



A Prospective Comparative Study Between Karydakis Operation Versus Modified Bascom (Cleft Lift) Procedure for Pilonidal sinus

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Abstract

Background: Pilonidal sinus is one of the common conditions encountered in general surgical practice, characterized by an epithelial tract generally containing hairs (the sinus) located in natal cleft, affecting young adults between age 15-30yrs and is associated with considerable morbidity. The management of pilonidal disease is always contentious.

Method: A prospective comparative study was conducted on patients of age between 14-60yrs, being diagnosed with pilonidal sinus admitted to Dept of General Surgery, S.C.B Medical College between period AUGUST 2016 TO JULY 2018. After routine investigations, patients underwent randomly either of the procedures i.e. Karydakis or Bascom (modified) after an informed consent. Parameters like total operating time, amount of blood loss, perioperative pain, total hospital stay, total recovery time, complications and recurrence rate of patients were evaluated.

Result: Out of 30 included in study, 15 patients with pilonidal sinus underwent Karydakis operation (Group A) and rest 15 underwent Modified Bascom (cleft lift) procedure (Group B). Mean operative time for Group A and Group B were 48.67 ± 10.08 mins and 60.00 ± 14.64 mins respectively ($p < 0.05$). Average amount of blood loss in Group A and Group B were 132.67 ± 13.87 ml and 154.67 ± 12.46 ml ($p < 0.05$). Mean hospital stay for Group A and Group B were 8.13 ± 2.13 days and 13.60 ± 1.64 days respectively. Mean time taken to return to work for Group A and Group B were 10.33 ± 1.84 days and 16.07 ± 2.40 days ($p < 0.05$). No recurrence was found during follow up.

Conclusion: Karydakis procedure is relatively easy with average learning curve with less number of days in hospital, less blood loss, less healing time and less loss of man-hours. More so Bascom (modified) procedure has more learning curve and lands up with delayed healing, though recurrence rate is almost same in the both groups.

Keywords: Pilonidal sinus, Karydakis operation, Modified Bascom cleft lift procedure

1. Introduction

Pilonidal sinus is one of the common surgical problems encountered in general practice. It was first described by Anderson in 1847 and by Hodges in 1880.^{1,2} The term pilonidal is derived from the Latin word Pilus (hair) and Nidus (nest), hence, meaning "a nest of hair". Pilonidal sinus disease (PSD) can involve different sites such as axilla, umbilicus, interdigital space, but it is usually seen in the sacrococcygeal region (natal cleft), although it is chronic but often presenting with acute exacerbations.³ It is characterized by epithelial tract (the sinus tract) located in natal cleft, a short distance behind the anal verge and generally contains hairs inside.

It is a commonly seen with young adults, aged between 15-30yrs, and after puberty, when sex hormones are known to affect pilosebaceous glands and change healthy body hair growth. It is also associated with the occupation, where the patient sits long time daily for a long period as seen with "Jeep drivers", commonly known as Jeep Driver's disease (JDD). It is associated with considerable morbidity and can have significant socio-economic impact on individuals. The management of pilonidal disease is variable, contentious and problematic. In the past, it was thought to be a congenital disease but recently it is more accepted to be an acquired condition.⁴ Karydakis (1992) stated that the pathogenesis of pilonidal sinus attributed to three main factors

1. loose hairs invading intergluteal cleft (falling from the back),
2. some force (buttock friction and shearing forces) in that area allows shed hair or broken hairs which are sucked in there to drill through the midline skin (e.g. riding in a jeep, prolonged sitting/ sedentary lifestyle), and

3. vulnerability due to loss of barrier function of the skin (epidermal and deep tissue disruption from moisture, anaerobic conditions, hair and bacteria). Moisture creates an environment that is friendly to anaerobic bacteria and results in maceration of epidermis and loss of this natural barrier to infection. This barrier function is also lost in a surgical scar in this region.^{5,6} Bascom (1980) proposed that the pilonidal sinus disease starts as a midline pit or pits which result in inflamed or infected hair follicles and deep natal cleft lead to creation of moist anaerobic environment whereas the movement of buttocks and sitting pressure help in bursting of the distended hair follicle in the subcutaneous fat causing an acute abscess.^{7,8} The repetition of this process at subacute level leads to chronic pilonidal sinus disease i.e., a subcutaneous, chronically infected, midline track. From this primary sinus, secondary tracks may spread laterally, which may emerge at the skin as granulation tissue lined, discharging openings.

Miocinovic (2001), explained why sacrococcygeal pilonidal disease occurs in the midline or recurrent after midline scar, as increased depth of the intergluteal sulcus leads to an anaerobic media and increased anaerobic bacterial content, also, the vacuum effect that present between heavy buttocks is thought to play an additional role in pilonidal disease development because it sucks the anaerobic bacteria, fragmented hair, and debris into the subcutaneous fat tissue.⁹

If these factors responsible for the development of the disease eliminated, this will lead to decrease recurrence rates. So, most of authors thinking that the most important factor in development or recurrences of sacrococcygeal pilonidal sinus disease is the deepness of natal cleft and if the surgeon makes natal cleft more shallow and post-operative scars away from midline this decrease recurrence rates.

Most of authors thinking that the most important factor in development or recurrences of sacrococcygeal pilonidal sinus disease is the deepening of natal cleft^{8,9} and if the surgeon makes natal cleft shallower and bring midline laterally (Karydakias, limberg, Bascom cleft lift, modified Bascom), then it will decrease recurrence rates.

