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RESEARCH ARTICLE

Lateral Advancement Adipo-Fascio-Cutaneous Flap Or Primary Closure In The Treatment Of Uncomplicated Pilonidal Sinus

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Abstract

Background and Objectives: Controversy still exists regarding the best surgical technique for the treatment of pilonidal disease in terms of minimizing disease recurrence and patient satisfaction. The present work was designed to retrospectively analyze the results of pilonidal sinus managed using excision with primary closure and excision with lateral advancement adipo-fascio-cutaneous flap.

Materials and methods: Data from 52 consecutive patients who had elective surgery for chronic pilonidal sinus from February 2012 to February 2015 with either excision or primary closure [group 1, $n = 21$ patients] or excision and flap reconstruction [group 2, $n = 31$ patients] were retrospectively analyzed. Special emphasis was placed on demographic data, operative time, hospital stay, duration of time off work, postoperative complications (wound infection and wound breakdown), and postoperative recurrence were recorded.

Results: The mean follow-up was 20 months. A significant difference was observed between the two groups in terms of postoperative complications, and duration of time off work (in days), and frequency of recurrent disease ($P < 0.05$) for all comparisons. There were no significant differences among the two groups with respect to age, sex distribution, operative time (min), length of hospital stay (in days) ($P > 0.05$) for all comparisons.

Conclusion: The eccentric excision and partial obliteration of the natal cleft using the lateral advancement adipofascio-cutaneous flap ensured reliable earlier wound healing, shorter time off work, with fewer dressings and wound morbidity, lower rate of recurrence, which are the main advantages of this flap technique in comparison to primary closure after excision of uncomplicated pilonidal sinus.

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INTRODUCTION

Although many authors ascribe the first reference to this disease to Anderson, the initial description was by Mayo in 1833. Warren defined hair as the causative agent of the infirmity and considered it to come from an inverted polarity of growth. Hodges proposed the term "pilonidal" (from the Latin *pilus* hair and *nidus* nest)¹. The most important predisposing factors for the development of pilonidal sinus are the existence of a deep natal cleft and the presence of hair within the cleft. A deep natal cleft is a favorable environment for sweating, maceration, bacterial contamination, and penetration of hairs. Thus, for treatment and prevention, these causative factors must be eliminated². Though various modalities of treatment have been described, no consensus has emerged as all have met

with varying degrees of recurrence^{3, 4}. The aim of the present work was to retrospectively analyze the results of 52 pilonidal sinus patients managed using excision with primary closure and excision with lateral advancement adipo-fascio-cutaneous flap.

Patients and Methods

This is a retrospective analysis of 52 patients operated for pilonidal sinus diseases, between February 2012 and February 2015. Twenty one patients (group I) were treated with excision and primary closure, whereas another 31 patients (group II) were treated with excision and adipo-fascio-cutaneous flaps. Recurrent cases and patients with acute abscesses were excluded from the study. The nature of surgical procedures was explained to the patients and informed consent had been obtained.

Patient's preparation

Preoperative preparation included shaving on the day of surgery, a prophylactic antibiotic in the form broad-spectrum antibiotic and metronidazole were given intravenously before 30 min of the operation and after 6 h of operation. Patients under spinal or general anesthesia were placed in a prone, jack-knife position with buttocks widely separated using adhesive tapes laterally and cleaning the area with povidone iodine, and methylene blue was injected without pressure into the sinuses(Fig. 1).

Surgical procedures

Excision and primary closure

An elliptical incision around the midline natal cleft was made to enclose the sinus and its tracts. With continuous sharp dissection, the incision was carried down to the sacrococcygeal fascia. Hemostasis was achieved by electrocautery without using any ligature. The subcutaneous fat was undermined and lifted as a flap from the gluteal fascia followed by placement of six to eight 1-0 polypropylene deep full-thickness tension sutures including the postsacral fascia and crossing symmetrically through both sides of the elliptical defect. A suction drainage was inserted through a separate stab incision, and the skin was closed primarily with 3-0 polypropylene interrupted mattress sutures. Tension sutures were then softly tightened over a gauze roll over the skin sutures. Tension sutures were removed after one week and the skin sutures after two weeks.

