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Surgical treatment of Pilonidal Sinuses Comparison of Two Approaches-Clinical Study of 3-year practice

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Original Article

ABSTRACT

Pilonidal sinus usually develops in young males between 15 – 35 years and it can also been occurs in older. The treatment of choice for the pilonidal cyst must have a minimum rate of recurrence and a short period of postoperative convalescence. Among the different surgical techniques, the use of local flaps, and particularly the Limberg flap, have shown better results with lower recurrence rates. This study aimed to assess the outcome of treatment of Pilonidal Sinuses comparing Limberg Flap versus Excision with Primary Closure Procedures. Therefore, a retrospective study conducted in our Hospital . Included 120 patients who presented with PNS for the period 2017 to 2019 . Patients were assigned into two groups , each with 60 patients. First group were operated on by excision of sacrococcygeal sinus and local rhomboid flap was used to close the defect primarily. Group 2 included were operated on by excision of sacrococcygeal sinus only to be healed by secondary intention . Both groups were followed up for a period of about 10 -12 months, postoperatively. Findings revealed that rhomboid closure technique was found to be a useful technique for the treatment of pilonidal sinus with favorable results regarding the time before return to work. New prospective studies are required and controlled with long-term follow-up to evaluate the best alternative in the treatment of PNS.

Keywords: *Pilonidal Sinuses, Pathogenesis, treatment, surgical options , Limberg Flap , Primary Closure*.

1. INTRODUCTION

The pilonidal sinus, also called pilonidal cyst or sacral cyst, is a cyst that occurs in the midline of the back, at the height of the sacrococcygeal area, very close to the intergluteal fold, and that is caused by the penetration of a hair in the subcutaneous tissue. PNS is a small hole or tunnel in the skin. It can become filled with fluid or pus, causing a cyst or abscess. It usually contains hair, dirt, and debris. This can cause severe pain and discomfort to the patient (1–3)

It is considered a more prevalent entity in the white population, it is rare among blacks, and it is practically less frequent in Asian countries. Pilonidal sinus usually develops in young males between 15 – 35 years and it can also been occurs in older with increased hair growth, but it is also possible in women, also some authors mentioned that family history of PNS could be a predisposing factor(4,5). Symptoms are usually absent; pain appears when it became infected (6,7). Treatment for an acute abscess is dissection and drainage. Typically, the patient has one or more chronic draining sinuses that need to be removed by excision with primary sutures or by open surgery (eg, cystotomy, marsupialization). Antibiotics are usually not required(8–10).

By itself, PNS does not cause significant discomfort to the patient, but it accumulates metabolic products of epithelial tissue and then inflammatory processes may develop(1). They begin after injury, and sometimes without any preconditions. In the most unfavorable cases, an abscess forms at the site of the sinus. The sinus into which the hair penetrates has a stratified squamous epithelium and invariably extends proximally, ending in a cystic cavity that is blind or opens in a lateral “fistulous” orifice, usually on the left. This cavity is limited by a chronic granulatory tissue that may contain hairs (hence its name: nest of hairs), the root of which is oriented towards the depth. This fact and the absence of sebaceous glands, sweat glands and hair follicles, undoubtedly support the acquired theory(6). The introduction of loose hair through macerated and vulnerable skin at the level of the natal fossa is favored by the suction effect exerted by the buttocks, especially during ambulation (11). This causes the foreign body granuloma that is frequently found in the histopathological study of the pilonidal cyst. As a result of this concept, some laser techniques have been proposed that attempt to modify these factors without the need for a radical resection of the cyst or plastic procedures for a benign lesion(12), also endoscopic surgeries were introduced as a

successful management option than open ones (13,14)

To prevent complications and infection the sinus is treated with antiseptic solutions, but conservative treatment only protects against infection, without eliminating the main cause of the pathology. Therefore, patients require surgical treatment. Sometimes, PNS requires to be treated as urgent. Management of PNS still raises many controversial aspects today, which is reflected in the abundance of surgical techniques proposed as the choice for its definitive treatment , There are numerous techniques described for the treatment of PNS (8–11,15,16).

Recurrence is the main problem after treatment, usually occurring in the first 3 years after surgery , varying according to surgical techniques (5,16).

