The Professional Medical Journal
www.theprofesional.com

DOI: 10.17957/TPMJ/16.3602

ORIGINAL PROF-3602

PILONIDAL SINUS;

EXPERIENCE WITH MODIFIED KARYDAKIS PROCEDURE USING SUBCUTICULAR SKIN CLOSURE

mramzaan@hotmail.com

Dr. Muhammad Ramzan[1], Dr. Muhammad Khalid Mirza[2], Dr. Muhammad Arif Ali[3]

1. Professor of Surgery Independent Medical College, Faisalabad
2. Associate Professor of Surgery Aziz Fatima Medical College, Faisalabad
3. Associate Professor Community Medicine Independent Medical College, Faisalabad

Correspondence Address:
Dr. Muhammad Ramzan
Professor of Surgery
Independent Medical College, Faisalabad
mramzaan@hotmail.com

Article received on:
24/08/2016
Accepted for publication:
10/11/2016
Received after proof reading:
00/00/2016

ABSTRACT… Objectives: To prospectively evaluate the results of modified Karydakis procedure with subcuticular skin closure in presacral pilonidal sinus disease patients. **Design:** Prospective cohort study. **Setting:** Armed Forces Hospital Dhahran. **Period:** Jan.2007 and Jan 2013 were prospectively followed for 2 & ½ yrs. **Methodology:** 243 patients having pilonidal sinus disease who underwent surgery by modified Karydakis technique with subcuticular skin closure. They were evaluated for age, sex, BMI, duration of symptoms, hospital stay, morbidity, recurrence and cosmetic satisfaction. The patients having acute pilonidal sinus abscess were excluded from the study. **Results:** Out of 243 patients, 230 were males and 13 females with a mean age and BMI of 24.7, 26.3, 29.4 and 30.8 respectively. The most common symptom was seropurulent discharge from the sacrococcygeal area. 232 (95.5%) patients completed their follow up whereas 11 (4.53%) patients (5 females and 6 males) could not be traced in follow up calls after 3 months. 22/243 patients (9%) had minor wound related complications like minor wound infection, partial wound or skin disruption and seroma formation. There were only 3 (1.23%) recurrences (2 males and 1 female). All patients were fully satisfied with the cosmetic result. **Conclusion:** Karydakis asymmetrical flap closure using subcuticular skin closure is a simple technique which gives best outcome in terms of morbidity and Cosmesis.

Key words: Pilonidal Sinus disease, Karydakis procedure, subcuticular skin closure

Article Citation: Ramzan M, Mirza MK, Ali MA. Pilonidal Sinus; Experience with modified karydakis procedure using subcuticular skin closure. Professional Med J 2016;23(12):1499-1504. **DOI:** 10.17957/TPMJ/16.3602

INTRODUCTION

Pilonidal sinus disease (PNS) is the presence of a discharging sinus or sinuses in the natal cleft skin and is frequently associated with a chronic abscess cavity in the subcutaneous tissues containing loose hair and debris. The term pilonidal sinus "nest of hair" was used first time by Hodges in 1880.[1] It predominantly affects the males in their most productive years of life, puberty to 40's, causing considerable quality of life impairment and treatment related morbidity.[2] Initially it was thought to be a congenital disease and treatment strategies based on this etiological concept were associated with high morbidity and significant recurrence rates.[2]

The acquired theory of the disease origin is now widely accepted and is based on the extensive work of Bascom and Karydakis. According to Bascom the disease starts as a midline pit or pits which represents inflamed or infected hair follicles (Figure-1). The natal cleft depth creates moist anaerobic environment whereas the motion of buttocks and sitting pressure helps in bursting the distended hair follicle in the subcutaneous fat causing an acute abscess. The repetition of this process at subacute level leads to chronic pilonidal sinus disease.[3]

Figure-1. Midline pits

Karydakis on the other hand believes that because of the chisel like root ends and scales on the hairs, loose hair penetration in the natal cleft skin at midline raphe is the initial event followed by foreign body reaction and infection which subsequently leads to chronic sinus formation. He actually devised the following formula for the factors aiding in hair penetration after his work on more than 6000 patients.[4,5,6,7]

Pilonidal sinus Disease=Hair (H)* Force (F)* Vulnerability (V^2) and each one is further elaborated in Table-I.

