



**ORIGINAL RESEARCH PAPER**

**General Surgery**

**MINIMAL INVASIVE SINUSECTOMY TECHNIQUE AND COMPARISON WITH OTHER SURGICAL PROCEDURES IN PATIENTS WITH SACROCCYGEAL PILONIDAL SINUS DISEASE: SINGLE-CENTER EXPERIENCE**

**KEY WORDS:** Sacrococcygeal pilonidal sinus disease, complications, flap repair, recurrence

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**ABSTRACT**

**Introduction:** The purpose of this study was to evaluate patients with sacrococcygeal pilonidal sinus disease who underwent flep, primary closure and minimally invasive sinusectomy at our centre with reference to the perioperative findings, early and late postoperative results and recurrence.

**Material and Methods:** A total of 143 patients who underwent sacrococcygeal pilonidal sinus surgery from november 2011 to june 2013 were evaluated in terms of demographics, type of disease (primary or recurrent), hypoesthesia at the operative site, sense of tension and pain during daily activities, suture removal, satisfaction with the cosmetic results, and recurrence rate.

**Results:** A total of 106 of the 143 patients were male and 37 were female. The mean age of female patients was 24, whereas it was 27 for male patients. For those 143 patients, 72 of the patients were treated with Limberg flep reconstruction. The other 56 patients underwent Minimally-invasive sinusectomy operation, and 15 patients underwent excision plus primary closure. The recurrence rates were 3 cases for excision plus Limberg flap reconstruction group, one case for minimally-invasive sinusectomy group and 2 cases for excision plus primary closure group.

**Conclusion:** For surgical treatment of sacrococcygeal pilonidal sinus disease, minimally invasive sinusectomy should be the first treatment option which has similar recurrence rate and early recovery period comparing with other techniques.

**Introduction**

Pilonidal sinus disease (PSD) was first described in 1847 by Anderson, and its denomination arises from the Latin terms "pilus" and "nidus" meaning "a nest of hair." still remains a challenge for surgeons because of not created a precise treatment algorithm [1]. PSD commonly affects young adults between the ages of 15-25 years at a rate of 0.7% [2]. In the etiopathogenesis of pilonidal sinus disease, it is commonly accepted that non-living hairs provoke a foreign body reaction subcutaneously, leading to abscess and sinus formation. While congenital factors were considered causal in the previous years, acquired factors are currently considered etiologic. Pilonidal sinus disease is common among young men and does not occur in childhood, which suggests an acquired etiology [3]. Sometimes it causes discomfort that may interfere with education or work due to poor hygiene and malodor or itching for a long period. It may cause severe pain and abscess formation as well. Even malignant transformation has been described in this condition in the literature [4].

Complete removal of the sinus or sinuses and proper reconstruction are essential to achieve full recovery and prevent recurrence. The management of this disease is one of the most discussed topic in surgery. Many methods have been described in the literature. There are many surgical methods including the simple incision, drainage, unroofing, curettage and spontaneous secondary healing to excision-flap sliding. Conservative methods like crystallized phenol, cauterization and alcohol injection have also been described [5,6]. The objectives for treating PSD disease are minimal tissue loss, minimal postoperative morbidity, rapid return to daily activities and work, acceptable cosmetic results, minimal recurrence rate, and low cost. Although many surgical and conservative methods have been described, there is no optimal treatment algorithm which provides these positive results is known [7]. We aimed to compare the complications, recurrence rates, time required to return to normal activities, and patient satisfaction in patients who underwent three different surgical operations for pilonidal sinus retrospectively.

**Material and Methods**

The medical records of 143 patients who underwent Limberg flap (LF) transposition, primary closure (PC) and minimally-invasive sinusectomy (MIS) for PSD between November 2011 and June 2013 at the General Surgery Clinic of Izmir University Faculty of Medicine were evaluated retrospectively. This study was reviewed by local ethical committee and reported that there is no need for any ethical approval. The patients were contacted via phone. Suspicious patients were recalled and checked. Patients who had follow-up period less than 6 months; had diabetes mellitus, hematological or psychiatric disorders and who had acute pilonidal abscess were excluded from the study. The medical records of the patients were evaluated in detail in terms of demographics, type of disease (primary or recurrent), hypoesthesia at the operative site, sense of tension and pain during daily activities, satisfaction with the cosmetic results, and recurrence rate. Patient satisfaction was evaluated by scoring their answers according to the following scheme: poor (1), moderate (2), good (3), and very good (4).

