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Original Article

Effective treatment and good cosmetic results in the treatment of pilonidal sinus disease; Comparison of four surgical methods

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Abstract

Aim: In the treatment of pilonidal sinus disease (PSD), the patient wishes to be able to get rid of the disease quickly and effectively with the ideal treatment, which not only improves the patient's satisfaction with the best cosmetic result but also has a low recurrence rate. The aim of this study is to demonstrate that the gluteal sliding transposition (GST) method is more advantageous and preferred by patients in terms of better cosmetic results and lower loss with lower recurrence and complication rates.

Materials and Methods: Between 2008 and 2017, patients who were operated for PSD were retrospectively reviewed using hospital digital records. Four groups of patients were included in the study: those who underwent excision and secondary healing (ESH), excision and primary repair (EPR), GST, and Limberg flap transposition (LFT). The groups were compared based on time of hospitalization, time of healing, time of labor loss, infection, hematoma, seroma and wound dehiscence, flap necrosis, paresthesia, recurrence and aesthetic satisfaction.

Results: Between 2008 and 2017, 1526 patients underwent PSD surgery in the hospital. Of the patients, 276 were female and 1250 were male, and their median age was 21.3 (16-45) years. The mean follow-up was 24 months (6-120 months). The longest mean operation time (46.04 ± 9.1 min) was found in LFT patients. The longest time of healing was in the ESH group (49.62 ± 12.7 days) ($p<0.05$). Although there was no significant difference between GST and LFT in terms of healing time, the time of healing was shorter in GST than in ESH and EPR methods (18.72 ± 7.72 days) ($p<0.05$). The shortest loss of labor was observed in EPR (13.53 ± 2.02 days) ($p<0.05$). The hematoma, seroma and the wound opening were more significant with the EPR method than other methods ($p<0.05$). While the aesthetic satisfaction was expected to be greater for the reconstructive procedure of LFT, the results showed that aesthetic satisfaction was found to be better with the GST method ($p<0.05$). In terms of recurrence, GST was also found to be the most advantageous method (4.4%) ($p<0.05$).

Conclusion: The GST method provides lower hospitalization and complication rates, similar to the ESH, and quicker wound healing with lower recurrences, as in LFT. In addition, GST has better aesthetic satisfaction than LFT.

Keywords: Pilonidal sinus disease; surgery; gluteal sliding transposition

INTRODUCTION

Pilonidal sinus is a health problem that significantly affects quality of life, especially in young men (1). The exact pathogenesis of pilonidal sinus disease (PSD) is still controversial. Male sex, obesity, sedentary lifestyle, jobs that require sitting for long hours, family history, hirsute body habitus, trauma or irritation of the natal cleft, and poor hygienic conditions are among the listed risk factors (2-5). Local trauma and being overweight are the most important conditioning factors for the development of symptomatic PSD (3). Two theories were proposed for the pathogenesis of PSD. The congenital theory assumes that PSD is a congenital remnant of an epithelial-lined tract from post-coccygeal epidermal cell rests. Since pilonidal cyst is not a true cyst with epithelialized walls, the congenital theory faded soon after its proposal and was replaced by the acquired theory. The acquired theory suggests that fallen hairs from the scalp or local hairs penetrate into the subcutaneous tissues of the natal cleft causing a localized foreign body reaction resulting in the formation of a cyst and subsequently an abscess (2). The acquired pathogenesis is the most accepted one. However, different types of intervention are performed based on its pathogenesis. Clinical presentation ranges from the simple pit to the complex infectious type with multiple

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orifices and purulent or serosanguinous discharge. The most common site of involvement is the intergluteal (natal cleft or sacrococcygeal) area (6). Obesity alone is not an important factor in the aetiology of pilonidal sinus disease (7). Treatment of pilonidal sinus is still controversial and different surgical methods have been applied. However, rates of complications and recurrences vary, and as yet there is no consensus on a specific technique. Different surgical methods have been compared over many years. The main factors to be considered to form an ideal treatment procedure are practical surgical technique, shorter length of stay in the hospital, short recovery period, fewer postoperative complications and pain, and low rates of recurrence (8).

Several methods have been invented for the management of the disease including medical treatment without surgical intervention, excisional methods and flaps. Each method has its own indications and advantages, depending on the condition of the patient and preference of the surgeon (6).