Hair (H)	Force (F) causing insertion	Vulnerability (V)
Number of loose hair	Depth of natal cleft	Softness of skin
Root end acuteness	Narrowness of natal cleft	Maceration of skin
Kind of hair (tough or Silky)	Friction at buttocks	Erosions
Shape (straight more dangerous)		Wounds/ Scars
Scaliness on shaft (prominent in young)		Obesity, occupation

Table-I. Pilonidal Sinus Disease Factors

It is quite possible that in some patients hair penetration may be the initial event whereas in others it might have started as folliculitis.

The main treatment modality for PNS is surgical. An ideal surgical therapy should prevent recurrence, be easy to adapt & perform by a general surgeon, cost effective, need minimal wound care and should provide quick cure with minimal morbidity. The surgical procedures like simple excision with healing by secondary intension, excision with marsupalization and excision with primary midline closure are simple to perform but either have high complication & recurrence rates or have a long healing time.[8,9] Advanced flap procedures like rhomboid flap, VY-plasty and Z-plasty are claimed to have less recurrence but they are difficult to perform, have poor cosmetic outcome and may end up with flap necrosis.[10,11]

The modern treatment strategies such as pit picking, Bascom's cleft lift and modified Karydakis procedures are easy to perform and relatively have a shorter learning curve with a very high success rate.[9] We adapted the Karydakis procedure in 2006 where the natal cleft is made shallower, incision is closed off the midline in 2-3 layers and the lower end of the wound is deviated away from the perianal area for better hygiene. In 2007 we modified it by closing the skin by subcuticular sutures as we believed that in this way the risk of hair penetration is further reduced due to better skin approximation and absence of interrupted suture entry weak points. This way the wound related morbidity and recurrence rate is further reduced. Moreover Cosmesis and patient satisfaction is much better as compared in Figures-2 & 3.

Figure-2&3. Interrupted Vs subcuticular sutures

MATERIAL AND METHODS

This is a prospective cohort study of 243 patients having pilonidal sinus who underwent surgery at Armed Forces Hospital Dhahran between Jan 2007 and Jan 2013. These patients were evaluated for Age, Sex, BMI, profession, presenting symptoms and history of any previous pilonidal sinus surgery. They were also evaluated for duration of procedure, length of hospital stay, postoperative complications, patient's satisfaction and any recurrence in 2 & 1/2 years. After discharge from the hospital the patients were weekly followed in the surgery clinic for 6 weeks afterwards information for any pain, discharge, reoperation in any other hospital was obtained

regularly by telephone after every 3 months. The patients who underwent I & D for acute pilonidal sinus abscess were excluded. The patients who had surgery by any other technique by other surgeons were also excluded from the study. The data are analyzed by a computer software and expressed as percentage or mean ±SD.

Surgical Procedure

The surgery was performed under spinal or general anesthesia in prone position. All patients received cefuroxime and flagyl on call to OR which were then continued postoperatively for 3-5 days as extended prophylaxis. A suction drain was inserted in all patients which was removed once its output was serous and below 10ml in the previous 24 hours. The patients were also strictly advised to avoid sitting for 10 days. The patient was discharged home once drain is removed. The steps of the procedure are shown in Figures-4 to 7.

- The flap side is mobilized in a plane above the gluteal muscles (Figure-6)