Excision and Adipo-Fasciocutaneous Flap

The lateral advancement adipo-fascio-cutaneous flap was a rectangular flap that contained adipose tissue with its underlying fascia (but no muscle) and overlying skin, so differed from the adipofascial turn-over flap described by Onishi and Maruyama.⁵ The flap was marked (Fig. 2). The flap with all its layers was dissected (Fig. 3 and 4). A rectangular excision was used to include all the sinuses and their ramifications and then the flap was approximated medially to achieve primary closure with an eccentric suture line (Figure 5). Then the undersurface of the flap was fixed to the presacral fascia by using Polyglycolic acid 2/0 sutures in order to immobilize the flap, avoid tension and obliterate the dead space. For skin closure, mattress polypropylene 2/0 sutures were used. A closed suction drain was placed and was removed when 24-hour drainage was less than 10 mL, usually by the fifth postoperative day. Sutures removal was on the 12th to 14th postoperative day.

Follow-up and data analysis

Patients were used oral form of second generation cephalosporin and metronidazole for the first 5 postoperative days. Postoperatively, low residue diet was allowed and patients were encouraged to walk after 8 h but not to exercise until removal of stitches. The wound dressing performed every other day and after the drain was removed no dressing was performed till stitches removal. Instructions on discharge included avoidance of prolonged sitting and riding a bicycle, scooter or horse until 6 weeks postoperatively to prevent wound disruption, improving local hygiene. The patients were advised to shave the hair for 3–4 cm from the surrounding edges of the wound and to keep the natal cleft free of hair for 3–6 months after healing. All patients were advised to visit outpatient clinic every week for 1 month and then every 3 months for at least 12 months during the follow-up period. The duration of operation, length of hospital stay, duration of incapacity for work, postoperative complications (infection and wound dehiscence), and postoperative recurrence were recorded for both groups. Thereafter, the two groups were compared. Duration of operation was defined as the length of time between the first incision and placement of the last suture. Duration of incapacity for work was defined as the time from the date of surgery to the date on which the patient returned to normal activities including employment and leisure activities. Infection was considered as leakage of purulent secretion through the surgical wound and not only peri-incisional hyperemia.



Figure 1. Methylene blue was injected into the sinuses.