Various authors like Karydakias (1992), Kitchen (1996), Anyanwu, Hossain, Williams, and Montgomery (1998), Kumar and Sutradhar (2014), Ashour and Abelshahid (2015), etc. had showed that Karydakias operation had a low recurrence rate because it produces a shallow midline furrow free from scar or suture holes which is less vulnerable to hair penetration than a midline wound.^{5,10-13}

Bascom and Bascom (2002) described cleft lift procedure as procedure modified from the operation originally used by Karydakias and Kitchen, only difference being removal of superficial disease process avoiding removal of deep inflamed tissue and avoiding use of thick flaps of fat attached to skin (aim was only to shift skin alone). The process never involved division or shifting of muscle or fascia.⁸

Bascom (2007) published the results of 69 cleft-lift operations. All patients had wounds healed at the end of the 30-month follow-up period and no patient had recurred with sinus. He also stated on comparing the cleft-lift procedure with minimally invasive surgical measures in pilonidal disease e.g. pit picking (Bascom I), fewer recurrences occur during the cleft-lift. Compared to the Limberg procedure, the recurrence rate (renewed sinus formation) and the frequency of wound healing disorders are approximately the same. The cleft-lift procedure according to Bascom leads to approximately the same results as the Karydakias technique but tends to show a higher rate of wound healing disorders.¹⁴

Authors like Mohamed et al (2018), Umesh et al (2018), etc. showed that Modified Bascom natal cleft lift was

associated with good outcome, low recurrence rates, and good patients' satisfaction.^{15,16}

Although authors like Rabea (2015)¹⁷ and various others had compared Bascom's cleft lift with rhomboid flap (Limberg) procedures for the treatment of primary sacrococcygeal pilonidal sinus (SCPS), but there is no comparative study between Karydakias and modified Bascom (cleft lift) procedure.

Hence, keeping all above facts in mind we undertook Modified Bascom and Karydakias, two commonly employed procedures for its merits and demerits with recurrence rates ranging a post-op follow up prior from 3 months to 2 years.

2. Materials and methods

A prospective comparative study was conducted on all patients irrespective of sex, aged 14-60yrs, being diagnosed with pilonidal sinus admitted to Dept of General Surgery, S.C.B Medical College between period August 2016 To July 2018.

Inclusion criteria

Patient aged between 14 to 60 yrs. diagnosed with pilonidal sinus in natal cleft

Exclusion criteria

- 1.Pilonidal abscess
- 2.Patient having Diabetes Mellitus
- 3.HIV positive patient
- 4.Patient on chemotherapy
- 5.Patient on immunosuppression therapy
- 6.Recurrent pilonidal sinus

Detailed history of patient was taken and different investigation like- routine hemogram, MRI of pilonidal sinus, X ray of spine, etc. was undertaken. Patients underwent either of procedures i.e. Karydakias or Bascom (modified) after being randomly selected after giving an informed consent.

Surgical Procedure:

Karydakis Procedure

The operation was performed under spinal anesthesia after an informed consent.

- The gluteal area, including the region surrounding the intergluteal sulcus, was shaved on the day of surgery.
- Preoperatively, the patients were administered 1 g of a 1st generation cephalosporin for prophylaxis intravenously.
- After positioning the patient in the prone position, the skin around the intergluteal sulcus was stretched using medical tape and the skin was cleaned using 10% povidone iodine.
- The sinus tract was removed down to the sacrococcygeal fascia by a semi lateral (asymmetrical) elliptic incision, while keeping the sinuses of the pilonidal sinus disease at the center of the elliptic incision.
- The central aspect of the semi lateral elliptic incision was mobilized, and a contralateral flap containing cutaneous-subcutaneous fatty tissue was raised
- A suction drain was placed in the cavity for aspiration purpose after the medical tape stretching the buttocks was removed.
- The flap was advanced to the contralateral side, the tissue was fixed on the contralateral side crossing the sacrococcygeal fascia using number 2-0 Vicryl suture, and the natal cleft was transposed laterally. The skin was sutured using 2-0 polyamide suture.
- An oral free-feeding regimen was initiated in the early postoperative period. The patients were advised to pay special attention to perineal hygiene following defecation.
- The aspiration drain was removed when the flow rate was <10 mL/day. Oral antibiotics were continued until the end of the first postoperative week.

- Wound sutures were removed 10–12 days postoperatively.

Modified Bascom Procedure

- The buttocks are taped apart, and the operative area is shaved, painted with povidone-iodine or chlorhexidine, and draped.
- A skin flap is raised on the least diseased side of the gluteal cleft.

(Inferiorly this flap is then curved over to the diseased side, several centimeters above the anus, just below the area of lowest disease. The flap containing skin, deep dermis, and a small amount of fat, resulting in a flap about 1 cm in thickness raised.)

- The tapes holding the buttocks in place is then released, so that the skin flap could be pulled over to the opposite side to determine the extent of the excision. This is marked, and then the disease process is excised along with the skin on the opposite side of the gluteal fold.
- The excisional portion including skin, obvious sinus tracts, and areas of granulation tissue is removed along with minimal amounts of fat.
- Suction drain is placed.
- Closure is done in layers using Vicryl 2-0 and skin closed with 2-0 polyamide or skin stapler.

