OUTCOME OF RHOMBOID FLAP AND Z-PLASTY IN PILONIDAL SINUS SURGERY

AbdulWahid M. Salih *, Hawar Hasan Ali Ghalib **, Diary A. Ismael *, Mohammed I M Gubari ***, Karzan Mohammed Salih Hassan and Masrur Sleman Aziz

Submitted: 13/4/ 2015; Accepted: 7/6/2015; Published: 1/12/2015

ABSTRACT

Background

There are controversies about the etiology and management of pilonidal sinus. The numbers of techniques are testament in treating pilonidal sinus (PNS) and no single procedure is superior in all aspects.

Objectives

The Purpose of this study was to evaluate two operative procedures regarding its complications including recurrences of the disease

Methods

The medical records of 40 patients in whom the Rhomboid Flap and Z-Plasty techniques were applied for reconstruction after the excision were evaluated retrospectively.

Results

The incidence rates of postoperative hematoma 1 (2.5%), wound infection 3 (7.5%), seroma 1 (2.5%), sinus formation 1 (2.5%) and neurological symptoms 17 (42.5%) patients were observed respectively. Return to daily activities were achieved after a mean of 21.20 days. During the average follow-up of 24 months, three patients (7.5%) developed recurrent disease.

Conclusion

Rhomboid flap and Z-plasty technique are flattening of the natal cleft, thus reducing local recurrence rates. Hence, we recommend use of flap technique for pilonidal sinus patients; Z-plasty is cosmetically more accepted as it has less postoperative complication.

Keywords: *Rhomboid flap , Z-plasty, Pilonidal sinus.*

* Department of Surgery, School of Medicine, Faculty of Medical Sciences, University of Sulaimani.
Correspondence: abdulwahid.salih@univsul.edu.iq
** Surgical Unit, Shar Hospital, Sulaimani, Iraq.
*** Department of Community Health, Sulaimani Polytechnic University Kurdistan Region, Iraq.

https://doi.org/10.17656/jsmc.10078

INTRODUCTION

Pilonidal sinus is a common disorder of sacrococcygeal region affecting young people [1]. Sacrococcygeal pilonidal sinus (PNS) is pathologically, irrespective of origin, a foreign body granuloma, a nidus of hair is almost invariably found within these sinus tracts. The disease may be congential or acquired [2]. The onset of PNS is rare both before puberty and after the age of 40. Males are affected more frequently than females, probably due to their more hirsute nature [3]. There are controversies about the etiology and management of pilonidal sinus

The number of techniques is a testament in treating pilonidal sinus and no single procedure is superior in all aspects. Most of these methods employ the excision of the PNS. However, the main dilemma concerning treatment is what to do with the wound cavity after excision. The procedure can be carried out by one of four techniques: Incision and drainage, excision and healing by secondary intention, excision and primary closure and excision with reconstructive flap techniques [4] .

Wide excision and healing by secondary intention: The procedure necessitates general anaesthesia and hospital stay for a few days postoperatively. The principal advantage is a low recurrence rate but the downside is a lengthy healing time (8-10 weeks) [5].

Excision and primary closure: In a recent study, failure of primary healing was significantly associated with early recurrence of disease [6].

Excision with reconstructive procedures: Their use was restricted to recurrent pilonidal disease. The aim of the procedure is to reshape and flatten the natal cleft to reduce friction, local warmth, moisture, and hair accumulation. Recurrence of the disease is usually due to residual hair or debris that was not removed at operation, inadequate wound care or insufficient attention to depilation [7]. These techniques used a Z-plasty or Rhomboid flap to close the defect following excision. Studies were done in Kurdistan, however, they studied PNS with primary closure rather than flaps [8, 9]. Therefore, the purpose of this study was to evaluate the two operative procedures regarding its complications including recurrences of the disease [8,9].

SUBJECTS AND METHODS

Study setting

The study was conducted at four hospitals in Sulaimani city including;Teaching, Zhian, Shar and Soma hospital.

Study design

A retrospective case study design was used for the implementation of the study.

Target population:

Patients with pilonidal sinus diagnosed within the past two years were enrolled in order to study the effectiveness of Rhomboid Flap and Z-Plasty procedures for reducing the complication, recurrence of the disease and cosmetic result after the operation.

Exclusion criteria

Two Patients were lost in the follow up and one patient didn't accept to participate in the study.

