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ORIGINAL ARTICLE

RHOMBOID FLAP VERSUS SEMICLOSURE METHOD IN TREATMENT OF RECURRENT PILONIDAL SINUS

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ABSTRACT

Background: One of the most important surgical issues in the treatment of pilonidal sinus disease is recurrence.

Aim of the work: The aim of this study is to compare two surgical techniques (rhomboid flap and semi closure method) for treatment of recurrent pilonidal sinus.

Patients and Methods: This randomized clinical trial was conducted in Zagazig University Hospitals the work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans between the period of Aug 2018 to Feb 2019 on 12 patients with recurrent pilonidal sinus, divided randomly into 2 groups: Group A 6 patients managed by semi closure method and Group B 6 patients operated with rhomboid flap method.

Results: There was a significant difference regarding pain duration, time of comfort sit, total time of healing and time of return to work between the two groups for the favor of group B which was markedly short in patients of group B. according to post-operative complication regarding delayed wound healing and wound infection had no significant difference between group A and group B. Regarding post-operative recurrence, follow up of both groups done during postoperative care and at time of 2nd, 3rd, 4th and 6th post-operative months. Only one case of group B had recurrence with no recurrent cases reported during the 6 post-operative months in group A .

Conclusions: Patient of group B shows decreased pain duration, time need for comfortable sit and early return to work. There no significant difference between the 2 groups in post-operative complications. Rhomboid flap repair is an advantageous and effective modality than semi closure method in treatment of sacrococcygeal disease.

Keywords: Rhomboid Flap , Semi closure method, Recurrent Pilonidal Sinus .



INTRODUCTION

A pilonidal sinus, also referred to as a pilonidal cyst or sacrococcygeal fistula, is a cyst near or on the natal cleft of the buttocks that often contains hair and skin debris [1]. A sinus tract, or small channel, may originate from the source of infection and open to the surface of the skin. Material from the cyst may drain through the pilonidal sinus. A pilonidal cyst is usually painful, but with draining, the patient might not feel pain [2]. One proposed cause of pilonidal sinus is ingrown hair. Excessive sitting is thought to predispose people to the condition because they increase pressure on the coccyx region [3]. Trauma is not believed to cause a pilonidal sinus; however, such an event may result in inflammation of an existing cyst. However there are cases where this can occur months after a localized injury to the area. Some researchers have proposed that a congenital pilonidal dimple may cause a pilonidal cyst [4] .

Excessive sweating can also contribute to the cause of a pilonidal cyst and sinus. Moisture can fill a stretched hair follicle, which helps create a low-oxygen environment that promotes the growth of anaerobic bacteria, often found in pilonidal sinuses. The presence of bacteria and low oxygen levels hamper wound healing and exacerbate a forming pilonidal cyst and sinus [5]. Usually, the pilonidal sinus patient is afebrile and nontoxic. Local examination of sacrococcygeal area may show a relatively unremarkable opening of the sinus tract, but, the patient has typical findings of an abscess, including redness, warmth, local tenderness, and fluctuance with or without induration. Loose hair may be seen projecting from the site [6]. Treatment may include antibiotic therapy, hot compresses and application of depilatory creams [7]. In more severe cases after surgical excision of the sinus tract, the wound may be left opened to granulate, closed by primary

closure or with some forms of flaps, or partly closed by marsupialization. Primary closure of the defect of the resulting wound cavity is often complicated by early or late break down and recurrence in 20%-40% [8]. In addition, the postoperative period may be complicated with discomfort and pain because the closure is not always tension-free. Wounds left open take many weeks to heal, require daily nursing care and recurrence rate is not low [9]. The main causes of recurrence after surgical management of pilonidal sinus disease are the possible results of incomplete resection, postoperative dead space, excessive flap tension, chronic inflammation, trauma and the nature of body hairs and skin. Midline incision and deep intergluteal sulcus could particularly cause to the poor results. [10] and [11]. Karydakakis [12], Surgery aims to obliterate the natal cleft and thereby the rolling action of the buttocks. Described a technique of asymmetrical closure with excellent results. Ambulatory surgical treatment have come into vogue including; Bascom's operation performed under local anesthesia. Transposition flaps have been described which effectively obliterate the crease and thereby neutralize the causative factors, which lead to a vicious circle of infection and recurrence [5]. Compared two techniques for the primary closure of the defect after excision of the pilonidal sinus. The first is the transposition rhomboid flap and the second is deep suture technique. He confirmed that primary closure after excision of pilonidal sinus using rhomboid flap is an effective procedure, it is superior to deep suturing technique as regard hospital stay, wound complication, and return to the work and recurrence [13]. Ghareb et al., [14], assessed the treatment of chronic pilonidal sinus with semi-closure technique in term of effectiveness, healing time, complications and recurrence rate after surgery. They concluded that semi-closure technique for treatment of pilonidal sinus appears to be a simple, effective procedure with a low morbidity with a lower chance of recurrence. The aim of this study is to compare two surgical techniques (rhomboid flap and semi closure method) of treatment of recurrent pilonidal sinus.

