

Comparison of Z-plasty Versus Excision for Primary Treatment of Chronic Pilonidal Sinus

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Abstract:

Pilonidal sinus is a common chronic benign surgical condition affecting young males with thick, coarse body hairs, deep natal cleft and involved in profession requiring prolonged sitting like drivers.. It is associated with lot of distress and morbidity leading to loss of wages. There are many different modalities of surgical treatment of the disease and simple excision, followed by regular dressing for secondary healing is most commonly used method. Present study was designed to compare Z-plasty with simple excision in chronic pilonidal sinus. Z-plasty is associated with early healing (16.6 days versus 42.2 days) and low recurrence rate(6% versus 20 %). However, operating time (62.4 versus 34.8 minutes) and post-operative stay (8.4 versus 5.9 days) was slightly prolonged in Z-plasty.

Keywords: Pilonidal sinus; Z-plasty; Sinus excision; Asymmetrical closure.

Introduction

Mayo¹ first described pilonidal sinus in 1833 and Hodge (1880)² used the term "Pilonidal", originating from Latin word pilus which mean hair and nidus, meaning nest. It is a common

infective condition observed in young patients presenting clinically as single or multiple sinuses in the midline and/or lateral side of natal cleft with seropurulent discharge. Many theories have been put forward regarding etiology ranging from congenital to acquired reasons. Invasion of skin and subcutaneous by shaded body hairs in deep natal cleft is supposed to be the cause of sinus persistence. Therefore, hairy individual with deep natal cleft and those involved in prolonged sitting (jeep drivers)³ are commonly affected. Besides natal cleft, interdigital space, periumbilical region, chest wall, axilla, penis, perineum, anal verge, ear and scalp^{4,5} are other sites involved, though infrequently.

Pilonidal disease may be asymptomatic or clinically presents as an acute abscess, chronic abscess or as complex and recurrent sinuses. Cycle of acute infection, abscess formation, spontaneous rupture and closure of opening is repeated. Hairs may be projecting from orifice or lie in abscess cavity. The tract may be lined by granulation tissue or epithelium.

Treatment of pilonidal disease is challenging task for surgeons and primary aim of treatment is to adopt a procedure having quick recovery with minimum morbidity and recurrence. At the same time, it is also expected that the technique used for treatment is simple and can be practiced by majority of general surgeons i.e. should have shorter learning curve.

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Procedures ranging from simple excision to more complex reconstructive procedures for primary closure of defect following excision are being practiced. Each procedure has its own advantages and disadvantages.

Aims of the study:

Present study was thus aimed to evaluate primary treatment of chronic pilonidal sinus by excision followed by simple Z plasty for primary closure of wound as compared to excision followed by secondary healing.

Material and Methods

Total 150 patients admitted with a diagnosis of pilonidal sinus were subject of the study. Patients presenting with recurrent pilonidal sinus were excluded from the study. Post-operatively patients were followed up for a period of 18 months. Informed consent from patients were taken and the study design was approved by ethical committee of the institute.

Following regional anesthesia, all patients were put in prone/ Jackknife position with buttocks strapped by the side of operating table to open up natal cleft space. Methylene blue dye was used to delineate sinus tract and its branches for complete excision of the tract.

Patients were divided in two groups. 50 patients in Group A underwent excision of the sinus tract/s, hemostasis and wound was packed with gauze soaked in povidone iodine (10%) solution. From second day onwards, daily dressing was done till wound healed.

In Group B, 100 patients were subjected to excision and single Z- plasty was done for primary closure of wound with negative suction. Drainage was continued till drained amount is insignificant and skin stitches were removed on 10th - 12th postoperative day.

Results

Table 1: Age and Sex distribution.

Parameter	Group A	Group B
11-20 years	14 (28%)	16 (16%)
21-30 years	22 (44%)	54 (54%)
31-40 years	20%	18 (18%)
40 years	4 (8%)	12 (12%)
Mean age	24.56+6.8 yrs.	28.32+9.3 yrs.
Male: Female	11.51: 1	10.32: 1

Table 2: Occupation.

