

# Laser Hemorrhoidoplasty with Mucopexy vs. Milligan Morgan Hemorrhoidectomy for 2<sup>nd</sup> and 3<sup>rd</sup> Degree Piles

## Original Article

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## ABSTRACT

**Background:** The most common anal canal complaint is hemorrhoids, which afflict most people at some point in their life and interfere with daily functioning. The best course of action for symptomatic hemorrhoids that do not improve with medication is surgery. Although hemorrhoid surgical procedures have been revised several times, people still refuse surgery because they fear pain and suffering after the procedure. There are now more options for less invasive hemorrhoid surgeries thanks to laser ablation.

**Objective:** To evaluate the short-term postoperative outcomes of Milligan Morgan haemorrhoidectomy and laser hemorrhoidoplasty with mucopexy in instances of second- and third-degree piles: pain, bleeding and infection, healing rate, return to normal life, and early recurrence.

**Patients and Methods:** For six months, from January to July 2024, this prospective comparison study was carried out at the Ain Shams Hospitals' Colorectal Unit and General Surgery Department. Two groups of patients with second and third degree haemorrhoids were randomly assigned to have laser hemorrhoidoplasty with mucopexy in group A and Milligan-Morgan haemorrhoidectomy in group B.

**Results:** In terms of operative time, our study observed that laser hemorrhoidoplasty with mucopexy generally required less time compared to the Milligan-Morgan hemorrhoidectomy. The results in our study indicated that patients who underwent laser hemorrhoidoplasty with mucopexy experienced less postoperative pain compared to those who had the Milligan-Morgan hemorrhoidectomy. When comparing postoperative bleeding, infection, and recurrence, the two groups show no significant difference.

**Conclusion:** Comparing Milligan-Morgan hemorrhoidectomy and laser hemorrhoidoplasty with mucopexy, the laser technique has number of benefits, such as a faster recovery period and reduced discomfort following surgery. These results underline the need for more study to validate these advantages in broader, more varied patient groups and support the rising trend towards less invasive surgical procedures.

**Key Words:** Milligan Morgan, Mucopexy, Laser Hemorrhoidoplasty.

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## INTRODUCTION

In clinics, hemorrhoids is a common surgical issue that arises as a common complaint from patients<sup>[1]</sup>. With a frequency of up to 28%<sup>[2,3]</sup>, it is the most prevalent anorectal disease that is seen, and its primary presentation is bleeding and prolapse<sup>[4]</sup>. Under anoscope, grade I haemorrhoids resemble dilated veins; grade II haemorrhoids prolapse and go away on their own; grade III haemorrhoids prolapse and require manual reduction; and grade IV haemorrhoids are irreducible<sup>[5]</sup>.

Clinical manifestations of hemorrhoids may include discomfort, itching, bleeding, discharge, or prolapse<sup>[6]</sup>. Although there are several therapy options for managing

patient symptoms, surgery is still the most effective way to treat this problem, particularly for patients who do not respond to conservative non-surgical managements<sup>[7,8]</sup>.

The primary issue we face in surgical excision of hemorrhoids in postoperative follow-up is sometimes unbearable pain<sup>[9]</sup>, which is explained by the anal area abundance of sensory nerve supply<sup>[8]</sup>. That is the driving force behind doctors' search for novel haemorrhoid treatment strategies in the hopes of improving patient results. Laser hemorrhoidoplasty is a relatively recent therapy for bothersome haemorrhoids, having been first described in (2009)<sup>[9]</sup>. Its feasibility, safety, and efficacy

in treating haemorrhoids have now been documented in a number of trials, with results that are on par with surgical excision. Because it has been associated with less postoperative discomfort and increased patient satisfaction, the laser method is preferable to surgery<sup>[5,7,10]</sup>.

There is no proved difference in the results of blind and doppler-guided hemorrhoidal artery ligation (suture mucopexy), which has been regarded as an effective minimally invasive alternative for hemorrhoids<sup>[11,12,13]</sup>. Laser hemorrhoidoplasty and surgical excision in individuals with hemorrhoids have been compared in several research<sup>[3,5,7]</sup>. On the other hand, not much is known about the combination of laser and mucopexy in these individuals.