Sampling design

The sample size was determined using statistical software (Epinforversion, based on the 80% power at 5% significance level.

Study procedures

The records of patients whom underwent surgery between 2013 and 2014 of the hospitals above, with a diagnosis of primary-recurrent or complicated pilonidal sinus (PNS) were retrospectively reviewed. The medical records of single cohort patients in whom Rhomboid flap (RF) and Z-plasty flap techniques were applied for reconstruction after the excision were evaluated retrospectively. Vertical elliptical incision was made including the affected skin. All the area containing the sinuses were excised down to the sacrococcygeal fascia centrally, and the gluteal fascia laterally, the sinus tract was excised en-block. Homeostasis is secured.

The cavity and the flap were irrigated with 10% povidone iodine. The rhomboid flap is transported to cover the excised rhombus, and the triangular flap is used to cover the place left behind the rhomboid flap. A suction drain was left deep to the flaps. The wound was closed by deep vertical mattress with 0

or 1 polypropylene suture for both the subcutaneous layer and for the skin. The primary closure by deep non absorbable suturing was omitted as it might cause foreign body reaction. Regarding Z-plasty Elliptical excision of the sinus tract including the narrow margins of healthy surrounding skin was carried out down to fascia to achieve excision of main and secondary sinus tracts. Limbs of the Z-plasty were marked. Skin flaps were raised and transposed. Each limb of Z was equal in length. Angle of the flaps was roughly equal to 60°.

The wound was closed in one layer after keeping a suction drain. The researchers then contacted patients by phone, letter or home visit to request a meeting with the researchers for the purpose of obtaining informed consent. Following consent, sociodemographic data and history of various exposures were collected using a structured interview questionnaire which was filled by the researchers and anthropometric measures was conducted. Clinical data were retrieved from the patients' hospital records under the supervision of the managing physician.

Data collection tools and methods

Structured interview questionnaire

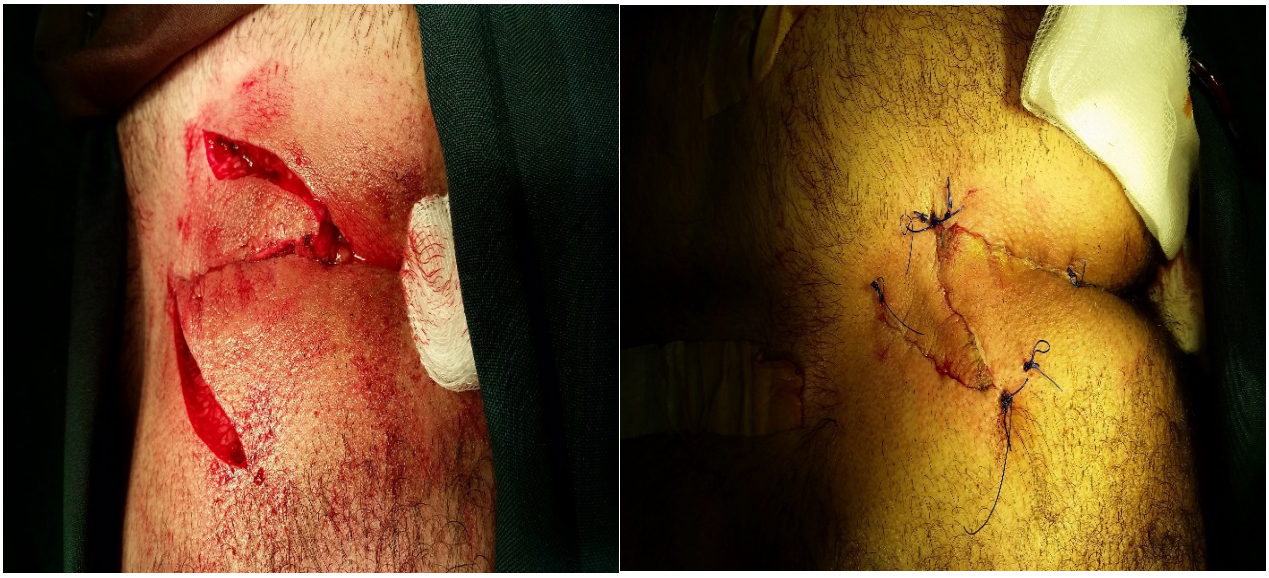
The questionnaire included the following; socio-demographic data as: age, gender, residence, marital status, occupation. Risk factors related to PNS as: positive family history, smoking status, and sleep position.Data on the complication such seroma, infection, hematoma, neurological symptoms, cosmetic results and recurrence of the disease were also collected in addition to anthropometric measurements: height, weight and body mass index (BMI).

