A comparative study between stapled hemorrhoidopexy and laser hemorrhoidoplasty in the treatment of second-degree and third-degree hemorrhoids

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Background
Hemorrhoidal disease is the most common disease of the anorectal region. Its symptoms are variable, including bleeding, pain, discharge, and itching, which may be troublesome. Treatment options include conservative medical, conventional surgical, minimally invasive, stapled hemorrhoidopexy (SH), and recently, laser hemorrhoidoplasty (LH).
Aim
The aim of this study is to compare SH and LH in the management of second-degree and third-degree piles in terms of postoperative pain, bleeding, incontinence, stenosis, recurrence, and patient satisfaction.
Patients and methods
Thirty patients who underwent SH were prospectively compared to 30 patients who underwent LH between January 2019 and January 2020 and a 1-year follow-up at Ain Shams University Hospitals was performed. Efficacy and tolerability in terms of postoperative pain, bleeding, incontinence, stenosis, and recurrence were compared.
Results
Lower postoperative pain scores with the need for fewer analgesics were noted after LH, with shorter hospital stay, early return to daily activities, and lower incidence of incontinence, while lower postoperative bleeding incidences and recurrence rates were noted following SH. No incidence of postoperative anal stenosis was found with both the procedures, and the overall satisfaction was almost equal.
Conclusion
LH is a simple and safe technique with less postoperative pain, operative time, and hospital stay, but with a higher rate of recurrence, while SH is a more reliable technique with less postoperative bleeding and recurrence, and may be a suitable alternative to conventional hemorrhoidectomy.

Keywords:
anal incontinence, hemorrhoids, laser hemorrhoidoplasty, laser, recurrent hemorrhoids, stapled hemorrhoidopexy, stapler

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Introduction

Hemorrhoidal disease (HD) is the most common anorectal disease affecting millions of people around the world and representing a major medical and socioeconomic problem, severely affecting patients' quality of life [1,2].

Hemorrhoids or hemorrhoidal columns are submucosal cushions containing venules, arterioles, and smooth muscle fibers; with the internal anal sphincter, they are essential in the maintenance of anal continence by providing soft tissue support and keeping the anal canal closed tightly [2].

Nowadays, there are several therapeutic modalities for the treatment of HD, ranging from conservative measures with changes in eating habits, systemic and local medications that improve symptoms, non-excisional methods such as cryotherapy, sclerotherapy, laser photocoagulation, and rubber band ligation, to surgical excision techniques for advanced symptomatic patients with grade III or IV hemorrhoids and patients with persistent bleeding when conservative measures fail [3,4].

Bleeding and prolapse are the most common complaints, which usually require surgical

intervention. Although there are several surgical techniques for HD, debates about the best choice still remain. Indeed, despite modifications and progress in the HD surgical techniques, postoperative pain and discomfort, mucous discharge, daily activity limitation, and recurrence remain the major drawbacks [1].

However, the conventional hemorrhoidectomy (Milligan–Morgan) is associated with a low rate of recurrence, but postoperative pain and discomfort are still of major concern. Instead, the newly developed techniques lead to less postoperative pain and discomfort, but are associated with higher recurrence rates and newly developed postoperative symptoms such as urge incontinence and tenesmus [5,6].

The postoperative complications that a patient may experience after hemorrhoidectomy are variable: degrees of pain vary according to the technique used, urinary retention, bleeding, incontinence, wound infection, abscess formation, fistula formation, anal fissure, stenosis, and recurrence [7–9]. Therefore, many symptomatic patients often hesitate to receive treatment and are reluctant to undergo surgery.

Stapled hemorrhoidopexy (SH) is performed with a circular stapler device, which circumferentially disconnects the mucosa and submucosa above the dentate line. Many studies have reported less pain, short hospital stay, and early return to work in comparison with conventional hemorrhoidectomy [10], which accounts for the preference among patients toward SH [11].

