ORIGINAL ARTICLE

A MORE SENSIBLE APPROACH FOR TREATMMENT OF PILONIDAL SINUS

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Aim: Evaluation of surgical management of pilonidal sinus using wide excision with primary closure with rotation-cutaneous flap.
Methods: This study included 30 patients with chronic pilonidal sinus. A vertical elliptical excision of the sinus down to the presacral fascia was done. A cutaneous skin flap of similar size and shape was raised horizontally over the gluteus muscle fascia. The flap was then rotated about its pivot point to the presacral defect and sutured with vertical mattress stitch of 3-0 polypropylene.
Results: Wound infection occurred in 2 (6.7%) patients, minor wound dehiscence occurred in 1 (3.3%) patient. No case developed haematoma, seroma or superficial flap necrosis. The mean healing period was 16.6± 2.9 days (range 12-21 days). The mean period off work was 21.2± 3.4 days (range 18-27 days). No case developed re-infection, failed healing or recurrence during the follow up period.
Conclusion: This technique is simple, reliable , placing the scars away from the midline and flattening the natal cleft – factors that help to prevent recurrence.

Keywords: Rotation-cutaneous flap, Natal cleft.

INTRODUCTION

Pilonidal sinus is a chronic intermittent disorder of the sacrococcygeal region and its treatment, usually surgical, remains controversial.[1] Factors implicated in its etiology are large buttocks with deep natal cleft,[1-3] adolescent or young males with positive family history, folliculitis at another site, obesity,[4] occupations requiring prolonged sitting, traveling or driving, excessive body hair,[5] and poor local hygiene.[6]

Though various modalities of treatment have been described, no consensus has emerged as all have met with varying degrees of recurrence.[7] The two main factors responsible for recurrence due to hair penetration: namely, the depth of the cleft and the presence of a portal of entry for hairs in the midline (the wound).[8]

Excision and healing by open granulation is one of the several procedures practiced since long. However, it takes months to heal and needs regular dressing and meticulous wound care. While excision with primary closure obviates a large wound, the incidences of complications, such as infection, wound dehiscence and recurrence, are very high.[9]

Complex procedures, such as closure by Z-plasty, rhomboid or myocutaneous advancement flaps, require expertise, long operation time and extended hospital stay.[10]

This study was designed to evaluate the results of surgical management of pilonidal sinus using wide excision with primary closure with rotation-cutaneous flap in term of morbidity, healing time , the consequent return to work & recurrence rate.

PATIENTS AND METHODS

This prospective study was conducted in General Surgery Department, Benha University Hospital over a period of 3 years, started April 2004 and comprised 30 patients (28 males, 2 females) within age range of 21-49 years presented with chronic pilonidal sinus disease. There were 18 recurrent, 7 extensive, 5 simple cases (presented with a single external opening). Patients with abscess or acute inflammation of the sinus tract were excluded off the study. Written consent was obtained before surgery from all patients after explanation & discussion of the procedure and possible complications of various surgical modalities for treatment of pilonidal sinus.

Preoperative preparation: Preoperative preparation included fluids only after lunch , rectal enemas in the afternoon & bathing on the night before the day of surgery. On the morning of the operation, the natal cleft was shaved and disinfected with chlorhexidine solution and covered with sterile gauze. All patients received a single dose of broad-spectrum antibiotics before induction of anesthesia.

Surgical technique: All operations were performed under general anesthesia, Patients were placed in a prone, jack-knife position with buttocks widely separated using adhesive tapes, and methylene blue was injected into the sinuses.

