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Original Research Article

A modified surgical approach to sacrococcygeal pilonidal disease: our experience

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ABSTRACT

Background: Pilonidal disease is a fairly common condition encountered in clinical practice with recurrent follicular infection being the causative factor. Inspite of many surgical options available, controversy still exists for the best procedure. Pilonidal disease has been treated for a long time with the conventional open excision technique. Limberg procedure is a safe and reliable technique in the treatment of sacrococcygeal pilonidal disease, with low complications and recurrence rates if performed according to appropriate surgical principles. Epilation is a very useful adjunct to the surgery for Pilonidal disease to prevent recurrence, which is almost a rule.
Methods: In our study we recruited 27 patients of pilonidal disease who underwent modified Limberg flap procedure and were followed up for two years post-surgery. All the patients were subjected to epilation in preoperative period and post operatively for 6 months.
Results: During our study period (2011-2016) 27 patients were enrolled with a median age of 25 years and were followed up 2 years post-surgery. 22 patients were males while 5 were females, 13 were recurrent cases with previous history of one or more surgeries, 11 cases had a sinus without any surgical intervention in the past and 3 had an abscess. There was no recurrence noted for a follow up period of 2 years and there was no flap failure as well.
Conclusions: Modified Limberg flap with epilation for pilonidal disease is safe and easy to perform with minimal morbidity, early recovery and no recurrence.

Keywords: Pilonidal disease, Recurrence, Rhomboid excision, Modified Limberg flap reconstruction, Epilation

INTRODUCTION

Sacrococcygeal pilonidal sinus disease, a commonly encountered disease, is equally frustrating for the patient to have and the surgeon to treat. There are various surgical and nonsurgical modalities described for the management of pilonidal sinus disease; however the main problem with all these is recurrence apart from the complications of the procedure chosen. Sacrococcygeal pilonidal sinus disease is a chronic inflammatory disorder characterised by an abscess or a sinus tract in the natal cleft region with seropurulent discharge. Karyadaki's theory is the most accepted theory to explain the pathogenesis of the disease. He proposed that pilonidal sinus results from the interplay of three main factors which result into the insertion of hair into the natal cleft which are: The presence of loose hair (the invader), some force facilitating hair insertion into the skin, and the vulnerability of the skin such as the intergluteal sulcus depth.[1] Thus a deep natal cleft which favours sweating, hair penetration and bacterial contamination as well as buttock movements while walking which cause hair to penetrate the skin and cause foreign body reaction and inflammation form a part of the etiologic process.[2,3] Understanding the etiopathogenesis helps to treat the disease effectively with minimal recurrence.

Treatment options available include observation, antibiotics, drainage and wide excision. The excision techniques used for treatment of pilonidal disease generally involves a flap procedure that achieves primary closure away from the midline and obliterates the natal cleft. The management of pilonidal sinus disease is frequently unsatisfactory. Many surgical and non-surgical treatment modalities have been suggested, but the ideal and widely accepted treatment has not yet been established.[4] An ideal operation should be simple, should not need prolonged hospital stay, should have low recurrence rate and should be associated with minimal pain, wound care and decrease patients time off work.[5] In 1946, Limberg first described a technique for closing a 60° rhombus shaped defect with a transposition flap.

Limberg procedure is a safe and reliable technique in the treatment of sacrococcygeal pilonidal sinus disease, with low complication and recurrence rates if performed according to appropriate surgical principles.[6]

In recent years, reports of laser epilation in the pilonidal sinus disease have shown beneficial effect by decreasing the risk of recurrent Pilonidal sinus disease.[7-13] Excessive hair growth in the natal cleft is thought to be a key factor in initiating these abscess and their recurrence. Hair are often found trapped in the base of pilonidal wounds. Recurrence is common and many cases are difficult to heal. Weekly shaving is often advised as an adjunct to surgical treatments. However, the natal cleft is difficult to access with a conventional razor. It is often seen that recurrence is delayed if the hair-free interval is prolonged. Blade shaving is the most traditional form of shaving, but also is the hardest. The natal cleft is not easy to shave with a standard razor as the bikini area is. The natal cleft can be easily shaved if someone else does it for a person, since the usual results of self-shaving are nicks, cuts and horrible rashes afterwards.[14] Laser epilation in the affected area have shown beneficial effect by decreasing the risk of recurrent pilonidal sinus disease.[12]

This study was carried out to evaluate the usefulness of combination of modified limberg flap technique and the efficacy of long term (6 months) hair removal (epilation by laser/shaving/cream) in treatment of pilonidal sinus in our setup.