Laser hemorrhoidoplasty (LH) is a newly developed minimally invasive and painless 1-day surgery technique for the treatment of symptomatic hemorrhoids, influencing the shrinkage of the hemorrhoidal piles. The commonly used laser energy in medicine includes diode, carbon dioxide, argon, and Nd : YAG. The laser beam causes tissue shrinkage and degeneration at different depths according to the laser power and the duration of application of laser light [2,12].

The aim of this study is to evaluate and compare both SH and LH in terms of postoperative pain, bleeding, incontinence, stenosis, recurrence, and patient satisfaction.

Patients and methods

This prospective randomized study was carried out on 60 adult patients who presented to the surgery outpatient clinics in Ain Shams University Hospitals from January 2019 to January 2020, with a 12-month follow-up period, with symptomatic HD (grades II, III). Patients were simply randomized according to the closed-envelope method and were treated by either SH (group A, n=30) or LH (group B, n=30). The results of both techniques were compared.

Inclusion criteria

Any adult patient who presented to the general surgery outpatient clinics with symptomatic hemorrhoid grades II and III (pain, bleeding, and discomfort defecation) and patients who agreed to continue follow-up for 1 year were included in this study.

Exclusion criteria

Any patient with fourth-degree hemorrhoids with mucosal prolapse (only eligible for conventional or SH), recurrent hemorrhoids after surgery, and patients with thrombosed hemorrhoids were excluded.

All patients underwent a full clinical assessment, laboratory investigations including complete blood picture to assess the degree of decrease in hemoglobin in cases of bleeding hemorrhoids and whether preoperative blood transfusion was needed, liver function tests, and assessment of prothrombin time. Anoscopic and digital rectal examinations were performed at the outpatient clinic to exclude local causes of hemorrhoids and determine the degree of hemorrhoids. For elderly patients who had a recent history of constipation, or any suspicious symptoms, colonoscopy was ordered. All patients were preoperatively and postoperatively evaluated. Ethical approval was obtained from the Ain Shams University ethical committee, and written consent was obtained from every patient after an explanation of all details of the operation, advantages, disadvantages, realistic expectations, and all the possible intraoperative, early, and late postoperative complications. Surgeries were performed by the same surgical team throughout the study. Patients were instructed to perform rectal enema at least 12 h preoperatively and have a light dinner.

Operative steps

Stapled hemorrhoidectomy

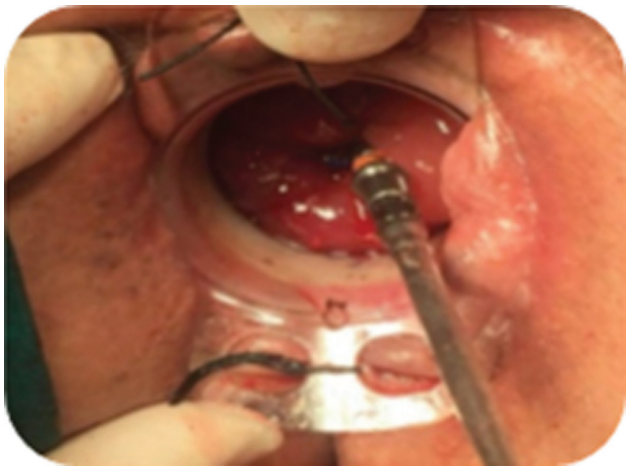
The patient was placed in the lithotomy position. A digital rectal examination was performed, followed by anal dilation and reduction of any protruding hemorrhoids or prolapsing mucosa. The external device (transparent anoscope) of the procedure for prolapsed hemorrhoids stapler (hemorrhoid and prolapse stapler with DST series technology,

Circular Stapler Set; EEA Auto-suture; Covidien, USA) was applied and fixed to the perineal skin. A transparent retractor (Fig. 1) was used to insert a 2/0 ploy prolene purse-string suture circumferentially (Fig. 2), with submucosal bites of the lower rectum, about 2 cm above the dentate line with maximum depth not more than 5 mm to avoid sphincteric injury. The anvil was then inserted beyond the purse-string suture, and the purse string was tied over the stem of the anvil firmly. The stapler was then applied and closed to accommodate the prolapsing hemorrhoidal tissue in the cup of the stapler by gradually tightening the screw. After confirmation that adequate tissue is accommodated (and that the vaginal wall in female patients is free by PV examination), the stapler was then fired (Fig. 3) and taken out slowly by doughnut extraction (Figs 4 and 5). Any skin tags were excised using diathermy and prolapsed mucosa was plicated.