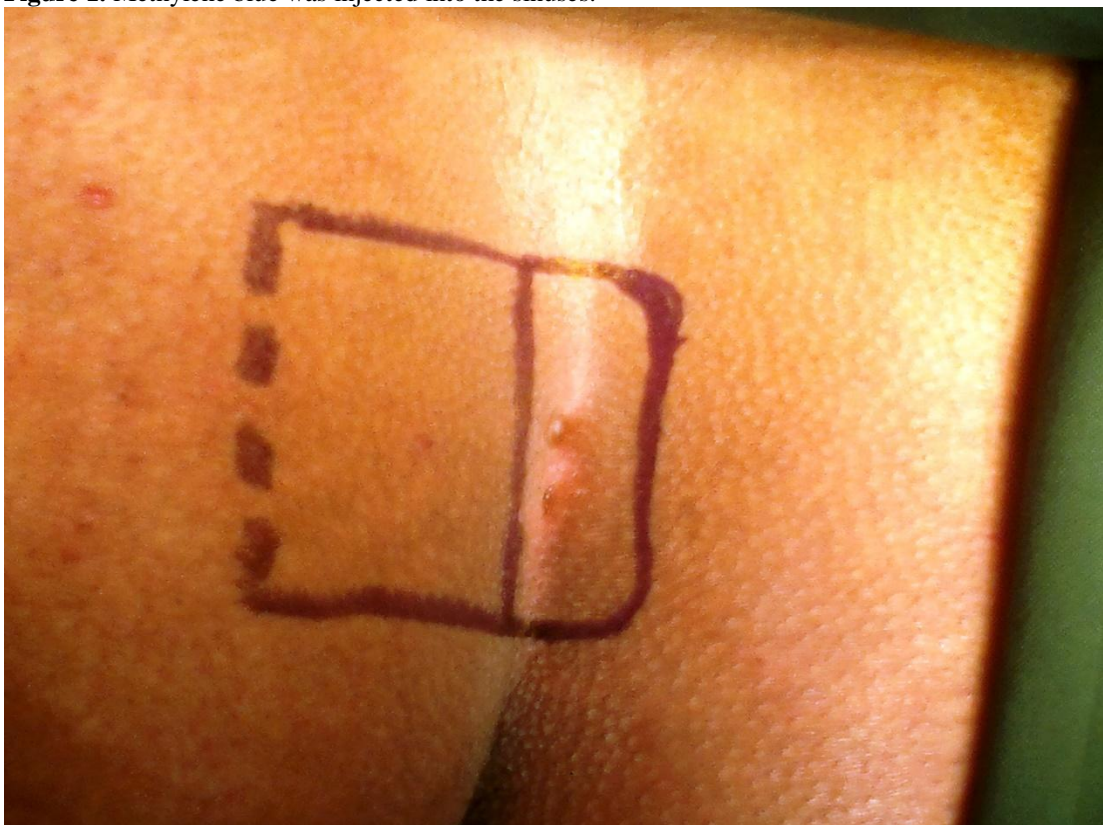


Figure 2. The lateral advancement adipo-fascio-cutaneous flap was marked



Figure 3. The flap with all its layers was dissected (outside view).

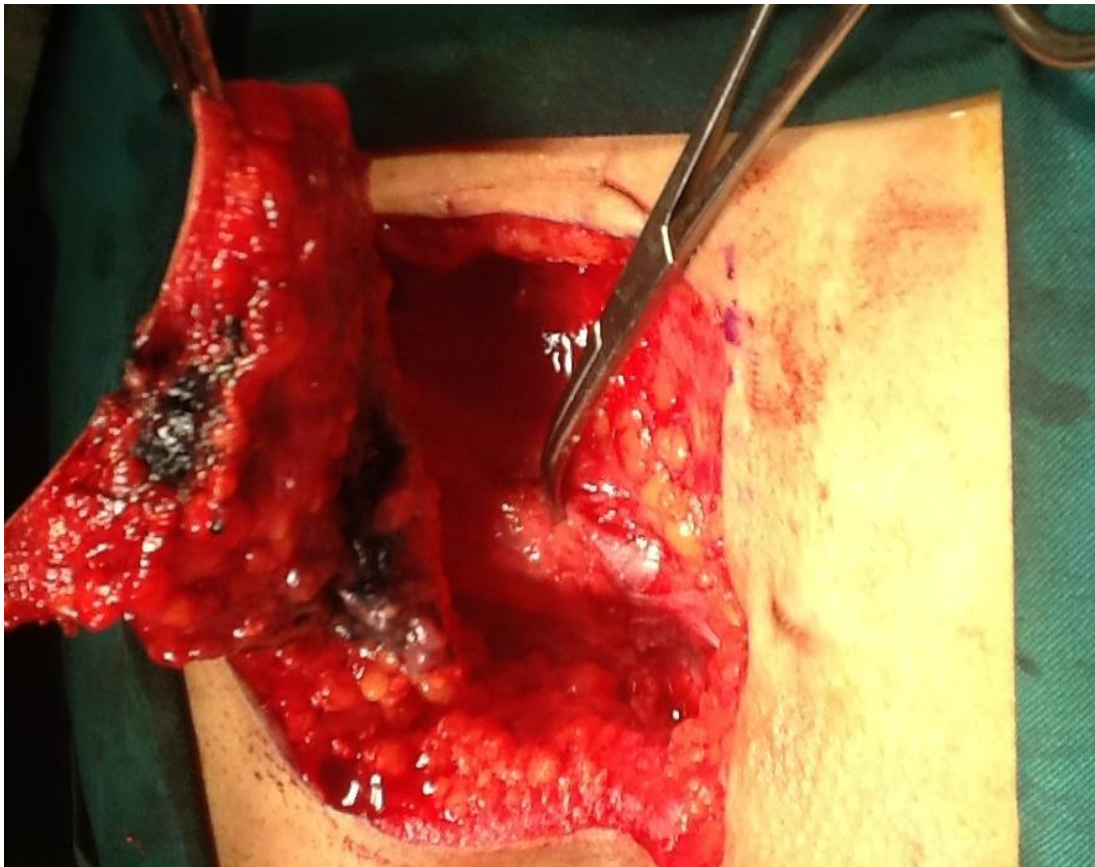


Figure 4. The flap with all its layers was dissected (inside view).