The procedure should treat the patients with a short hospital stay, and allow early return to normal activities by reducing pain and discomfort. With flap surgery, the resulting defective area is filled with fasciocutaneous tissue after wide excision, and its superiority to primary closure was reported in many papers (9,10).

The aim of this study is to demonstrate that the gluteal sliding transposition (GST) method is more advantageous and preferred by patients in terms of cosmetics and lower labor loss despite the same recurrence and complication rates. Therefore, complication rates, hospital stay, loss of work power, healing time, recurrence and aesthetic satisfaction results were evaluated in four methods applied for PSD treatment.

MATERIALS and METHODS

Between 2008 and 2017, patients who were operated on for PSD were retrospectively reviewed using digital hospital records. The operations were performed by two general surgeons.

Inclusion criteria were age over 12 years, no infection or abscess, PSD unrelated to perianal disease, no hidradenitis suppurativa and no use of anticoagulants. Exclusion criteria for the study were age younger than 12 years, presence of infection or abscess, PSD related to perianal disease, presence of hidradenitis suppurativa, and use of anticoagulants.

Acute abscesses were drained first and the reconstructive operation was applied after the infection was ended. Those who preferred excision and second healing (ESH) were operated on one session. Early follow-up was in the form of outpatient visits during 6-8 weeks postoperatively. Four groups of patients were included in the study: ESH, Excision and Primary Repair (EPR), GST and Limberg Flap Transposition (LFT). These four groups were compared in terms of operation time, time of hospitalization, time of healing, time of labor loss, infection, hematoma, seroma and wound dehiscence, flap necrosis, paresthesia, recurrence and aesthetic satisfaction. Complication rates, recurrence and cosmetic results were reported through conversations on the phone or in person.

Operative Technique

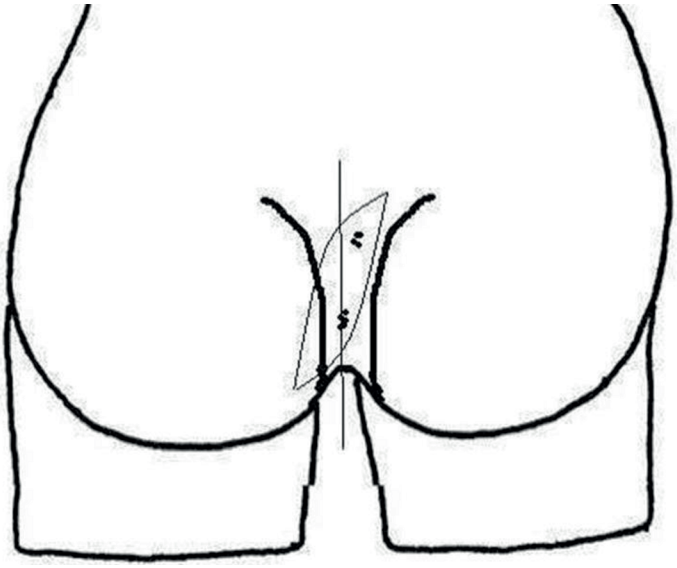

Figure 1. Preoperative view

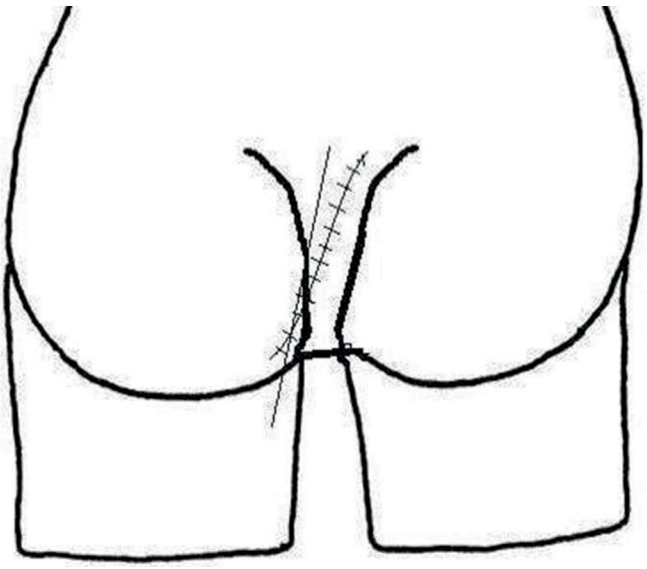

Figure 2. Postoperative view

Patients were admitted with mean 6-hour fasting times on the day of surgery. Patients underwent spinal anesthesia in the sitting position and were laid in the prone position when the spinal anesthesia was mature. Both gluteal regions were separated with a patch to reveal the presacral and perianal regions. The operation area was cleansed from lumber to anal area with an antiseptic solution and 1 g cephalexin was administered intravenously to the patients. Following excision in ESH and EPR methods, either the area was healed with wound dressing or was sutured. GST; an oblique elliptical incision was made to include the upper and lower orifices of the pilonidal sinus.