METHODS

This randomized clinical trial was conducted between the period of Aug 2018 to Feb 2019 in Zagazig University Hospitals. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans. Twelve patients with recurrent sacrococcygeal pilonidal sinus were enrolled in this study divided randomly into 2 groups A and B. **Inclusion criteria:** Patient age >18 years and <45 years. All patient with

recurrent pilonidal sinus who previously underwent sacrococcygeal pilonidal sinus operation using open or primary closing method.

Exclusion criteria: Patient who previously underwent sacrococcygeal pilonidal sinus operation using flap techniques. Diabetic patient. HGB <10g/dl. Platelet count <105/ μ l. Patient on anticoagulant treatment **Method of study: The patients were subjected to the following:**

History: A detailed history was taken time and technique of the previous pilonidal sinus operation, time of recurrence, duration of symptoms, occupation, and similar condition in the family.

Examination: local examination of the recurrent sinus for the number of openings or discharge.

Investigations: The following investigations were performed for all patients: Complete blood count. Bleeding and clotting time. PT, PTT, INR. Liver and kidney functions. Blood sugar (fasting and post prandial). Hepatitis marker **Patient preparation:**

All patients were admitted to the hospital the day before operation and were subjected to routine preoperative check-up and a written informed consent from them for ethical consideration. On the day of operation, the patients were shaved all hairs around the natal cleft. **Maneuver description:**

Operative technique in both groups A and B: The process of surgery was explained to all patients. The operation was done under spinal anesthesia in a prone position. A single dose of 3rd generation cephalosporin (Ceftriaxone 1gm) and metronidazole drip was given intravenously 30 min before surgery. The skin was disinfected with 10% povidone iodine. The anus was excluded from the operative field by surgical drapes. I.V. cannula is inserted inside the sinus and methylene blue dye will be injected inside the sinus cavity. **Figure (1) Group A (Semi closed technique):** An elliptical incision done around the track, then the whole ellipse containing the sinus tracks excised down to the sacrococcygeal fascia, then after complete hemostasis the lower half of the wound is closed in two layers. Leaving the upper half of the wound without closure as a drain to be closed by granulation tissue (second intention). **Figure (2)**

Postoperative care and follow up: All patients of both groups were discharged one day after operation. Ceftriaxone IM/24h and metronidazole 500 tablets twice daily were prescribed as a post-operative prophylaxis and ibuprofen 400mg tab twice daily as pain killer. In case of infection ciprofloxacin and clindamycin were prescribed until control of infection Instructions for home dressing were given for each patient. **Group A (Semiclosed technique)** (wound washing with normal saline was ordered twice a day and classic dressing with absorbent sterile cotton gauze after disinfection with 10% povidone iodine). **Group B**

(rhomboid flap technique) Take care of suction drain, sleeping on prone position and no sitting on the flap till removal of the suction drain. Postoperative wound evaluation was done in the outpatient clinic (**Figure 3**) every 3 days for the first 12 days and every 5 days for the next 12 days and then every week till complete healing is achieved, wound debridement (for group A) was also done weekly and whenever necessary in order to remove the necrotic tissues or to evaluate the flap situation. All data related to the patients of the two groups were collected regarding complications (surgical site infection and recurrence), the duration of post-operative pain by detecting the day at which the patient stop taking pain medication and time to return to work.

ETHICAL CLEARANCE

Written Informed consent was taken from the patient to participate in the study. Approval for performing the study was obtained from general surgery departments, Zagazig University Hospitals after taking Institutional Review Board (IRB) approval

STATISTICAL ANALYSIS

The collected data were computerized and statistically analyzed using SPSS program (Statistical Package for Social Science) version 18.0. Qualitative data were represented as frequencies and relative percentages. Chi square test was used to calculate difference between qualitative variables.