Figure 5. Flap closure with an eccentric suture line.

Results

The study consisted of 52 patients (44males and 8females), with a mean age for group 1(N= 21) of 25.4 years (range, 17 to 40 years) and with a mean age for group 2 (N= 31) of 25.2 years (range, 17to 41years; Table 1). Patients were followed-up for a mean period of 20 months (range, 12 to 36 months). There were no statistically significant differences between the two groups regarding patients' demographic data. No significant differences were found between group I and group II in terms of operation time or hospital stay (Table 2). . A significant difference between group I and group II with regard to time to complete healing ($P < 0.001$), time off work ($P < 0.001$), wound infection rates ($P < 0.01$), wound dehiscence rates ($P < 0.01$) and recurrence rates ($P < 0.01$) was also observed (Table 3). In patients treated with flaps, disease recurrence was not observed.

Table 1. Patient characteristics

| Characteristic | Primary closure (group I) N= 21 | Flap closure (group II) N=31 | P value |
|----------------------|---------------------------------------|------------------------------------|--------------|
| Age, years, mean(SD) | 25.4 (5.8) | 25.2 (5.3) | 0.898 (N.S.) |
| Sex | | | 0.860 (N.S.) |
| Male (percent) | 18 (85.7) | 26 (83,9) | |
| Female (percent) | 3 (14.3) | 5 (16.1) | |

N.S. = non-significant

Table 2. Operative time and hospital stay in relation to the type of operation

| | Primary closure (group I) N= 21 | Flap closure (group II) N=31 | P value |
|----------------------|---------------------------------------|------------------------------------|--------------|
| Operative time (min) | | | 0.347 (N.S.) |
| Mean ± SD | 48.33 (7.66) | 50.09 (5.73) | |
| Range | 30-60 | 35-60 | |
| Hospital stay (days) | | | 0.984 (N.S.) |
| Mean ± SD | 5.6 (1.02) | 5.6 (1.11) | |
| Range | 4-7 | 4-8 | |

N.S. = non-significant

Table 3. Clinical outcomes of different treatment modalities

| Clinical outcomes | Primary closure (group I) N= 21 | Flap closure (group II) N=31 | P value |
|---------------------------------------|---------------------------------------|------------------------------------|---------|
| Time to complete healing, days | | | < 0.001 |
| mean (range) | 22.6 (16-29) | 18 (14-24) | |
| Time off work, days | | | < 0.001 |
| mean (range) | 23.5 (17-30) | 19 (15-25) | |
| Wound infection | | | 0.008 |
| n (percent) | 6 (28.5) | 1 (3.2) | |
| Wound dehiscence | | | 0.008 |
| n (percent) | 6 (28.5) | 1 (3.2) | |
| Recurrence | | | 0.004 |
| n (percent) | 5 (23.8) | 0 | |

Discussion

Pilonidal disease presents many therapeutic challenges to surgeons throughout the world. Its varied clinical presentations necessitate a wide range of treatments⁶. Several modalities have been implicated in the treatment of pilonidal disease. A large number of surgical techniques (with varying complexity) have been described in the literature for the treatment of this disease, many of which are unfamiliar to general surgeons. Such diversity suggests that no single technique has emerged as the favorite to prevent recurrence of this condition. These include conservative non-excisional care, phenol injection, pit excision and tract brushing (Millar–Lord procedure), Bascom procedure, excision and leaving the wound to granulate, excision and marsupialization, excision and primary closure with midline or asymmetric incisions, or excision and closure using local flaps⁷. Surgical treatment should be limited in extent to the least necessary to heal the sinus. Surgical procedures that keep the main wound away from the midline are more successful⁸.

