



The Only Problem with Sacrococcygeal Pilonidal Sinus Disease is not Recurrence. A Comparison between Microsinusectomy and Limberg Flap Technique

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Abstract

Purpose: The aim of this study was to compare Limberg Flap technique (LF) with Microsinusectomy technique (MS) for the treatment of Sacrococcygeal Pilonidal Sinus disease (SPS), in terms of early postoperative outcomes.

Methods: This study was carried out from October 2015 to October 2016, wherein 96 patients who underwent LF and MS for SPS at two different centers were included. The patients were evaluated retrospectively. The primary endpoints comprised of the duration of incapacity for work and postoperative patient's comfort and convenience; while the secondary endpoints included postoperative complications, first-year satisfaction, and recurrence rates.

Results: The demographic data were similar in both groups. The median operating times (60 min vs. 18 min; $p < 0.01$) and median length of stay (26 h vs. 2 h; $p < 0.01$) were significantly shorter in the MS group. Postoperative pain scores were comparable in both groups. Postoperative complications were significantly higher in the LF group (61.1% vs. 6.7%, $p < 0.01$). Pain-free walking (11.4 vs. 2.15; $p < 0.01$) and return to work (26.2 vs. 5.15; $p < 0.01$) were significantly lower in the MS group. Postoperative first-year satisfaction and recurrence rates were comparable.

Conclusion: Despite similar satisfaction and recurrence rates as with LF, MS might initially be preferred due to its shorter hospital stay, lower risk of complication and rapid return to work and normal activities.

Keywords: Microsinusectomy; Complication; Postoperative patient's comfort

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Introduction

Pilonidal sinus is a cystic disease that affects the sacrococcygeal region most often. It disrupts daily activities and life comfort and its surgical treatment causes long-term labor loss. The prevalence of Sacrococcygeal Pilonidal Sinus disease (SPS) has increased in the recent years, and the presently estimated incidence is 26 per 100,000 per year in the general population [1]. Although SPS treatment seems simple, yet the socioeconomic burden is quite high as young people between 20 and 30 years of age are at risk. The treatment takes weeks to months and the reported overall recurrence rates at 20 years follow-up reach 34% [2].

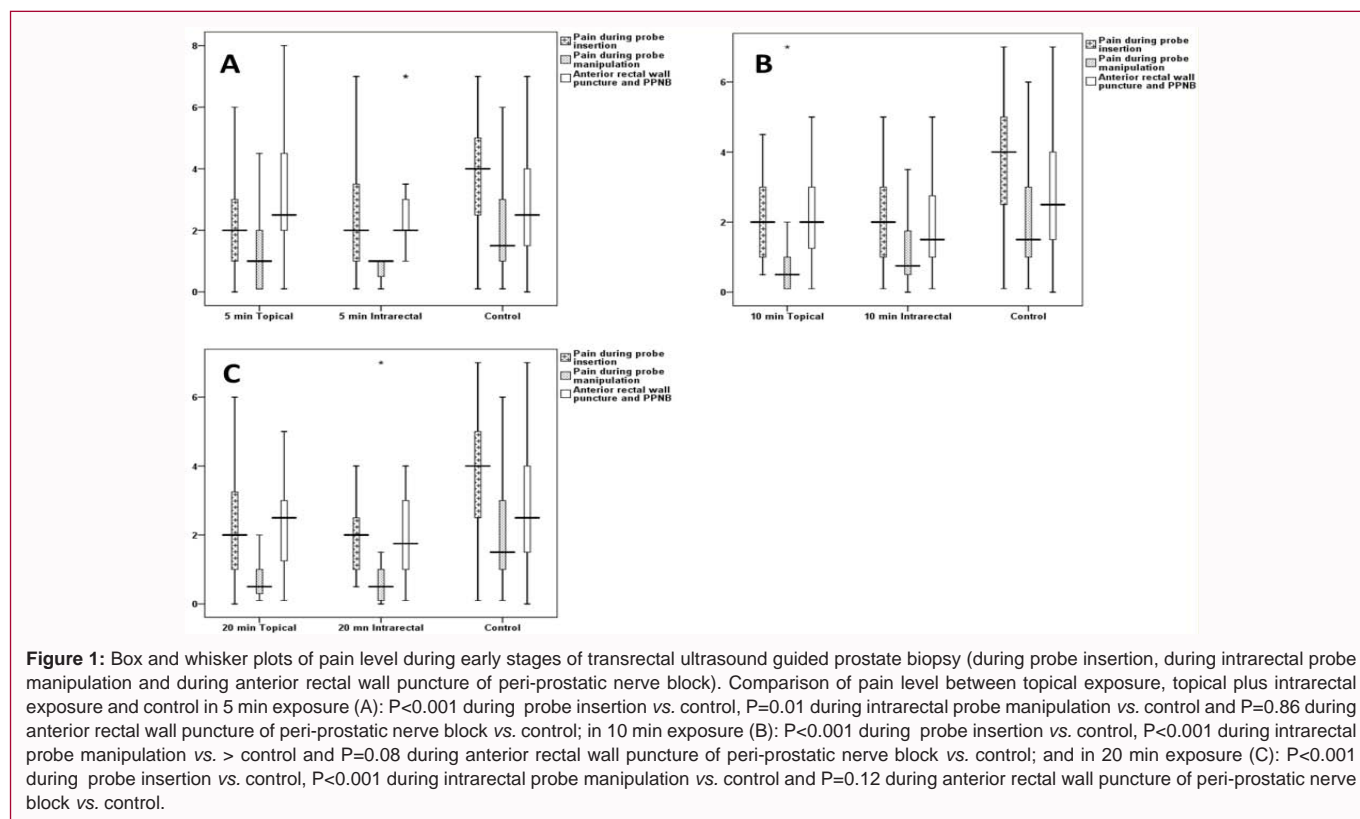
The ideal treatment for pilonidal sinus should include short hospitalization period, low risk of complications, and rapid return to normal activities, low cost and should have a low recurrence rate [3,4]. Limberg flap technique is frequently used for the treatments of SPS; however, it does not fulfill the criteria to be an "ideal" surgical treatment for SPS.