Statistical analysis

Data were collected and coded. The collected data were reviewed and analyzed using the Statistical Package for Social sciences (SPSS version 22). Descriptive statistics was used to describe the study sample. Measures of central tendency and dispersion around the mean were used to describe continuous variables.

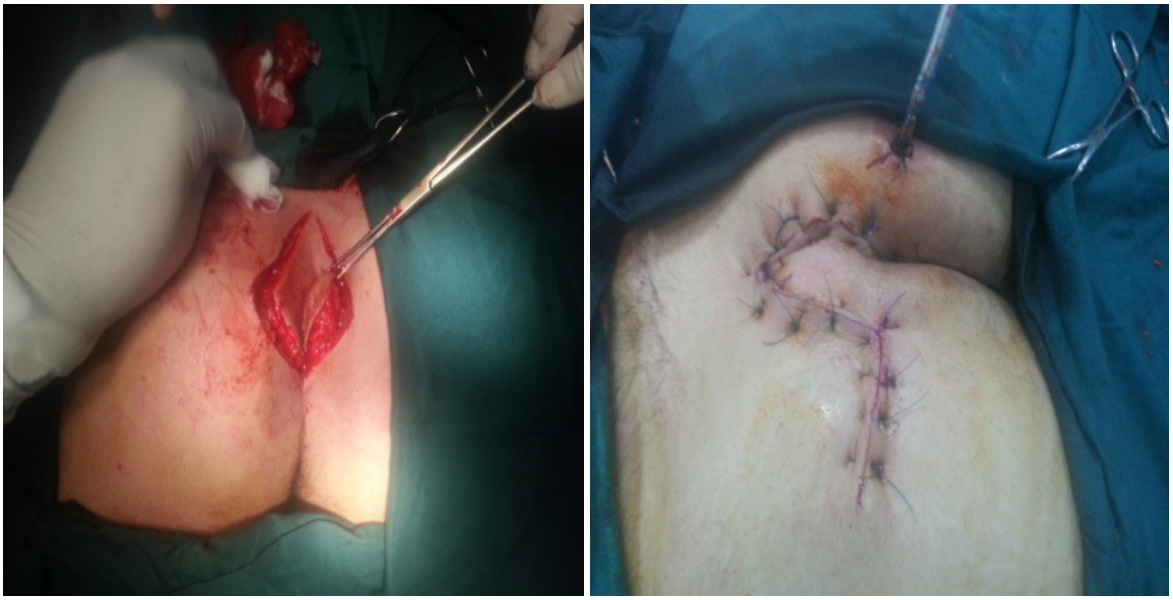
Ethical considerations

The researchers obtained the approval of the Ethical Committee of the Sulaimani medical school / University of Sulaimani for conducting the study and complied with the international Ethical Research Guidelines. Informed consents were obtained from the participants and confidentiality was assured.



A B

Figure 1. A. Z-Plasty procedure, B. complete procedure.



A B

Figure 2. A. Rhomboid Flap, B. complete procedure.

RESULTS

The study included 27 males (67.5%) and 13 females (32.5%) with a mean ± SD of age of 26.39 ± 7.34 years (range, 16 to 49 years). The distribution of patients in according to demographic characteristics and return to work and are given in (Table 1).

In this study we looked at life style of patients. For instance, most of the patients were overweight 47.5 %, and obese 15.0 %. The rest of the results are shown in table 2

Minor complications (hematoma 1 (2.5%), wound infection 3 (7.5%), seroma 1 (2.5%), sinus formation 1 (2.5% and neurological symptoms 17 (42.5%) were respectively. The distribution of complications is shown in Table3. During the average follow-up of 24 months, three patients (7.5%) developed recurrent disease

Table 1. Main characteristic of the participants.