**Surgical technique**

Patients were operated with spinal anaesthesia in prone jack-knife position. We used 1g of cefazolin intravenously for antibioprophylaxis. After trichotomy and skin disinfection of the intergluteal cleft with 10% povidone-iodine, the region is infiltrated with 10 ml of 2% prilocaine. An elliptical, rhomboid or S-shaped incision was performed and deepened down to the post-sacral fascia with electrocautery to perform en-block resection of diseased area.

**Excision plus Limberg flap reconstruction: group 1**

A rhomboid-shaped excision was performed. A right- or left-sided fasciocutaneous Limberg transposition flap was mobilized on its inferior edge and transposed medially to refill the defect. The defect on the gluteal region was closed primarily. A vacuum drain was placed and the subcutaneous layers were sutured with 2/0 vicryl. The skin was closed with nonabsorbable polypropylene sutures. These sutures were removed on the 14th postoperative day.

**Figure 1.**(a,b) Preoperative design of the Limberg flap

reconstruction technique; (c,d) early and late postoperative appearance of the flap.

**Minimally-invasive sinusectomy: group 2**

After the injection of methylene blue, primary opening of the sinus was sutured with 2/0 polypropylene for the traction and manipulation. The cone-shaped excision was performed through a small elliptical incision. After the excision, the skin circle was reconstructed. The subcutaneous layers were sutured with 2/0 vicryl and the skin was closed with nonabsorbable polypropylene sutures. These sutures were removed on the 7th postoperative day.

**Figure 2.** (a,b) Preoperative images of suturation of the primary opening of the sinus and cone-shaped excision; (c,d) early and late postoperative schematic appearance of the minimally-invasive sinusectomy

**Excision plus primary closure group: group 3**

A wide S-shaped excision followed by en-bloc resection of the diseased area was performed. 1/0 polypropylene tension sutures were placed through the all layers and post sacral fascia at both sides of the defect. The subcutaneous layers were sutured with 2/0 vicryl. The skin was sutured with 2/0 nonabsorbable polypropylene mattress sutures. The tension sutures were tightened over a gauze roll over the skin sutures. The tension sutures were removed on the first postoperative week and the skin sutures were removed on the second postoperative week.

**Figure 3.** (a,b) Preoperative design of the excision and disease free surface; (c,d) early postoperative schematic appearance of the excision plus primary closure

All Patients had prolonged antibiotherapy with ciprofloxacin 500 mg twice in a day until first postoperative week. All specimens were evaluated histopathologically. All patients were discharged from hospital at first postoperative day. Regular follow-up period is one week for all patients. If the healing does not occur, second follow-up is needed about one week later again. Unless recovery is achieved by the second follow-up period, the technique is considered to be a failure.