The surgical procedure is a modification of Nessar et al*[11] *technique:

- The site of the predetermined incision was marked vertically as an ellipse including all orifices and any existing granulation tissue, then at the planned donor site, a horizontal incision-site of identical shape and size to the vertical one was marked out with its midline point shared with the most caudal point of the vertical incision (Pivot point), (Fig. 1).
- An incision was made along the vertical elliptical landmark and was deepened down to the presacral fascia so as to remove all tracks and surrounding indurated tissues till a healthy, soft and supple wound margins was achieved (Fig 2). Gentle tissue manipulation and meticulous hemostasis was accomplished.
- Another incision along the horizontal elliptical landmark was made and deepened down to the gluteus muscle fascia but not including it, to prepare the required flap that adjusted to have length/width ratio of 2:1.
- Pivot point of the flap was assigned to be 1.5 cm in its midline end, then the flap was rotated along the pivot point so as to close the presecral defect (Fig 3).
- The flap was then sutured to the healthy skin margin of the vertical ellipse using vertical mattress stitch of 3-0 polypropylene. Each stitch included the presacral fascia so as not to leave a dead space (Fig 4).
- Suction drain was used and the flap donor area was sutured primarily with the same material in similar fashion (Fig 5).

The modifications I had made were:

- Creation of 1.5-cm pivot point in the lower corner of the flap (instead of 1-cm pivot point in Nessar et al technique).
- Single layer closure with no subcutaneous stitches (instead of 2 layers closure with the use of subcutaneous stitches in Nessar et al technique).
- Usage of suction drainage of the cavity (no drains were used in Nessar et al technique).

Postoperative care: Postoperative management included bed rest, low residual diet until the fifth postoperative day, and usual sanitary precautions, drain was removed when 24-hour drainage was less than 10 mL, usually by the fifth postoperative day , inspection of dressings on the fifth and eighth postoperative days, and suture removal was assigned to be at the 12th postoperative day.

All patients were discharged on the first postoperative day with oral pain medication. Instructions on discharge included avoidance of prolonged sitting until 4 weeks postoperatively to prevent wound disruption, improving local hygiene and regular removal of hairs by depilatory creams monthly (Fig. 6).

Healing period, defined as the time elapsed since end of surgery till complete wound healing without any residual open segments after stitches removal, and work-off period were determined.

The follow up was performed as outpatient clinic visits 2 & 4 weeks & 3 months after surgery and 6-monthly thereafter. Follow-up items included early complications; namely seroma or hematoma formation, wound infection or dehiscence and superficial flap necrosis, late complications including failed healing, recurrence or irregular scar tissue formation as scar hypertrophy or keloid formation.

Patients were inquired about their satisfaction regarding the operative outcome and their answers were graded as yes (+ve) or no (-ve) .

Statistical analysis: Data were analyzed using t-test and Chi-square test. Statistical analysis was conducted using the SPSS (Version 10, 2002) for Windows statistical package.

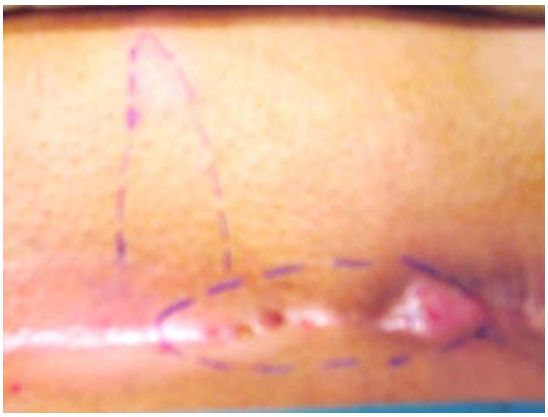

Fig 1. Marking the site of excision of the sinus and the horizontal elliptical flap before the operation .

Fig 2. Vertical elliptical excision of the sinus with all diseased tissue down to the presacral fascia.

Fig 3. Cutaneous skin flap of similar size and shape to the excised sinus was raised horizontally over the gluteus muscle fascia.

Fig 4. Rotation of the flap about its pivot point to the presacral defect and suturing it with vertical mattress stitch of 3-0 polypropylene including the presacral fascia in the stitches.

Fig 5. Suction drain was used & the flap donor area was sutured primarily with the same material in similar fashion.

Fig 6. Showing the scar formed post-operative with reduction of the depth of the concave natal cleft.