Characteristics	No.	(%)
Gender		
Male	27	(67.5)
Female	13	(32.5)
Address		
Inside city	23	(57.5)
Outside city	17	(42.5)
Married		
Yes	26	(65.0)
No	14	(35.0)
Presentation of the disease		
Chronic	30	(75.0)
Acute	10	(25.0)
Age		
Mean ±SD (min. – max.)	26.39 ± 7.34(16 – 49)	
Return to work		
Mean ±SD	21.20 ± 14.20	

The main characteristics of all pilonidal sinus patients, the table gives both the number and percentage of the patients, and the mean ± standard deviation of the age and return to work

Table 2. Distribution of pilonidal sinus patients according to the life style risk factors.

Life style factors	No.	(%)
Smoking		
Yes	10	(25.0)
No	30	(75.0)
Sleeping position		
Prone	14	(35.0)
Side	20	(50.0)
Back	6	(15.0)
Body mass index		
18.6 – 25	15	(37.5)
25 – 30	19	(47.5)
≥30	6	(15.0)
Type of toilet use		
Eastern	31	(77.5)
Western	9	(22.5)

Table 3. Distribution of pilonidal sinus patients according post-operative complication.

Complications	No.	(%)
Hematoma		
Yes	1	(2.5)
No	39	(97.5)
Infection		
Yes	3	(7.5)
No	37	(92.5)
Seroma		
Yes		
No	1	(2.5)
	39	(97.5)
Sinus formation		
Yes		
No	1	(2.5)
	39	(97.5)
Neurological symptom		
No NS	23	(57.5)
Pain	6	(15.0)
Paresthesia	5	(12.5)
Tingling	6	(15.0)
Recurrence	3	(7.5)
Yes	37	(92.5)
No		

DISCUSSION

Pilonidal sinus is a chronic intermittent disease. There are numerous surgical treatment procedures that have been previously reported. None of these techniques is accepted as ideal for the surgical treatment of PNS. Thus, an ideal operation should be simple, have low recurrence rate, should be associated with minimal pain and be less postoperative complications [10]. The most difficult problems that follow surgery for pilonidal disease are persistent unhealed midline wound and recurrence. Various innovations were proposed to deal with these problems [11]. Some authors advise primary wound closure [12-14]. Some lay the wound open (secondary wound healing) [15, 16] , and some use fascio or musculocutaneous flaps.

Z-plasty involves fasciocutaneous flap [17, 18]. Although numerous surgical treatment procedures have been evaluated, no clear consensus has been reached as to which one is optimal for lower wound infection, wound dehiscence and recurrence rate. Recurrences is the main problem associated with all surgeries described which ranged from 21.4% to 100% for incision and drainage, 5.5–33% for excision and open packing, 8% for marsupilisation, 3.3–11% for Z- plasty [19, 20]. In this procedure results agreed with previous reports. Flap techniques have been associated with lower complication and recurrence rates. Pilonidal sinus disease is an unpleasant, chronic relapsing condition that is difficult to cure [21]. There is a wide variety of treatments with mixed results. Laying open of the sinus with healing by secondary intention1 reduces recurrence rates but requires a prolonged recovery period. Alternatively, the defect may be closed directly or asymmetrically [22]. However, these techniques predispose to tension at the repair site, which may lead to healing problems.

Closing the defect with local flaps reduces dead space, provides tension free closure, obliterates the natal cleft and later alises scars, all factors that may be important in reducing complications [23]. The rhomboid flap is well represented in the literature but the size of the defect that can be closed (and therefore the extent of the disease that can be excised) is limited [24-27]. Nevertheless, the ideal method for treating pilonidal sinus excision wounds is yet to be defined.

In this study, the complication rates in both were consistent with those reported in the literature. With the Limberg (rhomboid) flap technique, cleft can be flattened and tissue can be approximated without tension. This study is designed to research the possibility of decreasing postoperative complains in the form of daily dressing costs, pain suffering ,preventing the patients from sitting and comfortable sleeping even mobilization. The defect is closed with interrupted sutures without tension to permit full blood supply to the flap, Also it was attempted to avoid sinus recurrence by omitting subcutaneous non absorbable suture usage as it may act as a focus for bacterial colonization. The use of subcutaneous suturation, unfortunately, prolongs the time needed for surgery as well as increasing the cost. Some authors claim that using deep tension sutures may lead to more pain and discomfort and encourages infection [28-29].