RESULTS

Intraoperative data According to intraoperative data the mean intraoperative time of semiclosure method was 32.36 minutes while the mean time in rhomboid flap technique was 65.12 minutes. No patient had intraoperative bleeding during performance of semiclosure technique while 2 patients had intraoperative bleeding in rhomboid flap group. (Table1) Data shows significant difference in favor of semiclosure method (Table1)

Postoperative follow up: In the postoperative period there was a significant difference between group A and group B in favor of group B. Regarding time of sitting (in days) with a mean of (19.7 and 11) respectively, toilet sitting with a mean of (20.5 and 11.8) respectively, pain duration with a mean of (18.5 and 9.5) respectively, time of complete healing with a mean of (24 and 18.5) respectively and return to work with a mean of (28-22.7) respectively (table 2).

In this comparison high statistically significant of data in (Comfort sitting - Toilet sitting - Pain duration - Complete healing - Return to work) due

to high variation between groups of different method as shown in table (2). **Postoperative complications:** The number of cases had postoperative complications of both groups A & B as regarding wound infection (2-2) respectively, delayed wound healing (3-2) respectively with no statistically significant of data in both groups as the results are in close range between each other. According to recurrence, which not found in group A all over the time of study (6 months) and only one case of group B (16.6%) represented with pain at time of 4 months after surgery and complicated with sinus formation with discharge at time of 6 months after surgery with no significant difference (table 3).

DISCUSSION

Pilonidal sinus is a disease that most commonly arises in the hair follicles of the natal cleft of the sacrococcygeal area. Incidence is reportedly 26 per 100 000 population, affecting males twice as often as females and predominantly young adults of working age with mean age of 21[15]. Pilonidal sinus usually presents as an abscess or a chronically discharging, painful sinus tract. Irrespective of the mode of presentation the painful nature of the condition causes significant morbidity, often with a protracted loss of normal activity. The ideal therapy would be a quick cure that allowed patients to return rapidly to normal activity, with minimal morbidity and a low risk of complications[16]. Three major parameters should be considered before choosing the appropriate treatment strategy for pilonidal disease: the recurrence rate, the wound infection, and the healing of the resulting cavity or surgical wound. Recurrence rate varies with the technique[17]. It was reported that the recurrence rate for excision and healing by open granulation comparing with excision with primary closure was 3.8-9% and 19-23.5% respectively[18]. In our study, Intraoperative mean time of semiclosure technique was 32.36 minutes compatible with results of **Ghareb et al [14]**, While some other studies reported longer time as **Abdelraheem and Magdy study [19]**. In rhomboid flap technique it takes longer time with mean 65.12 minutes resemble data of **Singh et al.,[20]** and **Shabbir et al ., [21]**. According to the postoperative follow up data in our study, the pain duration, time needed to comfortably sit and the mean healing time in group A(18.5 days) , (19.7 days) and (24 days) respectively was longer than in groups B (9.5 days), (11days) and (18.5 days) respectively, similar to many previous studies as **Mohamed Rabea study [22]** and **Ghareb et al.,[14]**. The patients undergoing rhomboid flap method were encouraged to return to work as early as possible. The mean time before return to work was

significantly shorter in this group (22.7 days) compared with the other group (28 days) similar to study results of **Horwood et al.,[23].Gencosmanoglu et al., [24]** said that the minimal wound care required after the first postoperative week did not undermine the quality of life of the patients. our results seem to be in discordance with those of **Perruchoud et al., [25]**, who reported an average healing time of 72 days and an average time before return to work of 38 days in patients who had undergone total excision and open granulation compared with 28 days, after semiclosure of the wound. Similarly, **Fuzun et al., [26]**, reported that the time to return to work was significantly shorter following total excision with primary closure compared with that after total excision and secondary healing.**Eryilmaz [27]** said that the rhomboid flap procedure was indicated for complex and recurrent cases, but now it has been recommended as a first line management of chronic sacrococcygeal pilonidal sinuses. Furthermore, the early postoperative surgical outcome of our patients showed that the reported incidence of wound infection, wound dehiscence and delayed wound healing were less among the flap group series in comparison with the other group but with no significantly difference unsupporting the hypothesis that type of surgical intervention may affect the rate of wound infection more than the use of antibiotic prophylaxis stated in studies of **Fuzun et al., [26]** and **Z.Matar [28]**, we suggest that may return to factors related to the