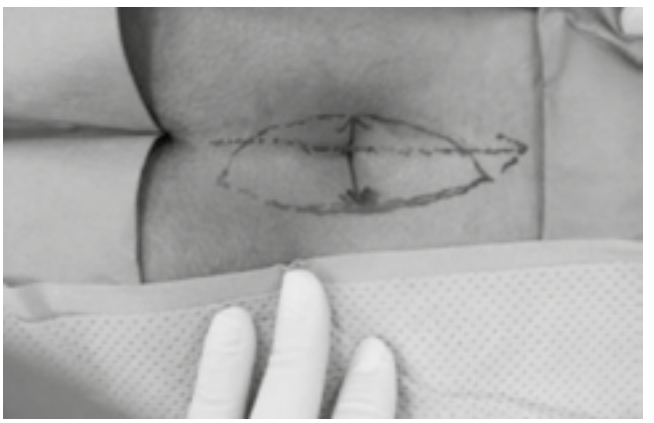


Figure-4. Markings, the arrow indicating midline

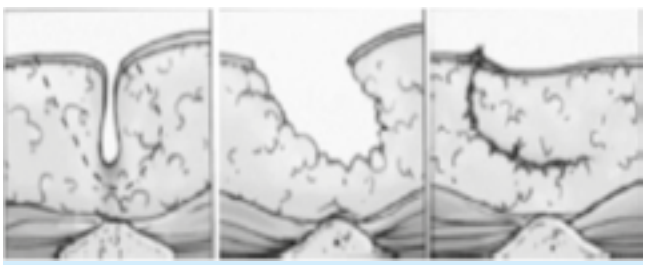


Figure-5. Procedure sketch (source google images)

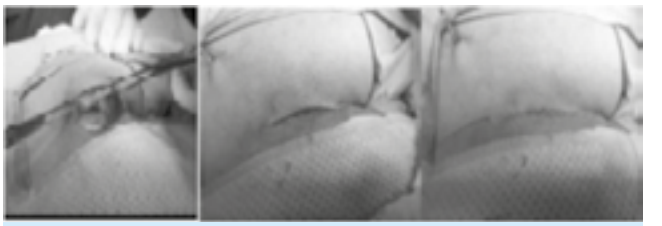


Figure-6. Flap elevation above the gluteal muscles, closure in progress & completed

Figure-7. Interrupted sutures for comparison

RESULTS

Out of 243 patients 13 were females; their demographic features are mentioned in Table-II. The most common presentation was seropurulent discharge from the sacrococcygeal area for more than six months.

The mean operative time was 66 minutes (45-72 minutes) and the mean duration of drain insertion was 4 days (3-5 days). The mean duration of hospital stay was 5 days (4-7 days). All patients had 1st OPD follow up visit at 10th postoperative day then weekly for 6 weeks.

Out of 243 patients, 232 (95.5%) patients completed their follow up whereas 11 (4.53%) patients (5 females and 6 males) could not be traced in follow up calls after 3 months. Their outcome data are presented in Table-III.

Out of 243 patients only 22 (9%) had surgery related complications which were all minor, managed in outpatient clinics except two who needed debridement in operation room and none of them ended up in recurrence? Most of these complications probably happened because these patients ignored to avoid sitting during first 10 days.

		Number (%)	Age (Mean, Range)	BMI (Mean ± SD)
Gender	Males	230 (94.65)	24.7 (17-34)	29.4 ± 6.1
	Females	13 (5.35)	26.3 (16-29)	30.8 ± 4.6
Occupation		Military Recruits	Students	Others
	Males	128	72	30
	females	0	5	6
History of previous PNS Surgery		Excision & primary closure	Excision & laying open	Total
	Males	25 (10.3)	5 (2%)	30 (12.3)
	Females	0	0	0

Table-II. Patient characteristics

		Males= 230(Number, %)	Females=13(Number, %)
Early failure < 1 month		2 (0.8)	1 (7.7)
Wound infection		5 (2.2)	0
Partial wound disruption		6 (2.61)	0
Partial skin disruption		9 (3.91)	0
Seroma		2 (0.8)	0
Recurrence	1 year	2 (0.8)	1
	2 years	0	0
	2 ½ years	0	0
Total complications	22/243 (9%)	22/230 (9.57)	0
Total recurrences	3/243 (1.23%)	2/230 (0.8)	1/13 (7.7)

Table-III. Outcome Data

Some of them travelled after discharge to their home towns which were at least 500-1200 kilometers journey by car. There were total 3 (1.23%) recurrences two in males and one female. The female was 15 years old having type 1 diabetes and the resident forgot to order preoperative antibiotics. She got bad wound infection for which the whole wound was layed open. All the patients were satisfied with the ease of wound care and final cosmetic result.