Figure 1

Transparent retractor fixation to the skin.

Figure 2

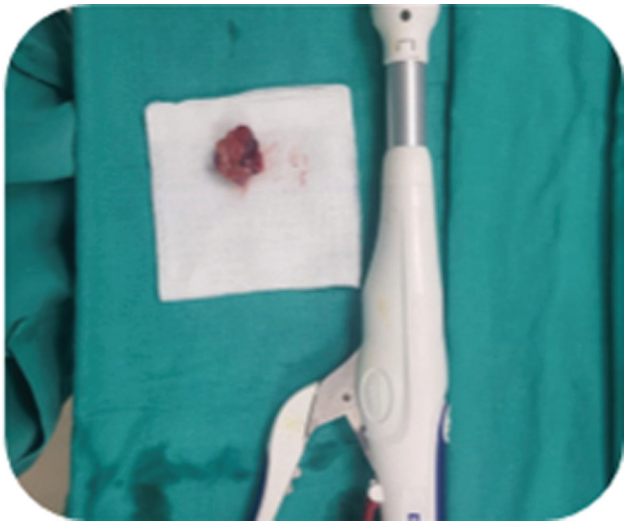


Purse string suture around the anvil.

Figure 3

Stapler firing.

Figure 4



Doughnut extraction.

Figure 5

Third-degree piles.

Hemostasis along the staple line was ensured and a small gauze was applied.

Laser hemorrhoidoplasty

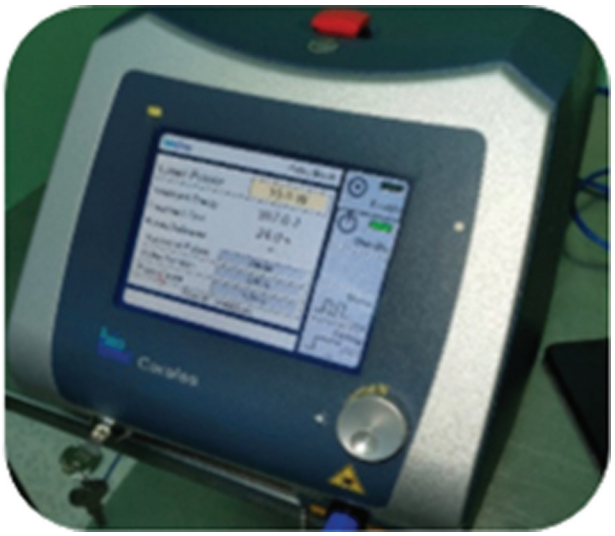
The laser intervention was performed using the Ceralas diode laser Biolitic system (Biolitec Biomedical Technology, Jena, Germany) (Fig. 6). This is a minimally invasive laser therapy of hemorrhoids and fistulas, with wavelengths of 980 and 1470 nm, power 10 W (980 nm)/4 W (1470 nm), fiber diameter more than or equal to 360 µm, and treatment modes of continuous wave and pulse mode (optional) with pulse duration/break 0.01?60 s/0.01? 60 s. The patient was placed in the lithotomy position. In most of the patients, a dedicated disposable proctoscope (23 mm in diameter) was inserted into the anal canal. The procedure was started via a small incision at the base of each hemorrhoid (Fig. 7) by the laser port into the hemorrhoidal plexus taking care not to injure or burn the mucosa or the internal sphincter. Laser shots were delivered through the optic fiber in a pulsed manner to reduce undesired degeneration of the periarterial normal tissue. The depth of shrinkage can be controlled by the power and duration of the laser beam. Through the optic fiber, laser shots (Fig. 8) were generated with a duration of 3 s. Each shot was followed by a pause of 0.5 s and caused shrinkage of tissues up to the depth of less than or equal to 5 mm. After completion of treatment of each hemorrhoid, an ice finger was introduced internally for 0.5–1 min to decrease the effect of heat. Any mucosal prolapse or skin tags were excised using the continuous wave mode. After good hemostasis, a piece of gel foam was applied.