S. No	Occupation	Group A	Group B
1.	Drivers	24 (48%)	37 (37%)
2.	Students	25 (50%)	54 (54%)
3	Traders	1 (2%)	5 (5%)
4	Others	0	4 (4%)

Table 3: Hair density and depth of natal cleft.

Parameters	Group A	Group B
Thick & Coarse hair	44 (88%)	92 (92%)
Deep natal cleft	38 (76%)	86 (86%)

Table 4: Duration of symptoms.

Duration	Group A	Group B
< 1 month	14 (28%)	24 (24%)
1 - 6 months	26 (52%)	48 (48%)
6 - 12 months	6 (12%)	18%
>12 months	4 (8%)	10 (10%)

All patients had chronic discharging sinus as main symptom.

Table 5: Number and Location of External Openings.

Location	Number	Group A	Group B
Midline	Single	18(36%)	28 (28%)
Midline	Multiple	6 (12%)	17 (17%)
Lateral	Single	7 (14%)	8 (8%)
Lateral	Multiple	3 (6%)	7 (7%)
Midline & Lateral	Multiple	16 (32%)	40 (40%)

Table 6: Operating Time.

Group	Mean operating Time	P value
A	34.8 + 4.3 minutes	
B	62.4 + 7.8 minutes	< 0.0001

Table 7: Post-operative Hospital Stay.

Hospital Stay	Group A	Group A
4 - 6 days	30 (60%)	32 (32%)
7 - 9 days	20 (40%)	52 (52%)
10- 12 days	0	16 (16%)
Mean Hospital Stay	5.9 + 1.3 days	8.4 + 1.1 days
P value	< 0.0001 Significant	

Table 8: Total Wound healing time taken (in days).

Parameter	Limit	Group A	Group B
n		50	100
Mean		42.2 days	16.6 days
SD		6.3 days	4.8 days
95%confidence interval for mean	Lower limit	39.57	14.65
	Upper Limit	44.82	18.63
P value		<0.0001	
Significance		Highly significant	

Table 9: Post-operative Complications.

Complication	Group A	Group B
Wound Infection	12 (24%)	10 (10%)
Altered sensations	14 (28%)	26 (26%)
Recurrence	10 (20%)	6 (6%)
Seroma	0	16 (16%)
Flap Necrosis	0	4 (4%)
Wound Dehiscence	0	2 (2%)

Discussion

Herbert Mayo (1983) described the disease as a cyst that contained hairs just below the cccyx.¹ Hodge (1880) coined the term "pilonidal" from Latin word pilus, which means hair and nidus, means nest.² During World War II the condition was also known as "jeep disease" and was felt to be due to sitting for long periods in vehicles.³ Although natal cleft is the commonest site for pilonidal sinus, it has also been reported to occur in inter-digital space in barbers, sheep shearers⁶ and dog groomers.⁷ Rare occurrence as in finger-tip pulp⁸ and penis⁹ have also been reported.

In the 19th Century, congenital origin of the lesion¹⁰ was proposed but in a study on thousands of cases of pilonidal disease leaves no doubt to true acquired etiology.¹¹ Three factors that are involved in the hair insertion process: -

1. The invader consisting of loose hair;
2. A force that cause hair insertion;
3. The vulnerability of the skin to the insertion in the depth of natal cleft.

All races can develop the disease but it seems more common in those with dark & stiff hairs¹² Gravity and motion of the gluteal folds have been suggested as a cause of creation of vacuum that pulls on the follicles.¹³

72 % of Group A and 70% patients in present study were between 11 to 30 years (Table 1). Mean age was almost similar in both groups. Pilonidal disease commonly affects adult in the second & third decade of life. Pilonidal cysts are extremely uncommon after age of 45 year¹⁴ and the incidence usually decreases by age of 25 years. The average age of presentation is 21 years for men and 19 years for women. 98.9% of patients are in the age group of 15-60 years.¹⁵

Pilonidal disease in the general population has a male preponderance probably due to thick and dense body hairs. Male female ratio was 11.51:1 in Group A and it was 10.32:1 in Group B. Another

reason of male preponderance could be occupation involving long sitting like commercial vehicle driving is more commonly performed by males as compared to females. 48 % in Group A and 37% of Group B patients were driver by occupation in present study whereas nearly 50 % were students (Table 2).