Post-operative period:

- Postoperative management included post-operative antibiotics, analgesics, daily dressing and encouragement of patient's ambulation in early post-operative period.
- VAS (visual analogue scale) score for pain was recorded for every patient, time taken to do normal daily activities was recorded, suction drain was removed when content < 10 ml/24hr. And IV antibiotic was replaced by oral antibiotic on discharge after removal of suture.

- Follow up in surgery outpatient clinic weekly for one month, then on 3, 6 months and up to 2 years following surgery (if required).

Statistical Analysis

Collected data was subjected to SPSS (IBM SPSS ver. 21) for Statistical analysis. For all statistical analyses, Student t-test was used with $p < 0.05$ considered as significant.

3. Results

Out of these 30 patients, 15 patients underwent Karyadakis procedure (Group A) and other 15 underwent Modified Bascom cleft lift procedure (Group B).

All of the cases (100%) were male with no cases being female in both groups. The maximum number of cases (73.4%) were between 21-30 years of age in both Group A and Group B. The minimum age recorded in Group A and Group B was 17 years and 18 years respectively whereas the maximum age in Group A and Group B was 35 years and 34 years respectively. The mean age for Group A and Group B were 25.40 ± 4.99 years and 24.60 ± 4.55 years respectively.

Table 1. Age distribution of patients

SL.NO.	AGE (Years)	GROUP A N (%)	GROUP B N (%)	P-value
1.	0-10	0	0	0.650
2.	11-20	2 (13.3)	3 (20)	
3.	21-30	11(73.4)	11(73.4)	
4.	31-40	2 (13.3)	1 (6.6)	
	TOTAL	15	15	

The maximum number of cases in Group A and Group B were Hindu (86.7% and 93.3% respectively) followed by Muslim (13.3% in Group A and 6.7% in Group B).

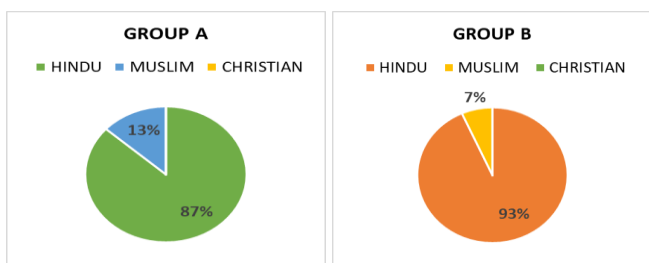


Figure 1. Religious distribution of patients

The maximum cases in Group A (46.7%) and Group B (33.3%) were driver by occupation. Others occupation in Group A and Group B were student (33.3% and 26.7%), vendor (13.3% and 6.7%), officer (6.7% and 26.6%) and others (0 % and 6.7%) respectively.

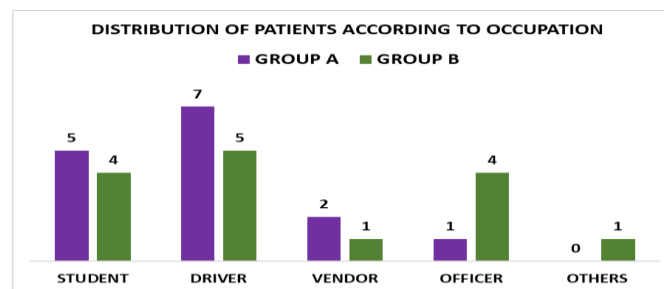


Figure 2. Distribution of patients according to Occupation

The most common complaints in Group A were intermittent pain (93.33%) and discharge from sinus (93.33%), followed by swelling at the base of spine (66.67%). The most common complaints in Group B were intermittent pain (86.67%), followed by discharge from sinus (73.33%) and swelling at the base of spine (53.33%).

Table 2. Distribution of patients according to chief complaints

SL.NO.	CHIEF COMPLAINTS	GROUP A N(%)	GROUP B N(%)
1.	INTERMITTENT PAIN	14 (93.33)	13 (86.67)
2.	DISCHARGE	14 (93.33)	11 (73.33)
3.	SWELLING	10 (66.67)	8 (53.33)

The maximum number of cases in Group A (66.67%) and Group B (80%) were having the symptoms for duration 6-12 months. Minimum and maximum duration of symptom being 4 months and 15 months in the total sample respectively. The Mean duration of symptoms for Group A and Group B were 8.93 ± 3.43 and 9.87 ± 2.75 months respectively.

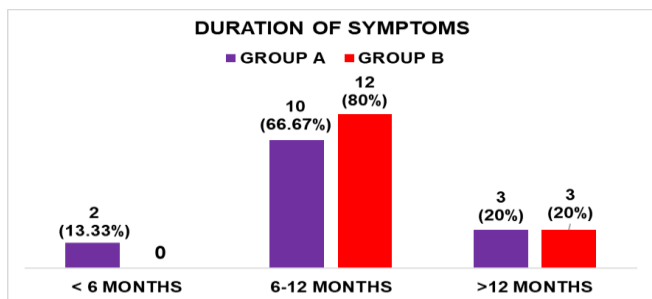


Figure 3: Distribution of patients according to duration of symptoms

The maximum cases in Group A (73.3%) and Group B (53.3%) were overweight. Mean BMI of Group A and Group B were 25.67 ± 2.72 and 25.33 ± 3.75 respectively.

