Excision hemorrhoidectomy versus laser hemorrhoidoplasty in second and third degree hemorrhoids: a prospective cohort study

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Received: 22 November 2023
Revised: 28 November 2023
Accepted: 3 December 2023
Published: 31 January 2024

The Egyptian Journal of Surgery 2024, 43:157–162

Background
Hemorrhoids are considered the commonest benign anorectal diseases globally, being the most annoying anorectal problem. They commonly present with discomfort, prolapse, and bleeding.
Aim
The aim of this study is to compare between surgical excision of hemorrhoids and laser hemorrhoidoplasty (LHP) in the treatment of second and third-degree hemorrhoids.
Patients and methods
The study was conducted on 80 patients. The patients were divided into two equal groups. First group underwent surgical excision of hemorrhoids while the second group underwent LHP. We compared the outcomes of surgical excision of hemorrhoids with LHP in the of duration of surgery, intraoperative bleeding, postoperative pain, postoperative hospital stay, and the time needed for work return and short and long-term postoperative complications.
Results
LHP had a significantly lower time of surgery, intraoperative blood loss and pain postoperative with no effect on defecation. There were no significant difference in the complications postoperative.
Conclusion
LHP is a safe and effective modality in treatment of second and third degree hemorrhoids and being more superior than traditional surgical excision of hemorrhoids.

Keywords:
excisional hemorrhoidectomy, laser hemorrhoidoplasty, second and third degree hemorrhoids

Egyptian J Surgery 43:157–162

1110-1121

Introduction

The oldest and most prevalent anal disease in the world, hemorrhoidal disease is considered from the most prevalent surgical outpatient presentations [1].

The aberrant prolapse of the cushions of anal canal, projecting from the mucosa of the anal canal created by smooth muscle, loose connective tissue, and venous and arteries, is referred to as hemorrhoids [2].

The most typical sign of hemorrhoids is bright red, painless bleeding into the peranal space, often accompanied by anal tissue protrusion. For the diagnosis of hemorrhoids, it is mainly a clinical diagnosis requiring physical examination, using digital rectal examination and proctoscopy, together with an accurate history are necessary and sufficient [3].

Hemorrhoids are commonly categorized based on where they originate: internal hemorrhoids, lined by the mucosa of anal canal and located above the pectinate line; external hemorrhoids, lined by anoderm and located under the pectinate line; and mixed type [4].

Hemorrhoidal plexus hyperperfusion, vascular hyperplasia, and the degenerative alteration of the connective tissue inside the cushions of anal canal are the established pathophysiologies of hemorrhoids. Medical intervention, along with dietary and lifestyle modifications, can readily and effectively manage low-grade hemorrhoids. When hemorrhoids are bothersome, high-grade, and/or complex, surgery is typically recommended [5].

Although the most common surgical procedure is hemorrhoidectomy, alternative methods such as ligasure hemorrhoidectomy, Doppler guided

hemorrhoidal artery ligation, stapled hemorrhoidopexy and laser hemorrhoidoplasty (LHP) have also been used recently. The most difficult issues in the management of hemorrhoids continue to be postsurgical discomfort and recurrence [6].

Aim

we aimed to compare between surgical excision of hemorrhoids and laser hemorrhoidoplasty in treatment of second and third-degree hemorrhoids.

Methodology

This is an observational prospective cohort study comparing between the conventional excisional hemorrhoidectomy (EH), and LHP as a surgical modality in the treatment of hemorrhoids of second and third degree. We conducted our study at Ain Shams University Surgery Hospital and Al-Azhar Surgery University Hospital, starting from the beginning of June 2021 till the end of January 2023. All the operations were done by the same surgical team. Eighty patients with symptomatic second and third degree piles were included. Patients have been divided into two equal groups, 40 patients in each group, group A: underwent EH, group B: underwent LHP.

Inclusion criteria

Patients with second and third degree piles who were able to retain the provided information and consent and not listed in the below mentioned exclusion criteria.

Exclusion criteria

(1) Patients with previous anal surgery or recurrent hemorrhoids.
(2) Patients with compromised anal sphincter function.
(3) Patients presented by anal incontinence.
(4) Patients presented by inflammatory bowel disease (IBD).
(5) Age group less than 18 and greater than 60 years old.
(6) Patients with history of previous anal malignancies.
(7) Patients with complicated hemorrhoids as thrombosed, infected hemorrhoids.
(8) Patients not fit for surgery (ASA IV – ASA V).
(9) Patients with portal hypertension or bleeding tendency.