RESULTS

The study comprised 30 patients; 28 males and 2 females, with mean age 26.2 ± 1.5 years; range 21- 49 years Table 1.

Table 1. Distribution of the study group according to sex.

Sex	No.	%
Males	28	93.3
Females	2	6.7
Total	30	100

The mean operative time was 42.5 ± 4.3 minutes; range 36-50 minutes. In all cases, post-operative pain regression was observed after a few hours with a simple analgesic (non steroidal anti inflammatory) therapy.

In the early post-operative period ; wound infection was reported in 2 (6.7%) patients, minor wound dehiscence was reported in 1 (3.3%) patient, they were responded to conservative treatment by daily dressing & antibiotics; leading to delayed healing but this did not lead to established recurrence. No case developed haematoma, seroma or superficial flap necrosis Table 2.

Table 2. Early complications among the study group.

Early complications	No. (N=30)	%
Haematoma	0	0.0
Seroma	0	0.0
Wound infection	2	6.7
Wound dehiscence	1	3.3
Superficial flap necrosis	0	0.0

The mean healing period was 16.6 ± 2.9 days; range 12-21 days. In all cases partial obliteration of the natal cleft was achieved by primary wound closure with an acceptable scar tissue pattern except for the case with minor wound dehiscence which healed by an irregular scar .

The mean period off work was 21.2 ± 3.4 days; range 18-27 days. All patients completed the study and the follow up with no missing cases. The mean follow up period was 20.8± 8.1; range 10-34 months Table 3.

Table 3. Range and means ± standard deviations of different variables.

Variables	Range	X ± SD
Operative time (minutes)	36-50	42.5± 4.3
Period off work (days)	18-27	21.2± 3.4
Healing period (days)	12-21	16.6± 2.9
Patients' satisfaction (+ ve) = (No.= 27) (90%)		

In the late post-operative period; no case developed re-infection, failed healing or recurrence during the follow up period Table 4.

Table 4. Late complications among the study group.

Late complications	No. (N=30)	%
Failed healing	0	0.0
Recurrence	0	0.0
Re-infection	0	0.0
Irregular scar tissue formation	1	3.3

DISCUSSION

Surgical treatment of chronic pilonidal sinus by excision of the diseased tissue down to the presacral fascia is generally accepted but the management of the remaining defect is still a matter of debate. Many methods have been described such as (1) open excision; (2) primary closure and (3) excision and flap closure. Open excision and healing by secondary intention technique is associated with long hospitalization, wound dressing daily, increased postoperative morbidity, loss of work days and poor cosmetic outcome due to wide unacceptable scars.[12] Primary closure of the wound is a simple technique but it has a high recurrence rate due to continuing deep natal cleft.[13] Excision with local flap procedures have the lowest recurrence rates but they are more technically demanding and their use is generally restricted to recurrent complex pilonidal sinus.[14]

In this study, there was no recurrence in the flap method. This agree with Nessar et al,[11] Iesalnieks et al[13] and Lamk et al[15] who found no relapse following skin flap procedures. This could be explained by placing the scars away from the midline thus avoidance of portal entry of hairs in the midline (the wound) and flattening the natal cleft to reduce friction, local warmth, moisture and hair accumulation . This agree with Bascom & Bascom[2] who reported that pilonidal abscesses never begin on a convex surface and the primary source of surgical failures is the shape of the gluteal cleft, which creates the moist, warm, bacteria-friendly environment and thus reducing the depth of the concave fold that harbors the problem cures the disease.

Another factors that contributed to the prevention of late recurrence included: improved local hygiene by daily cleansing of the natal cleft with soapy water to clear all debris, foreign bodies, cotton and hair; and monthly removal of hair in the vicinity of the natal cleft either by shaving or by use of depilatory creams.