#### Aim:

This study compares laser hemorrhoidoplasty with mucopexy and Milligan Morgan hemorrhoidectomy in patients of second- and third-degree piles in terms of operating time and short-term postoperative results, such as pain, bleeding and infection, healing rate, return to normal life, and early recurrence.

#### PATIENTS AND METHODS:

##### Study Design:

From January to July of 2024, a prospective comparison research was carried out at Ain Shams University Hospitals. Participants were required to be at least eighteen years old, to have a physical status of I or II (according to ASA), to have symptomatic haemorrhoid disease (second or third degree, according to Goligher's classification), and to be willing to attend follow-up appointments. Patients with recurrent anal conditions, high-risk patients unfit for surgery (ASA III or IV), pregnant patients, patients with other anorectal diseases (fistula, abscess, rectal carcinoma, inflammatory bowel disease, etc.), elderly patients (over 70 years), patients with first- or fourth-degree haemorrhoids, and, of course, patient refusal were all excluded.

The study was approved by our hospital's ethical committee and institutional review board. Each participant received an explanation of the study's goal and potential risks, and before enrollment, all patients provided signed informed permission.

##### Sample Size Calculation

The sample size was established using the pass 15 program, and the results of the prior study (Cemil *et al.*, (2023)) show that the postoperative third hour vas scores were statistically significantly lower in the laser hemorrhoidoplasty group than in the Milligan Morgan hemorrhoidectomy group ( $1.3 \pm 0.7$  Vs  $4.4 \pm 1.8$ ). These results show that when the population mean difference is  $u_1 - u_2 = 1.3 - 4.4 = -3.1$ , a sample size of 20 patients per group, after a 10% dropout rate adjustment, has 100% power to reject the null hypothesis of equal means. The two-sided

two-sample unequal-variance t-test has a significance level (alpha) of 0.050 and standard deviations of 0.7 for group 1 and 1.8 for group 2. Randomization:

Forty patients were divided into two groups: twenty got the Milligan Morgan haemorrhoidectomy surgery, and twenty underwent laser hemorrhoidoplasty with mucopexy. The randomization procedure was carried out using computerized randomization software.

#### Operative Technique:

##### Milligan Morgan hemorrhoidectomy technique

After the Ferguson retractor was used to establish the proper field exposure, curved artery forceps were placed on the pedicle of the haemorrhoidal vascular column and a V-shaped skin incision was made by electrocautery in the skin covering the haemorrhoidal base. The dissection was performed proximally through the submucosal plane in order to separate the haemorrhoidal tissue from the surrounding tissues. The pedicle was then reached and ligated with a 2/0 vicryl suture. After that, the haemorrhoidal tissue was totally removed. The same procedures were followed for each haemorrhoidal column that had enough mucosal bridges between them to prevent anal stenosis after surgery. To prevent anal stenosis from anal skin abnormalities, enough flaps are left in between each surgery (Figures 1 and 2).



**Figure 1:** 3<sup>rd</sup> degree piles at 3, 5, 9, 11 with posterior skin tag.



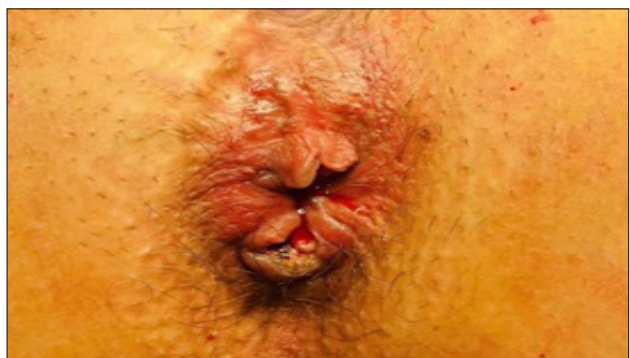
**Figure 2:** Post excision of hemorrhoidal columns at 5 and 11 o'clock.