The goal of treating PNS is ideally to eradicate the disease on an outpatient basis or with a short hospitalization, with low morbidity, minimal nursing care requirements, early return to work, little or no cosmetic effect, and, above all, a minimal recurrence. There is a higher frequency of complications in patients operated by the lateralized Limberg flap. The most frequent occurrence of infection or dehiscence of the surgical wound in this variant of the technique is due to the fact that the suture is more subject to maceration and friction between the buttocks during gait than if it were aligned in the midline as in the flap. However, no patient in whom the lateralized Limberg flap was used relapsed, this variant can be considered to have advantages in decreasing the recurrence at the level of the midline that occurs in patients operated by the classic Limberg flap(17–20).

The sacrococcygeal sinus represents a complex surgical challenge not only in choosing the surgical technique but also in managing its complications, the risk of recurrence and the patient's expectations. In the vast majority of cases, these patients are accompanied by the specialty of General Surgery in which classic techniques such as excision and marsupialization are most often used, which lead to a long recovery time with the need to regularly visits to health units for follow-up and treatment. dressing realization(1,8,10).

In relation to other flap techniques, the choice of the Limberg rhomboid flap has the advantages of leading to the flattening of the intergluteal fold, attenuating this predisposing factor, having the ability to reconstruct large defects, allowing extended excisions, having a good pedicle and therefore good viability , and according to the literature, it has fewer local complications and less recurrence than the other techniques. Recurrence can reach 20% in series with adequate follow-up, which is not acceptable as an elective technique for

Sacrococcygeal pilonidal sinuses(17–20).

Incision and curettage

Known as a fistulotomy, flat lay or "lay open" it has the advantage of being an outpatient procedure under local anesthesia. It consists of opening the cystic cavity on a stylet, the hair is excised and a curettage of the cavity is carried out, which is left for healing by second intention. It does not completely remove the lesion and leaves a wound that requires nursing care for a long time, although less than the open radical technique(21,22).

Marsupialization*:*

It consists of unroofing the cyst after which a skin suture is made to the edges of the cystic cavity to reduce the bloody surface that is left for healing with granulation tissue. In the literature, this technique has been confused with the McFee technique, which performs a radical resection of the lesion up to the aponeurosis, reducing the cavity with points that lead the skin to the aponeurosis (semi-open technique), which usually stresses the sutures (23). The marsupialization technique has an intermediate healing time averaging 30 days, which can occasionally be prolonged by 5 to 6 months, has low operative morbidity and a shortened one-day hospitalization. Recurrence averages 3-4% and there is a national center that uses it as the preferred technique in elective patients with satisfactory results. The detractors of the technique point out that, in addition to the long healing time, it is difficult to place the stitches on the borders of the cyst when the inflammatory phenomenon is very intense(21,24).

Closed techniques

Simple primary resection and closure

It is one of the techniques most used in the surgical treatment of PNS, according to previous studies and literatures, which seems logical if one thinks that it is a simple and reproducible technique, although its results are highly variable. The average hospitalization time in the last 4 years in our material is 1.5 days, but a non-negligible morbidity of 10% is maintained, which includes hematoma, seroma, dehiscence and infection of the operative wound, similar to that reported in the literature. In 90% of patients who do not present any of these complications, the healing time is short between 14 and 17 days, which has been demonstrated in prospective and randomized studies. In the national experience of a total of close to 150 patients, recurrence fluctuated between 4 and 7% with a follow-up between 36

and 105 months (average 49), a figure clearly lower than that of foreign publications that have a minor follow-up, which has no plausible explanation. It is also interesting to note that in our experience and that of others, the early morbidity of the operative wound is not predictive of recurrence, since most of the patients who presented this complication had completely healed in the usual timeframes (25,26) .

Resection plus flap rotation use of a plastic procedure after radical resection of the aims to cover the defect with healthy tissue without tension in the sutures and, furthermore, to reduce one of the conditioning factors of recurrence, namely, the depth of the natal fossa. Numerous techniques have been used. Similar results have been obtained with the triple L plasty . Asymmetric resection (Karydakis technique) is also used *(27,28)*, Other techniques in the search for a less invasive outpatient procedure under local anesthesia (12–14)

2. PATIENTS and METHODS

This was a retrospective study conducted at our Hospital . Included 120 patients who presented with PNS for the period 2017 to 2019

Patients were assigned into two groups with 60 patients in each; First group consisted (6 females, 54 males) patients with age ranged 15 – 35 years, who were operated on by excision of sacrococcygeal sinus and local rhomboid flap was used to close the defect primarily

Group 2 included (3 females, 57 males) patients with age group between 18 to 37 years were operated on by excision of sacrococcygeal sinus only to be healed by secondary intention . Both groups were followed up for a period of about 10 -12 months, postoperatively.