Excision of PNS and primary closure technique with a flap wound edges were re-approximated by using deep interrupted vertical half matress 0-2 no polypropylene sutures. Since most of these recurrences occur in the midline, a modification of the Limberg flap technique has been used by several authors [30, 31]. According to the latter technique, the wound and all suture holes are taken away from the midline, and the lower pole of the incision is placed on the contralateral side of the elevated flap. This way there is no incision in the lower intergluteal sulcus. Sophisticated surgical procedures requiring plastic reconstruction and fasciocutaneous flap need more experience. All patients were discharged on the same operative day. Early mobilization and short time off periods are relative measures of outcome. As regards the cosmetic appearance after surgery it is well known that plasty techniques leave a considerable surgical scar, and not all patients are satisfied from this point of view [32] . For that reason there were reluctant to select female patients for rhomboid plasty, instead they preferred z-plasty technique.

The procedure has been proven to be a safe and advantageous technique, offering minimal postoperative pain, a low complication rate, a quick healing time, short hospitalization and disability and a very low recurrence rate. The outcome for the flap was felt by the authors to be good and no patient reported issues at the follow-up visit. Only 3 patients (7.5%) were found to have recurrence of the sinus formation on the subsequent visits and were treated by local excision of the sinus without closure; while other patients were grateful for relief from pilonidal disease. Five patients developed temporary postoperative complains such as hematoma, infection and seroma. All were treated successfully by simple measures like aspiration or

drainage with or without antibiotics. In this study we tried to avoid complications during the procedure by complete excision of the tract, flattening of the excised cavity and a tension free repair. On review of the literature, we found that recurrence rates range from 20% to 40% and sometimes more [33]. Out of the 40 patients operated with excision and reconstruction (37 with rhomboid flap and 3 with Z-plasty) none had recurrence [34]. In our study, recurrence rates range was 3 out of 40 patients (7.5%). It is recommended the use of rhomboid flap technique for PNS male patients but Z-plasty cosmetically more accepted as its bilaterally symmetrical.

Subcutaneous non absorbable suture usage increases the rate of the sinus recurrence so better to omit it. Rhomboid flap and Z-plasty technique are flattening of the natal cleft, thus reducing local recurrence rates.

REFERENCES

1. Tocchi A, costa G, Leore L, Liotta G, Mazzoni G, Agostini N, et al. Ambulatory closed surgery for the treatment of pilonidal sinus. G Chir 2001; 22(8-9): 303 -7.

2. Spivak H, Brook VL, Nuss-bam M, Friedman L. Treatment of chronic Pilonidal Sinus. Dis. Colon Rectum. 1999; 39(10):1136.

3. Sondenaa K, Nesvik I, Anderson E, Natas O, Soreide JA. Patient characteristics and symptoms in chronic pilonidal sinus disease.Int J Colorectal Dis. 1995; 10(1):39-42.

4. Dwight RW, Maloy JK. Pilonidal sinus. Experience with 449 cases. N Engl J Med 1953; (249): 926-30.

5. Kronberg I, Christensen KI, Zimmerman-Nielson O. Chronic pilonidal disease: a randomised trial with complete three year follow up Br J Surg. 1986; 72: 303-04.

6. Sondenaa K, Diab R, Nesvik I, Gullaksen FP, Kristiansen RM, Saebø A, et al. Influence of failure of primary wound healing on subsequent recurrence of pilonidal sinus. Eur J Surg. 2002; 168(11): 614-18.

7. Allen-Marsh TG. Pilonidal sinus: Finding the right track for treatment. Br J Surg. 1990; (77): 123- 32.

8. Hamawandi.NM. Pilonidal Sinus Using Excision and Primary midline Closure. Bas J Surg 2010 (16): 111-117.

9. Kareem .T.S. Surgical treatment of chronic sacrococcygeal pilonidal sinus open method versus primary closure. Saudi Med J 2006; 27 (10): 447-450

10. Al-Jaberi T. M. Excision and simple primary closure of chronic pilonidal sinus. Eur J Surg, 2001; 167 (2): 133-5.

11. Ankit Kayal, Akhlak Hussain, Anil Choudhary, and Ashok Meghwal . A Comparative Study between Karydakis Flap Reconstruction and Double Z-Plasty in Patients with Sacrococcygeal Pilonidal Disease. International Scholarly Research Notices. 2014; 5.

12. Anyanwu A. C., Hossain S., Williams A., Montgomery A. C. Karydakis operation for sacrococcygeal pilonidal sinus disease: experience in a district general hospital. Ann R CollSurgEngI, 1998; 80 (3): 197-199.