Therefore, the present study was aimed to compare LF and the Microsinusectomy techniques (MS) in terms of clinical outcomes.

Methods

Patients who underwent surgery for SPS with LF and MS in Bayburt State Hospital and Bursa Private Aritmi Osmangazi Hospital, from October 2015 to October 2016 were evaluated retrospectively. This study was approved by the institutional review board.

The demographics of the patients, presence of initial abscess, length of stay, postoperative complications, duration of wound healing, postoperative pain scores (Visual Analogue Scale [VAS]:



0= no pain, 10= most intolerable pain), pain-free walking time without the use of painkiller, return to work, satisfaction in the first year and recurrence rates in the first year were compared between the two groups.

The SPS was divided into 5 types, as classified by Irkorucu et al. [5]. Type I: Pit(s) on the natal cleft, Type II: Pit(s) on either side of the natal cleft, Type III: Pits on both sides of the natal cleft, Type IV: Complex SPS with multiple pits on and beside the natal cleft and Type V: Recurrent SPS.

Inclusion criteria comprised of patients older than 16 years of age, ASA type 1 and 2 patients and SPS type 1, 2 and 3 patients. Exclusion criteria comprised of ASA type 3, 4, 5 and 6 patients, SPS type 4 and 5 patients, patients with penicillin allergy, and patients who could have not been followed up.

After the patients were evaluated at the outpatient clinic and informed about both the methods, they were made to decide the surgical technique. The surgeries were performed by two different surgeons with the patient in prone position, using standard methods. LF was performed by a standard method as defined by Käser et al. [1] without the use of methylene blue, under spinal anesthesia. In the MS, the patient was brought into a supine position and the shaved and buttocks were separated by bands. The orifices of the pilonidal sinus were probed. The orifices and sinus were then closely excised with a scalpel or scissor over a 2 cm elliptical mini-incision which also included the pilonidal cyst under local anesthesia. After hemostasis was achieved, the wounds were left open to heal. All the patients were instructed to clean the wound in the shower at least once a day until complete healing was achieved. Second-generation cephalosporin was administered in a single IV dose before both the surgeries. No postoperative antibiotic treatment was given. If the abscess was

present, it was first drained by a small incision under local anesthesia followed by oral amoxicillin and clavulanic acid for 7 to 10 days in a dose of 2 g × 1 g per day; 2 weeks later, either of the two surgeries was performed.

Postoperatively, patients were assessed on the 1st day, 3rd day, 7th day, 14th day, 1st month, 3rd month, 6th month, and 1st year. At the end of the first year, recurrence was assessed and a satisfaction score questionnaire was given to the patients. Satisfaction scores ranged from 0 to 10 (0= not at all satisfied, 10= completely satisfied).