Data collection was performed using a pre-constructed data collection sheet consisted of three sections, the first one for demographic characteristics including the age, gender, obesity, smoking history and history of chronic diseases,. The second section included the presenting complaint , perioperative findings, clinical examination, laboratory and other investigations , operative findings and surgical procedures. Third section for the follow up postoperative findings including early postoperative and later follow up , complications , pain, swelling, bleeding , healing time , return to usual activity, recurrence and final outcomes.

Data management and analysis: data were analyzed using the statistical package for social sciences version 24 . Descriptive statistics presented as frequencies, percentage, mean and

standard deviation. Both groups compared using chi square test for frequencies and student's t test for means. Level of significance set at 0.05 below which considered significant.

3. RESULTS

A tension-free defect closure was obtained in patients with group one . All cases except 6 were healed with no complications. A mean follow-up of 6 ± 2 months revealed aesthetically and functionally acceptable results with the obliteration of the natal cleft in all patients. No recurrence was observed in the follow-up period.

In group one , mean healing time was 22 ± 6 days to heal by primary intention, however, 3 patients with flap oedema which subside after 2-3 weeks of follow up , 2 patient with seroma under flap and subsided after 4-5 weeks of conservative treatment, 1 patients with ischemic changes of edges of flap which improved and healed after 2-3 weeks with regular change dressing and follow up. 2 cases started to discharge serosanguinous fluid after 3 weeks from surgery (these 2 cases are recurrent and each operated on twice before this surgery by excision only and on long term follow up of period of 3 months the discharge stopped (1 male and 1 female). After follow up of 18 months no recurrence reported, all cases in group one were operated on under either spinal or general anesthesia in prone position. In group two out of 60 patients, 58 with primary disease while 2 with recurrent disease., patients treated by excision of pilonidal sinus and leave it to heal by secondary intention Time of operation; 30-45 min, mean healing time was 59 ± 10 days to heal by secondary intention . In group 1, 2 patients developed wound infection compared to 11 in group 2 at postoperative period and need to use oral and or parenteral antibiotics for 5 ± 2 days due to open wound in this area. In group 2, Non obliteration of natal cleft to satisfied degree in about 18 cases lead to recurrence of pilonidal sinus in 6 cases. Because of healing by secondary intention ,this process ended with midline scar which leaded to unpleasant sensation on sitting because of tension in this area due to scar tissue and in on case this leaded to tear of this scar tissue and some bleeding occurred whenever patient sit for long time this patient were treated by limberge flap after 2 years from first surgery. No Bleeding reported in both groups. These findings are summarized in the following (**Tables 1,2,3 and 4**).

Table 1. Demographic characteristics of the studied group

		Group 1 (N=60)		Group 2 (N=60)		P. value
Variable		No.	%	No.	%	
Age (years)	≤ 20	12	20.0	10	16.7	0.763
	21 - 25	20	33.3	24	40.0	
	26 - 30	23	38.3	19	31.7	
	31 - 40	5	8.3	7	11.7	
	Mean± SD	23.6 ± 7.2		24.6 ± 8.6		0.622
Gender	Male	54	90.0	57	95.0	0.719
	Female	6	10.0	3	5.0	
Obesity	Obese	19	31.7	17	28.3	0.79
	Non-obese	41	68.3	42	70.0	
Smoking	Smoker	12	20.0	9	15.0	0.521
History of chronic diseases		5	8.3%	6	10.0	0.851
SD: standard deviation						

Table 2. Main complaints of all patients (N = 120)

Presenting complaint	**No.**	**%**
Discharge	39	65.0
Pain	31	51.7
Pruritus	15	25.0
Swelling	13	21.7
Bleeding	8	13.3
Recurrent case	1	1.7

