they did find a notable decrease in the size of the wound within the first two weeks following surgery, which is consistent with our findings.

Danne et al., [21] show that using VAC or NPWT therapy improves healing, particularly in the first two weeks after surgery, and that recurrence rates are lower as compared to normal laying open operations, which is consistent with our findings. Also, Yousef et al., [8] In line with our findings, the vacuum group's healing period was noticeably shorter than the open group's. In study of Gabor et al., [12] When compared to the control group, the vacuum group's recovery period was noticeably shorter (23.8 vs. 57.9 days). The finding of Abdu et al., [13] confirm our findings that the suction groups' wounds healed completely in roughly five weeks (4-6 weeks).

According to our research, group B saw an early return to regular daily activities, a large decrease in the frequency of dressings, and a considerable increase in patient satisfaction. Banasiewicz et al., [11] discovered that using VAC dressings speeds up the wound's granulation process, reduces inflammation-related edema, resolves pain, improves patients' functional comfort, and clearly makes it easier to resume full activity, all of which are consistent with our findings.

Hussain et al., [22] discovered that certified medical personnel must visit patients who are provided with a portable NPWT device up to once every 48 hours. In addition to checking that their device usage is acceptable and consistent with our findings, this is mostly for dressing changes.

Yousef et al., [8] revealed the same findings as our vacuum group, which were linked to an early return to regular daily life and less frequent dressing. In contrast to the open group alone, individuals in the vacuum group in the current trial were generally satisfied with the ascitic result of the wound. The study's findings imply that, as compared to open, primary midline incisions in the intergluteal groove, the use of vacuum may improve favorable outcomes (such as reducing postoperative pain, the number of dressings, and the time to heal) following excision.

The relatively small sample size of this study limits its applicability to the general population; larger sample sizes will be required for future research. Comparing with other facilities helps get over the prejudice in patient selection.

CONCLUSIONS

Sacrococcygeal pilonidal sinuses respond better to sinus resection and closed negative pressure drainage of the wound compared to simple sinus excision and suture. It can successfully shorten recovery times, lower the risk of problems following surgery, and produce minimal scarring, pleasing aesthetics, and increased patient satisfaction.

Conflict of Interest: None.

Financial Disclosure: None.

REFERENCES

1. Harries RL, Alqallaf A, Torkington J, Harding KG. Management of sacrococcygeal pilonidal sinus disease. Int Wound J. 2019 Apr;16(2):370-8.
2. Agron Dogjani A, Fiss F, Rustem CELAMI A, Catena F, Andrew BAKER F, Jorgensen J, et al. Study size impact on accuracy of the worldwide incidence of pilonidal sinus. AJTES, 2024; 8(2), 1432–8.
3. Mahmood F, Hussain A, Akingboye A. Pilonidal sinus disease: review of current practice and prospects for endoscopic treatment. Ann. Med. Surg. 2020 Sep 1;57:212-7.
4. Ahmadinejad M, Ahmadi K, Ahmadinejad I, Hashemian AM, Khademhoseini P. A comparison between the tie-over and closed suction drainage therapeutic strategies in patients suffering from sacral pilonidal sinus. J. Biomed. Sci.: IJBS. 2016 Dec;12(4):149.
5. Kallis MP, Maloney C, Lipskar AM. Management of pilonidal disease. Curr. Opin. Pediatr. 2018 Jun 1;30(3):411-6.
6. Kraft CT, Khansa I, Janis JE. Practical management of pilonidal disease. Plast Reconstr Surg. 2020 Dec 1;8(12):e3270.
7. Zabaglo M, Sharman T. Postoperative Wound Infection. Clin. Infect. Dis., Second Edition, 2022; 729–33.
8. Ahmed Yousef El-Tohfa Y, El-Deen Abd El-Azeem Zayed E, Mohammed MS, El-Fattah A. Comparative study between vacuum assisted open excisions versus open alone in treatment of complicated pilonidal sinus. Al-Azhar Intern. Med. J. 2020 Jul 1;49(3):1303-12.
9. Niederstätter IM, Schiefer JL, Fuchs PC. Surgical strategies to promote cutaneous healing. Med. Sci. 2021 Jun 16;9(2):45.
10. Normandin S, Safran T, Winocour S, Chu CK, Vorstenbosch J, Murphy AM, et al. Negative pressure wound therapy: mechanism of action and clinical applications. SEMIN PLAST SURG. 2021 Aug;35(3):164-70. Thieme Medical Publishers, Inc..
11. Banasiewicz T, Bobkiewicz A, Borejsza-Wysocki M. Portable vac therapy improve the results of the treatment of the pilonidal sinus–randomized prospective study. Pol. Med. J. 2013 Jul 1;85(7):371-6.
12. Gabor S, de Lima Favaro M, Pedroso RF, Duarte BH, Novo R, Iamarino AP, et al. Pilonidal cyst excision: primary midline closure with versus without closed incision negative pressure therapy. Plast. Reconstr. Surg. Glob. Open. 2021 Mar 1;9(3):e3473.
13. Abdu ME, Fareed AM, Shetiwy M, Aziz MA, Mahmoud MM. A comparative study between the closed tie-over and open vacuum suction drainage procedures in patients with sacrococcygeal pilonidal sinus disease. Egypt. J. Surg. 2022 Oct 1;41(4):1746-53.
14. Strugala V, Martin R. Meta-analysis of comparative trials evaluating a prophylactic single-use negative pressure wound therapy system for the prevention of surgical site