METHODS

From Jan 2011 to Jan 2016, a non-randomised retrospective study was carried out which involved 27 patients with pilonidal sinus disease who were operated by rhomboid excision and modified limberg flap reconstruction with pre-operative as well as post-operative hair removal done using either laser, shaving or depilatory creams at our tertiary care centre. Patients with primary and recurrent pilonidal sinus disease underwent this operation. The clinical presentation included chronic discharging sinus, pain, recurrent sinus and abscess formation. An informed consent was taken and patients were counseled about the merits and demerits of the procedure.

Inclusion criteria

- Pilonidal sinus in the natal cleft of the sacrococcygeal region.
- Patients ages 18 to 60 years
- Pilonidal abscess
- Recurrent pilonidal sinus

Exclusion criteria

- Pregnancy
- Patients with systemic conditions causing immunosuppression like HIV, cancer chemotherapeutic drugs and immunosuppressant therapy.

The hair removal session was done a day before surgery from both shoulder blades to mid-thigh region. Out of 27 patients studied 15 male patients were subjected to laser epilation, 7 male patients were subjected to shaving with a razor and in 5 female patients hair removal was done with depilatory cream. Surgery was performed under spinal anaesthesia. Patients were placed in prone jack-knife position with buttocks strapped in jack knife position for wide exposure. After painting and draping, rhombus shaped area of excision was marked and flap lines were marked with sterile surgical skin marker as shown (Figure 1).

Figure 1: Incision marked as shown.

The rhomboid incision (with each side equal in length), including all the sinuses, was made till the presacral fascia in the midine and gluteal muscle laterally. The fasciocutaneous flap was constructed by extending the incision laterally till the fascia of the gluteus maximus muscle (Figure 2, 3). It is important to include all the tissues till the fascia to prevent flap necrosis. Haemostasis was achieved with the use of bipolar cautery and 3-0 polyglactin violet (vicryl) stitches to control bleeders. The use of monopolar cautery was strictly

avoided to prevent epidermolysis. The flap was transposed to the rhomboid defect without tension, created by excision of the sinus as shown. A Romson's 100% silicone- jackson pratt type close wound drainage system was placed in the wound cavity and was brought out through a separate stab incision. Subcutaneous tissue was approximated with interrupted 2-0 polyglactin violet (vicryl) suture. The skin was closed with interrupted 2-0 monofilament polyamide suture (ethilon) sutures (Figure 4).

Figure 2: Flap made as shown.

Figure 3: Flap positioned as described.

Figure 4: Closure done as described.

Technical modification of limberg flap reconstruction

- Placement of the vertical axis of the rhomboid flap in a paramedian position so as to avoid subsequent midline scarring which leads to recurrence (Figure 5).
- No usage of monopolar electrosurgical cautery while reconstructing the flap.
- Use of Romson's 100% silicone- Jackson Pratt type close wound drainage system to reduce seroma formation and subsequent infection.

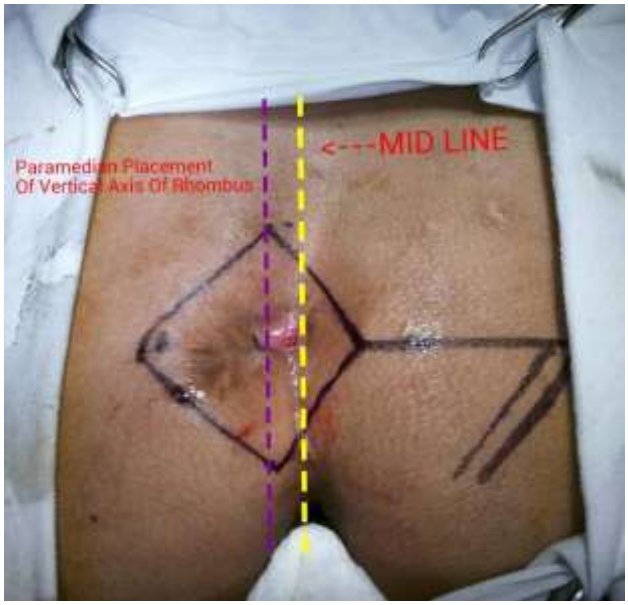

Figure 5: Paramedian placement of vertical axis of the rhombus.

