



Outcome of the lay open vs. excision and primary closure treatment modalities for chronic sacrococcygeal pilonidal sinus in the local Saudi Arabian community

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ABSTRACT

Background and Objectives: Sacrococcygeal pilonidal sinus is a chronic condition for which the treatment options remain controversial based on the high recurrence rates. Before 1997, excision and primary closure was the most popular method offered in our local community surgical practice. In this study, we aim to evaluate the results of treatment outcomes of the lay open method offered in 1997 to our local community patients and compare it to the excision and primary closure method, hoping it may help in opening up wider frontiers in the surgical practice on our local community to provide the best health care.

Materials and Methods: Between January 1997 and December 2011, 600 patients with chronic sacrococcygeal pilonidal sinus were included in our study. 443 were male and 157 were female (age range: 16–39). The lay open method was performed on 300 patients who agreed to the newly offered procedure, and excision with primary closure was performed on the other 300 patients that refused surgery with the lay open method.

Results: The recurrence rate was 0% for the lay open technique, and 3% for the excision with primary closure method. All patients had undergone 5 years of follow-up.

Conclusion: When the lay open technique is performed in a meticulous and carefully prepared manner with superb post-operative care and regular follow-up, it is more promising than excision with primary closure in treating chronic sacrococcygeal pilonidal sinus, and may successfully achieve a zero (0%) recurrence rate, low postoperative complications, and acceptable cosmetic wounds.

Key words: Lay open, excision, primary closure, chronic sacrococcygeal pilonidal sinus, sitz bath

Introduction

Sacroccygeal pilonidal sinus is a chronic condition affecting young adults [1]. It was first described in 1833, and its incidence varies from 10 to 26 per 100,000 people [2,3]. The etiology and pathogenesis of pilonidal sinus have been a matter of great controversy over

the last number of decades. Accumulating evidence has supported the notion that pilonidal sinus is an acquired disease. The suggested two important causes of pilonidal sinus are deep natal cleft, causing buttock friction, and poor personal hygiene causing accumulation of loose hair and debris in the cleft [4]. Other etiologic

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factors, such as hirsutism, deep natal cleft, obesity, local trauma, familial predisposition, smoking, and sedentary lifestyle have been indicated [5].

Pilonidal disease may arise in one of three forms: acute abscess, sinus tracts or complex disease characterized by chronic or recurrent abscesses with extensive, branching sinus tracts. Symptoms related to pilonidal abscess include fever, chills, and pain, and intermittent discharge or bleeding is common from the sinus tracts [6].

Surgery is the main type of treatment, and up to 40% of patients experience recurrence. The management of patients with recurrent disease has led to the development of various surgical approaches. There is no definitive agreement on any optimal surgical technique that would minimize the recurrence rate, and debate is ongoing [7]. The surgical treatments include a wide spectrum of techniques that vary from sinus excision with secondary healing of the surgical wound, or marsupialization, to the use of flap reconstruction [8]. Primary closure is preferred in patients with pathology limited to the midline and for whom the residual defect after excision is narrow - a Karydakis or Bascom procedure can also be employed. When the residual defect is anticipated to be wide, excision with secondary healing of the wound or flap reconstructions are recommended [3].

Recent studies have shown an increasing interest in the lay open technique as the most efficient operation [9,10], and a randomized clinical trial with a complete two-year follow-up concluded that the modified lay open technique is superior to excision with primary closure for the surgical treatment of chronic sacrococcygeal pilonidal sinus with regards to morbidity and recurrence rates and time needed before returning to work, although the healing time is longer [11].

Prior to the beginning of our series (January 1997), the lay open method for the treatment of chronic sacrococcygeal pilonidal sinus was not popular in the Medina, Saudi Arabia local surgical community, and all four general public health hospitals in Medina were performing the excision and primary closure in the majority of cases. In fact, even until the present time, most surgeons are still using just the excision and primary closure, even in our hospital. Therefore, in this study,

we aimed to evaluate the results of treatment outcomes of the lay open method and compare it to those with excision and primary closure, hoping it may facilitate opening wider frontiers in the surgical practice in our local community to provide the best health care.