Table 3. Distribution of patients according to BMI

SL.NO.	BMI	GROUP A N(%)	GROUP B N(%)	P-value
1.	<18	0	0	0.783
2.	18-25	4 (26.7)	6 (40)	
3.	25-30	11 (73.3)	8 (53.3)	
4.	>30	0	1 (6.7)	

All cases in both groups were found to have dark and coarse body hair. Maximum number of cases in Group A (73.3%) and Group B (80%) were to have natal cleft

depth more than 25mm. Mean natal cleft depth in Group A and Group B were 26.40 ± 1.55 mm and 26.00 ± 2.14 mm respectively.

Table 4: Distribution of patients according to natal cleft depth

Sl.No.	Natal Cleft Depth (Mm)	Group A N(%)	Group B N(%)	P-Value
1.	<20	0	0	0.562
2.	20-25	4 (26.7)	3 (20)	
3.	>25	11 (73.3)	12 (80)	

Maximum number of cases in Group A (93.3%) and Group B (53.3%) were having single, midline sinus opening. About 6.7% in Group A and 40% in Group B were having multiple, midline sinus openings. Only one patient of Group B had a para-midline sinus opening.

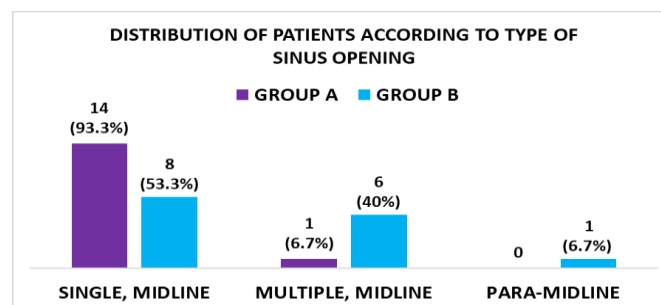


Figure 4. Distribution of patients according to type of sinus opening

Table 5: Intra-operative and Post-operative observations for both groups

SL.NO.	PARAMETER	GROUP A	GROUP B	P value
1.	Operative time (min)	48.67 ± 10.08	60.00 ± 14.64	0.02 (<0.05)
2.	Blood loss (ml)	132.67 ± 13.87	154.67 ± 12.46	0.0000001
3.	Drain removal (days)	7.55 ± 1.13	11.87 ± 1.55	0.0000001
4.	POST-OP PAIN			
	(1) Day 1	3.67 ± 1.35	4.07 ± 1.39	0.43
	(2) Day 3	1.80 ± 0.68	1.93 ± 0.7	0.6
	(3) Day 5	1.4 ± 0.83	1.2 ± 0.86	0.52
	(4) Day 7	0.07 ± 0.26	0.13 ± 0.52	0.66

5.	POST-OP COMPLICATIONS	2 (13.3%)	3 (20%)	0.638
	(1) Seroma	0	0	
	(2) Partial wound dehiscence	0	2 (13.3%)	0.153
	(3) Infection	1 (6.67%)	1 (6.67%)	1.00
	(4) Necrosis of flap	1 (6.67%)	0	0.326
6.	Time to return to normal daily activities (days)	2.53 ± 0.64	4.73 ± 1.335	0.0000001
7.	Hospital stay (days)	8.13 ± 2.13	13.60 ± 1.64	0.0000001
8.	Healing time (days)	9.87 ± 2.066	15.80 ± 1.859	0.0000001
9.	Time to return to work (days)	10.33 ± 1.84	16.07 ± 2.40	0.0000001

Maximum number of cases in Group A (86.7%) had operative time between 30-60 mins and about 66.7% in Group B had operative time more than 60 mins. Mean operative time for Group A and Group B were 48.67± 10.08 mins and 60.00 ± 14.64 mins respectively.

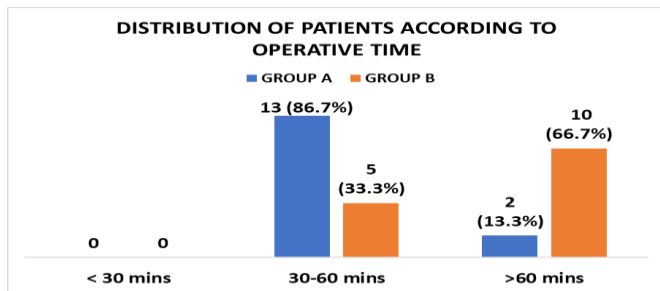


Figure 5: Distribution of patients according to operative time

Average amount of blood loss in Group A was 132.67 ± 13.87 ml and in Group B was 154.67 ± 12.46 ml. Minimum and maximum amount of blood loss in Group A were 100 ml and 150ml respectively whereas minimum and maximum amount of blood loss in Group B were 130 ml and 170 ml respectively.

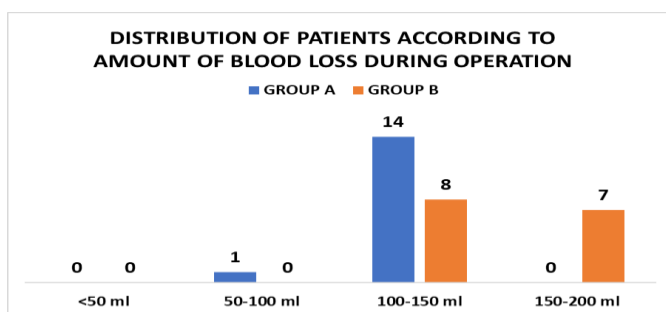


Figure 6: Distribution of patients according to amount of blood loss during operation

Mean number of days for drain removal for Group A was 7.55 ± 1.13 days and for Group B was 11.87±1.55 days. (p=0.0000001).