Thick and coarse hairs were present in both group (88% and 92%) in Group A and B respectively (Table 3). More than 75 % of patients had deep natal cleft and both these factors are important etiological factors precipitating initiation of the disease process.

Duration of symptoms varies for month to years. Majority of patients i.e. 52 % in Group A and 48% in Group B had symptoms for one to six months whereas 28 % in Group A and 24% in group B presented within one month of symptoms.

Pilonidal disease consists of spectrum of entities ranging from asymptomatic hair containing cyst and sinus to a large abscess in the sacrococcygeal area. In a study of 1000 Turkish soldiers, 88 were having pilonidal sinus, 48 were symptomatic and 40 were asymptomatic.¹⁶ Half of the patients presents with an abscess.¹⁷ More commonly, patients present with chronic draining pilonidal sinus tracts as observed in present study where all patients had chronic discharging sinus in natal cleft with or without pain.

Usually, an opening is seen in the midline of natal cleft but there can be multiple sinus tracts & openings in midline as well as lateral to midline. 48 % of Group A and 45% of Group B patients had midline single or multiple opening whereas 20 % of Group A and 15% of Group B had lateral opening. Remaining patients had midline as well as lateral sinus openings at the time of presentation. All lateral openings were located within 2.5 cm of midline.

Primary aim of treatment of pilonidal sinus is to remove all sinus tract, early healing of wound with minimum morbidity in terms of operating time, hospital stay, early complete healing and therefore return to work with minimum recurrence. Ideal procedure should have primary closure of wound with scar away from midline, early healing with no pressure on scar while sitting and obliteration of natal cleft to avoid recollection of body hair in cleft and resulting recurrence. The procedure should have reproducible result, shorter learning curve and general surgeons should be able to perform surgery

Unroofing of all the sinus tracts and converting them to an open wound to heal by secondary intention is the oldest, simple and most frequently used method to deal with chronic pilonidal disease. Although it is technically easier, takes shorter operating time and patient is discharged from hospital with wound to be dressed daily for secondary healing but takes longer time for complete healing, resulting scar in midline with discomfort in sitting and high recurrence rate.

In different studies using this method with a follow up ranging from three months to 20 years, time taken for healing was 27 days to six weeks and recurrence rates ranged from 1% to 19%.^{17,18}

Various type of flaps is used for primary closure of wound with several advantages.¹⁹ All sinus tracts, infected cutaneous and subcutaneous tissue are removed and flaps are created for tension free closure of primary wound using healthy tissue. Excision and primary midline closure has the advantage of primary and early healing but scar is situated in a midline cleft with propensity to accumulate hair. The average healing time was two weeks (9-28 days) and 22% recurrence was reported.²⁰ In a collective series of 1129 patients' failure to achieve primary healing was observed in 16% with recurrence rate of 16%.²¹

An asymmetric scar, as in excision with Z-plasty is another option for management of pilonidal sinus. Since it diverts the sulcus from midline with resultant obliteration of natal cleft (planned with true physiopathology of the disease in mind), recurrence rate (1.6%) is likely to be low.^{22,23} In another study, recurrent disease appeared in 23.1% patients after traditional method of surgery and only 4% after Z-plasty.²⁴

