

# Laser Hemorrhoidoplasty Procedure versus Conventional Open Surgical Hemorrhoidectomy

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## ABSTRACT

**Background:** Hemorrhoids affect millions of people around the world, and represent a major medical and socioeconomic problem. There are many treatments of hemorrhoids varying from medications and band ligation to stapled hemorrhoidopexy, laser photocoagulation, sclerotherapy, Doppler-guided artery ligation, and finally surgery. The current study aimed to compare between laser hemorrhoidoplasty and conventional open surgical hemorrhoidectomy in treatment of the hemorrhoidal diseases. **Patients and methods:** This comparative study conducted on 30 patients with symptomatic hemorrhoidal diseases; divided equally into open method (MMH) group and laser method (LHP) group. Postoperative infection was evaluated at 1, 2, 4, 6 weeks and after 6 months. Fecal incontinence were assessed using wexner score. **Results:** Only one case found with mild infection in LHP group in 1st week and 2 cases found with Mild infection in MMH group in 1st week and one case in 2nd week managed by ciprofloxacin 500 tab two times per day for one week the no significant difference was found between groups regarding infection. After 6 months of post-operative follow up we found one case in the open group with a total score of 2(mild incontinence) after postoperative fecal incontinence assessment by Wexner score, with no significant difference. Postoperative urine retention occurred in one case in the MMH group and managed with foley catheter, with no significant difference. The mean time for wound healing/days  $21.63 \pm 2.36$  in MMH group and  $5.36 \pm 1.85$  in LHP group and the mean time to return to normal activity / days in MMH was  $24.85 \pm 3.58$  days and in LHP was  $7.41 \pm 2.11$  days. No patients developed anal stenosis or recurrence in both groups. **Conclusion:** Laser hemorrhoidoplasty technique is a modality of minimally invasive technique for treatment of patients with hemorrhoids, which considered better method for hemorrhoids management with less complications (pain, infection, urine retention and fecal incontinence) than open surgical hemorrhoidectomy.

**Keywords:** Surgical hemorrhoidectomy; Wexner score; Laser hemorrhoidoplasty, fecal incontinence

## INTRODUCTION

The concepts of hemorrhoid formation could be categorized into four groups: sliding anal cushions (loss of fixation network), vascular abnormality, rectal redundancy, and an increased pressure on anorectal vascular plexus (1).

The anal cushions of patients with hemorrhoids show significant pathological changes. These changes include abnormal venous dilatation, vascular thrombosis, degenerative process in the collagen fibers and fibroelastic tissues, distortion and rupture of the anal subepithelial muscle. In addition to the above findings, a severe inflammatory reaction involving the vascular wall and surrounding connective tissue has been demonstrated in hemorrhoidal specimens, with associated mucosal ulceration, ischemia and thrombosis (2).

Hemodynamic study of the anorectal vascular plexus using transperineal color Doppler ultrasound with spectral wave analysis showed significant higher peak velocities and acceleration velocities of afferent vessels in patients with hemorrhoids compared to normal controls. The arterial blood flow was also significantly higher in patients with hemorrhoids. The terminal branches of the superior rectal artery supplying the anal cushion in patients with hemorrhoids had a significantly larger diameter than those of healthy volunteers. Interestingly, an increase in arterial caliber and flow was well correlated with the grades of hemorrhoids (3).

For internal hemorrhoids, rubber band ligation, sclerotherapy, and infrared coagulation are the most common procedures but there is no consensus on optimal treatment. Overall, the goals of each procedure are to decrease vascularity, reduce redundant tissue, and increase hemorrhoidal rectal wall fixation to minimize prolapse (4).

Continued symptoms despite conservative or minimally invasive measures usually require surgical intervention. In addition, surgery is the initial treatment of choice in patients with symptomatic grade IV hemorrhoids or those who have strangulated internal hemorrhoids. It may also be required for symptomatic grade III hemorrhoids and in patients who present with thrombosed hemorrhoids (5).