Mean VAS score for Group A on Post-op day 1, day 3, day 5, and day 7 were 3.67±1.35, 1.80 ± 0.68, 1.4 ± 0.83 and 0.07 ± 0.26 respectively. Mean VAS score for Group B on post-op day 1, day 3, day 5, and day 7 were 4.07±1.39 ,1.93±0.7, 1.2±0.86 and 0.13±0.52 respectively.

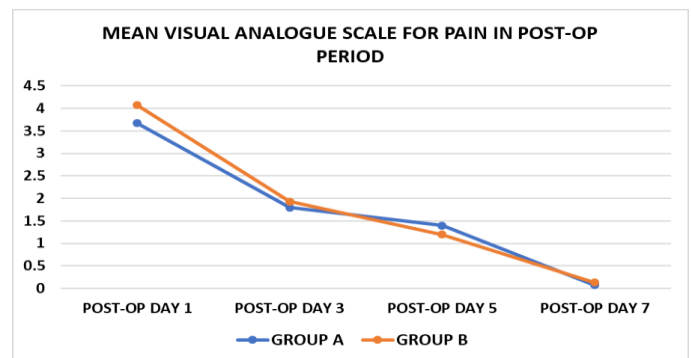


Figure 7: Post-operative pain for both groups

Post-op complications like seroma didn't occur in any patients, whereas infection occurred in one patient each in Group A and Group B. Wound dehiscence occurred only in 2 patients of Group B whereas tip necrosis of flap occurred in one patient in Group A and none in Group B.

Mean hospital stay for Group A was 8.13 ± 2.13 days and for Group B was 13.60 ± 1.64 days. Minimum and maximum hospital stay for Group A were 5 days and 12 days respectively, whereas minimum and maximum

duration of hospital stay were 11 days and 16 days respectively.

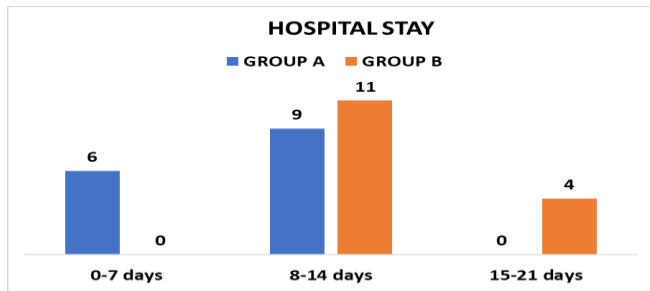


Figure 8: Hospital stay

Mean healing time for Group A was 9.87 ± 2.066 days and for Group B was 15.80 ± 1.859 days. Minimum and maximum healing time for group A were 7 and 13 days respectively, whereas minimum and maximum healing time for Group B were 13 and 19 days respectively.

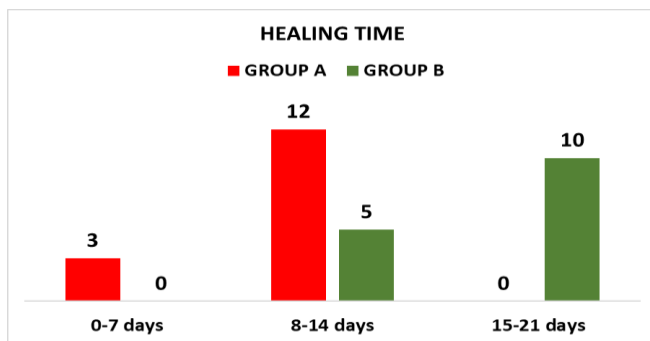


Figure 9: Healing time

Mean time taken to return to normal daily activities for Group A was 2.53 ± 0.64 days and for Group B was 4.73 ± 1.335 days. Minimum and maximum time taken to return to normal daily activities for Group A were 2 and 4 days respectively, whereas minimum and maximum time taken to return to normal daily activities for Group B were 3 and 7 days respectively.

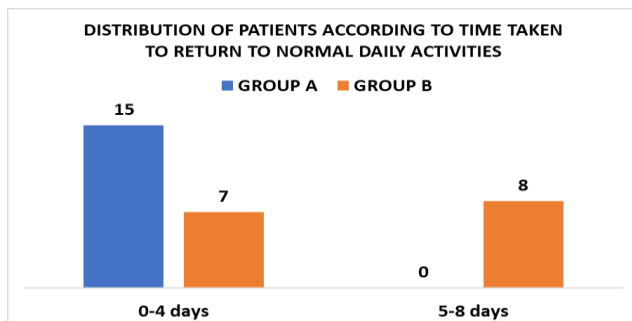


Figure 10: Time taken to return to normal daily activities

Mean time taken to return to work for Group A was 10.33 ± 1.84 days and for Group B was 16.07 ± 2.40 days. ($p=0.0000001$) Minimum and maximum time to return to work for Group A were 8 days and 14 days respectively. Minimum and maximum time to return to work for Group B were 12 days and 20 days respectively.