**Results**

A total of the 143 patients, 106 (74.1%) patients were male and 37 (25.9%) were female. The mean age of female patients was 24 (15-38), whereas it was 27 (14-52) for male patients (Table 1). For those, 14 patients were recurrent cases previously underwent surgery. Surgery applied for these cases were LF reconstruction for 6 patients, excision plus PC for 4 cases, and Karydakis technique for 4 patients. For recurrent cases, it was detected that mean time of relaps as 14 (6-22) months and mean time of reoperation apply after relaps as 8 (2-18) months. For those 143 patients operated in our clinic, 72 of the patients (50,3%) were treated with Limberg flep reconstruction (group 1). The other 56 patients (39.1%) underwent MIS operation(group 2), and 15 patients (10.4%) underwent plus excision plus PC (group 3)(Table 1). The follow-up period ranges from 6 to 19 months. The recurrence rates were 3 cases (4,1%) for group 1, one case (1,9%) for group 2 and 2 cases (13%) for group 3. Recurrences in group 1 come up at 7th, 10th and 13th months, whereas, it was at 4th month in group 2, and 4th and 13th months in group 3. As far as patient satisfaction surveys are concerned, the rate of hypoesthesia at the surgical site that did not interfere with daily activities was 75%; and the rate of patients who suffered post-spinal headache and chronic pain were 16% and 13% respectively, rate of complaints from prolong time of drain existance was 58%; it was 48% for patients complaining from positional constraints and 34% of patients had complaints arised from sutures in group 1. For overall satisfaction scores, it was 3 (good) for 80% of patients in group 1. For group 2, rate of patients suffering hypoesthesia was 2%, complaints of prolong time of drain existance were for 4% of patients; 12% of patients were annoyed with sutures; and the rate of patients who suffered post-spinal headache and positional constraints were 5% and 4% respectively. No one grumpled about chronic pain in this group.

Overall satisfaction scores reveal as very good(4) for group 2. Patients in group 3 complain from hypoesthesia at a rate of 33%, while it was 73% about prolong time of drain existance; rate of complaints arised from sutures and positional constraints were 20% and 13% respectively ; and 20% of patients suffered from post-spinal headache and chronic pain. Overall satisfaction score was good(3) for 66% ofpatients in group 3 (Table 2).

**Discussion**

The hypothesis of this study depends on the inflammation of the subcutaneous tissue because of hair and epithelial debris which entrapped through the skin. This hypothesis is supported by the onset of a pathology similar to pilonidal disease which occurs in the interdigital spaces of barbers due to short hairs penetrating the skin because of cutaneous microlesions. The removal of foreign bodies may reduce the inflammation and precipitate the healing process. Many methods have been described for the management of pilonidal disease. Therefore, we analysed all studies reported in the literature about pilonidal disease between 2000 to 2013. Most surgeons argued that the diseased area must be completely removed. But there is a controversy about the surgical strategy, should be sutured or left open. Yildar et al reported that the removal of the diseased area with healing by secondary intention leads to be a better outcome in terms of recurrence with a rate of 4-8% [8]. However, this procedure requires a long period of hospitalization, and causes more postoperative pain and a long recovery time up to 2-6 months [8]. Therefore, primary intention results faster recovery; but have a higher risk of recurrence with a rate of 10-50% [9]. In order to reduce the recurrence rates, some techniques like flap reconstruction have been introduced, although this technique requires more technical skills and have more serious complications such as infection and flap necrosis.

Over the years, conservative treatment have been popularised. Armstrong et al. reported his encouraging results in 1994 [10]. He treated patients by shaving off the intergluteal cleft until recovery. Lavelle et al. suggested that the use of laser hair removal is the optimal treatment option [11]. Kayaalp et al. reported a review regarding the use of phenol in the treatment of pilonidal disease in 2009 with a recovery rate of 60-100% [12]. Video-assisted ablation of pilonidal sinus (VAAPS), a therapeutic endoscopic method, has been described in 2013. Although it provides an early return to work with a 3 ± 3 days and a faster recovery time with 15 days, it requires expensive equipment and further evaluation [13]. We suggested that minimally-invasive sinusectomy has a simple and fast evaluation time, low complication rate, no postoperative morbidity and much cost-effective procedure compared with other surgical techniques. We also emphasized that this technique does not preclude the chance to perform other treatments. There are some deficiencies in this study including a small number of patients and potential biases related to the lack of a control group. Therefore, the results showed the practicability and safety of the procedure achieved by easy technique, the lack of complications. A randomised controlled trial should be designed to evaluate the advantages and disadvantages of this technique with a large number of patients.

**Conclusion**

For the surgical treatment of pilonidal sinus disease (PSD), causing loss of labor , flap applications has begun to take place of lay-open in recent years. However, in stead of this surgical method, causing large surgical scars and loss of labor, we think that minimally invasive sinusectomy should be the first treatment option which has similar recurrence rate and early recovery period.

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