In this study , no case reported flap necrosis , this result goes in hand with Nessar et al,[11] Lamk et al[15] & Quinodoz et al[16] who reported no flap necrosis in 218 patients managed with sinus excision and rotation skin flap. To address the flap survival of the technique, not only the subdermal plexus but also some of the small

gluteal perforator vessels have contributed to its viability in penetrating through the fascia to the overlying skin.[17] In addition 1.5 cm pivot point in its lower corner has been used. This random pattern flap can be elevated and rotated to provide viable skin and subcutaneous tissue to close an adjacent wound.[11] Some surgeons had used perforator-based flaps for the reconstruction of lumbosacral defects after the excision of pressure sores or natal cleft.[18,19]

All patients in this study passed a smooth post-operative period, they were discharged on the first post-operative day. Though the pressure dressing permitted patients to lie prone or on either side, the supine position was preferred because the added compression decreased dead space and drainage and promoted flap adherence to the presacral fascia. They were able to join their duties after 21.2± 3.4 days. This was possible because of rotation flap procedure has the advantage of being tension-free closure which improves patient comfort in body movements and shorten hospital stay. This agree with Quinodoz et al,[16] who found that excision and rotation skin flaps causes less postoperative pain and shortens convalescence. On the other hand, complex flap procedures as Z-plasty, rhomboid flaps, fasciocutaneous V-Y advancement flap, Gluteus maximus myocutaneous flap requires long hospital stay with bed rest of a week or more.[20-22]

In the present study, minor complications were encountered in the form of wound infection in 2 (6.7%) patients, minor wound dehiscence in 1 (3.3%) patient. These results goes in hand with other cutaneous flap procedures as asymmetric eccentric flap operation described by Karydakis[23] who reported 9% morbidity. On the other hand, these results are better than 20% reported after rhomboid transposition flap & 17 % reported after fasciocutaneous V-Y advancement flap.[20,21] Factors that contribute to prevent potential wound complications that may predispose to early recurrence include:

- Methylene blue injection into the sinuses to avoid missed tract , this agree with Testini et al[24] and Kitchen[8] who reported that the key to complete excision includes staining of all the sinuses and their tracts.
- Use of suction drainage to decrease dead space or haematoma formation, and to promote flap adherence. This agree with Curer et al[25] who reported significant increase in the number of fluid collection in patients without suction drainage ,this also agree with Tritapepe & Padova[26] who reported that drainage is essential for primary healing and avoidance of recurrences ,this is also agree with Sakr et al[27] who recommended suction drainage to avoid seroma formation .
- Single layer closure with no subcutaneous stitches to avoid foreign body granuloma or interference of blood supply of the flap.
- Edge-to-edge approximation of the skin using mattress polypropylene sutures to avoid raw areas and to prevent the formation of a deep pit that can act as a nest for hairs at the lower margin of the flap.
- Low-residue diet to achieve constipation in the initial 5 days to prevent soiling of dressing and wound contamination.

On contrary to Nessar et al[11] who depended on closure of the dead space using subcutaneous stitches to avoid seroma formation; the current study was relied on the dead space suction drainage to safeguard against seroma collection and to avoid application of subcutaneous stitches that may jeopardize flap blood supply. Moreover, Nessar et al[11] neglected in their article to comment on the frequency of seroma formation and to which extent the dead space closure was beneficial to guard against such complication. Additionally, the pivot point being assigned at 1.5 cm from the angle of the ellipse was applicable and provided better vascularity for the flap and this could be recommended to safeguard the possibility of flap necrosis.

In this study , the patients were accepted and satisfied with closing the wound by this technique (90%). This is better than 67% reported after Z-plasty reported by Toubanakis.[28]

It could be concluded that this technique is simple, reliable & offers an effective and elegant alternative to the more classic operations for pilonidal sinus as it has the advantage of being tension free, providing minimal dead space, no subcutaneous tissue mobilization, thus increasing patient comfort and wound healing, and decreases the length of hospital stay with early return to work. It does not only remove the existing sinus but also eliminate factors that predispose to formation of another sinus by placing the scars away from the midline and flattening the natal cleft and it is useful for recurrent cases after a failed surgical procedure and it gives good cosmetic results without any early or delayed recurrence.

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