Ethical considerations

We took the Approval from the Ethical Committee and patients signed written informed consent after explanation of the procedure carefully to the patients and the possible complications that may occur. The Confidentiality of the patients' personal data was secured.

Study tools

All the patients enrolled in our study underwent:

Full clinical examination

Personal history involving, surgical and family history, careful analysis of complaint like constipation, bloody stools, general and full abdominal examination, digital per rectal examination was done to our patients.

Investigations

Routine preoperative investigations and colonoscopy for bleeding hemorrhoids to all patients.

Intervention

Patients were candidate for hemorrhoidectomy and laser hemorrhoidoplasty according to our study groups.

Study operation

Under spinal or general anesthesia The patients were in the lithotomy position and reexamined to confirm the diagnosis and determine the grade of hemorrhoids, also other anal diseases as fistula, fissure or any anal or rectal masses were ruled out followed by performing the surgery by the same surgical team.

Group A

Excisional hemorrhoidectomy (EH)

Using cutting cautery device, we mad V shaped skin incision around the base of hemorrhoid. Followed by dissection of the hemorrhoid from its bed in the submucousal region by cautery. Then, we ligated the pedicle with absorbable suture, and the distal portion of hemorrhoid was cut out. The other hemorrhoids were treated in the same way, with a skin bridge left in place to prevent anal stenosis. Gelfoam sponge and cautery equipment were used to achieve hemostasis. The incision was left open, and the surgical site was covered with an external pack of gauze.

Group B

Laser hemorrhoidoplasty (LHP)

We used Ceralas laser diode from Biolitic system. We inserted C shaped anoscope in to the anal canal, a small incision was done by the laser probe in the skin 1 cm from anal verge, then we delivered the probe into the hemorrhoid base, we generated 5–6 pulses (laser shots in pulsed manner) the duration of each was 3 s and was followed by 0.5 s pause which caused the tissues to shrink up to 5 mm in depth followed by introduction of

ice into the anal canal to decrease the effect from the heat of laser beam. The depth can be controlled by the time and power of the laser.

Follow-up

We followed-up the patients through the visits to the clinic or using phone calls at 1, 2, 4, and 8 weeks and 6 months from operation.

Short term outcomes

(1) Intraoperative: duration of surgery and intraoperative surgical bleeding.
(2) During staying in hospital: pain post operative, postoperative bleeding, urinary retention, postoperative anal discharge.
(3) The time which was needed by the patients to return to the ordinary life activities.

Long-term outcomes (after 6 months postoperatively): stenosis, recurrence, incontinence, and perianal fistula.

Statistical analysis

We collected the data, revised them followed by data coding then data entry to the we Statistical Package for Social Science 23 by IBM. We presented the parametric quantitative data in our study as mean, standard deviations and ranges while presented the nonparametric as median, inter-quartile range (IQR). We Presented the qualitative data in forms of numbers and percentages. We compared between the two groups regarding parametric quantitative data Independent *t*-test with nonparametric distribution using Mann–Whitney test while we used the χ^2 test for the comparison between the two groups in terms of qualitative parameters. We considered the *P* value to be significant at level less than 0.05 and highly significant at level less than 0.01.

Results

(1) The mean age group was 35.54 years, 52 (65%) patients (65%) were males, and 28 patients (35%) were females.
(2) In EH group 48.7% of the patients were females versus 51.3% for males. In LHP group 43.2% of the patients were females versus 56.8% for males.
(3) In EH group the surgery duration mean was found to be 44.55 min with range from 30 to 60 min. While the surgery duration mean in LHP group was 33 min with a range from 20 to 50 min. There was a statistically significant lower time in LHP group.
(4) The mean volume of intra operative blood loss in EH group was 61.6 cc with range from 40 to 75 cc. The mean volume of intraoperative blood loss in LHP group was 34.33 cc with range from 20 to 50 cc. there was a statistically significant lower intraoperative bleeding in LHP group.
(5) We evaluated the pain postoperative, we used the visual analog scale (VAS 0–10), as following 0–1= no pain was felt, 1.1–3= pain of low intensity, 3.1–7= medium intensitypain, 7.1–9= high intensity pain, and 9.1–10= unbearable pain.

We performed the VAS protocol at day 0 and 1, 4, and 8 weeks after surgery. According to the VAS), on day zero postoperative the median pain score in EH group was 7 compared with 6 in the LHP group, then the median pain score after the first, fourth, and eigth week postoperative in EH group was 5, 4, and 2, respectively compared with 3, 2, and zero, respectively in LHP group. We found statically significant lower pain score in LHP group (Table 1).