In present study, operating time for excision was 34.8 +4.3 minutes whereas it was 62.4 +7.8 minutes in excision with Z-plasty (Table 6) and the difference was statistically significant. Mean Post-operative stay was 5.9 +1.3 days in Group A and 8.4+1.1 days in Group B (Table 7). This difference was also statistically significant. This indicates that operating time and post-operative stay were longer with Z-plasty as compared to excision only. But the patients are discharged with an open wound which needs prolonged outpatient nursing care till healing. Another study also reported that Z-plasty might increase the duration of hospitalization.²⁵

Total healing time taken in Group A was 42.2 days but it was 16.6 days in Group B. The difference was highly significant (Table 8). Literature also reported that healing time was considerably faster in

patients who were treated with Z-plasty technique of closure.²⁵ Sood commented that healing time with excision and Z-plasty operation are clearly less than those obtained by other procedures like excision only. With the exception of the Z-Plasty operation, other methods required considerable outpatient treatment time and were more susceptible to recurrence.²⁶

Post-operative complication specific to Z-Plasty were seroma (16%), Flap necrosis (4%) and wound dehiscence (2%). Wound infection was more common in Group A (24%) as compared to Group B (10%) (Table 9). Altered sensation at repair site was 26% in Group B as compared to 28 % in Group A. Altered sensation in flap is common after Z-plasty.²⁷

Avoidance of recurrence is major factor in assessment of result of any procedure. Only 6% had recurrence in Group B whereas it was 20 % in Group A. Various other studies have also confirmed that recurrence after Z-plasty is much less as compared to excision only.^{22,23,24,26}

Karydakis modified the technique with midline sinus being excised elliptically the entire suture line is positioned lateral to the midline with 0-1 % recurrence after a long follow-up from 2 to 20 years.¹²

Bascom devised an operation to reshapes the cleft, making it shallower, with the suture line displaced out of the fold called cleft closure.²⁸ However, the procedure is more complicated than Z-plasty.

Excision followed by skin grafting is another modality. Although low recurrence was reported with skin grafting²⁹ but it required longer hospitalization and breakdown of grafted area was common.

Unilateral or bilateral V-Y advancement flaps are used when the defect exceeds 10 cm. The flaps are composed of skin, fat and underlying gluteal fascia and involves considerable technical expertise for successful outcome.

The rhomboid flap starts by excising all sinuses down to the presacral fascia using a rhombic incision. The flap is rotated and secured. In a large series of 129 patients there was 5% recurrence rate at an average of two years follow-up. The average hospital stay of 5.3 days with no recurrences after a mean follow-up of 74 months was also reported with rhomboid flap.³⁰

The advantage of V-Y Advancement and Rhomboid flaps are flattening of the gluteal cleft with a large well-vascularized pedicle that can be sutured without tension. The most common complication is seroma or wound dehiscence.

The gluteus maximus myocutaneous flap is a large rotational buttocks flap. The procedure permits radical excision of all diseased tissue and fill the dead space with bulky, well vascularized and compliant tissue in large defects. On the negative side, musculocutaneous flap procedures are larger operations with long hospitalization and higher morbidity should wound dehiscence occur. They are best performed by reconstructive surgeons and should be reserved for patients who had multiple failure after different procedures.

In a study, five patients with recalcitrant pilonidal disease who had suffered for an average of 15 years and had undergone an average of six previous surgical procedures (3-13) were treated with this flap and all patients were disease free at 40 months. The average hospital stay was 13 days and total time off work was two months.³¹

Conclusions

Excision followed by primary closure of the wound by single Z-plasty have shorter healing time and therefore patient can return to work earlier. Recurrence rate is much lower as compared to excision only and the difference is statistically significant. However, it takes little longer operating time and hospital stay. The procedure is simple, can be practiced by majority of general surgeons with reproducible results. Hence, it is an ideal modality of treatment of simple pilonidal sinus as primary treatment.

However, procedures like V-Y advancement flap, Rhomboid flap, Limber's Flap and other myocutaneous flaps are useful for complicated and recurrent disease but they have steep learning curve and best performed by reconstructive surgeon.

Conflict of Interest : No conflict of interest.

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