ORIGINAL ARTICLE

Comparative Study of Outcome of Simple Excision with Primary Closure versus Rhomboid Excision with Limberg Flap for Sacrococcygeal Pilonidal Sinus

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ABSTRACT

Background: Pilonidal sinus is a chronic intermittent disease that typically affects the sacrocygeal zone. It usually affects young and middle-aged males. For more than a century, surgeons have have been using different treatment modalities to treat this disease, including both simple and complex procedures like laying open of tract, simple excision, marsupialization, karydakis procedure and limberg flap closure.
Aim: To compare the outcome of rhomboid flap excision versus ellipticalexcision in primary closure for management of patients undergoing surgery for sacrococcygeal pilonidal sinus.
Methods: A Randomized controlled trial was conducted in West Surgery Ward, Department of Surgery, Mayo Hospital, Lahore from August 17, 2016 to July 17, 2017. This study included 120 patients suffering acute primary sacrococcygeal pilonidal sinus. Patients were allocated randomly into groups A & B: One group included patients with Excision and primary closure while other included patients undergoing modified Limberg flap procedure respectively. Postoperative complications, length of hospital stay and duration of disease were recorded. Using SPSS v24.0 the data was entered and analysed..
Results: Overall mean age of the patients was 30.15±6.12 years. In Group-A & B, mean duration of disease was 14.82±3.34 and 7.67±1.73 days respectively. Mean hospital stay was 4.34±1.59 days in Group-A, while it was 3.43±1.10 days in Group-B. Comparing group A & B, rates of wound infection, edema and wound dehiscence were 8(13.1%) vs 3 (4.9%), 7(11.5%) vs 2 (3.3%) and 4(6.6%) vs 1(1.6%) respectively.
Conclusion: The outcome of rhomboid excision with limberg flap closure is safer for people having sacrococcygeal pilonidal sinus surgery than for elliptical excision with primary closure in terms of hospital stay, wound dehiscence, wound infection and oedema**.**
Keywords: Pilonidal sinus, simple excision, Rhomboid excision, limberg flap

INTRODUCTION

Pilonidal sinus is a blind ended track which leads to a cystic cavity and is lined by granulation tissue. Is is commonly situated in intergluteal cleft and usually contains loose hairs .Sacrococcygeal pilonidal sinus is problem commonly encountered by surgeons and constitutes a large portion of the patients treated worldwide in surgical clinics[1].

The etiology of the sinus varied with time from theory of its congenital origin to the development of acquired condition when sinus frequently appeared in soldiers driving jeeps during 2nd World War in the 20th century.[2] Continuous friction produced in the depth of the natal cleft tends to drive the hairs subcutaneously causing a foreign body reaction. This is superimposed by secondary infection with abscess formation which spontaneously erupts leading to formation of multiple discharging sinuses[3].

Pilonidal sinus commonly affects young adults after puberty. Peak incidence ranges from age of 16- 25 years with Male to Female ratio of 3:1. Pilonidal sinus after 40 years of age is rare[4]. It is a disease with prolonged course causing huge discomfort that can interfere with employment or education sometimes for prolonged period[5] Results of pilonidal sinus treatment are often unsatisfactory[6].

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Patients with chronic pilonidal sinus frequently pose the surgeon with a dilemma. Loss of tissue, involvement of fibrous tissue and prior excision attempts limit surgical options.[7] However, in several aspects, some procedures have been superior to others.[8] Incision and drainage, excision with open packing, excision with primary closure, cryosurgery, marsupialization, application of phenol and flap procedures done recently are some of the varied treatment modalities that have been studied for pilonidal disease[9].

Rhomboid excision followed by limberg flap repair is supported by current published literature over primary midline suture techniques for the treatment of primary pilonidal disease. Comparing flap with off midline repair needs more high-quality studies[10].