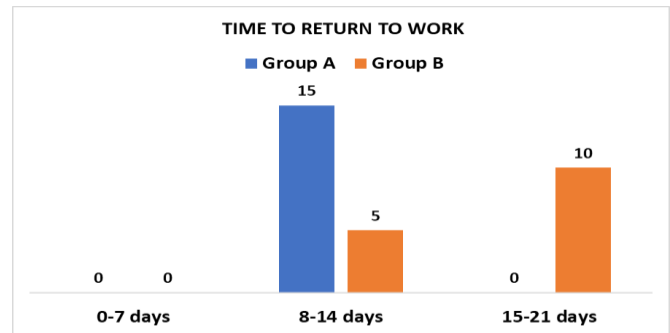
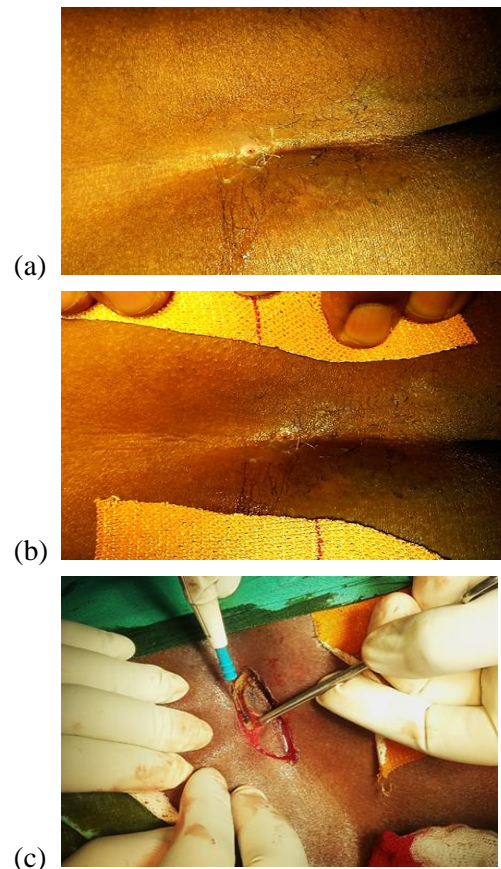


Figure 11: Time taken to return to work

There was no recurrence seen in either group during the period of follow up of 6 months (up to maximum of 2 years).



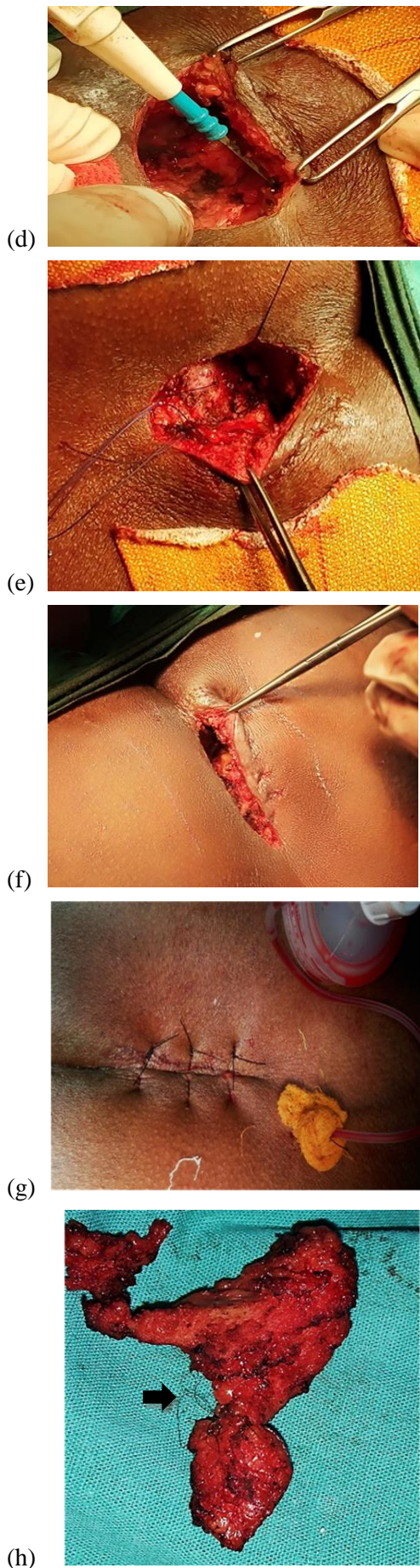
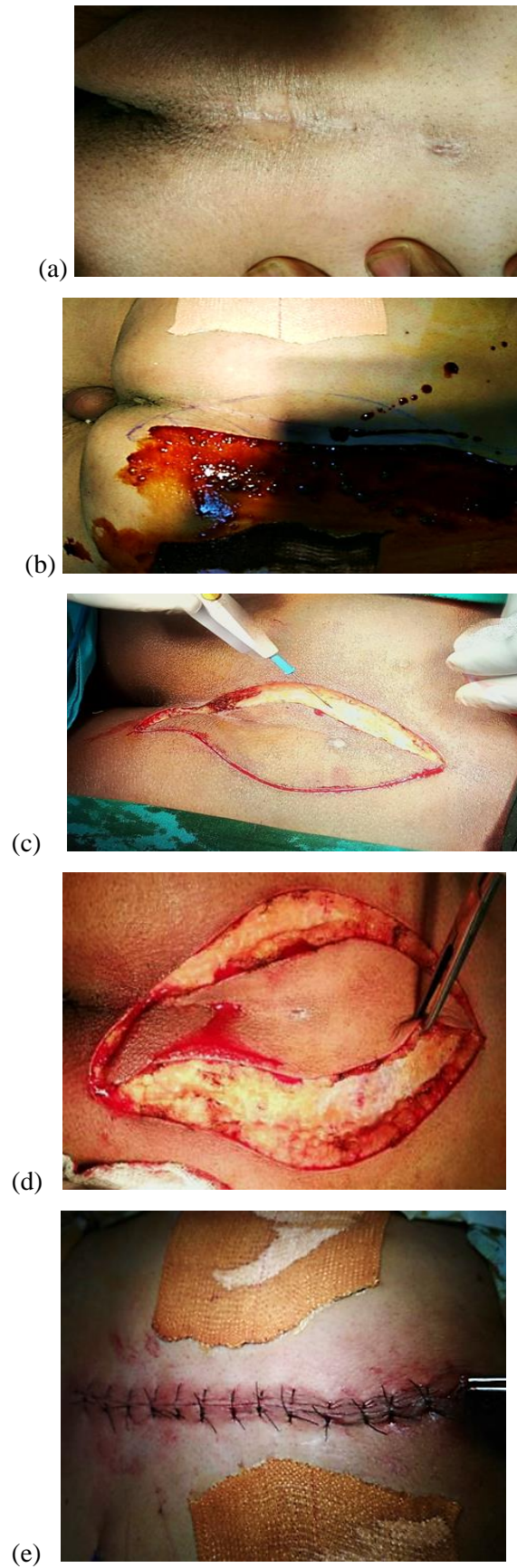