Materials and Methods

Retrospective database analysis of the results of the first 300 consecutive patients that accepted the offered method for the lay open procedure as treatment for chronic pilonidal sinus, as well as the 300 patients who refused to try the lay open method and preferred the popular excision and primary closure method, between January 1997 and December 2011 was conducted.

The preoperative work-up, selection of patients, surgical procedures and follow-up were carried out by the same surgeons at the Al-Ansar general public health hospital in Medina, Saudi Arabia.

Patients were selected from the outpatient clinic (referred from primary care centers in Medina city or from local hospitals from the Al-Madina-Al-Monawara region – towns and villages) and all presented with a chronic disease. Random selection in terms of age, gender, occupation and co-morbid disease states was performed.

Patients who presented with the acute form at the emergency department were excluded from the analysis because they were managed by the duty on-call surgeons.

All patients had the same preoperative work-up (complete blood count- coagulation profile, blood chemistry, chest x-ray and electrocardiogram).

Patients with co-morbid diseases were referred to the appropriate specialty physician for preoperative evaluation and preparation.

The procedure and postoperative care methods were carefully discussed with the patients, with a particular focus on explaining the surgical technique, the resulting surgical wound and the methods of postoperative wound care.

All patients had one teaching session in the appropriate wound care method by the surgeon prior to admission. The patients were admitted to the surgical floor one day before surgery and discharged on the first postoperative day. No antibiotics were used in any of the patients.

The lay open procedure was conducted under general anesthesia in the prone position with visibility of the intergluteal area maintained by lateral traction from the lateral margin of the gluteus, using adhesive tape, probe insertion through the external opening of the sinus to map the tract, lay open using cutting diathermy, removal of hair tufts and debris from the wound, curettage of the wound wall by surgical curette to remove any remnants of the sinus sac and establishing a healthy tissue for healing. Haemostasis was secured by coagulation diathermy, the wound was cleaned with normal saline, packed with vaseline gauze and covered by surgical gauze.

The excision and primary closure procedure had similar intraoperative preparations, though methylene blue dye was injected through the tract's external opening to outline the tract followed by elliptical incision around the tract with a surgical blade, dissection by coagulation diathermy until complete excision of the sac and tract as one entity, cleaning and haemostasis. Primary mass closure using 2-0 proline was performed and the wound was covered with surgical gauze.

Postoperative care for the lay open patients consisted of a sitz bath three times daily at home based on the lack of an outpatient sitz bath facility in our hospital, using warm water and 20 grams of commercial mineral salt for 20 minutes, and wound packing by vaseline gauze to keep the wound moist and open to help the growth of healthy tissue from below upwards. For the excision and primary closure patients, daily wound dressing in the hospital outpatient dressing room was conducted using normal saline and povidine iodine solutions with wound coverage by surgical gauze.

Follow-up took place in the outpatient clinic once every week until complete healing and closure of the wound for the lay open patients, while the excision and primary closure subjects were followed up with once weekly until suture removal. All patients were then seen once every three months for one year to evaluate recurrence, then once every year for 4 years. All patients were provided with an open appointment whenever recurrence occurred. All patients in this study completed the whole 5 years of follow-up.

The retrospective database analysis with respect to symptoms, duration of the disease, duration of postop-

erative care until complete healing, quality of life post-operatively (pain and discomfort, complications like bleeding or puss discharge), return to work or school, effects on social activity, complications and recurrence of the disease was performed with SPSS v.22.0 (IBM Corp., Armonk, NY, USA).

Results

Between 1997 and 2011, 600 patients were diagnosed with chronic sacrococcygeal pilonidal sinus in outpatient clinics - 317 (52.8%) were from Medina city and 283 (47.2%) were referred from towns and villages of the Al-Madina-Al-Monawarrah region. 300 (50%) patients agreed to be treated by the lay open technique, which was not previously popular in our local community surgical practice, while the other 300 (50%) patients refused the concept of an open wound for a prolonged period and preferred the excision with primary closure method (Figure 1).