One randomized trial found that with primary closure (n=60) wound infection was 10% while with rhomboid flap excision (n=60), it was just 3.33%, edema was also high with primary closure (13.33% vs. 3.33%) as well as wound dehiscence (6.67% vs 1.67%) compared with rhomboid flap excision ($p<0.05$). Mean hospital stay was also longer with primary closure(3.6±1.6 days vs. 2.1±1.2 days) as compared to rhomboid flap excision($p<0.05$)[11].

Several clinical studies have reported similar rates[12,13,14]. Although numerous randomized clinical trials have evaluated different treatment options, no clear consensus has been reached as to the optimal medical or surgical management of pilonidal sinus disease.

We conducted a randomized clinical trial to evaluate the outcome of rhomboid flap excision followed by limberg flap repair versus ellipticalexcision with primary closure for management of patients undergoing surgery for sacrococcygeal pilonidal sinus.

MATERIALS & METHODS

With IRB approval, a RCT was carried out in West Surgical Ward, Department of Surgery, Mayo Hospital Lahore from August 17, 2016 to July 17, 2017 using probability simple random sampling technique. The sample size consisted of 122 patients (each group having 61 cases) was estimated with confidence interval of 90 per cent, 10% absolute precision with a percentage of rhomboid excision and limberg flap repair as 85%[14] and percentage of simple excision and primary closure as 89%[15] for patients undergoing sacrococcygeal pilonidal sinus surgery.

Study population included patients of age 20-40 years, either gender having primary sacrococcygeal pilonidal sinus (presenting with acute symptoms). While patients having recurrent chronic pilonidal sinus disease (on medical record),patients with bleeding disorder (PT>20sec, APTT>15secINR>2) and type I or II diabetics (fasting BSR >126 mg/dl, random BSR >200 mg/dl) were excluded from the study

122 cases fulfilling inclusion criterion were recruited in the study from Surgery Department, Mayo Hospital, Lahore after receiving approval from hospital ethical committee. Informed consent was granted. It also reported demographic data (including name, age gender, length of the sinus). Applying lottery method, patients were randomly allocated into two groups.

Patients in group A underwent excision of sinus followed by closure of wound primarily. The procedure started by making elliptical incision around the discharging sinuses and deepening the incision uptosacrococcygeal fascia and removing all the sinuses en bloc along with ellipse of surrounding tissue from skin uptosaccrococcygeal fascia. Closure started by placing deep absorbable sutures and subcutaneous sutures using vicryl 3/0. Skin was closed with interrupted mattress sutures using prolene 2/0. A separate incision was used to place suction drain at the end of procedure.

In group B, patients underwent a rhomboid excision followed by Limberg flap repair. The procedure started by making a rhomboid shaped incision lengthed equally on all sides including all the sinuses with inferior apex placed lateral to midline.The incision deepened upto gluteal fascia and rhombic area of skin and subcutaneous tissue including all sinuses excised. An equallylengthed rhomboid flap including skin, subcutaneous fat and gluteal fascia rotated from the adjacent gluteal area to cover the midline rhomboid defect without any tension.Deep absorbable suture to include to include fascia and fat were placed over a vacuum drain using vicryl 3/0 and finally the skin was closed with interrupted prolene 2/0 sutures. Neither group used methylene blue to identify the tracks. Before the incision, a single shot of antibiotic was given in all cases.

All surgeries were performed under GA by the researcher himself under the supervision of a supervisor having at least 4 years of experience. Patients were kept in ward postoperatively and noted for any oedema, redness, pus discharge or dehiscence. Duration of disease and stay in hospital were also recorded. Data was collected via a pre-designed proforma.

SPSS v24.0 was used to record and analyse the data. Quantitative variables such as age, hospital stay and period of illness were described as mean along with standard deviation. While qualitative variables like gender, wound infection, edema and wound dehiscence were presented by calculating frequencies and percentages. Categorical variables like gender, wound infection, edema and wound dehiscence were analyzed by Chi Square test. A p-value
<0.05 was labelled as significant.

