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A new surgical approach for pilonidal sinus disease: De-epithelialization technique

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Abstract--Background: Different techniques, including conservative therapy and a fasciocutaneous rotation flap, are utilized to treat pilonidal sinus illness. This study's objective was to assess the effectiveness of "de- epithelialization technique" as a novel method for managing pilonidal sinus condition. Patients and Methods: Forty patients with pilonidal sinus illness who had de-epithelialization therapy were assessed. Age, gender, BMI, number of operations, length of hospital stays, visual analog scale scores, complications, and recurrent rates for each patient was assessed. Results: In this research, there were 37 male patients and 3 female patients. The patients' average age was 26.52 years, and their average BMI was 24.58. The average procedure lasted 63.23 minutes, and the majority of patients were released the same day. Healing times for wounds ranged from 9 to 14 days. Two individuals with high body mass indices had wound dehiscence and infection. Post-operative hematoma was found in only one patient. Throughout the follow-up period, no patient had seromas or a recurrence. Conclusion: With satisfactory cosmetic results and recurrence rates, "de-epithelialization" may be used in conjunction with other therapies for

pilonidal sinus illness. Keywords: De-epithelialization, flap, natal cleft, pilonidal sinus disorder, sacrococcygeal area.

Keyword--surgical approach, pilonidal sinus, de-epithelialization technique.

Introduction

Pilonidal sinus disease (PSD) is a frequent condition affecting the sacrococcygeal area (1). The stated prevalence rate is 6 per 100,000 people (2). The etiopathogenesis, however, is yet unknown. Additionally, some scholars have lately asserted that it is an acquired illness (3, 4). The treatment of the pilonidal sinus is still debatable, and various surgical techniques have been used. There is no agreement on a particular treatment, however, and rates of complications and relapses vary (1, 5, 6). The major variables to be taken into account to build an optimum treatment approach are practical surgical approach, reduced duration of hospital stay, rapid recovery time, less postoperative problems and discomfort, and low rates of relapse (1).

When the pilonidal cyst and surrounding healthy tissue are removed using any technique (flap or main closure), a cavity is left behind. This cavity needs to be filled or sealed in order to prevent complications like "dead space," hematomas, wound infections, and wound separation in the early postoperative period (7, 8). The primary disadvantage is the complexity of wound healing. Hypoesthesia and aesthetic issues with the sacrococcygeal area are often seen, particularly with flap techniques, at the late stage (9). This procedure is known as a cutaneous layer flap or graft (10). his technique is often used for mammaplasty by cosmetic surgeons. Basically, in this technique, the cutaneous flap and fatty tissue are reversed to generate the breast protrusion after the cutaneous tissue has been de-epithelialized (11).

The present work aimed

Describe the condition and the "de- epithelialization procedure" as a novel strategy for managing Pilonidal sinus disease.

Patients and Methods

Prospective research involved 40 patient who have PSD, were treated with de-epithelialization method as a new technique. The same surgeon performed the surgeries on each patient. In order to assess the method. We included both males and females aged from 18 to 60 years old with denovo Uncomplicated PSD. We avoided situations of complex pilonidal sinuses such infected sinus cavity abscess and recurring illness. The pre operative assessment for patients included sex, age, body mass index (BMI). The intra operative assessment for patients included operationtime. A visual analog pain scale was used to measure pain at 24 hours, wound healing time, and surgical problems such as wound dehiscence, infection, seroma, and hematoma. These factors were included in the postoperative evaluation for patients.

Surgical Procedure

The patient was positioned prone with the buttocks taped apart to reveal the natal cleft. After using povidone iodine to sterilize the skin, 20 mL of 2 percent prilocaine was administered to the sacrococcygeal region around the surgery site. Then, a sterile solution of methylene blue was administered through a plastic cannula to define the tract. After that, a flat intergluteal incision was made that was about 5 cm long and extended deep into the postsacral fascia. The cutaneous and some subcutaneous tissues around the pilonidal cyst and tract were retained; however they were exposed and removed along with the surrounding healthy fatty tissue. The top and lower points of the intergluteal incisions, which included sinus orifices, served as the upper and lower limits of an elliptical intradermal incision of partial thickness. Thus, by exerting traction force with the scalpel blade at a 90-degree angle to the surface, much like "peeling an orange," this ellipsoid region was simply de-epithelialized. The opening was fitted with a drain. The opening in the tract was used to insert the drain. In the beginning, 0 nonabsorbable sutures were used to sew the de-epithelialized skin edge, presacral fascia, and the opposite reciprocal free edge, respectively. The de-epithelialized incision was then reversed and stitched with 3/0 nonabsorbable sutures to create reciprocal overlap. Finally, 3/0 nonabsorbable sutures were used to seal the wound. De-epithelialized skin was therefore used to invert the pilonidal cyst's cavity.

Follow up

Outpatient follow-up was obtained through subjective assessment of the length of postoperative hospitalization, pain score at 24 hours (utilizing VAS), wound healing time, postsurgical consequences (Dehiscence of the wound, infections, seroma, and hematoma), cosmetic outcomes was also recorded (1 to 5; 1=worst result, 5=best result), and recurrence were retrospectively assessed from the hospital data. The patients were called and invited to the clinics throughout the follow-up duration.