An intravenous paracetamol injection was administered regularly every 8 h postoperatively, and NSAID (Diclofenac Na) was administered intramuscular on demand. An oral paracetamol 1000 mg tablet was prescribed every 8 h/1 week for all patients on discharge.

Follow up

Patients in both groups had regular follow-up visits after 1 week and then after 2 weeks, 1, 3, 6, and 12 months for clinical examination. Postoperative pain follow-up was performed using visual analog scale (VAS) (0–10), with 0 indicating no pain and 10 indicating worst pain, while postoperative bleeding risk was estimated by number of attacks of bleeding

Figure 6

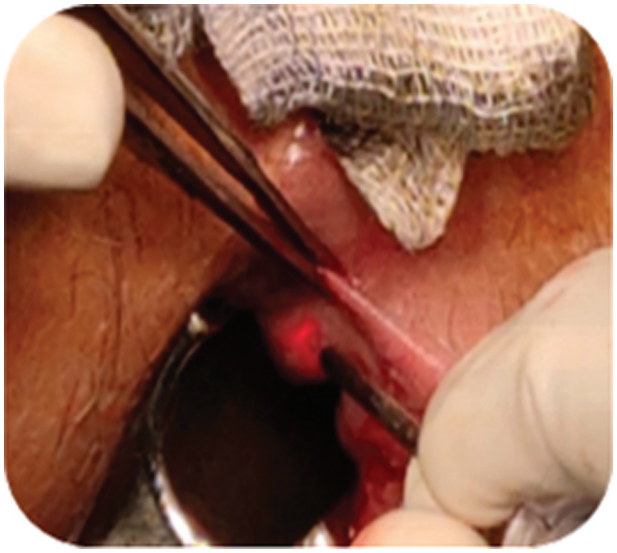


Ceralas diode laser Biolitic system.

Figure 7

Snip at the base of the hemorrhoid.

Figure 8



Laser shot delivery.

, amount and severity which may lead to hospital readmission i think it is clear. The postoperative possibility of incontinence was assessed using the Jorge–Wexner score (Table 1), which is the most widely used instrument in assessing the efficacy of surgical therapies for anal incontinence, although it is yet to be subjected to formal validation studies during specific treatments. This scoring system cross tabulates frequencies and different anal incontinence presentations (gas/liquid/solid/pad use/need for lifestyle alterations) and sums the returned score to a total of 0–20 (where 0 indicates perfect continence and 20 indicates complete incontinence). Each of the incontinence presentations is graded equally in this scoring system and no psychometric items are included, other than the nonspecific 'lifestyle alterations' item. Direct questions on postoperative anal stenosis were asked, in addition to postsurgical anal obstruction and degree of hardness of stool to differentiate severe constipation and the need to take laxatives as a continuous post-operative regimen. For rating the occurrence of recurrence, it was evaluated with recurrence of symptoms not only the recurrence of the same hemorrhoid as preoperative, because we considered failure of the procedure to achieve postoperative symptomatic satisfaction and the need of redo surgery is a recurrence.

Statistical analysis

Data were collected, tabulated, and exported to the Statistics Open for ALL (SOFA), version 1.5.3. The quantitative data were presented as median with standard deviation, while the qualitative variables were presented as number and percentages. The comparison of qualitative data was performed using the χ^2 test, while comparison of quantitative data was performed using an independent t test or a paired t test.

Results

The demographic data (age and sex), patients' symptoms, pain, bleeding, constipation, and pruritus were collected. Examination parameters and degree of hemorrhoids are reported in Table 2. There were no statistically significant differences between the two groups.