13. Khaira H. S., Brown J. H. Excision and primary closure of pilonidal sinus. Ann R CollSurgEngl, 1995; 77 (4): 242-4.

14. Kitchen P. R. Pilonidal sinus : experience with the Karydakis flap. Br J Surg, 1996; 83 (10) : 1452-5.

15. Fuzun M., Bakir H., Soylu M., Tansug T., Kaymak E., Harmancioglu O. Which technique for treatment of pilonidal sinus-open or closed? Dis Colon Rectum, 1994; 37 (11): 1148-50.

16. Sondenaa K., Andersen E., Soreide A. Morbidity and short-term results in a randomized trial of open, compared with closed, treatment of chronic pilonidal sinus. Eur J Surg, 1992; 158 : 351-5.

17. Azab A. S. G., Kamal M. S., Saad R. A., Abou Al Atta K. A., Ali N. A. Radical cure of pilonidal sinus by a transposition rhomboid flap. Br J Surg, 1984; 71 (2) : 154-5.

18. Khatri V. P., Espinosa M. H., Amin A. K. Management of recurrent pilonidal sinus by simple V-Y fasciocutanous flap. Dis Colon Rectum, 1994; 37 (12) : 1232-35.

19. Jensen SL, Harling H. Prognosis after simple incision and drainage for a first-episode acute pilonidal abscess. Br J Surg 1988; 75(1): 60-1.

20. Sabet AM, El Shaer WMH, El Amary MK. Definitive treatment of recurrent pilonidal sinus disease using rhomboid excision and Limberg flap. Egypt J Surg 2004; 23(4): 324-7.

21. McCallum I, King PM, Bruce J. Healing by primary versus secondary intention after surgical treatment for pilonidal sinus. Cochrane Database Syst Rev. 2010; 17(4).

22. Karydakis GE. New approach to the problem of pilonidal sinus. Lancet. 1973;2:1,414–1,415.

23. Akca T, Colak T, Ustunsoy B, et al. Randomized clinical trial comparing primary closure with the Limberg flap in the treatment of primary sacrococcygeal pilonidal disease. Br J Surg. 2005;92:1,081–1,084.

24. Berkem H, Topaloglu S, Ozel H, et al. V-y advancement flap closures for complicated pilonidal sinus disease. Int J Colorectal Dis. 2005;20:343–348.

25. Tunçbilek G, Nasir S, Ozkan O, et al. Partially de-epithelialised and buried V-y advancement flap for reconstruction of sacrococcygeal and ischial defects. Scand J PlastReconstrSurg Hand Surg. 2004;38:94–99.

26. Khatri VP, Espinosa MH, Amin AK. Management of recurrent pilonidal sinus by simple V-y fasciocutaneous flap. Dis Colon Rectum. 1994;37:1,232–1,235.

27. Dýlek ON, Bekereciodlu M. Role of simple V-y advancement flap in the treatment of complicated pilonidal sinus. Eur J Surg. 1998;164:961–964.

28. Williams R. S. A simple technique for successful primary closure after excision of pilonidal sinus. Ann R CollSurgEngl, 1990; 72 (5) : 313-5.

29. Al-Jeberi T. M. R. Excision and simple primary closure of chronic pilonidal sinus. Eur J Surg, 2001, 167 (2) : 133-5.

30. Tekin, A. - A simple modification with the Limberg flap for chronic pilonidal disease. Surgery.2005;138:951.
31. Cihan, A., Ucan, Bh.,Comert, M., Cesur, A., Cakmak, Gk., Taskilar, O. - Superiority of asymmetric modified Limberg flap for surgical treatment of pilonidal disease. Dis. Colon Rectum, 2006, 49:244.

32. Eryilmaz, R., Sahin, M., Alimoglu, O., Dasiran, F. - Surgical treatment of sacrococcygeal pilonidal sinus with the Limberg transposition flap. Surgery, 2003, 134:745.

33. Ringelheim R, Silverberg MA, Villanueva NJJ. Pilonidal Cyst and Sinus. 2014. Available at: https://www.emedicine.com/emrg/topic 771 html.

34. Matar.Z. Pilonidal Sinus Disease: A 5-year Study. The Internet Journal of Surgery. 2006; 13 (2).