In the lay open group, there were 233 male patients (77.7%) and 67 female (22.3%), the age range being 16 - 39 (median= 27.5). 17 (5.7%) were between 15-20 years of age (the youngest was 16), 198 (66%) were between 20 - 30 years and 85 (28.3%) were between 31 - 40 years (the oldest was 39).

In the excision with primary closure group, there were 193 male (64.3%) patients and 107 female (35.7%), and the age range was 17- 37 (median= 27). 19 (6.3%) were between 15-20 years of age (the youngest was 17), 194 (64.7%) were between 20 - 30 years and 87 (29%) were between 31 - 40 years (the oldest was 37) (Table 1).

The reported symptoms were pain alone in the sacrococcygeal area in 82 (13.7%) patients, pain and bloody discharge in 241 (40.2%), pain and pus discharge in 215 (35.8%) and painless discharge – bloody or pus – in 62 (10.3%) (Table 2).

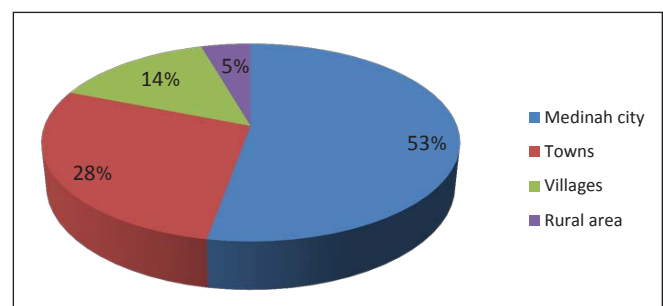


Figure 1. Geographic distribution of the study population.

Table 1. Age and sex data of the study population.

Sex and Age	The lay open group	The excision with primary closure group	Total
Male	233	193	426
Female	67	107	174
Age between 15- 20 years	17	19	36
Age between 20 - 30 years	198	194	392
Age between 31 - 40	85	87	172

Table 2. Presenting symptoms in the study population.

Presenting symptom(s)	Lay open group		Excision with primary closure group		Total	
	Male	Female	Male	Female	Male	Female
Pain alone	19	24	18	21	37	45
Pain and bloody discharge	65	59	61	58	126	117
Pain and pus discharge	56	52	53	54	109	106
Painless discharge (bloody or pus)	18	15	17	12	35	27

Table 3. Disease chronicity: duration of symptomatic disease.

Days	No. of patients	Lay open	Excision with primary closure
1 to 29	37	18	19
39 to 39	117	63	54
40 to 49	141	67	74
50 to 59	162	83	79
60 to 69	108	53	55
More than 70	35	18	17

Co-morbid diseases were present in 79 (13.2%) patients. Of them, 36 (6%) had high blood pressure, 29 (4.8%) had diabetes mellitus, 9 (1.5%) had cardiac conditions controlled by medications and 3 (0.5%) had hypothyroidism controlled by medications (Figure 2).

Regarding disease chronicity (continuing for a long time), the duration was 1 - 29 days in 37 (6.2%) patients, 30 - 39 days in 117 (19.5%), 40 - 49 days in 141 (23.5%), 50 - 59 days in 162 (27%), 60 - 69 days in 108 (18%) patients and more than 70 days in 35 (5.8%) (Table 3).

In terms of frequency, 146 (24.4%) patients had one disease episode prior to the presenting episode, 203 (33.8%) had two episodes and 251 (41.8%) had three or more episodes.

Past treatment history showed that 314 (52.3%) patients were treated conservatively by antibiotics and regular dressing at their local hospitals, 186 (31%) were

treated with traditional medicine (herbals), 34 (5.7%) treated themselves by topical honey, 66 (11%) had no treatment at all and none of the patients had previous surgical treatment (Figure 3).

Postoperative care duration until complete healing in the lay open group was three weeks in 41 (2%) patients, four weeks in 189 (44.5%), five weeks in 37 (30.5%), six weeks in 19 (18.5%), and seven weeks or more in 14 (4.5%) – all 14 patients were diabetics. In the excision and primary closure group, 186 (93%) patients healed after three weeks, 76 (0.5%) after four weeks, six (0.5%) after five weeks, four (0.5%) after six weeks and 15 (2%) after seven weeks – again, all 15 patients were diabetics. Duration of healing was found to be significantly shorter in the excision and primary closure group (P value < 0.05) (Figure 4).