Two orifices were found in the pilonidal sinus, the lower orifice was often the entrance orifice leading to the pilonidal sinus, and the upper orifice was the orifice where the pilonidal sinus was drained. The inlet orifice was always in the midline, and the drainage orifice was variable, either to the right or to the left. The direction of the incision was applied depending on the upper orifice and which side the gluteal fascia was to be released. The bottom of the incision was taken to the lower orifice and extended to the other gluteus. The excision of the pilonidal sinus was made in such a way as to expose the end of the coccyx, even prolonged in the opposite gluteus and inferior direction. The gluteal fascia on the side of the upper end of the incision was released. In addition, the soft tissue between the skin and the coccyx was completely released and the skin was separated from the coccyx as much as possible. The bottom of the incision was pulled down in the inferior and lateral direction by holding it with a clamp, the subcutaneous tissues that were tense around the coccyx were released and the bottom of the incision was shifted from the medial line to the lateral line. The subcutaneous tissue between the coccyx and the skin was attached with no:1 absorbable suture from both sides and the detachment of the skin from the coccyx was completed. A Penrose drain was placed under the skin from the top of the incision and advanced to the end of the coccyx. The skin was sutured with 3/0 nonabsorbable monofilament suture. The drain was kept until the amount of discharge reduced and after the drain was removed, the patient was called twice a week for control and seroma formation was checked from the drainage site. The stitches were removed on the tenth day, but it may remain up to fifteen days in case of suspected infection. In LFT, the excision was made in the form of a rhomboid and the standard method was applied, with a drain placed under the flap. The drain was removed before the patient was discharged. Sutures were removed on postoperative 10th day.

When the bottom of the incision is left on the midline, early recurrences are more frequent because of the delay in epithelization. We tried to reduce recurrence rates by sliding the lower end of the incision to one side of the gluteus and releasing the soft tissue around the coccyx, and separating the coccyx and skin from each other with subcutaneous sutures.

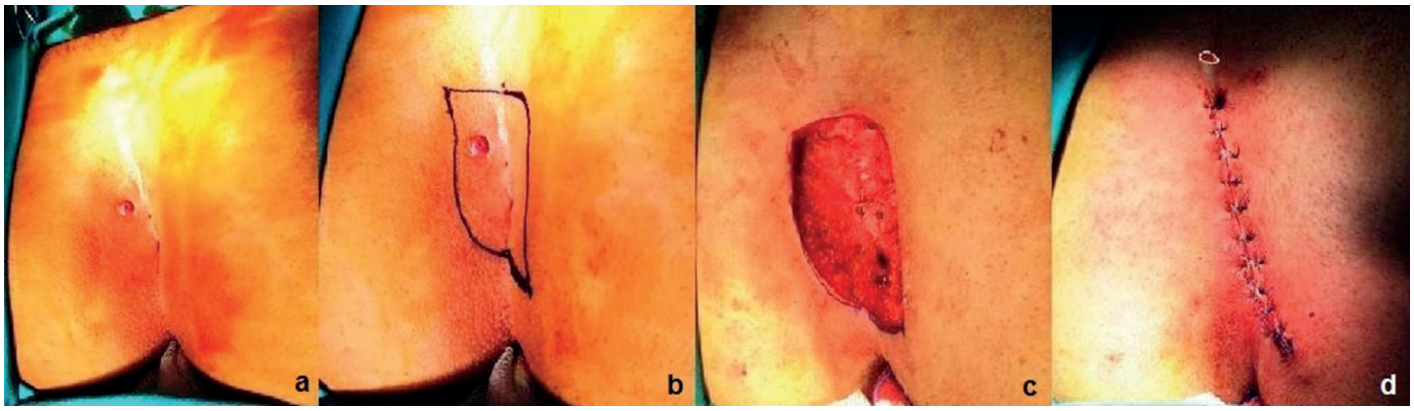

Figure 3. a, b. Preoperative view and marking the incision, c; View after excision, d; Postoperative view after suturing