The primary endpoints included the duration of incapacity for work and postoperative patient's comfort and convenience while the secondary endpoints included postoperative complications, first-year satisfaction, and recurrence rates.

The results were expressed as median and range. For statistical analyses, two-sided Fisher's exact test was used for categorical data and the Mann-Whitney U test was used for numerical data. A p value of less than 0.05 was considered to be significant.

Results

Out of 147 patients treated at the two centers for one year, 96 patients who met the inclusion criteria were included in the study.

Demographics and perioperative data of the patients were evaluated and have been given in Table 1. The operative time ($p < 0.01$) and length of stay ($p < 0.01$) were found to be significantly shorter in the MS group.

Wound healing time, postoperative VAS (Visual Analog Scale), postoperative complications, pain-free walking and return to work were assessed and are given in Table 2. It was found that the postoperative complications ($p < 0.01$), pain-free walking ($p < 0.01$)

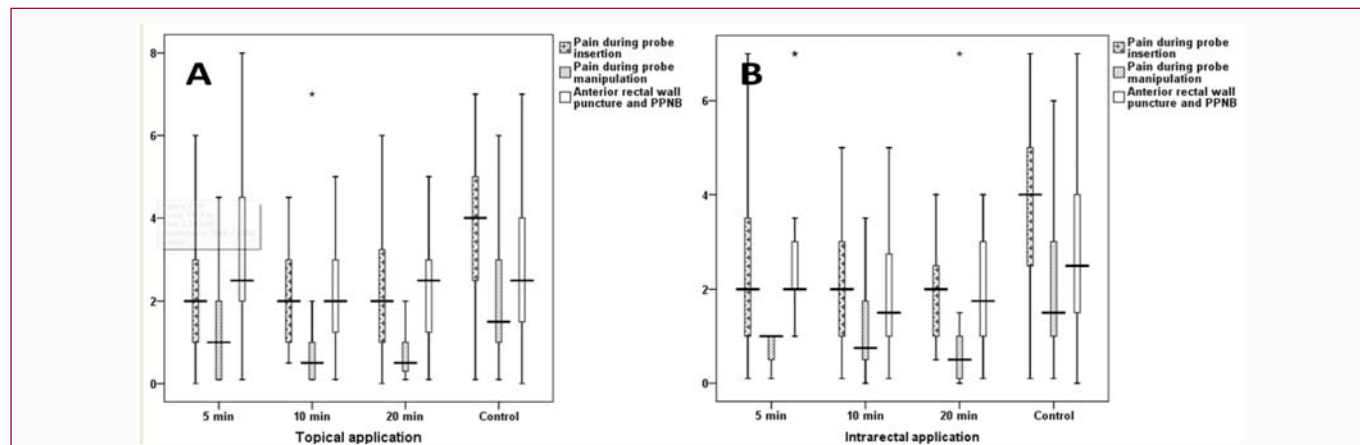


Figure 2: Box and whisker plots of pain level during early stages of transrectal ultrasound guided prostate biopsy (during probe insertion, during intrarectal probe manipulation and during anterior rectal wall puncture of peri-prostatic nerve block) with different exposure times. (A) Topical application. Pain level was significantly lower in case of 5 min, 10 min and 20 min exposures vs. control during probe insertion ($p < 0.001$), probe manipulation ($p < 0.001$), but didn't achieve statistical significance during periprostatic nerve block ($p = 0.09$); (B) Topical plus intrarectal application. pain level was significantly lower in case of 5 min, 10 min and 20 min exposures vs. control during probe insertion ($p < 0.001$), probe manipulation ($p < 0.001$), and periprostatic nerve block ($p = 0.04$).

Table 1: Patient demographics and clinical parameters.