Laserhemorrhoidoplasty technique is used in the Treatment of Second to Fourth Degree Hemorrhoidal Disease. The energy applied should be reduced to a minimum. Complication rates are largely comparable with those of other minimally invasive conventional methods (6).

The current study aimed to compare between laser hemorrhoidoplasty and conventional open surgical hemorrhoidectomy in treatment of the hemorrhoidal diseases.

## **PATIENTS AND METHODS**

This comparative study conducted on 30 patients with symptomatic hemorrhoidal diseases; divided equally into: group I (Conventional Open Surgical Hemorrhoidectomy method): Fifteen patients underwent open conventional hemorrhoidectomy by Milligan-Morgan technique (MMH). Group II (laser method): Fifteen patients were operated upon with Laser Hemorrhoidoplasty (LHP) "laser method".

### **Inclusion and exclusion criteria:**

Patients with symptomatic 2<sup>nd</sup> or 3<sup>rd</sup> degree of hemorrhoids who not responding to medical treatment. While, patients with associated anorectal diseases as fistula or abscess; 1<sup>st</sup> or 4<sup>th</sup> degree of hemorrhoids and patients with chronic illness or lost follow up were excluded.

Full history, clinical examination and preoperative investigations were performed. Fecal incontinence were assessed using the Continence Grading Scale wexner scorescore **Jorge et al (1993)** and no patients have incontinence. Detailed anorectal examination was performed with anoscopy in all cases, as well as rigid proctoscopy and colonoscopy if indicated to exclude other pathological lesion.

### **Operative Technique:**

All operations were performed under spinal anesthesia by the same surgical team.

#### **I- Open surgical hemorrhoidectomy:**

A V-shaped incision was made in the base of the hemorrhoid. The pedicle was then ligated with a 2/0 vicryl suture, and the distal part of the hemorrhoid was excised. The wounds were left open, light dressing with topical gentamicin cream and a gauze was left in the anal canal. Patients were discharged within 24 hours in case of no postoperative complications and the patient urinate without difficulties.

#### **II- Laser hemorrhoidoplasty:**

The laser procedure was performed using the (lasotronix laser Poland) and start with proper clinical examination PR in lithotomy position. A dedicated disposable proctoscope (23 mm in diameter) was inserted in the anal canal via small incision. Using a 980 nm diode laser were generated at a power of 7.5 W with duration of 3 s each shot followed by a pause of 0.5 s causing shrinkage of tissues up to the depth of 5 mm. After finishing each hemorrhoid, an ice finger was introduced intra anally for 0.5–1 min to decrease the heat effect patients were discharged from 6-8 hour after surgical operation.

### **Postoperative care and follow:**

Spinal anesthesia usually takes a few hours to wear off. Postoperative analgesia in the form of diclofenac sodium 100 mg daily. Metronidazole 500 mg tab three times per day for one week. A gentamicin cream three times dail. prescribes stool softeners and laxatives (duphalac). Frequent soaks in warm water (sitz baths) help relieve pain and muscle spasms. and clean the wound.

The need of analgesics after discharge was evaluated at 1, 2, 4, 6 weeks and after 6 months. Postoperative bleeding, was evaluated using the Visual assessment of blood loss by the 10 × 10 cm pads.

Postoperative infection was evaluated at 1, 2, 4, 6 weeks and after 6 months. Fecal incontinence was assessed using the Continence Grading Scale called wexner score at 6 months. Wound healing and time needed to come back to daily activity was also evaluated and expressed in days.

### **Statistical analysis:**

Data were analysed using Statistical Package for the Social Sciences (SPSS version 20.0) software. According to the type of data qualitative represent as number and percentage, quantitative continues group represent by mean ± SD, the following tests were used to test differences for significance. Difference and association of qualitative variable by Chi square test (X<sup>2</sup>). Differences between quantitative independent groups by t test or Mann Whitney. P value was set at <0.05 for significant results & < 0.001 for high significant result.