4 (10%) cases had postoperative bleeding in EH group and they were treated conservatively. Only 1 (2.5%) case had postoperative bleeding in LHP group and was treated conservatively.12 (30%) cases developed postoperative urine retention in EH group while 5 (12.5%) cases developed urine retention in LHP group, there were no statistically significant difference.

There was significant difference in incidence of postoperative discharge being more in LHP group, 27 (67.5%) cases compared with 15 (37.5%) cases in EH group.

LHP group had significant shorter duration of hospital stay postoperatively with median score of 1 day compared with EH group with median score of 2 days.

The time needed to return to ordinary life activities was statistically significant lower in LHP group (median 9.5 days) compared with EH group (median 18.5 days) (Table 2).

4 (10%) cases had some sort of bleeding after defecation in EH group. No cases reported with bleeding in LHP group.

3 (7.5%) cases developed anal stenosis in EH group. No cases reported with stenosis in LHP group.

In EH group 11 (27.5%) cases had recurrent/residual hemorrhoids (internal and external components) that

Table 1 Relation between excisional hemorrhoidectomy and laser hemorrhoidoplasty regarding post-operative pain

Postoperative pain (VAS score)	Excisional hemorrhoidectomy (EH) No.=40	Laser hemorrhoidoplasty (LHP) No.=40	Test value	*P*-value	Significance
Day zero					
Median (IQR)	7 (6–8)	6 (5–6)	–3.608≠	0.001	HS
Mean±SD	6.93±1.68	5.63±1.54			
Range	4–10	2–9			
1st Week					
Median (IQR)	5 (4–6)	3 (3–4)	–7.152≠	<0.001	HS
Mean±SD	5.33±1.27	3.43±1.10			
Range	3–7	1–6			
4th Week					
Median (IQR)	4 (3–4)	2 (1–2)	–9.787≠	<0.001	HS
Mean±SD	3.67±0.88	1.70±0.92			
Range	2–5	0–3			
8th week					
Median (IQR)	2 (2–3)	0 (0–1)	–11.118≠	<0.001	HS
Mean±SD	2.43±0.82	0.50±0.73			
Range	1–4	0–3			

Table 2 Relation between excisional hemorrhoidectomy and laser hemorrhoidoplasty regarding early postoperative

Early postoperative	Excisional hemorrhoidectomy (EH) No.=40	Laser hemorrhoidoplasty (LHP) No.=40	Test value	*P*-value	Sig.
Postoperative bleeding					
No	36 (90.0%)	39 (97.2%)	1.920*	0.165	NS
Yes	4 (10.0%)	1 (2.5%)			
Urinary retention					
No	28 (70.0%)	35 (87.5%)	3.660*	0.055	NS
Yes	12 (30.0%)	5 (12.5%)			
Postoperative discharge					
No	25 (62.5%)	13 (32.5%)	7.218*	0.007	HS
Yes	15 (37.5%)	27 (67.5%)			
Hospital stay duration (days)					
Median (IQR)	2 (1–2)	1 (1–1)	–3.535≠	0.004	HS
Range	1–4	1–3			
Return to normal daily activities (days)					
Median (IQR)	18.5 (15–21)	9.5 (7–12)	–7.570≠	0.000	HS
Range	10–28	5–20			

needed second stage hemorrhoidectomy. 5 (12.5%) cases in LHP group had recurrent/residual hemorrhoids with no significant difference between either group regarding recurrence rate.

Only 1 case had mild incontinence in EH group and it was incontinence to flatus once per week grade 2 on Wexner fecal incontinence score, while no cases had incontinence in LHP group.

No cases of perianal fistula occurred in LHP group. In EH group 3 (7.5%) patients had low inter sphincteric perianal fistula on top of perianal abscess and were treated by lay open of the fistulous tract after abscess drainage (Table 3).

Discussion

Procedural intervention is recommended when medicinal therapy fails to alleviate symptoms of hemorrhoids illness. The traditional surgical approach is removing the hemorrhoidal tissue's internal and exterior components using a variety of procedures, either with or without the anoderm or anorectal mucosa being closed [7,8].

The most effective surgical procedure for hemorrhoids is still surgical hemorrhoidectomy, however, there is a 15% chance of postoperative pain and complications. Moreover, lingering symptoms are typical [9].