	5 minutes topical	10 minutes topical	20 minutes topical	5 minutes topical + intrarectal	10 minutes topical + intrarectal	20 minutes topical + intrarectal	control	P
Number of patients	38	47	27	23	44	32	41	
Age (years, range)	67.5 (61.8-74)	68 (62-71)	68 (60-70)	66 (64-72)	67 (61-71)	66 (61-74)	67 (62-72)	0.99
Diabetes mellitus (%)	5 (13.2)	3 (6.4)	6 (22.2)	3 (13.0)	9 (20.5)	4 (12.5)	2 (5.3)	0.23
CVA/TIA (%)	4 (10.5)	2 (4.3)	1 (3.7)	1 (4.3)	4 (9.1)	1 (3.1)	0 (0)	0.41
Neurologic disease (%)	0 (0)	1 (2.1)	0 (0)	1 (4.3)	3 (6.8)	2 (6.3)	2 (5.3)	0.54
Spinal cord disease (%)	0 (0)	2 (4.3)	1 (3.7)	2 (8.7)	0 (0)	0 (0)	3 (7.9)	0.18
Hypothyroidism	0 (0)	0 (0)	0 (0)	1 (4.3)	0 (0)	0 (0)	1 (2.6)	0.35
Pain meds in past 48 hours (%)	0 (0)	1 (2.1)	0 (0)	2 (8.7)	1 (2.3)	1 (3.1)	2 (7.9)	0.29
Prostate clinical parameters								
PSA	6.4 (5.0-8.2)	5.9 (4.3-8.4)	7.0 (5.5-12.4)	5.5 (4.4-6.8)	6.9 (5.5-10.0)	6.0 (4.6-10.6)	6.3 (4.8-13.0)	0.096
Repeat biopsy (%)	9 (23.7)	12 (25.5)	7 (25.9)	7 (30.4)	9 (20.5)	6 (18.8)	7 (17.5)	0.9
Prostate size (cm ³ , IQR)	52 (37-77)	57 (38-76)	44 (28-75)	57 (39-79)	44 (36-91)	52 (35-73)	50 (32-62)	0.56
Abnormal DRE (%)	9 (23.7)	15 (31.9)	7 (25.9)	2 (8.7)	12 (27.3)	14 (43.8)	21 (51.2)	0.05
Non BPH histology (%)	16 (42.1)	13 (27.7)	14 (51.9)	6 (26.1)	19 (43.2)	15 (46.9)	18 (43.9)	0.16

CVA: Cerebral Vascular Attack; TIA: Transient Ischemic Attack; PSA: Prostate Specific Antigen; Kg: Kilograms; SD: Standard Deviation; IQR: Interquartile Range; DRE: Digital Rectal Examination; BPH: Benign Prostate Hyperplasia

and return to work ($p < 0.01$) were significantly higher in the LF group. Postoperative complications in LF were determined to be wound dehiscence (38.8% in 14 patients), skin necrosis (11.1% in 4 patients), wound infection (5.6% in 2 patients), hematoma (5.6% in 2 patients), while that in MS was bleeding (6.7%, 4 patients).

The satisfaction scores and recurrence rates at the end of the first year were compared and the results were found to be similar for both the groups ($p: 0.57$; $p: 1$) (Table 3).

Discussion

The optimal surgical treatment for SPS has not been defined yet. The optimal therapy for SPS is still under debate, and different surgical techniques are used. In our study in which patient comfort and convenience were investigated beyond recurrence rates, in MS group; we found that the duration of surgery and LOS were shorter, postoperative complication rates were lower, pain-free walking time

was shorter, and return to work was earlier. This study showed that MS could be safely chosen with clinical results in SPS treatment.

Surgery is the central treatment option known as SPS. Although minimally invasive procedures such as lay-open, removal of hair only, and curettage and phenol treatment are performed, the recurrence rates are higher when these techniques are used [4,6]. More invasive procedures such as flap techniques (e.g., V-Y advancement, Z-plasty, Karydakias flap and Limberg flap) have been thought to be overtreatment for SPS because large tissue displacements are involved [6]. Another known significant fact is that wound healing along the midline is faster than that away from the midline; also, the complications and recurrence rates that are said to be related to it are lower [7]. Therefore, flap techniques are especially preferred by surgeons for off-midline healing [8]. However, as the comparative studies for MS that use novel and less invasive techniques are limited in number, it is usually not the first choice. The biggest problem with

Table 2: Median pain VAS scores during different time frames of transrectal ultrasound prostate biopsy.

