



Research Paper

## CASE SERIES ON MODIFIED LIMBERG FLAP TECHNIQUE IN MANAGEMENT OF PILONIDAL DISEASE

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Pilonidal abscess and sinus in sacrococcygeal area are a common occurrence in youth. Various surgical and non-surgical modalities are used for managing this condition. There is high chances of recurrence with all modalities of treatment. Various complications do arise even after surgery. This case series presents clinical outcome of one surgical procedure-rhomboid excision with modified Limberg flap, practiced at our hospital. In our hospital 35 patients with newly diagnosed pilonidal sinus and recurrent pilonidal sinuses were treated with rhomboid excision and modified Limberg flap during a period of two year, i.e., from June 2009 to May 2011. These patients were followed up post-operatively for a mean duration of 1 year. This surgical technique showed promising results with regards to less post-operative complications, short hospital stay and low recurrence rate. Out of 35 patients, only 7 cases presented with various complications. One person had recurrence, two had seroma formation and four had wound infection.

**Keywords:** Pilonidal sinus, Rhomboid excision, Limberg flap

### INTRODUCTION

Pilonidal disease in sacrococcygeal or intergluteal region is a chronic inflammatory disorder with superimposed infection. It is commonly seen in young adults and usually presents as an abscess or a painful sinus tract in the natal cleft with seropurulent discharge (Schoeller *et al.*, 1997; Petersen *et al.*, 2002; and Sondanaa *et al.*, 1995). It was initially described by Mayo in 1833. Its causation has been debated for long, whether it

is a congenital disease or an acquired entity. Now it has been accepted by many as an acquired condition. Various surgical and non-surgical modalities have been described for management of pilonidal disease from a simple phenol injection to a complex flap mobilization, but an ideal treatment has not been determined because of substantial complications and high rate of recurrence (Petersen *et al.*, 2002; Sondanaa *et al.*, 1995; and Al-Khamis *et al.*, 2010). One

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important aspect in managing this condition is modifying natal cleft and lateralizing the scar from the midline which eliminate the risk factors of pilonidal sinus disease (Karydakos, 1992; Bascom, 1998; and Nursal *et al.*, 2010). Therefore, numerous lateralizing surgical flap techniques based on this principle are in practice, viz., Karydakos flap, Limberg flap, modified Limberg flap, z-plasty and y-v advancement flap (Petersen *et al.*, 2002); Al-Khamis *et al.*, 2010; Karydakos, 1992; Nursal *et al.*, 2010; Urhan *et al.*, 2002; Kapan *et al.*, 2002; Tekin, 2005; Akinci *et al.*, 2000; Bozkurt and Tezel, 1998; Ersoy *et al.*, 2009; Eryilmaz *et al.*, 2009).

In 1946, Limberg first described a technique for closing a 60° rhombus shape defect with transposition flap (Chiedozi *et al.*, 2002). A rhombus including the pilonidal sinus and the flap line is marked on skin using a sterile skin-marking pen. Under the guidance of methylene blue, the rhombus is excised down to the pre-sacral fascia and fascio-cutaneous flap is transposed medially so that the defect is closed without tension. The size of prepared flap is equal to that of the rhomboid area and the flap should be sutured asymmetrically placing lower pole of flap lateral to intergluteal sulcus.

## CASE SERIES

Thirty five patients with sacrococcygeal pilonidal disease were operated by rhomboid excision with modified Limberg flap technique from June 2009 to May 2011 at our hospital. We present this case series to show the effectiveness of modified Limberg flap in treatment of sacrococcygeal pilonidal disease. We adopted this technique in treatment of sacrococcygeal pilonidal disease due to its advantage like ease to perform and design the flap as it flattens the natal cleft with

wide well-vascularized pedicle that can be sutured without tension, low recurrence rate and less hospital stay.

This surgery was performed under spinal anesthesia by placing the patient in prone position. All patients received I.V. antibiotic of cephalosporin group during operation. The trunk was slightly jack-knifed at the hips and buttocks retracted with adhesive tape to allow wide exposure of the operative field. The surgical site was shaved before the operation and skin prepared with 10% povidone iodine solution. All sinus openings were injected with methylene blue to visualize the sinus tracts.

A rhomboid excision (Figure 1) is done upto the pre-sacral fascia and fascio-cutaneous flap is transposed medially so that the defect is closed without tension. A suction drain was placed beneath the flap through separate stab incision (Figure 2), and subcutaneous tissue was approximated with polyglycolic acid sutures. The skin was closed separately using 3-0 polypropylene sutures. Suction drain was removed on the 3<sup>rd</sup> or 4<sup>th</sup> post-operative day (Figure 3) depending upon the amount of drainage. Sutures were removed between 10<sup>th</sup> to 12<sup>th</sup> post-operative days.