Statistical Analysis

The data were compiled in SPSS 18 data format, and the result of skewness and kurtosis measurements showed that the data were not normally distributed. Consequently, mean, standard deviation, range, minimum and maximum values and percentage were calculated for the time of operation time, time of hospitalization, time of healing and time of labor loss. Time of operation, time of hospitalization, time of healing and time of labor loss, infection, seroma and wound dehiscence, flap necrosis, paresthesia, recurrence and aesthetic satisfaction parameters were tested with Kruskal Wallis test for the operation type. Furthermore, two groups with significant differences were compared again with the Mann-Whitney U test. P-value of <0.05 was taken as statistically significant.

RESULTS

Between 2008 and 2017, 1526 patients underwent PSD surgery in the hospital. Of these, 276 were female and 1250 were male and the median age was 29.91 ± 9.15 (13-77) years. Four groups of patients were included in the study: excision and secondary healing (ESH) (31.25%) (477/1,526), excision and primary repair (EPR) (18.35%) (280/1526), gluteal sliding transposition (GST) (26.67%) (407/1526), and Limberg flap transposition (LFT) (23.72%) (362/1,526). The groups were compared based on time of hospitalization, healing time, labor loss, infection, hematoma, seroma and wound dehiscence, flap necrosis, paresthesia, recurrence and aesthetic satisfaction. The mean follow-up was 24 months (6-120 months).

As shown in Table 1, when all patients are considered, mean duration of surgery (26.66 ± 13.92 min), mean hospital stay (1.09 ± 0.32 days), mean recovery time (30.58 ± 16.43 days) and mean work loss (19.38 ± 7.10 days) were determined. The longest mean operation time (46.04 ± 9.1 min) was found in LFT patients. This time was significantly longer than other treatment options ($p<0.05$). The shortest time of operation was determined in ESH (12.14 ± 3.64 min) ($p<0.05$), because no additional

procedure was performed after excision. EPR and GST were close to each other in terms of operation time. Although there was no statistically significant difference between these four methods in terms of hospitalization duration, LFT was slightly longer (1.21 ± 0.50 days) than the others (p>0.05).

The longest time of healing was for ESH (49.62 ± 12.7 days) (p<0.05). Although there was no difference in the healing period between GST and LFT (p>0.05), time of healing in GST was shorter than for conventional methods (18.72 ± 7.72 days) (p<0.05). The loss of labor time was the shortest in ESH (13.53 ± 2.02 days) (p<0.05) and longest with LFT (26.85 ± 6.61 days) (p<0.05).

As seen in Table 2, the infection was more frequent in the EPR method than the other methods (43/280, 15.4%). The incidence of wound infection in ESH (69/477, 14.5%) was close to EPR.

Infection was also less common in GST (16/407, 3.9%) and LFT (24/362, 6.6%) than in conventional methods (p<0.05). Considering all cases, the infection rate of 152/1526 (10%) was determined. Hematoma was not detected because the wound was left open in ESH. The method with the highest hematoma frequency was EPR (39/280, 13.9%) (p<0.05), which is almost identical to GST (7/407, 1.7%) and LFT (6/362, 1.7%) methods (p>0.05). Seroma and wound opening were more statistically significant with the EPR method than the other methods (64/280, 22.9%) (p<0.05). Since the wound was left open in ESH, there was no seroma or wound dissection, as with hematoma.

When flap necrosis distribution was examined, flap necrosis could not be mentioned because there were no flaps in the first two methods. When we looked at the GST and LFT methods, we found that there was a significant difference between the two methods (p<0.05).

Paresthesia was more common in reconstructive methods than in conventional methods (GST (56/407, 13.8%) and LFT (158/362, 43.6%)) and this complication was most common in the LFT method (p<0.05).

Table 6 shows the BMI group distribution according to the operation type. While there is no difference in ESH and LFT, most of the patients in EPR and GST had BMI 27 and above.

As seen in Table 7, all complications, except hematoma, were significantly higher in patients with BMI of 27 and above than those with BMI under 27.