Figure 11: (a) to (g) steps of Karydakis procedure & (h) excised specimen containing tuft of hairs.





(f) Figure 12: (a) to (e) showing steps of Modified Bascom cleft lift procedure & (f) excised specimen showing tuft of hairs

4. Discussion

Being first described by Anderson in 1847 and by Hodges in 1880^{1,2}, pilonidal sinus disease continues to remain as a matter of debate regarding the ideal method for its treatment. In our study of 30 patients, 15 patients underwent Karydakís procedure and other 15 Modified Bascom (cleft lift) procedure.

Age

Previous literature stated that PSD occurs frequently between the ages of 15 years and 25 years, and is rare before puberty and after the age of 40 years.²² In our study, mean age for Group A and Group B were 25.40 ± 4.99 and 24.60 ± 4.55 years respectively ($p > 0.05$). This showed that there is no significant difference between both groups in age distribution and hence proving indeed it is disease of young affecting from puberty till forties, which is considered the main productive years in life and its related morbidity affects the quality of life and financial state of the persons and economy of the country especially because days-off work during acute exacerbations.⁴

Sex

Previous studies like Mohamed et al (2018) showing male: female ratio of 6.2:1, Kumar and Sutradhar (2014) showing Male: female ratio of 5.4:1 and Duman and

Harlak (2014) showing male predominance.^{6,12,15} In our study, all patients were male (100%), this signified that pilonidal sinus predominantly affects males. In our study female patients didn't show up during study period. However, it didn't exclude the fact that females are not affected by it.

Religion

In our study, the maximum number of cases in GROUP A and GROUP B were Hindus (86.7% and 93.3% respectively) followed by Muslims (13.3% in Group A and 6.7% in Group B). The above observations agreed with religious composition of our country.

Risk factors and Pathogenesis

Karydakís (1992) stated that the pathogenesis of pilonidal sinus attributed to three main factors namely (a) loose hairs invading intergluteal cleft (falling from the back or neck), (b) some force (buttock friction and shearing forces) in that area allows shedding of hairs or broken hairs which are sucked in there to drill through the midline skin (e.g. riding in a jeep, prolonged sitting/ sedentary lifestyle), and (c) vulnerability (loss of barrier function) of the skin (epidermal and deep tissue disruption from moisture, anaerobic conditions, hair and bacteria).⁵

In our study, maximum cases in Group A (66.7%) and Group B (53.3%) had presence of tuft of loose hair at opening of sinus on examination of sinus, this agreed with the fact i.e. loose hairs invading intergluteal cleft is a one of the main factors for pathogenesis of PSD.⁵

In our study, the maximum cases in Group A and Group B were driver (46.7% and 33.3%) by occupation followed by student (33.3% and 26.7%), vendor (13.3% and 6.7%), officer (6.7% and 26.6%) and others (0 % and 6.7%) respectively. The above observations indicated patients' occupations played a major role in causation of PSD as professions like driver, student, vendor, officer etc. require prolonged sitting which is one of the main factors for

pathogenesis of PSD.⁵ All cases in both groups were found to have dark and coarse body hair, which fell from back and got collected in natal cleft due to suction created by buttock friction (caused by prolonged sitting).