patient himself such as hirsute body, obesity or bad hygiene. However, Many other current studies documented similar reported results **Khan et al., [29], Akin et al.,[30], Tavassoli et al.,[31], Singh et al.,[20]** and **Dass et al., [32].Akin et al., [30], Singh et al., and Jamal et al., [33]** in their studies used vacuum drains after rhomboid flap to abolish the dead space and to prevent complications such as hematoma, seroma and recurrence. In our study we used suction drains. Smaller number of studies reported that there was no significant difference between the use of drains or not on the surgical outcome. **Mentes et al., [34]** and **Erdem et al., [35]**. Rhomboid flap technique involves creation of a flap to facilitate primary closure and to obliterate the deep natal cleft [32].During the follow up period of 6 months, our results showed that recurrence occurred in one patient only in the flap group (16.6%) and no recurrence reported during the 6 post-operative months in group A. with no significant difference due to our study limitations included: relative small sample size, use of subjective evaluation, and the short period of our study (6 months) limit the further evaluation of any other recurrence possibility recurrence in both groups. However, **Ghareb and his co-workers[14]** who reported zero recurrent cases in his study after 12 months of post-operative follow up of 24 patients with chronic pilonidal disease six of them represented with recurrent pilonidal sinuses, all treated with semiclosure method.

Table (1): Intraoperative data of both Groups

Items	Group A	Semi-closure	Group B	Rhomboid flap	Statisticaly significant
Intraoperative time (minutes)	32.36±1.2		65.12±1.6		Sig
Intraoperative bleeding	0		2		Sig

Table (2): Post-operative follow up

Symptoms	Semi-closure method	Rhomboid flap	P Value	Statistically significant
Post-operative following (mean ± SD)				
Pain duration (day)	18.50± 2.74	9.5 ± 4.46	0.0018	Sig.
Comfort sitting (day)	19.7 ± 2.25	11 ± 3.63	0.0006	Sig.
Toilet sitting (day)	20.5 ± 2.07	11.8 ± 3.6	0.0005	Sig.
Complete healing (day)	24 ± 2.68	18.5 ± 3.73	0.0150	Sig.
Return to work (day)	28 ± 3.03	22.7 ± 2.88	0.0108	Sig.
Patient complains	----	1 from cosmetic appearance		

Table (3): Post-operative complications and Recurrence follow up

Variable	Semi-closure method	Rhomboid flap	P Value	Statistically significant
Post-operative complication (%)				
Wound infection	2(3.33)	2 (33.3)	1	N. S
Delayed wound healing	3 (50)	2 (33.3)	0.5582	N. S
Wound dehiscence	0	0	1	N. S
Recurrence follow up (%)				
2 months	0	0	-	-
3 months	0	0		
4 months	0	1 pain		
6 months	0	1 pain + discharge		

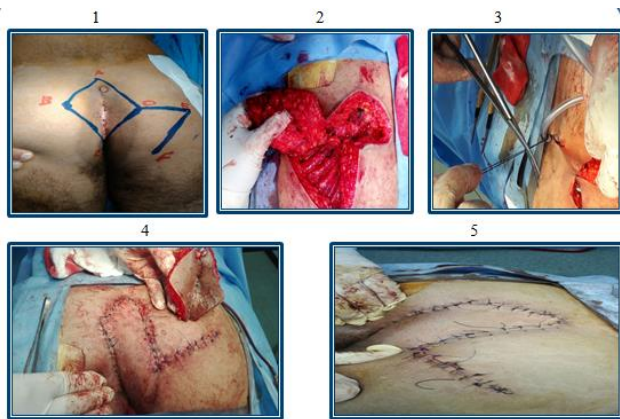


Figure (1): Steps of Rhomboid Flap Technique

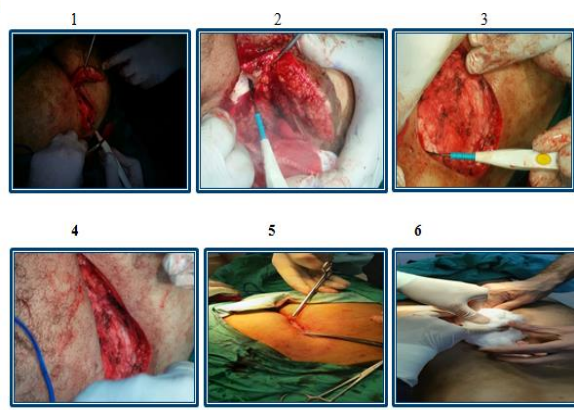


Figure (2): Steps of Semiclosure Technique



Figure (3): Postoperative wound evaluation of both techniques

CONCLUSION

Patient of group B shows decreased pain duration, time need for comfortable sit and early return to work. There no significant difference between the 2 groups in post-operative complications. Rhomboid flap repair is an advantageous and effective modality than semiclosure method in treatment of sacrococcygeal disease.

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