Statistical Methods

The statistical software for the social sciences (SPSS) version 28 was employed to code and input the data (IBM Corp., Armonk, NY, USA). Quantitative data were summarized utilizing the mean, standard deviation, minimum and maximum, while categorical data were summarized employing frequency (count) and frequency (%).

Results

This method was used to operate on forty individuals. 37 of the total cases included men (92.5 percent). While only three cases were females (7.5%) (Table 1).

Table 1
Feature of the patients regarding the gender

		Count	%
Gender	F	3	7.5%
	M	37	92.5%

The mean age of the patients was 26.52 ± 4.87 years (18-37 years) and median BMI was 24.58 ± 3.13 (19-32). The median operation time was 63.02 ± 9.66 min (47-88 min) (Table 2).

Table 2
Demographic results and patient features

	Mean	Standard Deviation	Minimum	Maximum
Age (Years)	26.52	4.87	18.00	37.00
BMI	24.58	3.13	19.00	32.00
Operation time (minutes)	63.23	9.66	47.00	88.00

With a median hospital stay of 1.03 ± 0.16 days, all patients had surgery under local anesthetic and were all released on the first postoperative day. Wound healing time ranged from 9 to 14 days with a median 11.48 ± 1.58 days (Table 3). The postoperative 24-hour visual analog pain scale (VAS) rating was 3 for 11 patients (27.5%) and 4 for 11 additional patients. The average level of cosmetic pleasure was 4.55 ± 0.68 (1 point for the worst cosmesis and 5 points for the best). In all cases, we saw that the de-epithelialization approach flattens the natal cleft (Table 3).

Table 3
Post-operative stay, pain and wound healing

	Mean	Standard Deviation	Minimum	Maximum
Post operative Hospital stay (days)	1.03	0.16	1.00	2.00
Pain VAS	3.33	1.29	1.00	6.00
Wound healing (sutures removal) (days)	11.48	1.58	9.00	14.00

None of the patients experienced a seroma or recurrence. While two patients (5%) complicated with wound infection, and two patients (5%) complicated with wound dehiscence, and only one patient (2.5%) complicated with hematoma (Table 4).

Table 4
Post operative complication

		Count	%
Wound dehiscence	+	2	5.0%
	-	38	95.0%
infection	+	2	5.0%
	-	38	95.0%
seroma	-	40	100.0%
hematoma	+	1	2.5%
	-	39	97.5%
Recurrence (6 months)	-	40	100.0%

Discussion

The surgical procedure known as "de-epithelialization" has been used effectively in mammoplasty since the 1970s by cosmetic and reconstructive surgeons (12, 13). Many uncommon indications have been treated with this method in a variety of specialized fields. Yang et al (14) employed this after removing the tumor surgically to repair oral and/or oropharyngeal abnormalities. Additionally, Lee et al. (15) By applying a de-epithelialized cutaneous graft from the wound's margins, finger deformities with exposing tendon or bone were repaired. Balat et al. (16) acquired a successful outcome while treating vulvar cancer with a de-epithelialized rhomboid flap. Another instance was the successful use of a de-epithelialized Belman (external pudendal superficial artery) flap for penile reconstruction on a patient with Peyronie's disease (17). A musculocutaneous serratus anterior flap was used to remove bronchopleural fistulas in a case series by Park et al. (18) after epithelization. Furthermore, a right ventricular rupture associated with sternal wound infection was repaired utilizing a described previously de-epithelialized myocutaneous latissimus dorsi flap (19).

Gupta et al. (20) revealed that it was a fantastic idea to use a de-epithelialized flap for the additional covering of the created neourethra in the correction of hypospadias after Snodgrass urethroplasty. Many alternative methods have been labeled as PSD treatment approaches throughout the years. For instance, Thompson et al. (21) suggested removing midline skin pits quickly and easily without making large incisions. Similarly, several publications recommended therapeutic ablation of cavity epithelia with phenol or radiofrequency as a less invasive method in place of cyst removal (22, 23). Washer et al. (24) suggested the use of the considerably more intricate flap technique known as gluteal fascial advancement as the ideal treatment for PSD. There is no agreement on the "gold standard" surgical technique in this book. Of course, the surgical technique used will depend on the patient's health and the surgeon's skill. However, it is generally agreed that the ideal PSD therapy should be based on concepts like a simple and painless procedure, quick hospital release, few postoperative problems, and also low rates of recurrence.

In most published research, the total success percentage of phenol treatment ranges between 67 and 95 percent (22, 25). Khan et al. (26) revealed in their

investigation, the relapse rate after the main closure approach was found to be 8%. According to Dass et al. (27) prospective randomized trial, the Limberg flap may be successful up to 100% of the time. In the case study of Yildiz et al. (28) who conducted the Karydakis flap operation, relapses were found in 2% of patients. Despite the very short median follow-up period in our data, no patient had a relapse during that time. The de-epithelialization technique's resultant flattening of the natal cleft may be the key factor contributing to the low recurrent rate. In fact, Yildiz et al. (28) have previously identified the optimum therapy for PSD as aiming to flatten the natal cleft and promote lateralization. But after a longer follow-up time, the data will need to be reassessed.