In order to affect the blood supply to hemorrhoids, avoid prolapse, and decrees the post operative pain,

Table 3 Relation between excisional hemorrhoidectomy and laser hemorrhoidoplasty regarding long-term outcomes

Long term outcomes	Excisional hemorrhoidectomy (EH) No.=40	Laser hemorrhoidoplasty (LHP) No.=40	Test value	*P*-value	Sign.
Bleeding					
No	36 (90.0%)	40 (100.0%)	4.211*	0.040	S
Yes	4 (10.0%)	0			
Stenosis					
No	37 (92.5%)	40 (100.0%)	3.117*	0.077	NS
Yes	3 (7.5%)	0			
Recurrence					
No	29 (72.5%)	35 (87.5%)	12.754*	0.000	HS
Yes	11 (27.5%)	5 (12.5%)			
Incontinence					
No	39 (97.5%)	40 (100.0%)	1.013*	0.314	NS
Yes	1 (2.5%)	0			
Perianal Fistula					
No	37 (92.5%)	40 (100.0%)	3.117*	0.077	NS
Yes	3 (7.5%)	0			

newer, less invasive procedures have been developed [10]. One such approach is stapled hemorrhoidopexy.

There have been reports of complications from this treatment, which include bleeding, complicated fistulas, rectal perforation, prolonged pain, and faecal incontinence. Additionally, there is a greater recurrence rate when compared with hemorrhoidectomy [11].

A novel minimally invasive method alternative for treating advanced hemorrhoids is LHP [12].

When endoluminal laser coagulation has been performed in hemorrhoidal vessels and there is sufficient anesthesia, LHP is utilized to precisely treat advanced hemorrhoids. Anoderm and mucosa (the surrounding healthy tissue) were unaffected since the laser beam's energy was only applied to the hemorrhoidal plexus [13].

This procedure eliminates the need for foreign materials (surgical sutures and buckles), which lowers the danger of anal canal narrowing following surgery and significantly reduces postoperative pain [14].

Because there are no incisions, exposed wounds, or sutures, healing and recovery are so good and quick that they hardly even register [15].

According to Halit and colleagues, the average level of postoperative discomfort on day 1 following a hemorrhoidectomy using the LHP was 2.2 (SD±0.3) VAS in a research including 200 patients. In contrast, the average pain level following hemorrhoidal intervention with the EH technique was 4.5 (SD ±0.8) [16]. The average VAS score four weeks after surgery in the LHP group was 0.2 (SD±0.1) and 0.8 (±0.2 SD) in the EH group, after 8 weeks, the same values were found.

According to our study, LHP group had lower pain postoperatively when compared with EH group (*P*-value <0.001).

According to Eskandaros and Darwish, they found highly statistically significant difference between LHP and EH which was in favor of the LHP group in terms of in the surgery duration, hospital stay length, and time needed to return to ordinary life activities (*P*-value <0.001) [17]. This study included 80 patients and had results similar to ours.

According to Hassan and El-Shemy in a research involving 40 patients, there were two cases of anal stenosis and one case of recurrent/residual hemorrhoids after surgery in the open surgical hemorrhoidectomy group, no similar cases were found in the LHP group [18].

In contrast to our research, 11 (27.5%) cases in the EH group required a second stage hemorrhoidectomy due to recurrence or residual hemorrhoids (internal and exterior components). 3 (7.5%) cases in the EH group developed anal stenosis, while 5 (12.5%) cases in the LHP group experienced recurrence or persistent hemorrhoids. In the LHP group, no stenosis cases have been reported.

Maloku and colleagues found that the pain in the early postoperative time was significantly lower in the group which underwen when compared with the EH group in a study involving 40 patients [19].

The VAS procedure was used in our study on the first day following surgery as well as weeks 1, 4, and 8. On day zero postoperative, the EH group's median pain score was 7, while the LHP group's was 6. Based on the VAS, the EH group's median pain score after the first, fourth, and eighth weeks postoperative was 5, 4, and 2, respectively, while the LHP group's was 3, 2, and zero.

When comparing the cases of LHP and EH, the pain score was lower with statistical significance in LHP group. Only 1 case (grade 2 on the Wexner fecal incontinence score) in the EH group experienced mild incontinence, which was incontinence to flatus once/week. The LHP group did not have any incidences of incontinence. In the EH group, there were 3 (7.5%) cases of perianal fistula. Following the drainage of the abscess the fistula we treated the patients by lay open of the fistulous tract, and no cases of perianal fistula developed in LHP group. The incidence of postoperative discharge varied significantly, 27 cases in the LHP group, compared with 15 cases in the EH group.

Conclusion

Laser hemorrhoidoplasty is a safe and effective modality in treatment of second and third degree hemorrhoids and being more superior than traditional surgical excision of hemorrhoids.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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