complications. Surg. Infect. 2017 Oct 1;18(7):810-9.
15. López JJ, Cooper JN, Halleran DR, Deans KJ, Minneci PC. High rate of major morbidity after surgical excision for pilonidal disease. Surg. Infect. 2018 Aug 1;19(6):603-7.
16. Bianchi E, Lei J, Adegboyega T, Shih SS, Berrones M, Purdy S, et al. Negative pressure wound therapy is beneficial in the treatment of pilonidal disease. J. Am. Coll. Surg. 2018 Oct 1;227(4):e109-10.
17. Chmielecki J, Ferenc J, Banasiewicz T. The role of negative pressure wound therapy in the treatment of pilonidal disease. Negat. Press. Wound Ther. J. 2019 Apr 4;6(1):14-7.
18. Ubbink DT, Westerbos SJ, Nelson EA, Vermeulen H. A systematic review of topical negative pressure therapy for acute and chronic wounds. Br. J. Surg. 2008 Jun;95(6):685-92.
19. Suissa D, Danino A, Nikolis A. Negative-pressure therapy versus standard wound care: a meta-analysis of randomized trials. Plast. Reconst. Surg. 2011 Nov 1;128(5):498e-503e.
20. Biter LU, Beck GM, Mannaerts GH, Stok MM, van der Ham AC, Grotenhuis BA. The use of negative-pressure wound therapy in pilonidal sinus disease: a randomized controlled trial comparing negative-pressure wound therapy versus standard open wound care after surgical excision. Dis Colon Rectum. 2014 Dec 1;57(12):1406-11.
21. Danne J, Gwini S, McKenzie D, Danne P. A retrospective study of pilonidal sinus healing by secondary intention using negative pressure wound therapy versus alginate or gauze dressings. Ostomy Wound Manage. 2017 Mar 1;63(3):47-53.
22. Hussain F, Bramham B, Parveen S, Chakaravarty B. Pilonidal sinus: Surgical outcome of lay open versus primary closure technique. Pathog. 2018;8(2):9-12.

Citation

Daghash, A., Amr, W., Abdelaziz, A., Negm, S. Vacuum Assisted Versus Open Alone Technique for Treatment of Sacrococcygeal Pilonidal Sinus Disease. *Zagazig University Medical Journal*, 2025; (1741-1748): -. doi: 10.21608/zumj.2025.364676.3858