Procedure stage	5 minutes topical	10 minutes topical	20 minutes topical	5 minutes topical + intrarectal	10 minutes topical + intrarectal	20 minutes topical + intrarectal	control	P	P _{ANCOVA}
During probe insertion	2.0 (1.0-3.1)	2.0 (1.0-3.0)	2.0 (1.0-3.5)	2.0 (1.0-3.5)	2.0 (1-3.0)	2.0 (1.0-2.5)	4.0 (2.25-5.0)	<0.001	0.07
During probe manipulation	1.0 (0.0-2.0)	0.5 (0-1.0)	0.5 (0-1.0)	1.0 (0.5-1)	0.75 (0.5-1.88)	0.5 (0-1.0)	1.5 (1.0-3.0)	<0.001	0.02
During PPNB	2.5 (2.0-4.5)	2.0 (1.0-3.0)	2.5 (1.0-3.0)	2.0 (2.0-3.0)	1.5 (1.0-2.88)	1.75 (1.0-3.0)	2.5 (1.5-4.0)	0.02	0.11
During biopsy	3.0 (1.5-4.3)	2.0 (1.5-3.5)	2.5 (1.5-3.5)	2.5 (2.0-4.0)	2.0 (1.5-4.0)	1.25 (1.5-3.5)	2.5 (1.0-4.0)	0.72	0.8
Overall estimate	3.0 (2.0-4.1)	2.0 (1.0-3.5)	2.5 (1.5-3.0)	2.5 (1.5-3.5)	2.5 (1.5-3.5)	2.5 (1.5-3.9)	3.0 (1.0-4.0)	0.35	0.58

Adjusted for PSA, diabetes mellitus status, spinal disease, abnormal digital rectal examination and non-benign histology

PPNB: Periprostatic Nerve Block

Table 3: Univariate and multivariate (multinomial) logistic regression for pain VAS scores during different time frames of transrectal ultrasound prostate biopsy.

Procedure stage	5 minutes topical OR (95% CI)	10 minutes topical OR (95% CI)	20 minutes topical OR (95% CI)	5 minutes topical + intrarectal OR (95% CI)	10 minutes topical + intrarectal OR (95% CI)	20 minutes topical + intrarectal OR (95% CI)	Control	P
Pain during probe insertion								
Univariate	0.68 (0.53-0.88)	0.66 (0.52-0.84)	0.67(0.51-0.89)	0.73(0.55-0.97)	0.67(0.53-0.85)	0.68(0.52-0.88)	Ref	0.002
Multivariate*	0.64(0.48-0.87)	0.58(0.43-0.79)	0.61(0.44-0.85)	0.67(0.48-0.93)	0.67(0.51-0.88)	0.64(0.48-0.87)	Ref	0.003
Pain during probe manipulation								
Univariate	0.78(0.59-1.03)	0.52(0.35-0.77)	0.41(0.23-0.73)	0.54(0.33-0.88)	0.61(0.44-0.86)	0.54(0.35-0.83)	Ref	< 0.001
Multivariate*	0.81(0.57-1.15)	0.42(0.25-0.71)	0.39(0.20-0.75)	0.51(0.28-0.92)	0.64(0.42-0.96)	0.59(0.37-0.95)	Ref	0.001
Pain during periprostatic nerve block								
Univariate	1.10(0.89-1.36)	0.81(0.64-1.03)	0.90(0.69-1.18)	0.97(0.74-1.26)	0.79(0.61-1.02)	0.78(0.59-1.04)	Ref	0.049
Multivariate*	1.11(0.86-1.43)	0.75(0.55-1.02)	0.92(0.68-1.25)	0.99(0.74-1.35)	0.88(0.67-1.16)	0.83(0.62-1.12)	Ref	0.12
Pain during biopsy sampling								
Univariate	1.18(0.94-1.48)	0.98(0.78-1.24)	1.05(0.81-1.36)	1.08(0.82-1.41)	1.02(0.81-1.29)	0.96(0.74-1.25)	Ref	0.67
Multivariate*	1.17(0.87-1.56)	0.89(0.66-1.21)	1.02(0.74-1.39)	1.07(0.77-1.47)	1.02(0.77-1.36)	0.99(0.77-1.34)	Ref	0.9
Overall pain estimation								
Univariate	1.10(0.86-1.39)	0.83(0.64-1.08)	0.88(0.66-1.18)	0.86(0.63-1.18)	0.89(0.69-1.15)	0.94(0.72-1.22)	Ref	0.39
Multivariate*	1.07(0.79-1.44)	0.78(0.57-1.07)	0.87(0.61-1.22)	0.87(0.61-1.23)	0.93(0.69-1.25)	0.99(0.73-1.34)	Ref	0.49

*Adjusted for PSA, diabetes mellitus status, spinal disease, abnormal digital rectal examination and non-benign histology

PPNB: Periprostatic Nerve Block

flap technique, which seems to be an ideal treatment, is the long period of return to daily activities and poor post-operative patient comfort and convenience. Therefore, this study was performed not only to compare the recurrence and the rates of postoperative complication, but also the time of return to daily activities and postoperative patient comfort and convenience.

