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Original Research Article

A Comparative Study on the Outcome of Limberg Flap and Primary Excision with Lateral Closure Procedures in the Management of Pilonidal Sinus

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Abstract:

Pilonidal sinus disease is a much common condition affecting the sacrococcygeal region of young hirsuite males. Simple surgical procedures like primary excision of the sinus are sufficient for simple diseases and in those whose symptoms are relatively minor and are of short duration. This study aims to compare the outcomes of different procedures like primary excision and flap based techniques in the management of pilonidal disease. The prospective randomized study was conducted in Department of General Surgery, Government Stanley Medical College, Chennai. Totally 40 patients willing to undergo surgery will be randomly assigned to two study groups – Primary excision with lateral closure procedure and Limberg flap procedure. In the present study, the age group between 21 – 30 yrs represents majority of the study population (67.5%). Males represent majority of the study population which is 28 out of 40 compared with 12 females. Duration of surgery and duration of hospital stay was significantly higher among limberg flap when compared to excision group and it was significant with the p value shows less than 0.05. This is in discordance with previous studies. But, the results of duration of surgery and the duration of hospital stay favours primary excision procedure compared to limberg flap procedure with a high statistical significance [14].Thereby, this study concludes the advantages of primary excision procedure over limberg flap procedure in terms of shortening the duration of procedure for simple pilonidal sinus disease without compromising significantly on morbidity like wound infection and disease recurrence.

Keywords: Pilonidal sinus, Primary excision and Limberg flap.

Introduction

Pilonidal sinus disease is a much common condition affecting the sacrococcygeal region of young hirsuite males. The incidence of disease is approximately 26 per 100,000 populations [1]. The age incidence of the appearance of pilonidal sinus is between the ages 20 and 29 years, which holds about 82 per cent of the diseased population. The condition impairs the daily activities and a greater percentage of DALY losses of the working men in the developing countries. The term ' Pilonidal sinus 'describes a condition found in the natal cleft overlying the coccyx, consisting of one or more, usually non-infected, midline openings , which communicate with a fibrous tract lined by granulation tissue and contain hair lying loosely within the lumen. It has been referred to as 'Jeep disease'. Historically, congenital theories were proposed as a cause of their origin. The presence of hair within the sinus lined by granulation tissue rather than the wall of the sinus and the age incidence which is at variance with the age of onset of congenital disease fails to support the old concept of congenital theories. Another finding is that the dead hairs are found to have their pointed ends directed towards the blind end of the sinus and many other sites of occurrence forms evidence for the accepted theory of pilonidal sinus disease. Although the most common site for pilonidal sinus disease is the intergluteal region, it may occur in other sites such as the umbilicus and the finger web. Interdigital pilonidal sinus is an occupational disease of professional hair dressers, the hair within the interdigital cleft or the clefts being from the customers [2]. Pilonidal sinuses are also reported from the axilla, groin and other dense hair bearing regions of the body. Sacrococcygeal pilonidal disease presents clinically as acute pilonidal abscess, chronic pilonidal sinus and complicated or recurrent pilonidal disease. Many different methods are used to treat the condition ranging from simple incision and drainage procedure to the more complex myocutaneous flap based procedures

depending on the disease presentation [3]. Simple surgical procedures like primary excision of the sinus are sufficient for simple diseases and in those whose symptoms are relatively minor and are of short duration. This method has advantages of shorter operating time, shorter hospital stay, early return to work and an acceptable percentage of wound infection. Many surgeons currently support the use of excision procedures in the treatment of simple diseases. In view of the current knowledge of the disease, previous studies on this topic and our institutional experience in treating the local population which represents most of the dark skinned Asian community, this study aims to compare the outcomes of different procedures like primary excision and flap based techniques in the management of pilonidal disease. The results in favour of complex flap based procedures are expected only for the treatment of complex and recurrent diseases. Whereas for simple disease, the outcomes in both the study groups should be comparable, though the simpler methods are techniqually easier and patient friendly. Thus justifying the use of primary excision techniques for simple and early disease presentations.

Aim of the study

To compare wound infection rate recurrence rate between Limberg flap and Primary excision with lateral closure procedures in the management of patients with pilonidal sinus disease.

Material and Methods

The prospective randomized study was conducted in Department of General Surgery, Government Stanley Medical College, Chennai. The duration of the study was 10 months January 2020 to October 2020. The study participants included in the study were both male and females who are clinically diagnosed as cases of pilonidal sinus disease with the inclusion criteria.