The study was carried out on 60 patients, 33 males and 27 females, age range 18–65 years, mean age 43.82 ±12.35 years. The mean operative time for SH was 37

Table 1 Jorge–Wexner incontinence scores [13]

Type of incontinence	Frequency Never	Rarely	Sometimes	Usually	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Wearing pad	0	1	2	3	4
Lifestyle alteration	0	1	2	3	4

Never=0; rarely=<1/month; sometimes=<1/week but >1/month; usually=<1/day but >1/week; always=>1/day.

Table 2 Preintervention parameters

	Group A stapler (*N*=30)	Group B laser (*N*=30)	*P* value
Age	18–65 43.82±12.35		
	20–65	18–62	0.796
	43.4±11.34	44.23±13.39	
Sex			
Male	19	14	0.194
Female	11	16	
Symptoms [*n* (%)]			
Pain	22 (73.3)	18 (60)	0.273
Bleeding	21 (70)	20 (66.6)	0.781
Constipation	24 (80)	22 (73.3)	0.542
Pruritus	10 (33.3)	9 (30)	0.592
Comorbidities [*n* (%)]			
On anticoagulants	6 (20)	5 (16.6)	0.739
Hypertension	12 (40)	10 (33.3)	0.781
Grade of hemorrhoids [*n* (%)]			
2nd	9 (30)	11 (36.6)	0.583
3rd	21 (21)	19 (63.3)	

±4.46 min, while the mean operative time for LH was 25.1±2.96 min, *P* value less than 0.001. Most of the patients in group A were discharged after 24 h and some patients were discharged after 48 h due to the need for intravenous analgesics, with a mean hospital stay of 30.3±8.43 h, while in group B, most of the patients were discharged on the same day as the procedure, but some patients were discharged after 24 h due to the fear of risk of bleeding, with a mean hospital stay of 14.53±5.6 h, *P* value less than 0.001. No major intraoperative complications occurred. The estimated amount of blood loss intraoperatively was 30.83±8.2 ml. in group A, while in group B, it was 39 ±8.84 ml, *P* value less than 0.001. Twenty-eight patients in group A received spinal anesthesia, while two patients were operated on under general anesthesia due to patients' refusal of spinal anesthesia; however, in group B, 27 patients were operated on under spinal anesthesia and only three patients were operated on under local anesthesia with combined sedation due to their medical comorbidities, which excluded other choices (Table 3).

Follow-up

Patients returned to normal daily activities after 8–14 days in group A, mean 10.6±1.56, while in group B, patients returned to normal daily activities after 4–8 days, mean 6±1.08, with *P* value less than 0.001 (Table 4 and Fig. 9).

Pain follow-up was performed before discharge, and 1 and 2 weeks after the procedure using VAS at OPC. The mean score for pain before discharge was 8.13±1.25 in group A and 4.16±0.75 in group B, with *P* value less than 0.001. In group A, seven patients experienced severe pain that required additional doses of NSAID and 23 patients had moderate pain that responded to the planned analgesic regimen. In group B, 14 patients had moderate pain and 16 patients had moderate to mild pain, all responding to the analgesic regimen. Also, after 1 and 2 weeks, the pain scores were 4.17±0.73 and 1±0.38 for group A and 1.7±0.65 and 0.38±0.49 for group B, with *P* value less than 0.001.

Complete resolution of postoperative symptoms occurred over 14–21 days in group A and after 10–14 days in group B.

Estimated risk of bleeding at home was assessed and it was found that two patients in group A had intermittent attacks of minor bleeding that stopped spontaneously 7–10 days postoperatively with no need for hospital readmission, while in group B, five patients had intermittent attacks of minor bleeding that

Table 3 Operative parameters

	Group A stapler (*N*=30)	Group B laser (*N*=30)	*P* value
Anesthesia	2 general	27 spinal	
	28 spinal	3 local with sedation	
Operative time (min)	30–45	20–30	<0.001*
	37±4.46	25.1±2.96	
Blood loss (ml)	20–40	20–50	<0.001*
Hospital stays (h)	24–48	10–24	<0.001*
	30.3±8.43	14.53±5.6	

*Statistically significant difference.