Regarding the effects on quality of life, 117 (29.25%) patients complained of pain postoperatively

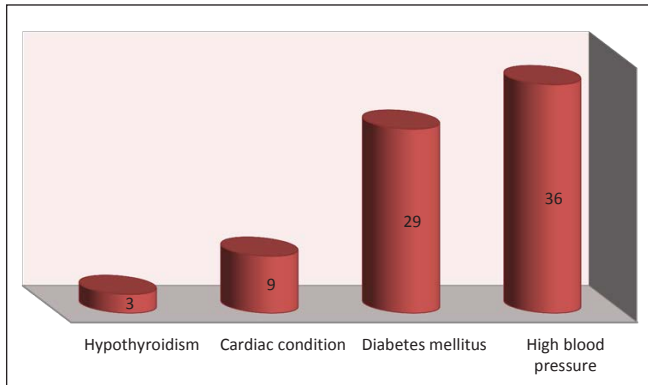


Figure 2. Co-morbid diseases in the study population.

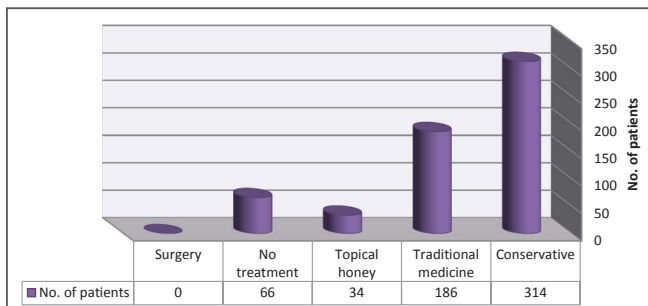


Figure 3. Past treatment received by the study population.

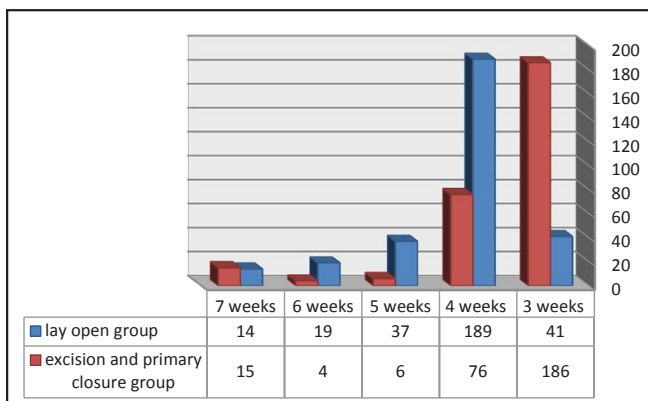


Figure 4. Postoperative care duration until complete healing.

for more than one week and required analgesia, 108 (54%) complained of discomfort that did not requiring analgesia and 175 (43.75%) had no complaints. Similar effects in both groups were reported with no significant difference detected between the two groups.

Postoperative complications in the lay open group showed minor bleeding from the surgical wound reported by 15 (5%) patients spontaneously stopping within one week and pus discharge was described by 16 (5.3%), in which the longest duration was one week in the 14 (4.7%) diabetic patients. The complication rate was 10.3%. In the excision and primary closure group, minor bleeding from surgical wound was reported by 13 (4.3%) patients and spontaneously stopped within

two to three days. Pus discharge was described by 15 (5%) patients, in which the longest duration was one week in the 15 (5%) diabetic patients. The complication rate was 9.3%. No significant difference statistically between the two groups in regards to morbidity was detected (Figure 5).

All wounds healed well in both groups. Surprisingly, in the lay open method group, nice-looking healed wounds without scarring were reported with great satisfaction by all 300 patients, while 11 (3.7%) patients in the excision and primary closure group developed visible scar tissue, and six (2%) developed keloid scarring. Cosmetic healing was significantly better in the lay open group (P value < 0.05).