Inclusion criteria

- Patients who are clinically diagnosed as cases of pilonidal sinus disease.
- Patients willing to participate in the study.
- Patients given written consent for participation.

Exclusion criteria:

- Patients who are not willing to participate in the study.
- Patients not willing to undergo surgery.
- Patients who have not given consent for surgery

Sample size: Totally 40 patients those who met the inclusion criteria (20 patients in the Primary excision group and 20 patients in the Limberg flap group)

Methodology:

All patients with Pilonidal sinus disease attending the Department of General Surgery in Government Stanley Medical College from January 2020 to October 2020 are educated regarding their diagnosis and the required surgical management. Data collection was done by an observer who is not participating in the procedure using a structured Proforma which includes the following Socio-demographic variables (age, sex, socio economic status), type of surgery, type of disease, duration of the procedure, duration of hospital stay, wound infection rates, reccurence rates after follow up for a period of 3 months and cosmetic outcome. Patient information sheet regarding the study process is provided for all patients. Written Informed consent is obtained before enrollment in the study. All patients willing to undergo surgery will be randomly assigned to two study groups – Primary excision with lateral closure procedure and Limberg flap procedure.

Procedure

Limberg flap procedure was mainly constrained and confronted for pilonidal sinus repair. A rhombic area of skin is marked over pilonidal sinus involving all midline pits and lateral extension if any.

The long axis of the rhomboid in midline is marked as A–C, C being adjacent to perianal skin, A placed so that all diseased tissues can be included in the excision. The line B–D transects the midpoint of A–C at right angles. B–E is a direct continuation of the line B–D and is of equal length to the incision A-D, to which it will be sutured after rotation. E–F is parallel to B–C and of equal length. After rotation, it will suture to A–B.

The skin and subcutaneous fat to be removed is excised down to deep fascia, and a rhomboid area of specimen including pilonidal sinus and it's all extensions are removed. Then flap is raised so that it includes skin, subcut fat, and the fascia overlying gluteus maximus, rotated to cover midline rhomboid defect. The defect thus created can be closed in linear fashion. Deep absorbable sutures to include fascia and fat are placed over a vacuum drain, and then finally the skin is closed in interrupted sutures. The operation produces a tension-free flap of unscarred skin in the midline.

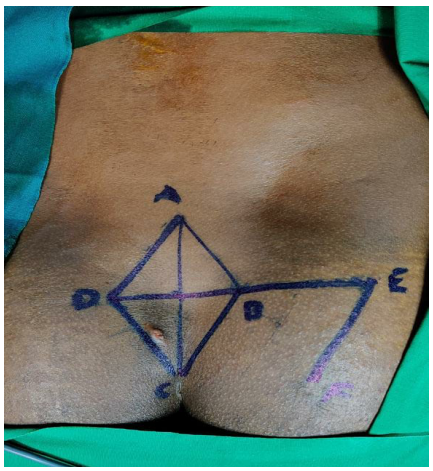

Figure A: Incision marking for Limberg flap cover

Figure B: Limberg flap cover placement

Figure C: Post op picture

Postoperative Care

Following surgery, standard postoperative care was given. Routine doses of intravenous antibiotics (third generation cephalosporin's) and analgesics were given [7]. Early ambulation and return to normal diet were followed. Postoperative pain was assessed according to visual scale [8]. Early postoperative complications like bleeding, fever, vomiting, and urine retention and wound infection were recorded during hospital stay [10]. The discharge collected in the suction drain was recorded and emptied regularly. Wound dressing was opened on the 5th postoperative day for both Limberg flap group and Primary excision group. The wound is assessed for the presence of any wound discharge and integrity of the wound also noted. Suction drain was removed on the 7th and10th postoperative day for Primary Excision group and Limberg flap group respectively. Patients were discharged the next day after removal of suction drain, in the absence of any wound infection. Patients were advised to remove hair in the sacral area around the operative site by depilatory creams every three week. Patients are advised follow up at monthly intervals for 3 months.

Outcome Measures

The primary outcomes were wound infection and the recurrence of Symptomatic Pilonidal Sinus Disease at 3 months postoperatively. Recurrence was defined as reappearance of pilonidal sinus at the site of surgery as diagnosed by physical examination by the operating surgeon. Wound infection was defined as discharge of purulent secretion through the surgical wound within 30 days of surgery. Seroma was defined as the formation of non-infected serous fluid collection beneath the flap and diagnosed by clinical examination. Secondary outcomes comprised postoperative pain, complications, operationtime, hospital stay, time away from work, time for stitch removal, time for drain removal and cosmetic satisfaction of the patients.