Table 4 Postoperative parameters

Postoperative	Group A stapler, (*N*=30)	Group B laser (*N*=30)	*P* value
Pain (VAS)			
12 h	8.13±1.25	4.16±0.75	<0.001*
1 week	4.17±0.73	1.7±0.65	<0.001*
2 weeks	1±0.38	0.38±0.49	<0.001*
Bleeding [*n* (%)]	2 (6.6)	7 (23.3)	0.023*
Urine retention	4 (13.3)	1 (3.3)	0.161
Readmission	0	2 (6.6)	0.150
Incontinence	3 (10%) 0.2±0.61	0	0.077
Recurrence of symptoms after 1 year	1 (3.3)	7 (23.3)	0.044*
Return to daily activities	8–14	4–8	<0.001*
	10.6±1.56	6±1.08	
Overall satisfaction	25 (83.3)	28 (93.3)	0.227

VAS, visual analog scale. *Statistically significant difference.

Figure 9

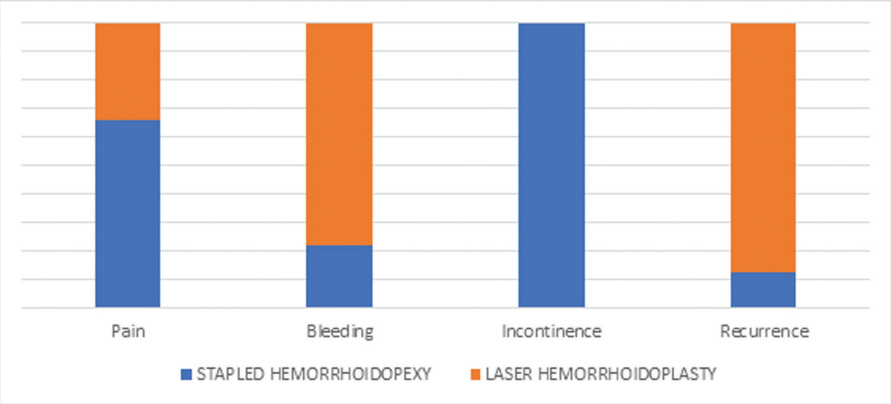


Diagram of postoperative complications between both groups.

stopped spontaneously 3–9 days postoperatively with no need for hospital readmission; however, in two patients, the bleeding was recurrent multiple times and severe, with blood clots, and hospital readmission was needed for evaluation of their condition. Both patients showed a decrease in hemoglobin of 2–3 g/dl and no blood transfusion was needed. Re-examination was performed under general anesthesia and revealed sloughing of mucosa at the site of previously treated hemorrhoids. Good hemostasis was achieved, and they were discharged after reassurance, *P* value of 0.023.

Four patients had postoperative urinary retention in group A, mostly due to spinal anesthesia with severe postoperative pain; two of these patients responded to an intramuscular analgesic dose and two received urinary catheterization for at least 48 h that was removed before discharge. However, only one patient in group B had postoperative urinary retention. He was an elderly patient with senile enlargement of the prostate and a urinary catheter was introduced and removed after one month by urological consultation, *P* value of 0.161.

We had three patients with anal incontinence in group A, who were incontinent to flatus (two sometimes), while in group B, none of the patients had incontinence. All three patients improved 6–8 weeks postoperatively, *P* value of 0.077.

After 1 year, one patient had recurrence of symptoms in group A, with second-degree and third-degree hemorrhoids, while in group B, seven patients had recurrent symptoms (two patients with second-degree hemorrhoids, four patients with third-degree hemorrhoids, and one patient with fourth-degree hemorrhoids with mucosal prolapse), *P* value of 0.044. All eight patients had continuous constipation, straining with defecation, and continued the regimen of postoperative laxative intake. Conventional surgery was performed for all of them after negative results of colonoscopy.