Concerning time to report to work or school, 247 (61.75%) patients went back to work and school within one week and had no side effects, 121 (30.25%) waited till complete healing and 32 (8%) had no work or school to attend. No significant difference statistically was established between the two groups with respect to time to report to work or effects on social life, 294 (73.5%) patients described no effect on social activities (daily activity, sports, social gatherings, and religious deeds), while 106 (26.5%) mentioned there

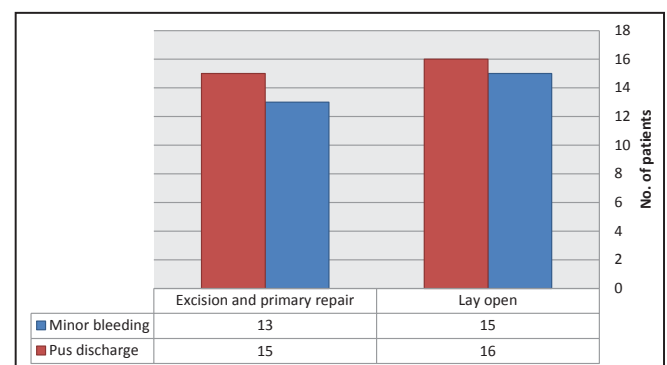


Figure 5. Postoperative complications in both groups.

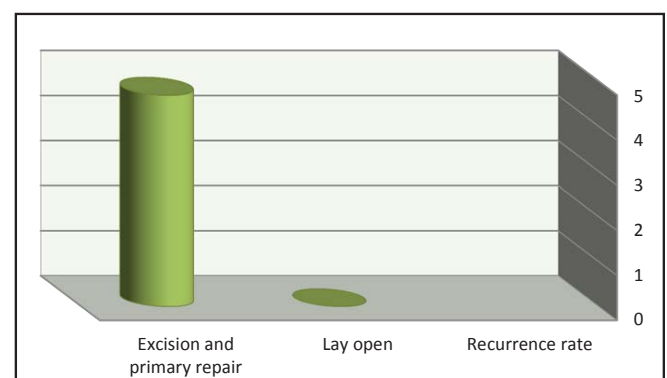


Figure 6. Recurrence rate in both groups.

was mild limitations in their participating in such activities.

The recurrence rate in lay open patients was zero (0%) after 5 years of follow-up, while in the excision with primary closure group, the recurrence rate was 4.7% – 14 patients out of 300. All recurrent cases were re-treated with the same method. The recurrence rate was significantly lower in the lay open group (P value < 0.05) (Figure 6).

The mortality rate was zero (0%) in both groups.

Discussion

Although pilonidal sinus cannot be considered a debilitating disease, patients are confronted with discomfort and a lower quality of life owing to complications such as abscess formation or sinus-related drainage or pain [12,13].

Recurrence is most often because of omission of any tract during the initial operation, infection of the wound, or abscess formation, potentially leading to formation of a new sinus tract inside the cicatrizing wound. Accumulation of dead tissue or debris in the intergluteal cleft, sweating, friction, or poor hygiene are predisposing factors for recurrence [14]. In addition, placing the suture line on the midline with considerable tension on the line and failure to lessen the depth of the natal cleft are also important contributors to recurrence. Lastly, poor wound care with lack of depilation around the wound also increase the likelihood of recurrent disease for patients having undergone the lay open method [15].

A variety of surgical techniques have been described in the literature for the treatment of primary pilonidal sinus. The treatment methods can basically be divided into 2 groups - open and close methods. With the open method, the residual cavity is left open after sinus excision. Lay open is one of the open methods that has also been detailed and consists of opening the skin covering the sinus and curettage of the residual cavity. This provides a narrower cavity and minimizes tissue loss [16]. Close methods are based on closure of the wound after sinus excision. In this group, the surgical techniques differ according to the type of the wound closure. The cavity can be managed by a midline closure, an off-midline closure, or a flap reconstruction. Phenol treatment for pilonidal sinus is a preferred conservative method,

used instead of surgery according to a number of authors because of its excellent cosmetic results. Girgin et al. reported 42 patients who had undergone crystallized phenol and laser depilation prior to it. According to the authors, a combination of crystallized phenol treatment and laser depilation is a minimally invasive procedure with perfect cosmetic results and low recurrence rates [17]. Each of these techniques has been used in the treatment of primary pilonidal disease. However, in the management of recurrence, flap reconstruction or secondary wound-healing techniques following sinus excision are favorable [18].