Follow-Up

Patients were instructed to visit the outpatient clinic every month for first 3 months postoperatively and then on an as of required basis. During each visit, complete patient assessment was conducted. Patients were asked about pain at the surgical site and during walking. Clinical examination was performed to detect recurrence of pilonidal sinus and postoperative complications including wound infection, wound dehiscence, flap necrosis, flap oedema and numbness and hypoesthesia.

During follow-up, patients were asked to evaluate the cosmetic appearance of the wound by looking at its picture, and to grade their satisfaction with the outcome using Visual Assessment Scale ranging from 0 to 10 where 0 means the worst cosmetic outcome and 10 indicates the best cosmetic outcome.

Statistical analysis

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics, frequency analysis and percentage analysis were used for categorical variables. To describe about the data descriptive statistics for continuous variables, mean and Standard deviation were used.

To find the significant difference between bivariate samples in independent group, the unpaired sample t-test was used. To find the significance in the categorical data, Chi-square test was used similarly if the expected cell frequency is less than 5 in 2x2 tables then Fischer's Exact were used. In all the statistical tools, the probability value less than 0.05 is considered as significant.

Ethical Consideration: Ethical principles such as respect to the patient, beneficence and justice were strictly adhered. Ethical committee approval was obtained before starting the study. The approval to conduct the present study was obtained from the Institutional Ethical Committee. Informed written consent was obtained from all the study participants before the starting the study. Confidentiality of the study participants was maintained throughout the study.

Results

Table 1: Basic characteristics of the study participants

Variables	Number	percentage
Age distribution		
Upto 20 years	5	12.5%
21 - 25 years	16	40.0%
26 - 30 years	11	27.5%
31 - 35 years	5	12.5%
Above 35 years	3	7.5%
Gender distribution		
Male	28	70.0%
Female	12	30.0%
Socio Economic Status		
Lower	27	67.5%
Middle	13	32.5%
Total	40	100%

In the present study, the age group between 21 – 30 yrs represents majority of the study population (67.5%). The groups 21-15years and 26-30years represents majority of the study population, which is in accordance with the data in literature. The young adults (21-29years) have highest incidence of pilonidal sinus disease. In gender distribution males represent majority of the study population (28 out of 40).

Table 2: Age, Gender, Socio Economic Status, Type of disease, Infection, Recurrence with wound infection and Cosmetic outcome comparison with type of surgery

	Excision	Limberg flap	P value
Age category			
Up to 20 years	3 (15%)	2 (10%)	0.146
21 - 25 years	6 (30%)	10 (50%)	
26 - 30 years	7 (35%)	4 (20%)	
31 - 35 years	1 (5%)	4 (20%)	
Above 35 years	3 (15%)	0	
Gender			
Female	7 (35.0%)	5 (25.0%)	0.490
Male	13 (65.0%)	15 (75.0%)	
Socio Economic Status			
Lower	15 (75.0%)	12 (60.0%)	0.311
Middle	5 (25.0%)	8 (40.0%)	
Type of disease			
Complex	9 (45.0%)	8 (40.0%)	0.749
Simple	11 (55.0%)	12 (60.0%)	
Infection			
Absent	11 (55.0%)	13 (65.0%)	0.519
Present	9 (45.0%)	7 (35.0%)	
Recurrence with wound infection			
Absent	15 (75.0%)	17 (85.0%)	0.695
Present	5 (25.0%)	3 (15.0%)	
Cosmetic outcome			
Excellent	6 (30.0%)	9 (45.0%)	0.091
Fair	6 (30.0%)	9 (45.0%)	
Poor	8 (40.0%)	2 (10.0%)	
Total	**20 (100%)**	**20 (100%)**	

This table depicts association between the age distribution of patients participated in the study with the type of surgery they underwent. Since the patients are randomly allocated into the study groups, there is no statistical significance with age distribution of patients. A greater percentage of age group between 21-35 years underwent primary excision with lateral closure procedure. Among patients who underwent limberg flap procedure also, the age group between 21-35 years has the highest proportion of patients. Majority of patients above 35years underwent primary excision procedure.

In both the study groups, males represent majority of the study population. 13 males compared to 7 females in the primary excision group. 15 males compared to 5 females in the limberg flap group. Out of 28 males, 17 males had simple disease. Out of 12 females, 6 females had simple disease.