RESULTS

This study included 120 patients suffering from acute pilonidal sinus disease. Patients were divided into two groups i.e. Group-A (Simple Excision) and Groups-B (Limberg Flap). Group-A included 31 (50.8%) males and 30 (49.2%) females , while in Group-B, males were 38(62.3%) and females were 23 (37.7%). The overall mean age of patients was 30.15±6.12 years. The mean age of the patients in Group-A was 27.49±5.79 years and 28.23±6.15 years in Group-B. Mean duration of disease was 14.82±3.34 days in Group-A patients , while it was 7.67±1.73 days in Group-B patients. Mean hospital stay was 4.34±1.59 days in Group-A patients, while it was 3.43±1.10 days in Group-B patients. Rate of wound infection was 8(13.1 percent) patients in Group-A as compared to 3 (4.9 percent) patients in Group-B. Edema occurred in 7 (11.5 per cent) Group-A patients, while it occurred in 2 (3.3 per cent) patients in Group-B. In Group-A, 4 (6.6%) patients had wound dehiscence, while in Group-B, one (1.6%) had wound dehiscence.

By applying the Chi-Square test, the difference between two groups was found to be statistically significant in terms of wound infection (p>0.014), edema (p>0.008) and wound dehiscence (p>0.017). Patients of Group-A are more likely to have these complications in comparison to the patients of Group-B.