The open surgical technique is simple to perform. Its recurrence rate is low, but it requires a longer time for wound healing and postoperative wound care. Daily painful wound care and the slow process of secondary healing are the main disadvantages of open techniques; namely, lay open. Marsupialization, however, by shallowing the cavity after the lay-open technique, helps to hasten the healing process [19,20]. In our study, the prolonged period of wound care was reported by all the patients as an annoying event. At the end, all patients were satisfied by the complete healing and no recurrence. Nice looking healed wounds without scar formation were noticed by all patients, and was a significantly influential satisfaction factor in our study.

In a randomized study, Gençosmanoğlu and Inceoglu [11] compared the marsupialization technique with the primary closure technique in 142 selected patients. Patients in the marsupialization group had a lower recurrence rate (1.4%) and diminished average time in returning to work (3 days). Kepenekci et al. [21] performed the unroofing and curettage (lay open) technique for 297 patients, 25 with recurrent disease; they described the procedure as a successful, easy-to-apply, and cost-effective technique. According to the authors, the method could be applied in the setting of chronic disease, abscess formation and recurrent disease with low recurrence rates (2.7%, 0%, 0%, respectively). Even with these successful results, the median wound healing took 5.4 weeks [21]. The results of our study is in accordance with those observations.

Personal hygiene, periodic epilation and daily wound care are the cornerstones for preventing recurrence, especially for the patients treated with open tech-

niques. Proper patient education both in the preoperative and immediate postoperative period is crucial. Close follow-up of the wound is advised and should be carried out in the same center to facilitate wound evaluation and, ultimately, lower recurrence rates [22]. We observed in our study that personal hygiene habits played an important role. Most of the patients reported a high satisfaction rate with the sitz bath method, and they changed their habits to daily body washing rather than weekly or even longer previously.

Several studies from Saudi Arabia reported the effect of different methods to treat sacrococcygeal pilonidal sinus among the Saudi population. Al-Homoud et al. [10] reported in favor of the lay open method (Riyadh city), and Rabie et al. [23] also favored sinotomy (Asir city), while Lawrence et al. [24] (Al-Jauf city) found that excision and primary closure was a superior option for most patients, especially those that are young and active. Al-Salamah et al. [25] (Riyadh city) found that excision and primary closure was recommended as the preferred procedure in the management of chronic pilonidal sinus (PNS) disease.

In our study, we noted reluctance of local community patients to try a new surgical procedure despite extensive endorsement by surgeons. We also observed hesitance in patients to apply a regimen of self care of the wound. In fact, all patients refused to shave the wound area and requested the surgeon to do so at every postoperative clinic visit.

According to our study's results, we noticed similar results in both treatment groups regarding postoperative effects on personal and social activities, the effect on quality of life, and postoperative complications. However, the duration of healing was longer in the lay open group, the cosmetic results were better in the lay open group, and the recurrence rate was much lower in the lay open group.

Despite reporting in favor of the lay open method in our study, we recommend that more detailed and specialized studies be planned, especially in terms of compliance to the postoperative protocol, the effect of personal hygiene habits in rural areas, the location of the wound and leaving the wound open for long periods based on religious deeds (prayer) among the Saudi population.

Conclusions

Ultimately, when the lay open technique is performed in a meticulous and carefully prepared manner with robust postoperative care and regular follow-up, it is more promising than excision with primary closure for treating chronic sacrococcygeal pilonidal sinus, and could successfully achieve a zero (0%) recurrence rate, low postoperative complications and favorably-appearing cosmetic wounds. Special consideration should be given to patient compliance as a result of the prolonged postoperative wound care.

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Conflict of interest statement

The authors have no conflicts of interest to declare.

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