## **RESULTS**

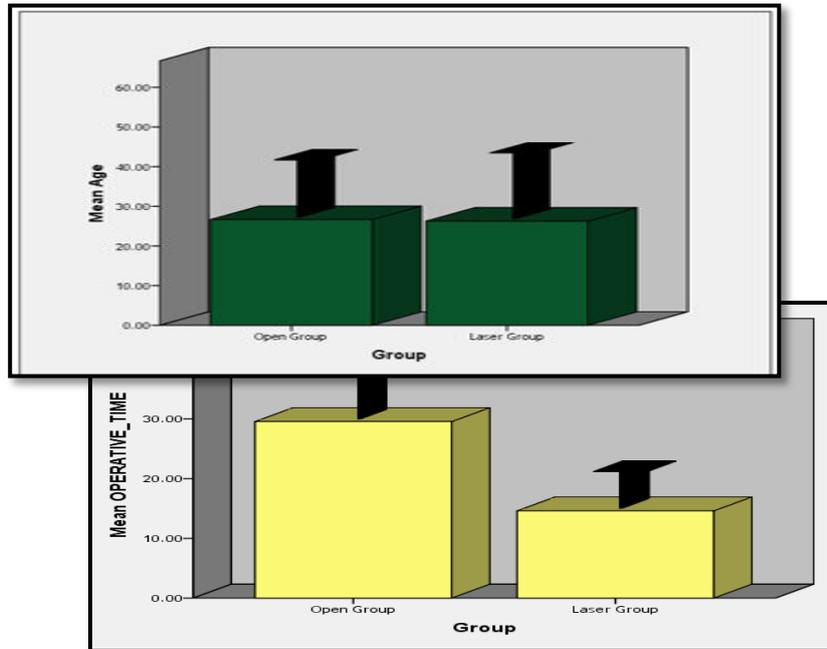
The present study showed mean age was  $36.03 \pm 7.32$  and  $35.73 \pm 8.39$  with no significant difference between groups (**Figure 1**).

Regarding operation time, open group was significantly longer than laser group (**Figure 2**). Open group significantly associated with longer hospital stay (**Figure 3**).

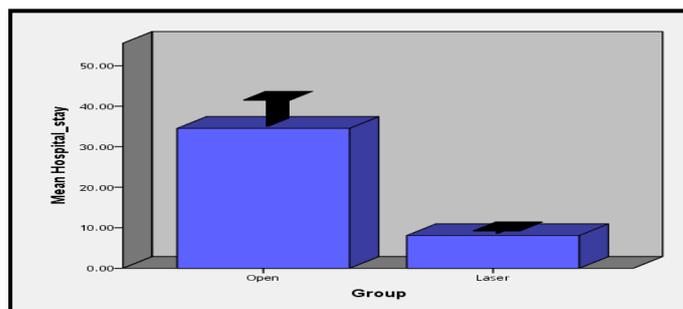
Concerning postoperative infection, there was no significant difference founded between groups (**Table 1**).

Regarding wound healing duration and return to normal activities distribution, Open group significantly associated with longer duration compared to laser group (**Table 2**).

There was no significant difference between the studied groups as regard urine retention , Stenosis and Recurrence (**Table 3**). NO cases founded pre op fecal incontinence and only one case founded post op fecal incontinence in open group withno significant difference (**Table 4**).



**Figure (2): Operation time distribution between studied groups**



**Figure (3): Hospital stay distribution between studied groups**

**Table (1): Infection distribution between studied groups at different stations of follow up**

			Group		X <sup>2</sup> fisher	P	
			Open Group	Laser Group			
Infection 1 <sup>st</sup> week	Absent	N	13	14	0.37	0.54	
		%	86.7%	93.3%			
Present	N	2	1				
	%	13.3%	6.7%				
Infection 2 <sup>nd</sup> week	Absent	N	14	15			
		%	93.3%	100.0%			
Present	N	1	0	1.03	0.30		
	%	6.7%	0.0%				
Infection 4 <sup>th</sup> week	Absent	N	15			15	
		%	100.0%			100.0%	
Present	N	0	0			0.0	1.0
	%	0.0%	0.0%				
Infection 6 <sup>th</sup> week	Absent	N	15	15			
		%	100.0%	100.0%			
Present	N	0	0	0.0	1.0		
	%	0.0%	0.0%				
Total	N	15	15				
		%	100.0%			100.0%	