Wide excision with flap repair is often carried out in practice under spinal anesthesia, and patients must stay in the hospital for at least one night (5). De-epithelialization is a less intrusive technique that may be carried out while a patient is under local anesthesia, avoiding the risks associated with spinal anesthesia and enabling patients to leave the hospital the same day as the treatment. Additionally, compared to other excisional operations, the average operative time is shown to be substantially shorter (63.02 ± 9.66 min). For example, in randomized research by Dass et al. (27), the median operation time for primary closure was 44 min; in the randomized research by Khan et al. (29), the median operation time in the excision+ primary closure group was recorded as 55 min and in the excision+ Limberg flap group as 70 min.

Hemostasis, seroma, and wound infections are known to increase the likelihood of relapse (30). Kırkıl et al. (31) showed that risk of complications for the Limberg flap groups with and without drainage were 17.8% and 29.6%, respectively. Käser et al. (32) showed The proportion of total complications was 12 percent in the excision-only group and 49 percent in the Limberg flap group. In the research of Arslan et al. (30), Patients who had the Karydakis flap operation experienced a 15.4 percent wound dehiscence rate and a 19.8 percent seroma development rate. In our series, we saw no seroma, only 2.5 percent hematoma development, and 5 percent wound infection, all of which led to wound dehiscence and were managed by leaving the wound's exposed area for secondary healing. The reduction of the cavity by flipping the de-epithelialized skin graft and preventing the seroma and/or hematoma, wound infections, and dehiscence brought on by dead space were thought to be the sources of the positive results in the early stages. The average BMI of our research group was discovered to be 24.58 ± 3.13 , which is at the upper limit of the normal range. Therefore, bigger series should be used to assess the relationship between BMI and wound consequences.

In their research, Krkl et al. (31) questioned the effectiveness of cavity drainage after comparing the risk of complications of the drained and undrained Limberg flap groups. Here, the authors asserted that surgical site problems in the Limberg flap method for PSD were unaffected by regular drain administration. In every instance, we used an aspiration drain with the intention of preventing intracavitary seroma and/or hematoma, although a controlled randomized trial is needed to more accurately assess the drain's efficacy. According to Akca et al. (33) randomized clinical research, the average pain VAS score was 4 in the group receiving excision and primary closure compared to 2 in the group receiving rhomboid excision and Limberg flap method. In the Limberg flap group and the

excision alone group, Käser et al. (32) reported that the mean pain scores upon discharge were, respectively, 2.4 and 2.5. Dass et al. (27) emphasized the link between wound tension and a higher pain VAS score and said that primary closure was a more painful method. In our research, the average pain VAS score was determined to be 3 (with a range of 1-6), which is consistent with the pain ratings of previous surgical procedures mentioned. But as anticipated, less intrusive methods like radiofrequency appear to result in less postoperative discomfort (34).

Arslan et al. (35) Patient satisfaction in the first year after surgery was rated as "outstanding," "good," "not bad," and "poor," respectively. At the conclusion of the first year, the percentages of "excellent" and "good" patient satisfaction across all flap groups (Karydakis flap, modified Limberg, and Limberg) were 74 percent, 78 percent, and 70 percent, respectively. In our research, 25 of the 40 patients said they were "excellently" satisfied with their aesthetic results (score: 5). One patient only had a "poor" score of two. No patient said the cosmetic outcomes were "extremely terrible" (score=1). Only studies looking at less invasive procedures like phenol application or cavity ablation revealed improved patient cosmesis (5, 34).

Study Limitations

Our research has several limitations. It is retrospective in nature and has a brief follow-up time frame. Additionally, the exclusion of complex patients was a limitation of this research; as a consequence, bigger randomized trials should be conducted to further analyze the outcomes of the de-epithelialization procedure in problematic PSD cases. Another drawback was the absence of a prospective comparison between the stated strategy and a commonly used alternative technique; this prevented the evaluation of any novel ideas without a control group. However, there are several descriptions of numerous surgical procedures in the literature, including marsupialization, Karydakis, oblique primary repair, and flap approaches. Consequently, this could not be seen as a total constraint. mortalities.

Conclusion

De-epithelialized flap produced a healthy, new dermal bed with great vascularity. As a result, by promoting faster wound healing, some issues such wound separation may be avoided. We also intended to use this approach in PSD surgery to flip de-epithelialized tissue in order to reduce the cavity left behind after excision. De-epithelialization of skin is also simple. Our innovative method has reduced postoperative morbidity and shortens hospital stays and surgery times. The lack of a hospital stay need is this technique's main benefit. It lowers expenditures and enables a speedier return to regular activities. Additionally, we think that by adjusting the natal cleft's angle during this procedure, the likelihood of recurrence may be decreased. Additionally, this approach yields a pleasing visual result.

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