**Figure 1: Rhomboid Excision**



**Figure 2: Modified Limberg Flap Technique with Drain Tube**



**Figure 3: Wound Healing on 4<sup>th</sup> Post-operative Day**



Among 35 patients, 20 were male and 15 were females. The demographic data of the patients is presented in Table 1. The mean duration of follow-up was one year. Out of 35 patients, only 7 patients had complications as shown in Table 2. One patient had recurrence, two patients had seroma formation and four had wound infection for which dressings were done followed by secondary suturing under local anesthesia.

**Table 1: Demographic Data of Patients**

	Males	Females	Total
Numbers	20 (57.14%)	15(42.85%)	35 (100%)
Age, in years (Mean ±SD)	25±7	22±5	24±4

**Table 2: Clinical Outcome After Surgery**

	Number of Cases (%)
Duration of post-operative stay in hospital, in days	3±1
Follow-up period, in days	365±30
Complete healing without complication	28 (80.00%)
Complications	7 (20.00%)
Recurrence	1 (2.86%)
Seroma formation	2 (5.72%)
Wound infection	4 (11.52%)

## DISCUSSION

The prevalence of sacrococcygeal pilonidal disease is 0.26% in general population in India. But, the disease is more common in some countries of Mediterranean and Persian gulf region (Chiedozi *et al.*, 2002 and Armstrong and Barcia, 1994 ). Preponderance is seen in young age and male gender. Few risk factors have been identified such as driving, obesity, deep natal cleft and poor hygiene (Sondenaa *et al.*, 1995; Akinci *et al.*, 2000; Eryilmaz *et al.*, 2009; Akinci *et al.*, 1999; Akinci *et al.*, 2009). Our patients were also in the young age with a mean age of 24±4 years and majority of them were males (57.14%).

The causation of sacrococcygeal pilonidal disease is debated for long. Earlier it was thought be of embryonic origin but now it has been widely accepted as an acquired condition which results due to the accumulation of hair penetrating skin (Surrell, 1994; da Silva, 2000; Allen-Mersh, 1990). Karydaki (1992) suggested three factors related to development of this disease namely ‘the invader’ consisting of loose hair, ‘a force’ that causes hair insertion and ‘vulnerability of skin’ to hair insertion in natal cleft.

Many surgical procedures has been described for sacrococcygeal pilonidal disease but a consensus on single most effective modality has not been advocated because all procedures involve complications and recurrences (Petersen *et al.*, 2002; Al-Khamis *et al.*, 2010). Simple excision and primary closure or open wound healing does not flatten the natal cleft and cannot prevent penetration of hair to skin at depths of natal cleft and may lead to patient discomfort and recurrence (Allen-Mersh, 1990; Al-Jaberi, 2001; Abu Galala *et al.*, 1999; Aydede *et al.*, 2001). Day-care surgery with simple curettage or injection of phenol may remove hair and cure the sinus. But, the midline wound may take several weeks to heal and recurrence rate is more because of open route for hair insertion. It has been widely accepted that use of flap technique by flattening and lateralization of natal cleft will avoid recurrence. The Karydakis technique has difficulty in mobilization and closure for complex disease. Z-plasty and Y-V advancement flaps covers the wound defect by moving full-thickness skin and subcutaneous tissue into midline defect.

Among the flap techniques modified Limberg flap procedure is reported to be safer and reliable technique in treatment of sacrococcygeal pilonidal disease with low complications and recurrence rates (Kapan *et al.*, 2002). It flattens the natal cleft with large, well vascularized pedicle and is particularly useful technique for complex sinuses with multiple pits and extended tracts when radical excision leaves a large defect (Urhan *et al.*, 2002). Several studies have reported superiority of modified Limberg flap over other flap techniques. Montes *et al* (Cihan *et al.*, 2005), Ersoy *et al.* (2009) and Can *et al.*, (2013) conducted randomized control trails comparing modified Limberg flap with Karydakis flap and

concluded that modified Limberg technique have low complications and recurrence rate. Contrary to these results, study by Ates *et al.*, (2011) showed Karydakis flap superior to Limberg flap. Walid and Kaled (2012) compared open excision with secondary healing versus modified Limberg flap and showed that modified Limberg flap is superior to open excision. In our cases, the healing was reasonably good in all cases in the first week after surgery which is supported by the shorter hospital stay post-operatively.

## CONCLUSION

Rhomboid excision with modified Limberg flap technique is a reasonably good treatment modality for both primary and recurrent pilonidal sinuses with less post-operative complications, short hospital stay and low recurrence rate.

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