We did not encounter any patient with postoperative anal stenosis in both groups after the full follow-up period.

At the end of the study, 25 (83.3%) patients in group A were satisfied with their procedure, while in group B, 28 (93.3%) patients were satisfied, with a *P* value of 0.227.

Discussion

In our study, we preferred to compare SH and LH, as most of the previous studies compared any new technique in the management of hemorrhoids with the conventional method of hemorrhoidectomy. The novelty in the management of hemorrhoidectomy is that the patient is offered an effective procedure with fewer postoperative complications and recurrence. Because of the perception of postoperative pain after conventional hemorrhoidectomy most patients hesitate to undergo surgery. With the development of new techniques, the role of traditional hemorrhoidectomy has been limited to specific conditions, and most patients prefer this because of the possibility of less postoperative pain and fewer complications; patients prefer new methods because less pain but surgeons prefer traditional methods because of less recurrence.

In the evaluation of postoperative pain in our study, we observed a highly significant difference between both groups; patients who underwent SH experienced

considerable pain than patients who underwent LH, with *P* value less than 0.001.

Sutherland *et al.* [14] carried out a meta-analysis study on SH and included several randomized-controlled trials. Postoperative pain scores collected at different stages after recovery show postoperative pain scores at 1 week after surgery in SH, which were much lower than the scores after conventional hemorrhoidectomy: 0.6–1/2–5, respectively.

Ram *et al.* [13] carried out a study on 58 patients with second-degree and third-degree hemorrhoids who underwent LH. Postoperative pain was noted to be VAS 0 in 80.6% of the patients at the first defecation, VAS 0 in 82.3% of the patients at 1 week, and VAS 0 in 95.2% of the patients at 1 month. Both previous studies are in agreement with our results of less postoperative pain associated with LH when compared with SH.

Postoperative bleeding was observed more after LH in comparison with SH in our study. In our study, seven (23.3%) patients experienced postoperative bleeding, two of them required hospital readmission, and only two (6.6%) patients experienced postoperative bleeding after SH, with no need for readmission, *P* value of 0.023.

Sturiale *et al.* [15] reported that bleeding occurred in seven patients after SH (4.1%) in a study carried out on 171 patients and only three required surgical treatment, while Goldstein *et al.* [16] reported that bleeding occurred in 21.7% of their patients.

Brusciano *et al.* [17] carried out a study on 50 patients who underwent LH. No cases of spontaneous bleeding after surgery occurred, while 32 (60%) patients experienced postdefecatory bleeding only on the first day after surgery and 15 (30%) patients on postoperative day 3, but in all cases, the bleeding episodes stopped from the seventh postoperative day.

Other studies highlighted that no patients required surgical hemostasis after LH, suggesting the hemostatic and coagulative effectiveness of the laser technique [18,19].

On comparing our results with the previous studies, we found that there is an increased incidence of postoperative bleeding after LH in comparison with SH, and due to the coagulative power of the laser technique, there was no need for postoperative blood transfusion in our patients.

In our study, three (10%) patients developed postoperative anal incontinence after SH; they showed incontinence for flatus. Their symptoms improved within 6–8 weeks postoperatively. No such cases were detected in group B. The occurrence of incontinence may be attributed to excessive anal dilatation, as all of the patients recovered early within 6–8 weeks, excluding sphincteric injury.

Johannsson *et al.* [20] reported that incontinence after hemorrhoidectomy is typically related to anal sphincteric injury, but it can also occur with intact sphincters, as the hemorrhoidal cushions provide 15% of the patient's resting anal tone, and their removal may affect anal continence. Scarring after hemorrhoidectomy may additionally cause decreased sensitivity and reduced capacity for anorectal discrimination.

Bellio *et al.* [21] studied 77 patients operated on by SH for grade III hemorrhoids at a median follow-up of 119 months. They found that 44% had defecation urgency and 8% had gas leakage without any solid or liquid incontinence.