Patients received injection metronidazole in postoperative period along with injection cefuroxime for two days along with a dose 1 hour prior to incision. Patients were discharged at an average of 3rd post-operative day and drains were removed on the 4-6th postoperative day on follow up. Delayed removal of skin stitches was done usually on 21st post-operative as it's a wound under

stress and tension. Patients were advised to avoid prolonged sitting or exercise for two weeks.

Laser epilation

Patients were treated with Hera600A, which is a precision medical instrument for permanent hair removal (Figure 6). Hera600A falls into class 4 laser product.

- Type: diode laser
- Wavelength: 810 nm
- Peak Power: 600 W
- Spot Size: 12X12 mm
- Energy Density: 10-120J/cm²
- Frequency: 1-10Hz
- Power Supply: AC200-240V /50Hz
- Input Power: 2KW
- Dimension: 480 mm×580 mm×1100 mm
- Weight: 60 kg
- Sessions: 4-6
- Time interval: 4-6 weeks.

Figure 6: HERA600A laser system: class 4

Patients were advised to maintain hygiene and keep the area including the back (to account for the hair falling from the back which lead to recurrence) epilated either by razor, cream, epilator or laser for a period of 6 months. This was to account for the wound healing upto the proliferative phase and early maturation phase which would take a period of 6 months in order to prevent recurrence. A follow-up done in outpatient clinic at 2 weeks, 4 weeks, 12 weeks post-surgery and then after completion of 6 months, 1 year and 2 years.

Statistical analysis

Data was entered in SPSS version 24.0 and statistical analysis was done.

RESULTS

The study consisted of 27 patients out of which 22(81.48%) were males and 5 (18.51%) were females with a mean age of 25 years (18-47 years). It was conducted from Jan 2011 to Jan 2016 with the last patient being enrolled in 2014 and 2 year follow up noted of all patients. Amongst the 27 patients 11 (40.74%) patients were fresh cases without previous surgical intervention, 3 (11.11%) patients had abscess and 13 (48.14%) patients were recurrent cases. Of the 13 recurrent cases 9 (33.33%) patients were operated once and 4 (14.81%) were operated twice and referred to our centre in view of recurrence (Table 1).

Table 1: Clinical presentation.

Presentation	Number of patients (27)	Percentage
Pilonidal sinus (no surgical intervention done previously)	11	40.74 %
Abscess	3	11.11 %
Recurrent sinus (operated once)	9	33.33 %
Recurrent sinus (operated twice)	4	14.81 %

The mean operative time was 50 from 60 to 90 minutes. Post operatively the drain output was monitored which gradually reduced over 4 to 6 days and drain was removed when the output was less than 10ml/ day. First wound check was done at 48 hours and later dressing was done as per soakage of the wound. The hospital stay ranged from 72-96 hours. Most of the patients had uneventful recovery while some had minor wound complications. Delayed Suture removal was done on day 21.

Table 2: Postoperative complications.

Complications	Number	Percentage
Seroma	2	7.40 %
Wound infection	1	3.70 %
Hematoma	0	-
Epidermolysis at tip of the flap	3	11.11 %
Wound seperation	1	3.70 %
Flap necrosis	0	-
Post-operative recurrence	0	-

Seroma developed in 2 (7.40%) patients, which was managed by conservative measures. 1 patient (3.70%) developed wound infection which was treated with antibiotics. 3 patients (11.11 %) developed epidermolysis at the tip of the flap which was managed conservatively with dry gauze dressings. No patient developed recurrent lesion till follow up of 2 years postoperatively, which was

due to sticking to the principles of the surgical technique of excision of the sinus with pre-operative and post-operative epilation (Table 2). Surgical scar at 2 year follow up (Figure 7).

Figure 7: Scar as seen at follow up at 2 years.