Table (2): Wound healing duration and return to normal activities distribution between studied groups

	Open Group	Laser Group	t	P
Wound healing/days	21.63±2.36	5.36±1.85	11.856	0.00**
Return to normal activity / days	24.85±3.58	7.41±2.11	10.977	0.00**

Table (3): follow up finding distribution between studied groups

			Group		X <sup>2</sup>	P		
			Open Group	Laser Group				
Urine retention	-VE	N	14	15	1.03	0.3		
		%	93.3%	100.0%				
+VE	N	1	0					
	%	6.7%	0.0%					
Stenosis	-VE	N	15	15			0.0	1.0
		%	100.0%	100.0%				
+VE	N	0	0					
	%	0.0%	0.0%					
Recurrence	-VE	N	15	15	0.0	1.0		
		%	100.0%	100.0%				
+VE	N	0	0					
	%	0.0%	0.0%					
Total	N	15	15					
		%	100.0%	100.0%				

Table (4): pre and Post operative fecal incontinence distribution between studied groups :

wexner score		pre-operative fecal incontinence		post-operative fecal incontinence		X <sup>2</sup>	P		
		Laser Group	Open Group	Laser Group	Open Group				
Normal 0	N	15	15	15	14	1.03	0.3		
	%	100	100	100	93.3%				
Mild (1-5)	N	0	0	0	1				
	%	0.0%	0.0%	0.0%	6.7%				
moderate 6-15)	N	0	0	0	0			0.0	1.0
	%	0.0%	0.0%	0.0%	0.0%				
Severe (16-20)	N	0	0	0	0				
	%	0.0%	0.0%	0.0%	0.0%				
Total	N	15	15	15	15				
	%	100.0%	100.0%	100.0%	100.0%				

DISCUSSION:

Laser hemorrhoidoplasty is characterized by using a Diode-laser device to stop the feeding vessels of the hemorrhoids in the manner of pulses (shots) by laser photothermal coagulation of the hemorrhoidal tissue proper then after until the hemorrhoids shrunk.

This comparative study included 30 patients with grade (2&3) hemorrhoidal disease who admitted to General Surgery Department, Faculty of Medicine, Zagazig University Hospitals for treatment of symptomatic hemorrhoidal diseases. The study aimed to compare between LHP and surgical conventional open hemorrhoidectomy a regard duration of surgery and postoperative duration of hospitalization and postoperative complications as (infection, urineretention, fecal incontinence).

Our study showed the age range was (22-47) with no significant difference between groups. **Maloku et al. (7)** The age among group(LHP)  $34.73\pm 10.17$  and group MMH methods  $33.67\pm 10.22$ . They found no differences between these two groups of patients regarding age.

Our study showed the mean operative time was distributed as  $29.53\pm 4.05$  and  $14.60\pm 3.13$  respectively. These in agreement with **Eskandaros and Darwish (8)** found that the mean operative time in group MMH was  $27.5\pm 5.3$  min, and in group LHP was  $22.8\pm 3.9$  min, with highly significant difference between the groups.

In our study, MMH group significantly associated with longer hospital stay. These results were in concordance with **Maloku et al. (7)** who got a statistically significant difference in length of hospitalization by the groups. Also, **Alsisy et al (9)** reported the mean operation time in the diode laser was shorter than MMH hemorrhoidectomy.

In our study the analgesia used in open group significantly higher than LHP **Alsisy et al (9)** found the consumption of analgesics was significantly reduced in the laser group. **Brusciano et al (10)** revealed the use of technique LHP technique provide a very low pain and discomfort period with minimal need of analgesics.