A study was carried out by Johannes *et al.* [22] after 4 years of follow-up of 546 patients for long-term evaluation after SH. The rate of early fecal urge incontinence was 3.3%, which mostly disappeared within 3–6 months after the procedure.

Sultan *et al.* [23], after 6 years of study in a referral center, found that early fecal urgency is a frequent postoperative complication of SH, with a reported incidence of 3–31%. It always disappears within the first few weeks after surgery, but in a minority, it may persist. The results of both the previous studies are in agreement with our results.

Altomare *et al.* [24] investigated internal anal sphincter function, morphology, and anal canal sensitivity prospectively in 20 patients who underwent SH. They reported that SH does not affect the function and morphology of both in the long term. The sensitivity of the anal canal can improve in patients with preoperative sensory impairment.

In our study, the operative time for LH was less than that for SH and patients returned to daily activities after 8–14 days in the SH group, with mean 10.6±1.56 days, while in the LH group, patients returned to daily activities after 4–8 days, with mean 6±1.08 days, with a significant difference. Also, we found no cases with anal stenosis in both groups. four (13.3%) patients had

urinary retention after SH, but only one (3.3%) patient had urinary retention after LH, with no significant difference.

In a study carried out at the university of Sao Paolo, Brazil, it was reported that LH had the advantages of being hemostatic and bactericidal, leading to rapid healing, and did not affect nearby structures, with fewer postoperative complications and less hemorrhage and stenosis [25,26].

Also, Ram *et al.* [13] carried out LH on 58 patients with second-degree and third-degree hemorrhoids. The mean duration of the operation was 20.8 min, postoperative abscess formation was 5%, and urine retention was 20.1%. Long-term complications were fissure (2.6%), anal stenosis (1%), incontinence (0.4%), and fistula (0.5%).

Giamundo *et al.* [27], after comparing LH with rubber band ligation in a comparative study, reported that LH was suitable for the treatment of second- and third-degree hemorrhoids.

Tjandra and Chan [28], in their systemic review on SH, reported that the incidence rates of anal stenosis and persistent anal pain were, respectively, 1.7 and 2.3%, and their results are similar to the mean values reported in other studies, with the exception of Khubchandani *et al.* [29], who reported that the incidences of anal strictures and stenosis ranged from 0 to 15.6% after SH [30].

The most important factor is the recurrence of hemorrhoids and the relapse of symptoms. After 1 year of follow-up, there was one (3.3%) case of recurrence after SH and seven (23.3%) cases of recurrence after LH, with a significant difference. We defined recurrence as any symptom that resolved after the surgical intervention, but that recurred during follow-up and caused discomfort. The overall satisfaction in both groups was almost equal: 25 (83.3%) patients were satisfied after SH, while 28 (93.3%) patients were satisfied after LH, with a nonsignificant difference.

The incidence rate of recurrence reported in the literature after SH is about 8.5% [10]. White *et al.* [31], in a study carried out on 169 patients, found a recurrence rate of hemorrhoidal bleeding prolapse during an 11-month follow-up period of 11.2%. In another series, it ranged from 0.3 to 27% [32].

Recurrence was observed in the study of Crea *et al.* [1], After a 2-year regular use of the laser procedure in 97 patients with symptomatic second-degree to third-degree hemorrhoids, minimal or moderate internal mucosal prolapse occurred in four (5.5%) patients, all within the first 5 postoperative months. In a recent study involving 50 patients with second-degree and third-degree HD, Brusciano *et al.* [33], after a mean follow-up of 5.4 years, reported recurrences in 39 and 33% of the patients with second-degree and third-degree HD, respectively [34].

Conclusion

LH is a simple and safe technique with less postoperative pain, operative time, and hospital stay, but with higher rates of recurrence, while SH is a more reliable technique with less postoperative bleeding and recurrence, and may be a suitable alternative to conventional hemorrhoidectomy. Due to the advantage that LH can be performed under local anesthesia, it is a good choice for symptomatic patients with bleeding hemorrhoids with associated major comorbidities in whom general surgery is a burden.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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