DISCUSSION

Pilonidal sinus is a well-recognized entity afflicting young and healthy individuals. It not only results in high morbidity rate because of its tendency to persist and recur again but also decreases productive power. There are reports of development of squamous cell carcinoma in longstanding cases. Davis et al suggested that it takes about two decades to develop this malignancy if this disease persists.[15] Also some fatal complications such as necrotising fasciitis and toxic shock syndrome have also been reported in international literature.[16]

A long list of surgeries have been described which itself reflects the need for a safe and efficient surgical method for this entity. Recurrence is the main problem associated with all surgeries described which ranged from 21.4% to 100% for incision and drainage, 5.5%-33% for excision and open packing, 8% for marsupialisation, 3.3%-11% for Z plasty.[17,18] Flap techniques have been associated with lower complication and recurrence rates. With the Limberg flap technique, internal flap cleft can be flattened and tissue can be approximated without tension.

In this study, 27 patients with sacrococcygeal pilonidal sinus disease were managed with rhomboid excision and limberg flap reconstruction. Recurrence was noted in none of the patients. Akin et al operated on 411 patients and reported recurrence rate of 2.91%.[19] Superficial necrosis was seen in 1 patient (3.70 %). El-khadrawky operated on 40 patients and had superficial necrosis at the tip of the flap in four patients (10 %).[20]

Limberg flap is basically a parallelogram with two angles of 120° and two of 60°. These angles that can be modified depending on the shape of lesion or defect. All sides of the rhomboid and all sides of the flap are equal. As many as four flaps can be raised from one rhomboid, if required. The procedure and flap elevation from subcutaneous tissue is easy to perform and the vascularity of the flap is good. The flap design places the longitudinal axis of the rhomboid excision parallel to the line of minimal skin tension. It can be performed almost anywhere in the body with good cosmetic results.[21]

The advantage of this reconstruction is that it is very easy to perform and design. It flattens the natal cleft with a large, well vascularised pedicle that can be sutured without tension. That eventually helps in maintaining local hygiene, avoids hair insertion by reducing the friction between buttocks, reducing humidity, maceration, erosions and scar formation at the natal cleft. Any midline dead space is eliminated and a midline scar is avoided. It is a particularly useful technique for complex sinuses with multiple pits and extended tracts where radical excision leaves a large defect.[22]

The importance of the post-operative wound care should also be stressed. Exercise or sitting down on the wound should be avoided for two weeks and the patient has to return slowly to normal activities.

Hair removal either by shaving the edges of the wound is mandatory.[23,24] This has to be continued at least until complete healing of the wound, but preferably on a long term basis. Long-lasting or permanent hair removal in the gluteal area in pilonidal sinus disease would eliminate the hairs and decrease the risk of recurrent disease.[11,13]

The recent literature consists of reports on the benefits of laser epilation in pilonidal sinus disease. Benedetto et al reported two patients with recalcitrant pilonidal sinus disease treated with an 800 nm diode laser, resulting in long term relief.[7] Similarly, Lavelle and collegues8 presented a case of pilonidal sinus disease. They treated surgical scar site five times with Ruby laser for epilation and did not observe recurrence in 6 months. Conroy et al reviewed 14 patients who underwent laser hair removal after pilonidal sinus surgery.[9] The mean number of treatments was 3.9, and none of the patients had developed recurrent disease at 1 year follow up. They suggested that laser hair depilation and the personal hygiene of the patient were useful in preventing recurrent pilonidal sinus disease. Schulze et al reported that 19 of 23 patients who had laser epilation after surgical interventions and remained in follow-up did not have recurrence or need further surgery.[10]

CONCLUSION

The main goals the management of pilonidal sinus disease should be determining the ideal medical or surgical treatment, which includes minimal inconvenience to the patient, a short period of hospitalization, and most importantly, a low risk of recurrence.

The results of our series support the rhomboid excision and modified limberg flap rotation as a preferred treatment of the disease. The technique can be mastered easily and provides an effective procedure for primary as well as recurrent disease. Few complications associated with it can further be reduced by meticulous skin closure and preventing skin inversion, especially at the lower midline. Also the flap should be wide enough to completely obliterate the midline natal cleft.

Peri-operative epilation is very useful adjunct to surgical removal of pilonidal sinus disease to prevent recurrence. The operating surgeon should work in tandem with the laser surgeon to combine the procedures to give the patients the advantages of both and help prevent the recurrence that is bound to happen if hairs are not taken care of.

We recommend laser epilation to every patient with pilonidal sinus disease as an adjunct treatment after surgical intervention to prevent further surgeries.

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