Table 3. Comparison of clinical parameters of the studied groups

Parameter	Group 1 (N=60)		Group 2 (N=60)		P. value
	Mean	SD*	Mean	SD*	
Mean Operation time (minutes)	39.2	8.2	31.1	10.3	0.003
Mean duration of hospital stay (day)	4.1	0.9	2.8	1.1	0.021
Mean duration of pain (day)	5.2	1.4	4.6	1.8	0.783
Mean VAS score (out of 10)	3.2	1.3	3.6	1.5	0.822
Disability score	4.6	1.8	3.9	1.7	0.092
Mean Healing time	22	6.0	59	10.0	<0.001
Patient satisfaction score (out of 5)	3.8	1.0	1.3	0.6	<0.001
VAS: Visual analog scale, SD: Standard deviation					

Table 4. Postoperative complications reported among the studied group

Complication	Group 1 (N=135)		Group 2 (N=135)		P. value
	No.	%	No.	%	
Wound infection	2	3.3	11	18.3	<0.001
Edema	4	6.7	2	3.3	0.022
Partial wound dehiscence	4	6.7	3	5.0	0.421
Hematoma	1	1.7	1	1.7	0.334
Seroma	2	3.3	0	0.0	0.041
Recurrence	0	0.0	6	10.0	0.002
ischemic changes / necrosis	1	1.7	0	0.0	0.367
Non obliteration of natal cleft to satisfied degree	0	0.0	18	30.0	<0.001
Discharge	2	3.3	2	3.3	0.114
Bleeding	0	0.0	0	0.0	-

4. DISCUSSION

The treatment of choice for the pilonidal cyst must have a minimum rate of recurrence and a short period of postoperative convalescence . Usually, the first signs of the disease occur in the acute phase, in the form of an abscess. The classic treatment in this phase basically consists of incision and drainage under local anesthesia, followed by wound healing by second intention . However, in many patients, the disease is recurrent (1,8,9,21,22)

Among the different surgical techniques, the use of local flaps, and particularly the Limberg flap, have shown better results with lower recurrence rates and also a lower rate of local complications and recovery time compared to classical techniques. In addition to allowing a quick recovery with immediate reconstruction, these flaps aim to reduce the factors predisposing to the PNS , by lateralizing or flattening the intergluteal fold. Among the various flap techniques, Limberg's rhomboid flap stands out for the possibility of covering major defects, better profile of local complications and lower recurrence rate (16–20,28).

Regarding the results obtained in this study, patients treated with Limberg's rhomboid flap had better outcomes than the other group, they had lower operation time, hospital stay, less healing time and better satisfaction .

Additionally lower complication rates and no recurrence after one year follow up. Higher recurrence rate of 10.4% was observed, and reported in the classical method group while none in the first group treated by Limberg's rhomboid flap which is comparable to other studies (16–18) . It is important to mention the small sample size that limits the extrapolation of results, but also the fact that these patients did not perform hair removal as recommended, which we believe is important to minimize relapse, apart from the controversy about this topic in the literature (20,28).

Analyzing the local complications, the frequency of infection of the surgical wound in group 1 was lower compared to in group 2, which is in accordance with other published series of the same technique,(16–20,28) , however, it still above what we would like . The location of the surgical wound in an often soiled and macerated area facilitates the occurrence of this complication. The absence of flap necrosis is highlighted, also rarely reported in the literature. literature, which proves the good viability of the Limberg flap for this location .

One of the biggest advantages of this technique is the quick recovery with an average time to return to active life, as shown by other series, compared to second intention healing methods with prolonged recovery time, with the need for dressing sometimes for months until definitive closure. Contrary to what reported in literature been found.

5. CONCLUSIONS

The rhomboid closure technique was found to be a useful technique for the treatment of pilonidal sinus with favorable results regarding the time before return to work. New prospective studies are required and controlled with long-term follow-up to evaluate the best alternative in the treatment of PNS

Ethical Clearance

Ethical clearance and approval of the study are ascertained by the authors. All ethical issues and data collection were in accordance with the World Medical Association Declaration of Helsinki 2013 for ethical issues of researches involving humans, verbal and signed informed consent obtained from all patients. Data and privacy of patients were kept confidentially. .

Conflict of interest: Authors declared none

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