DISCUSSION

The ideal technique for the treatment of sacrococcygeal pilonidal sinus disease is a controversial issue.[6] The main goal of treatment for the sacrococcygeal pilonidal sinus disease is the selection of the most appropriate technique that causes the least number of early postoperative complications, shortens the length of hospital stay, and results in the least number of long-term recurrences.[7] Numerous methods have been described as surgical treatment alternatives for sacrococcygeal pilonidal sinus disease including simple excision with secondary healing, primary oblique excision and closure, marsupialization, V-Y advancement flap, Z-plasty, Limberg flap, and Karydakis flap techniques.[8,9] The open techniques require prolonged local care and place a significant burden on patients and health care personal in terms of prolonged healing time and wound care. Postoperative supervision is necessary to avoid pocketing, with regular rubbing and periodical curettage of granulation tissue to avoid premature closure or bridging of the skin edges. Excision with an open wound involves prolonged hospitalization or clinic attendance for many painful dressings and takes months to heal hence prolonged period off from work. Moreover these methods leave a week portal in the midline for further hair entry and have a small but significant recurrence rate.[12,13]

Simple midline closure of intergluteal skin, following excision of the sinus, has been reported

with variable success rates. The mean healing time has been 10-18 days but many studies have reported wound related complications from 9% to 69% with a recurrence rate of 3.5% to 42%.[14] The higher chances of recurrence associated with primary closure could be due to a midline scar inviting further hair re-insertion.

Karydakis technique aims to take the scar away from the midline furrow and make the cleft quite shallow. Therefore, it reduces the vulnerability for hair re-insertion in the flattened intergluteal area. This can also be achieved by various types of advancement flaps but these procedures produce a bad cosmetic result and can end up in bad wound related morbidity.[15]

In this series the mean healing time was 14 days which is comparable to other series of closed excision especially Karydakis technique. Delayed healing has been a problem in some cases. However, as the wound lies on one side of the midline, it usually heals without any serious consequence especially recurrence. The mean hospital stay of 5 days in the present series is almost similar to the time period reported in many other series.[16,17] The rate of minor complications was 9% in the present series.

Recurrence has been consistently reported low with Karydakis technique even with prolonged follow-up as compared to other treatment modalities. Karydakis[6] reported 8.5% incidence of complications in his own large series of 6545 cases. Kitchen[7] reported early complications like hematoma (5%), wound infections (4%) and late complications in 12% of cases whereas recurrence was seen in 4% of the cases. In another series Akinci[17] reported 7.14% complications with a recurrence of 0.9%. In a retrospective comparative study of 68 cases between Karydakis procedure and midline excision & primary closure the recurrence rate was 0% and 11% respectively.[18] In another study the recurrence rate was 4.6% for the Karydakis group and 18.4% for the primary midline closure[19] Natal cleft is not completely flattened by any of the above mentioned techniques, thus accounting for a higher incidence of recurrence. In the present series recurrence rate was only 1.23%.

Like many others, open excision is still widely practiced in our country. It is understandable that no surgeon can experiment with all the available techniques of management of pilonidal sinus and may, therefore, confine himself to one or two procedures. A consensus appears remote to achieve for one particular technique, but to improve results a simple technique of Karydakis asymmetrical flap closure using subcuticular closure may be worth trying. Its results are comparable or even better in some aspects to the other published series.