Table 1. Type of operation and time of operation, hospitalization, healing, and labor loss

Type of Operation		Time of Operation (SEC)	Time of Hospitalization (DAY)	Time of Healing (DAY)	Time of Labor Loss (DAY)
ESH n:477	Mean (min- max)	12.14 (5-25)	1.05 (1-2)	49.62 (30-90)	13.53 (5-25)
	Std. Deviation	3.641	0.214	12.701	2.028
EPR n: 280	Mean (min- max)	24.00 (10-30)	1.10 (1-2)	20.93 (10-60)	20.65 (10-30)
	Std. Deviation	5.191	0.296	8.419	5.301
GST n:407	Mean (min- max)	28.28 (20-45)	1.02 (1-2)	18.72 (10-45)	18.73 (10-30)
	Std. Deviation	5.535	0.155	7.726	5.906
LFT n:362	Mean (min- max)	46.04 (30-65)	1.21 (1-3)	26.26 (10-60)	26.85 (15-45)
	Std. Deviation	9.101	0.501	8.791	6.617
P Value		p <0.05	p <0.05	p <0.05	p <0.05

Table 2. Four types of operation compared in terms of complications

	ESH		EPR		GST		LFT		P value
	n	% 477	n	% 280	n	% 407	n	% 362	
Infection	69	14.5%	43	15.4%	16	3.9%	24	6.6%	<0.05
Hematoma	0	0%	39	13.9%	7	1.7%	6	1.7%	<0.05
Seroma and wound dehiscence	0	0%	64	22.9%	20	4.9%	31	8.6%	<0.05
Flap necrosis	0	0%	0	0%	0	0%	14	3.9%	<0.05
Paresthesia	7	1.5%	15	5.4%	56	13.8%	158	43.6%	<0.05
Recurrence	54	11.3%	37	13.2%	15	3.7%	16	4.4%	<0.05

Table 3. Type of operation and aesthetic satisfaction

Bmi Group		AGE	BMI	Time of Operation	Time of Hospitalization	Time of Healing	Time of Labor Loss
BMI<27	Mean	28.27(13-77)	24.35 (21-36)	26.27 (5-65)	1.10 (1-3)	30.91 (10-78)	18.88 (5-40)
n: 662	± sd	± 8.419	± 1.675	± 14.737	± 0.343	± 15.382	± 6.765
BMI=>27	Mean	31.16(13-65)	32.39 (27-45)	26.97 (5-65)	1.08 (1-3)	30.32 (10-90)	19.76 (10-40)
n: 864	± sd	± 9.491	± 3.804	± 13.267	± 0.298	± 17.196	± 7.333
Total	Mean	29.91(13-77)	28.90 (21-45)	26.66 (5-65)	1.09 (1-3)	30.58 (10-90)	19.38 (5-40)
n: 1526	± sd	9.152	5.030	13.923	0.319	16.431	7.103

Table 4. Age, BMI, time of operation, time of hospitalization, time of healing, and time of labor loss means according to BMI

		BMI GROUP						
		BMI<27		BMI=>27		Total		P value
		n	%	n	%	n	%	
BMI GROUP	BMI<27	147	9.6%	515	33.7%	662	43.4%	<0.05
	BMI=>27	129	8.5%	735	48.2%	864	56.6%	
Total		276	18.1%	1250	81.9%	1526	100.0%	

Table 5. Gender and BMI

		BMI GROUP						
		BMI<27		BMI=>27		Total		P value
		n	%	n	%	n	%	
BMI GROUP	ESH	239	15.7%	238	15.6%	477	31.3%	
	EPR	101	6.6%	179	11.7%	280	18.3%	
	GST	149	9.8%	258	16.9%	407	26.7%	<0.05
	LFT	173	11.3%	189	12.4%	362	23.7%	
Total		662	43.4%	864	56.6%	1526	100.0%	

DISCUSSION

Since there are two theories explaining the formation of PSD, two main types of treatment have emerged for the treatment of the disease. Although conventional methods are directed towards the congenital theorem, reconstructive methods are directed to both theorems. Therefore, the rate of recurrence in reconstructive methods is lower than conventional methods (ESH and EPR). Hair follicles migrate to the natal cleft with physical activity in the acquired theory that Karydakis adopted (11). This theory is effective in explaining recurrences and the delays in wound healing with ESH. Cleaning the hair around the wound was proven to accelerate wound closure after ESH (12). By shifting the lower end of the incision towards the gluteal region, we modified the procedure to try to save the incision from being targeted by the ends of the hair (13). However, because the incision is delayed from healing from the lower end, we tried weekly perianal physical hair cleansing and bristle creams to protect the wound from hair, and as we saw that healing is faster, we apply this all the time.