Figure-1: Graphical presentation of Gender in Group-A

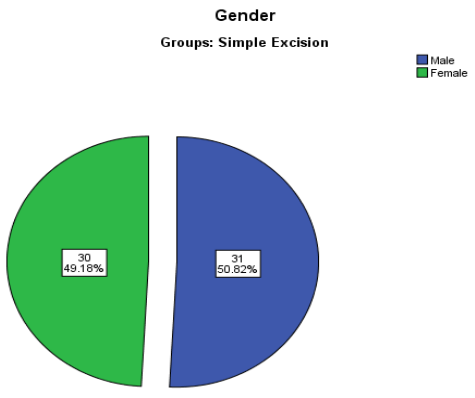

Figure-2: Graphical presentation of Gender in Group-B

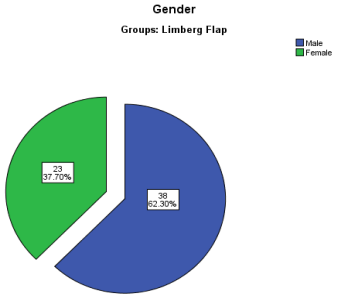

Figure-3: Graphical presentation of Wound Infection in Group-A

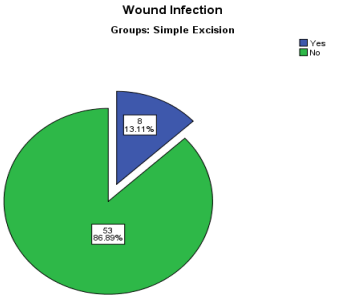

Figure-4: Graphical presentation of Wound Infection in Group-B

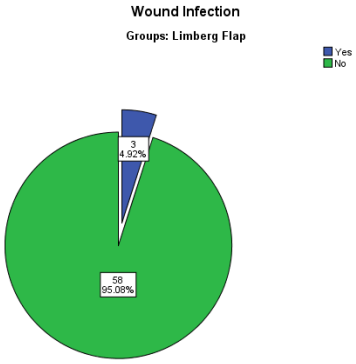

Figure-5: Graphical presentation of Edema in Group-A

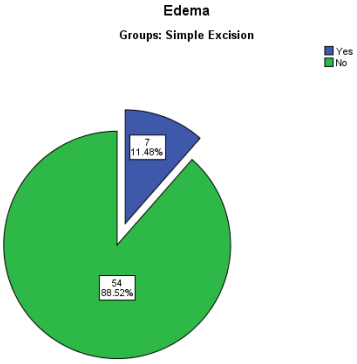

Figure-6: Graphical presentation of Edema in Group-B

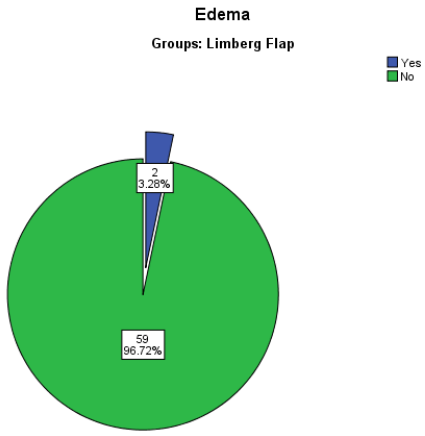

Figure-7: Graphical presentation of Wound Dehiscence in Group-A

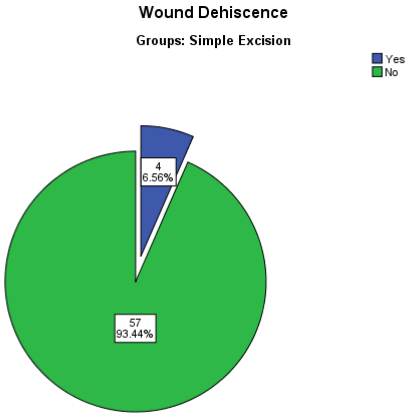

Figure-8: Graphical presentation of Wound Dehiscence in Group-B

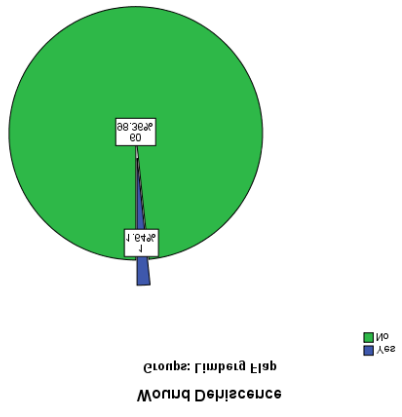

Table-1: Frequency distribution of different variables

Groups	Wound Infection	Frequency	%age
Simple Excision	Yes	8	13.1
	No	53	86.9
	Total	61	100.0
Limberg Flap	Yes	3	4.9
	No	58	95.1
	Total	61	100.0
Gender			
Simple Excision	Male	31	50.8
	Female	30	49.2
	Total	61	100.0
Limberg Flap	Male	38	62.3
	Female	23	37.7
	Total	61	100.0
Edema			
Simple Excision	Yes	7	11.5
	No	54	88.5
	Total	61	100.0
Limberg Flap	Yes	2	3.3
	No	59	96.7
	Total	61	100.0
Wound dehiscence			
Simple Excision	Yes	4	6.6
	No	57	93.4
	Total	61	100.0
Limberg Flap	Yes	1	1.6
	No	60	98.4
	Total	61	100.0

Table 2: Mean±S.D. of different variables

Groups	Statistics	Age	Duration of Disease	Hospital Stay
Simple Excision	n	61	61	61
	Mean	27.49	14.82	4.34
	Std. Deviation	5.79	3.34	1.59
	Minimum	20.00	10.00	2.00
	Maximum	40.00	20.00	7.00
Limberg Flap	n	61	61	61
	Mean	28.23	7.67	3.43
	Std. Deviation	6.15	1.73	1.10
	Minimum	20.00	5.00	2.00
	Maximum	40.00	10.00	5.00

Table-**3**: Comparison between groups and wound infection

Wound Infection	Groups		
	Simple Excision	Limberg Flap	Total
Yes	8(72.7%)	3(27.3%)	11(100%)
No	53((47.7%)	58(52.3%)	111(100%)
Total	61(50%)	61(50%)	122(100%)

P value 0.014

Table-4: Comparison between groups and Edema

Edema	Groups		Total
	Simple Excision	Limberg Flap	
Yes	7(77.8%)	2(22.2%)	9(100%)
No	54(47.8%)	59(52.2%)	113(100%)
Total	61(50%)	61(50%)	122(100%)

P value 0.008

Table-5: Comparison between groups and wound dehiscence

Wound Dehiscence	Groups		Total	p-value
	Simple Excision	Limberg Flap		
Yes	4(80%)	1(20%)	5(100%	0.017
No	57(48.7%)	60(51.3%)	117(100%)	
Total	61(50%)	61(50%)	122(100%)	

DISCUSSION

The varied surgical procedures suggested for eradicating pilonidal sinuses are evidence that this surgical problem requires a fully satisfactory method of management. Some of the surgical techniques relying on sound principles of surgery have certain benefits but in a large proportion of cases there is recurrence irrespective of the techniques used[16].