REFERENCES

1. Hodges RM. **Pilo-nidal sinus.** Boston Med Surg J 1880; 103:485–486.
2. Søndenaa K, Andersen E, Nesvik I, Søreide JA. **Patient characteristics and symptoms in chronic pilonidal sinus disease.** Int J Colorectal Dis 1995; 10(1):39–42.
3. Bascom J, Bascom T. **Failed pilonidal surgery: new paradigm and new operation leading to cures.** Arch Surg 2002; 137(10): 1146–1150.
4. Karydakis GE. **New approach to the problem of pilonidal sinus.** Lancet 1973; 2(7843):1414–1415.
5. Karydakis GE. **Easy and successful treatment of pilonidal sinus after explanation of its causative process.** Aust N Z J Surg 1992; 62(5):385–389.
6. Kitchen P. **Pilonidal sinus - management in the primary care setting.** Aust Fam Physician 2010; 39(6):372–375.
7. Akinci OF, Kurt M, Terzi A, Atak I, Subasi IE, Akbilgic O. **Natal cleft deeper in patients with pilonidal sinus: implications for choice of surgical procedure.** Dis Colon Rectum 2009; 52(5):1000–1002.
8. Emilie B. Fitzpatrick, M.D.a, Patrick M. Chesley, M.D. et al. **Pilonidal disease in a military population: how far have we really come?** The American Journal of Surgery 2014; 207: 907-914.
9. Karakayali F, Karagulle E, Karabulut Z, Oksuz E, Moray G, Haberal M. **Unroofing and marsupialization vs. rhomboid excision and Limberg flap in pilonidal disease: a prospective, randomized, clinical trial.** Dis Colon Rectum 2009; 52(3): 496–502.

10. Mahdy T. **Surgical treatment of the pilonidal disease: primary closure or flap reconstruction after excision.** Dis Colon Rectum 2008; 51(12):1816–1822.

11. Mentes O, Bagci M, Bilgin T, Ozgul O, Ozdemir M. **Limberg flap procedure for pilonidal sinus disease: results of 353 patients.** Langenbecks Arch Surg 2008; 393(2): 185–189.

12. Sondenaa K, Nesvik I, Andersen E, et al. **Recurrent pilonidal sinus after excision with closed or open treatment: final result of a randomized trial.** Eur J Surg. 1996; 162(3):237-40.

13. Allen-Mersh TG. **Pilonidal sinus: finding the right track for treatment.** Br J Surg. 1990; 77(2): 123-32.

14. Amit Khanna, M.D.1 and John L. Rombeau, M.D.1. **Pilonidal Disease.** Clin Colon Rectal Surg 2011; 24:46–53.

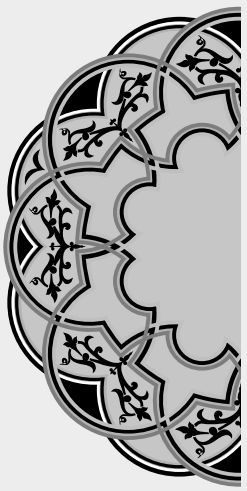
15. M. Kamil Yildiz, Erkan Ozkan, HacJ Mehmet OdabaGJ et all. **Karydakis Flap Procedure in Patients with Sacrococcygeal Pilonidal Sinus Disease: Experience of a Single Centre in Istanbul.** The ScientificWorld Journal 2013; Article ID 807027, 4 pages, 2013. doi:10.1155/2013/807027.

16. Petersen S et al. **Primary closure techniques in chronic pilonidal sinus: a survey of the results of different surgical approaches.** Dis Colon Rectum 2002; 45: 1458–1467.

17. Akinci OF, Kurt M, Terzi A, Atak I, Subasi IE, Akbilgic O. **Natal cleft deeper in patients with pilonidal sinus: implications for choice of surgical procedure.** Dis Colon Rectum 2009; 52(5):1000–1002.

18. Peter Morden Æ Robert A. **Drongowski James D.** Geiger Pediatr Surg Int 2005; 21: 793–796.

19. Mehmet Fatih, Mert Mahsuni Sevinc, Mehmet Yilmaz. **Comparison of Karydakis Flap Reconstruction Versus Primary Midline Closure in Sacrococcygeal Pilonidal Disease: Results of 200 Military Service** Members Surg Today 2009; 39:580–586.



"You can be comfortable or courageous, but you cannot be both."

Unknown

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Muhammad Ramzan	Surgeon data collection, Study design	
2	Dr. Muhammad Khalid Mirza	Surgeon data collection Lit. Review Discussion	
3	Dr. Muhammad Arif Ali	Review and Data analysis	