Patients from lower socioeconomic status represents majority of the study population in both the study groups. 15 out of 20 patients in the primary excision group are from lower socioeconomic status. 12 out of 20 patients in the limberg flap group are from lower socioeconomic status.23 out 40 patients in the study had simple disease compared with 17 patients having complex disease, which is in accordance with the literature. 11 out of 20 patients in the primary excision group were of simple disease type. 12 out of 20 patients in the limberg flap group were of simple disease type. 9 out of 20 patients in the primary excision group had wound infection. 7 out of 20 patients in the limberg flap group had wound infection. Although a greater percentage of patients undergoing primary excision procedure incurred wound infection compared with the limberg flap group, there is no statistically significant association. 5 out of 20 patients in the primary excision group had recurrence. 3 out of 20 patients in the limberg flap group had recurrence. Although a greater percentage of patients undergoing primary excision procedure incurred disease recurrence compared with the limberg flap group, there is no statistically significant association. 8 out of 20 patients in the primary excision group had poor cosmetic outcome. 2 out of 20 patients in the limberg flap group had poor cosmetic outcome. Although a greater percentage of patients undergoing limberg flap procedure had better cosmetic outcome compared with the primary excision group, there is no statistically significant association.

Table 3: Duration of surgery and duration of hospital stay comparison with type of surgery

Variable	Variable	N	Mean	± SD	T value	p value
Duration of surgery in minutes	Excision	20	66	± 12.0	4.648	0.005 *
	Limberg flap	20	82	± 10.0		
Duration of Hospital stay in days	Excision	20	11	± 2	2.866	0.007 *
	Limberg flap	20	13	± 3		
*Highly Statistical Significance at $p < 0.01$ level						

The mean duration of surgery among excision group was 66 ± 12 minutes and in Limberg flap was 82 ± 10 minutes. Duration of surgery was significantly higher among limberg flap when compared to excision group and it was significant with the p value shows 0.005. The mean duration of hospital stay among excision group was 11 ± 2 days and in Limberg flap was 13 ± 3 days. Duration of hospital stay was significantly higher among limberg flap when compared to excision group and it was significant with the p value shows 0.007.

Discussion

In the present study, the age group between 21 – 30 yrs represents majority of the study population (67.5%). The young adults (21-29years) have highest incidence of pilonidal sinus disease. Males represent majority of the study population which is 28 out of 40 compared with 12 females. A greater percentage of age group between 21-35 years underwent primary excision with lateral closure procedure. Majority of patients above 35years underwent primary excision procedure. 9 out of 20 patients in the primary excision group had wound infection. 7 out of 20 patients in the limberg flap group had wound infection. There is no statistically significant association between wound infection rates with the type of surgery they underwent (p=0.519). 5 out of 20 patients in the primary excision group had recurrence. 3 out of 20 patients in the limberg flap group had recurrence. There is no statistically significant association between recurrence of disease with the type of surgery underwent (p=0.695). 8 out of 20 patients in the primary excision group had poor cosmetic outcome. 2 out of 20 patients in the limberg flap group had poor cosmetic outcome. There is no statistically significant association between cosmetic outcome with the type of surgery underwent (p=0.091). The duration of surgery in limberg flap group had a mean of 82 minutes. The duration of surgery in primary excision group had a mean of 66 minutes. There is statistically significant association between the duration and the type of surgery (p=0.0005). The duration of hospital stay in limberg flap group had a mean of 13 days. The duration of hospital stay in primary

excision group had a mean of 11 days. There is statistically significant association between the hospital stay and the type of surgery (p=0.007).

Conclusion

The study aims to compare the wound infection rates and the disease recurrence rates between two study groups, the limberg flap procedure group and the primary excision with lateral closure procedure group in patients with pilonidal sinus disease. The results attained are suggestive of no statistically significant association of wound infection rates and disease recurrence rates with the type of surgery undergone [13].

This is in discordance with previous studies. But, the results of duration of surgery and the duration of hospital stay favours primary excision procedure compared to limberg flap procedure with a high statistical significance [14].Thereby, this study concludes the advantages of primary excision procedure over limberg flap procedure in terms of shortening the duration of procedure for simple pilonidal sinus disease without compromising significantly on morbidity like wound infection and disease recurrence [17,18].

Recommendations

Limberg flap procedure requires greater operating time and a longer hospital stay than primary excision procedure, but known to provide better cosmetic outcome than primary excision procedure [16]. So, streamlining patients with simple disease to primary excision procedure and more complex disease into complex flap based procedures helps in better utilization of health care in a developing population.

The high incidence of wound infection rates in the study is a shortcoming, which may be due to local factors [24]. This study recommends for a study involving much greater sample size and longer follows up of patients in multiple tertiary care centers for better comparison of study outcomes.

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