In this study, regarding the sex of patients, male patients were predominant (84.6%), with female patients (15.4 %), which is closely similar to results reported by Youssef *et al.*⁹ in which male patients were (85%) and female patients were (15 %). The mean age in the primary direct closure group was 25.4 ± 5.8 years, which is closely similar to results reported by Mahdy² in which the mean age was 26.3 ± 6.8 years, and the mean age in the flap closure group was 25.2 ± 5 years, which is relatively similar to results reported by Mahdy² in which the mean age was 28.0 ± 7.7 years.

Regarding The duration of surgery in patients treated with primary direct closure was 30-60 min (50 min), which was similar to that reported in the study by Akca *et al.*¹⁰ in which the time was 40–60 min (45 min) but was longer than the results reported by Inan *et al.*¹¹, which was 20–45 min (32 min). The duration of surgery in patients treated with local flaps ranged from 35–60 min (50 min). The mean length of hospital stay in the primary direct closure group ranged between 4 and 7 days (5.6 ± 1.02 days), which is closely similar to results reported by Akca *et al.*¹⁰ in which the range was 4–6 days, but is shorter than results reported by Mahdy², which was 3–11 days (4.8 days), relatively longer than that documented by Elshazly *et al.*¹² (3.8 ± 1.6). And regarding the hospital stay, the mean length of hospital stay following treatment of pilonidal sinus by local flaps ranged between 4 and 8 days (5.6 ± 1.11 days). This is similar to results reported by Singh *et al.*¹³ in which the mean duration of hospital stay was 5.7 days (range, 5–12 days), but longer than results reported by Mahdy² in which length of hospital stay was 2–6 days (2.9 days).

As regard the time off work in patients treated with primary direct closure was 17-30 days (23.5), which is relatively similar to results reported by Mahdy² of 15–50 days (25.5 days). The time to return to work in patients treated with local flaps was 15-25 days (19 days), which is in agreement with results reported by Singh *et al.*¹³ in which the time to return to work was 18 days and relatively similar to results by Mahdy² in which the time was 7–24 days (14.8 days).

Regarding the postoperative complications (wound dehiscence, wound infection) of treatment of pilonidal sinus in the primary direct closure group, there were six patients developed wound dehiscence (28.5 %), which was relatively similar to the results by Mahdy² in which there were four patients (20%), and also six patients developed wound infections (28.5 %), which is relatively similar to results reported by Ertan *et al.*¹⁴, 10 patients (20%), and

closely similar to results reported by Mahdy² in which there were five patients (25%). Regarding the postoperative complications (wound dehiscence, wound infection) of treatment of pilonidal sinus in the local flaps group, there was one patient developed wound dehiscence (3.2 %), which is relatively similar to results reported by Mahdy² in which there were two patients (5%) but is in disagreement with results reported by Singh *et al.*¹³ which was no patients (0 %), and one patient developed wound infections (3.2 %), which is relatively similar to results reported by Mahdy² in which there were two patients (5%). but is in disagreement with results reported by Singh *et al.*¹³ which was no patients (0 %).

Regarding postoperative recurrence after primary direct closure during the follow-up period, five patients developed postoperative recurrence (23.8%). This result is closely similar to results reported by Mahdy², which was also five patients (25%), but was relatively more than results reported by Chian *et al.*¹⁵, which was 14 cases (17.9 %). Regarding recurrence after the lateral advancement flap during the follow up period, no patients developed postoperative recurrence (0 %). This result was closely similar to the results of Singh *et al.*¹³, and was less than the results by Mahdy², which was (10%).

Conclusion

The eccentric excision and partial obliteration of the natal cleft using the lateral advancement adipofascio-cutaneous flap ensured reliable earlier wound healing, shorter time off work, with fewer dressings and wound morbidity, lower rate of recurrence, which are the main advantages of this flap technique in comparison to primary closure after excision of uncomplicated pilonidal sinus.

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