Authors like Bascom(1980) and Miocinovic et al(2001) proposed that the pilonidal sinus disease starts as a midline pit or pits and deep natal cleft lead to creation of moist anaerobic environment and increased anaerobic bacterial content.^{7,8,9} In our study, mean natal cleft depth in Group A and Group B were 26.40 ± 1.55 mm and 26.00 ± 2.14 mm respectively and the results were comparable to Akinci et al (2009) who showed mean natal cleft depth was 27.06 mm in the pilonidal sinus group and 21.07 in the non-pilonidal sinus group with the differences between the two groups being statistically significant ($P < 0.01$) for natal cleft depth.¹⁸ Also, maximum number of cases in Group A and Group B were having single, midline sinus opening (93.3% and 53.3%) followed by multiple, midline sinus openings(6.7% and 40%) respectively. Only one patient (6.7%) of Group B had a para-midline sinus opening. The above observation agrees with Bascom and Miocinovic et al work.

Cubukçu et al (2000), Poorghasem and Mahoori (2012), observed that higher BMI associated with incidence of pilonidal sinus and higher risk of recurrence of pilonidal sinus disease after surgical intervention.^{19,20,21} In our study, the maximum cases in Group A (73.3%) and Group B (53.3%) were overweight. Mean BMI of Group A and Group B were 25.67 ± 2.72 and 25.33 ± 3.75 respectively, though not definite relation of high BMI with PSD incidence could be ascertained, but some association could be suspected as cases with high BMI, long-term inactivity, hairiness, anatomical issues and etc. are involved in causing disease.

Chief complaints and duration of symptoms

In our study, the most common complaints in Group A were intermittent pain (93.33%) and discharge from sinus (93.33%), followed by swelling at the base of spine (66.67%). The most common complaints in Group B were intermittent pain (86.67%), followed by discharge from sinus (73.33%) and swelling at the base of spine (53.33%). The Mean duration of symptoms for Group A and Group B were 8.93 ± 3.43 and 9.87 ± 2.75 months respectively. These symptoms with time had resulted in frequent visits to hospital and days-off work resulted in a loss of productivity, a loss of earning, and an interruption of education.^{15,18}

Intra-operative period

Most of authors thinking that the most important factor in development or recurrences of sacrococcygeal pilonidal sinus disease is the deepness of natal cleft and if the surgeon makes natal cleft more shallow and post-operative scars away from midline this decrease recurrence rates. In our study, we compared two surgical techniques, Karydakias and Modified Bascom cleft lift procedure both of which serve the above purpose. However, there exist a significant difference between them in intra-operative and post-operative period. In our study, mean operative time for Group A and Group B were 48.67 ± 10.08 mins and 60.00 ± 14.64 mins respectively with p-value equal to 0.02 ($p < 0.05$) indicating there was significant difference in operative time between both groups i.e. more operative time consumed in performing modified Bascom procedure than Karydakias. Also, in our study, average amount of blood loss in Group A was 132.67 ± 13.87 ml and in Group B was 154.67 ± 12.46 ml with p-value of 0.0000001($p < 0.05$) indicating Modified Bascom procedure is associated with more blood loss than Karydakias.

Post-operative period

In our study, mean VAS score for Group A on Post-op day 1, day 3, day 5, and day 7 were 3.67 ± 1.35 , 1.80 ± 0.68 , 1.4 ± 0.83 and 0.07 ± 0.26 respectively. Mean VAS score for Group B on post-op day 1, day 3, day 5, and day 7 were 4.07 ± 1.39 , 1.93 ± 0.7 , 1.2 ± 0.86 and 0.13 ± 0.52 respectively. There was no significant difference between above mean VAS score ($p > 0.05$) indicating there was no difference in post-operative pain between these procedures.

In our study, post-op complications like seroma didn't occur in any patients, whereas infection occurred in one patient each in Group A and Group B. Wound dehiscence occurred only in 2 patients of Group B whereas tip necrosis of flap occurred in one patient in Group A and none in Group B. There was no much difference in occurrence of post-complications like seroma, wound infection, wound dehiscence and flap necrosis.

In our study, mean number of days for drain removal for Group A was 7.55 ± 1.13 days and for Group B was 11.87 ± 1.55 days ($p = 0.0000001$). Mean time taken to return to normal daily activities for Group A was 2.53 ± 0.64 days and for Group B was 4.73 ± 1.335 days ($P = 0.0000001$). Mean hospital stay for Group A was 8.13 ± 2.13 days and for Group B was 13.60 ± 1.64 days. Mean healing time for Group A was 9.87 ± 2.066 days and for Group B was 15.80 ± 1.859 days. Mean time taken to return to work for Group A was 10.33 ± 1.84 days and for Group B was 16.07 ± 2.40 days. ($p = 0.0000001$). The above observations suggest that drain removal was earlier in after Karydakis procedure than after Modified Bascom procedure because of fact that a large area was excised in Modified Bascom procedure than Karydakis procedure. Also, there was lesser time taken to normal daily activities after Karydakis than after Modified Bascom procedure. Based on the above observation, it is quite clear that

Karydakis procedure is associated with less hospital stay, less healing time, and lesser time to return to normal activities when compared to Modified Bascom procedure. So, the cleft-lift procedure according to Bascom leads to approximately the same results as the Karydakis technique but tends to show a higher rate of wound healing disorders.¹⁴

Recurrence

There was no recurrence seen in either group during the period of follow up.

5. Conclusion

Karydakis procedure is relatively easy with average learning curve for most of surgeons in contrast to Bascom (modified) operation. It also ends up with a smaller number of days in hospital, less blood loss, less healing time and less loss of man-hours. More so Bascom (modified) procedure has more learning curve and lands up with delayed healing, though recurrence rate is almost same in the both groups.

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