To prepare patients for the SPS surgery, any technique of anesthesia including local, spinal, and general anesthesia may be used. Almost all of the MS can be performed with local anesthesia. LF is usually performed under spinal anesthesia and general anesthesia. The difference in the method of anesthesia administered directly affects the discharge time and postoperative early period. General anesthesia is not preferred due to positional respiratory problems other than the side effects of general anesthesia itself [9]. Patients undergoing spinal anesthesia are admitted to the hospital for an average of 24 h, taking into consideration the duration of the spinal blockade and possible side effects [1,10]. On the other hand, patients undergoing local anesthesia can be discharged immediately after the procedure [9]. However, patients administered local anesthesia may rarely experience allergic dermatitis and toxicity at high doses. When the MS technique is performed under local anesthesia, the duration of surgery and the length of stay in the hospital are remarkably shortened. Therefore, it is thought that the cost of MS surgery is lower because

of the requirement of lesser medical equipment, shorter operating time and shorter length of stay. In addition, emotional effects may be lesser due to the short time spent in the operating room and also as hospitalization is not required. Indeed, in the present study, all of the MS techniques were performed under local anesthesia. However, if spinal anesthesia is administered in MS techniques, the duration of hospitalization would be prolonged due to the effect of the anesthetic technique. The duration of operation is a major known disadvantage in LF technique [1].

Even though in the present study, wound healing was similar, return to work and return to daily life were noticeably faster in MS method. However, there is a contradiction. Testini et al. [12] demonstrated that flap method is more advantageous as compared to the excision and secondary wound healing with respect to the time required to return to work. On the other hand, a study by Ersoy et al. [13] stated that there is no difference in the time required to return to work between the Limberg flap and primary closure. A meta-analysis reported a range of 3 to 42 days for returning to work in different types of procedures [7]. However, it is considered that the patients who undergo MS are more comfortable in the postoperative period because of not having extensive excision, smaller incision, a lower rate of complication and lack of tightness as the suture is not given. Due to the above-described reasons, the time required for daily activities

of the patients and that required to return to work are thought to be shorter. On the other hand, although the open wound may seem to be a disadvantage, only a few minutes of wound care are needed and pain does not require any analgesic and does not prevent daily activities.

The complications in the group with the LF technique mainly included wound dehiscence and skin necrosis. Some surgeons ignore wound dehiscence. To avoid this well-known complication, some surgeons prefer a modified LF technique, placing the lower pole 1 cm to 2 cm lateral to the midline [1,14]. In this study, modified LF technique was not applied in any of the patients and wound dehiscence was seen in almost one-third of them. The only postoperative complication detected in the MS technique group was bleeding. The bleeding was controlled in the outpatient room immediately after readmitting the patient. Other studies have reported bleeding after excision in 0% to 2.8% of the cases [4,6,12]. In this study, the rate of bleeding after MS technique was found to be 6.7%, which was higher than the rates indicated in other studies. This can be explained by the fact that in relation to the excision, MS is performed from a much smaller incision, and thus the exposed area is not as wide as the excision.

The studies comparing the LF technique with the excision technique have reported lower recurrence rates in the LF technique. However, the studies comparing MS are rare [15,16]. In this study, the recurrence rates were found to be similar in both the LF and MS techniques (2.77% to 1.66%); however, in a study by Doll et al. [2], the 20-year recurrence rate was noted up to 34%, which indicates an increase and difference in recurrence rates. Furthermore, as wound complications significantly influence the long-term recurrence rate, it can be anticipated that the long-term recurrence rate in the group with the LF would be higher than that in the group with MS [1,17].

Limitations of this study include retrospective design, type II error, and possibility of bias due to lack of randomization and short follow-up. Although one-year follow-up is sufficient in terms of evaluation of the postoperative comfort and convenience of the patient, it is often misleading in terms of recurrence rates. The lack of MS group under spinal anesthesia is another limitation of the study; the authors recommend MS technique under local anesthesia.

In conclusion, despite similar satisfaction and recurrence rates with LF, MS might initially be preferred due to shorter hospital stay, lower complication risk, and rapid return to work and normal activities. Further prospective clinical trials are required to examine the efficiency of this technique in the long term.

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