The time of hospitalization and the time of labor loss were variable, but were found to depend on a personal, sociocultural, socioeconomic level, type of work, social security and behavioral patterns (12).

Early return to work was found in patients who underwent ESH. However, further recurrence was detected in these patients and it required a second operation. In ESH, wound healing requires the formation of granulation tissue. Depending on the wound size, this process requires long-term daily wound care. It seems there is a contradiction between the high healing time and the low loss of labor with ESH. Patients that have undergone ESH have about two weeks of medical dressing, and they can perform their own medical dressing with epithelializing ointments after a warm shower, which leads to a lower loss of labor.

In all techniques (primary closure or flap), a cavity is created after excision of the pilonidal cyst accompanied by healthy tissue; this should be filled or closed, or else it causes a technical problem, which is frequently encountered, and can result in complications such as "dead space", hematoma, wound infection, and wound separation during the early postoperative period (14,15). In EPR, hematoma, seroma, and wound dehiscence are more than other methods which can be explained by the occurrence of subcutaneous dead space. This dead space is confined to the gluteal fascia, presacral fascia, skin and subcutaneous layer, and these fibrous structures, which form the dead space borders, create an unsuitable environment for resorption. This becomes the most important factor leading to infection, seroma and hematoma formation. In the GST and LFT methods, the gluteal fascia opens unilaterally and provides a larger area for hemorrhagic and serous fluid resorption. In addition, recurrence rates are low, as expected (11,16,17).

However, serious complications such as longer operative and postoperative hospitalization periods and flap necrosis should be considered for reconstructive procedures (18-20). Although flap effect is seen with GST method, flap necrosis and paresthesia which are the most important complications of flap methods, were not observed as in the conventional methods. Because the flap floor was wide, flap necrosis was not seen with GST. Likewise, the time of hospitalization was as early as ESH.

When we examine the distribution of unilateral gluteal paresthesia, which is an effect of the release of gluteal fascia, paresthesia is seen in conventional methods when the pilonidal sinus has damaged a wide area, especially gluteal fascia. Paresthesia is not usually seen if the cyst is confined to presacral fascia. It is remarkable that flap necrosis and paresthesia, which are the most important complications of flap methods, occur at the same rate as conventional methods, although the flap effect is observed with the GST method.

It was suggested that the rate of recurrence is low because of the absence of hair and sweat collection due to removing the intergluteal sulcus with the flap methods (21-23). In the GST, too, it was also seen to be flat enough to prevent hair and sweat accumulation in the gluteal sulcus. Therefore, recurrence rates were found to be close to LFT. Even better results were achieved with the separation of soft tissue around the coccyx.

In our study, all complications except hematoma were significantly higher in patients with BMI 27 and above than those under 27. This result may have occurred because hematoma may be associated with the surgical procedure. Differences in other complications can be attributed to differences in wound healing due to blood sugar irregularities in obese patients. According to some studies, the lifestyle parameters of smoking and body weight statistically do not complicate wound healing or long-term recurrence rates for the first 20 years following primary PSD surgery in this study (24,25). Arda IS et al. suggest that high BMI in adolescents is a significant risk factor for the development of both symptoms and complications of PSD after surgical treatment (26,27). According to Sakr M et al., complications occur in patients with a BMI greater than 30; in such patients, a dietary regimen before the operation is advisable (25).

Aesthetic satisfaction was higher for LFT, which is known as the most common reconstructive procedure in PSD treatment. The results show that aesthetic satisfaction is better than LFT for the GST method (307/407, 75.4%) ($p<0.05$). It can be concluded that the factors which increased aesthetic satisfaction are that GST has less gluteal facial dissection compared to LFT and that the incision is smaller and placed on the midline. Therefore, it could be argued that GST is more minimally invasive than LFT. In recent times, surgical procedures have become minimally invasive and this is an important point that should be taken into account.

CONCLUSION

The GST method provides lower time of hospitalization, better cosmetic results, fewer complications and lower labor loss time, similar to ESH and EPR, and has less recurrence and faster time of healing, similar to LFT (28). Thus, the GST method appears to be the optimal treatment with advantages and disadvantages. Regardless of the applied method, it was shown that presacral epilation and daily cleaning of the presacral region after wound healing in each patient reduces the recurrence rate (12).

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