In our study, only one case found with Mild infection in LHP group in 1st week and 2 cases found with Mild infection in MMH group in 1st week and one case in 2nd week we managed by ciprofloxacin 500 tab two times per day for one week no significant difference was found between groups regarding infection. **Mohammed et al. (11)** found that post-laser hemorrhoidoplasty, Mild infection take a part in 25.2% of cases in form of mild pus discharge and local inflammation. Moderate infection happened in 1.6% cases only in form of diffuse swelling, none was in need for surgical intervention. Only 1% of cases developed sever infection and abscess formation post- traditional hemorrhoidectomy, 37.4% of cases developed mild infection. While 14.6% of cases developed moderate infection in the form of diffuse swelling, while 3% developed severe infection and abscess formation Infection Post- laser hemorrhoidoplasty significantly lower than post-traditional hemorrhoidectomy regarding wound infection.

In our study after 6 months of post-operative follow up we found one case in the open group with a total score of 2 (mild incontinence) after postoperative fecal incontinence assessment by Wexner score, with no significant difference. and we managed by dietary changes to promote healthy bowel movements and physiotherapy to strengthen the anal sphincter. **Mohammed et al. (11)** found that no patients developed fecal incontinence after laser procedure, while 1.6% of cases developed fecal incontinence after traditional hemorrhoidectomy. Fecal incontinence post-laser hemorrhoidoplasty is significantly lower than post- traditional hemorrhoidectomy.

Postoperative urine retention occurred in one case in the MMH group and managed with foley catheter, with no significant difference. **Mohammed et al. (11)** found that no patients developed urinary retention after laser procedure, while 1.4% of cases developed urinary retention after traditional hemorrhoidectomy. Urinary retention post- laser hemorrhoidoplasty is significantly lower than post- traditional hemorrhoidectomy. **Eskandaros and Darwish (8)** found postoperative urine retention in three (7.5%) patients in group MM and no patients in group LHP.

In our study, the mean time for Wound healing/days  $21.63\pm 2.36$  in MMH group and  $5.36\pm 1.85$  in LHP group and the mean time to return to normal activity / days in MMH was  $24.85\pm 3.58$  days and in LHP was  $7.41\pm 2.11$  days. **Eskandaros and Darwish (8)** reported the mean time to return to activity in MM H was  $26.2\pm 4.3$  days and in LHP was  $11.3\pm 2.4$  days which was considered highly significant. **Maloku et al. (7)** The average recovery time for the patients treated with the LHP procedure was 17.2 days (SD  $\pm 4.9$  days), ranging from 5 to 30 days, while for the patients treated with the MM haemorrhoidectomy, the average recovery time was 19.2 days (SD  $\pm 2.9$  days), ranging from 14 to 35 days. **Poskus et al (12)** revealed Time to return to regular activity or work, days in the LHP 15 (5–14) days and in the MMH was 30 (14–35) days.

In our study no patients developed anal stenosis in both groups. **Alsisy et al (9)** found anal stenosis in the LHP 0 (0.0%) and in MMH was 4 (13.3%) **Mohammed et al. (11)** reported anal Stenosis Post- laser hemorrhoidoplasty, no patients developed anal stenosis while posttraditional hemorrhoidectomy, 6% of patients developed anal Stenosis., Anal stenosis after 1 year. **Eskandaros**

**and Darwish (8)** stated anal stenosis occurred in two (5%) patients ingroup MMH , with no patients affected in group LHP statistically nonsignificant

In our study until 6 month of follow-up no recurrence occur in both groups .**Mohammed et al. (11)** found that, at 3 years of follow up Post- laser hemorrhoidoplasty, none of the patients arrived with clinical evidence of recurrence. - Post- traditional hemorrhoidectomy, 9% of patients had recurrence, Recurrence Post- laser hemorrhoidoplasty significantly lower than post- traditional hemorrhoidectomy. **Eskandaros and Darwish (8)** suggested recurrence of occurred in one (2.5%) patient in MMH, and four (10%) patients in LHP. **Poskus et al. (12)** reported that recurrence at 1 year in LHP 4 (10.0%) and in MMH 0 (0%).

## CONCLUSION

Laser hemorrhoidoplasty technique is a modality of minimally invasive technique for treatment of patients with hemorrhoids, which considered better method for hemorrhoids management with less complications (pain, infection, urine retention and fecal incontinence) than open surgical hemorrhoidectomy

**No Conflict of interest.**

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