Excising the sinus completely is a common and widely adopted practice, but there remains controversy regarding treatment of wound following excision.[17] Varied surgical techniques have been developed for treating pilonodal sinus disease such as excision followed by primary closure, marsupialization, excision followed by open packing and procedures involving flap repair.[18] Ideal surgical procedure should reduce financial costs, have lower recurrence rate, should allow early return to work, minimize stay in hospital, be simple in technique and afflict less pain[19].

Regardless of controversy, broad excision and secondary intention healing is considerably popular among surgeons. The main advantage of this procedure is that it removes all the inflammed tissue and allows healing by secondary intention thus reduces the chances of recurrence, but it prolongs hospitalization and requires frequent dressing for longer period[20].

In comparison to marsupialization and open packing, excision followed by primary closure allows fast recovery and quicker return to work which in most cases is within 3–4 weeks.[21] But unfortunately it has reported higher rates of recurrence i.e., 7–42%[22–23]. However, rhomboid excision followed by closure with limberg flap has reported lower recurrence rates i-e 0-3% in several studies outweighing the disadvantages of unpleasant cosmetic look[24-26,17].

Hospital stays and time off work clearly demonstrated the increasing morbidity of surgical procedures. In our study, the mean hospital stay was 4.34± 1.59 in the primary closure group while for Limberg flap-treated patients the hospital stay was 3.42±1.1 days, which was less than 5.5 days for Limberg flap as reported by Rossi et al.[27] The gap between the groups was significant. Among the patients with Limberg flap repair, the time off work was slightly shorter compared to those with primary closure group i.e., 16.2±2.1 vs 21.6± 3.5 days. Abu Galalaet al[28] and Eryilmaz et al[25] reported similar results. Gilani et al[29] reported that the mean duration to return to work was 25.5 days after primary closure and Lieto et al[30] reported that the mean duration to return to work with rhomboid flap was 7 days. Muziet al[31] reported no significant difference.

Our study demonstrated significantly lower infection rates with limberg flap repair when compared with primary closure i-e 4.9% vs 13.1%. For infection rates, similar

results were reported in literature i-e 1.5–6 percent for Limberg flap,[25,32,33] and near 10% for primary closure which may possibly be due to increased tension along the suture line or occurence of serosanguinous collection leading to disruption of wound in primary closure[33,34].

Our study demonstrated lower rates of edema and wound dehisence with limberg flap repair when compared with simple excision and primary closure i.e., 3.3% vs 11.5% and 1.6% vs 6.6% respectively. Similar rates were reported by several authors[24–26,17,37]which demonstrates superiority of limberg flap repair over primary closure.

The prevention of recurrence is a prime concern with regard to pilonidal sinus surgery. As with the original sinus, recurrence mostly occurs in the midline as the birth cleft deepens following surgery creating an anaerobic medium which results in an increased anaerobic bacterial content.[35] In addition, hairs, debris and anaerobic bacteria are sucked into the subcutaneous tissue due to the vacuum effect created in the natal cleft among the buttocks.[36] Our favourable results after flap reconstruction are likely due the obliteration of the deep natal cleft. Lateralization or flattening of midline results in lower recurrence rates. Rhomboid excision followed by closure with limberg flap has reported lower recurrence rates i-e 0-3% in several studies outweighing the disadvantages of unpleasant cosmetic look.[24-26,17]

CONCLUSION

The outcome of rhomboid excision with limberg flap closure is safer for people having sacrococcygeal pilonidal sinus surgery than for elliptical excision with primary closure in terms of hospital stay, wound dehiscence, wound infection and oedema**.**

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