**Laser Hemorrhoidoplasty Technique:**

After utilising the laser fibre tip to create a 1mm opening from the ano-cutaneous line at the distal limit of the haemorrhoidal pocket, a 1470nm diode laser device (Biolitec LEONARDO Dual laser 45 with  $\geq 360\mu\text{m}$  optical fibre) was used. The fibre was then inserted into the haemorrhoidal vessel parallel to the rectal axis, starting at the submucosal area and ending at the proximal part of the enlarged haemorrhoid. The haemorrhoidal pocket was coagulated using 8 W 3-second pulses with a 1-second pulse delay. After that, cold packs were used to prevent more heat injury to the tissues beneath. The whole haemorrhoid pocket, from proximal to distal, was treated with a laser. In many cases, skin tags were eliminated. (Figures 3,4 and 5).



**Figure 3:** 3<sup>rd</sup> degree piles at 3, 7, 11 with anterior skin tag and posterior fissure.



**Figure 4:** Post laser hemorrhoidoplasty and mucopexy with excision of posterior skin tag.



**Figure 5:** Insertion of laser fiber in Hemorrhoidal column at 7 o'clock.

**Mucopexy Technique:**

Following laser coagulation of the haemorrhoids, a longitudinal continuous suture (mucopexy) was done using a 5/8-inch needle and a 2-0 absorbable polyglycolic acid. It ended just before the obvious pathologic pile and began 4–5cm above the anal border. Using a pivot proctoscope, it was easier to adjust the suture's depth such that it covered the rectal wall's mucosa and submucosa. To prevent excessive strain and lengthy gaps in the suture line, the needle's passages were spaced no more than 5mm apart. The knot was made to raise the prolapsed pile towards the distal rectum (Figure 6).



**Figure 6:** Continuous Suture starting 4-5cm above anal margin.

**Outcome Measures**

A VAS rating method, with 0 denoting "no pain" and 10 denoting "maximum pain," was used to measure pain on the first postoperative day as well as the first and second weeks. Bleeding, wound infection and edema were evaluated. The operational time was defined as the duration, expressed in minutes, between the beginning and the end of the procedure. At every follow-up appointment, the patient's symptoms and hemorrhoid column recurrence were assessed.

**Discharge and Follow-up**

Following confirmation that there would be no bleeding or other early postoperative issues, the patients were released the same day of surgery. Following the surgery, patients were monitored on the first postoperative day, one week, two weeks, one month, and three months for a minimum of three months.

**Statistical analysis**

Version 23.0 of SPSS Inc.'s statistical software for social sciences (Chicago, Illinois, USA) was used to analyse the data that was gathered. Quantitative data with parametric (normal) distributions were displayed as mean  $\pm$  standard deviation and ranges, whereas non-parametric (non-normally distributed) variables were displayed as median with inter-quartile range (IQR). Qualitative traits were also displayed as percentages and figures. The data was examined for normalcy using the Shapiro-Wilk and Kolmogorov-Smirnov tests.



The following tests were done: Two means were compared using the independent-samples *t*-test of significance. The Chi-square test was used to compare groups based on qualitative data. A 95% confidence range and an acceptable 5% margin of error were established. As a result, the *p*-value (probability) was deemed significant. *P*-values were deemed significant when they were less than

0.05. A *P*-value of less than 0.01 was considered to be of extreme importance. *P*-values were deemed insignificant if they were higher than 0.05.

## RESULTS:

Following analysis of the results, it is presented in the following tables (1-4).

**Table 1:** Demographic and Health Profile of Studied Patients:

		Studied Patients (n= 40)	
		N	%
Age (Year)	Mean±SD	42.97±13.07	
	Range	22–64	
Gender	Male	16	38.5
	Female	24	61.5
	Non	33	82.5
	Obesity	1	2.5
Comorbidities	Diabetes Mellitus	1	2.5
	liver fibrosis	1	2.5
	Ischemic Heart Disease	2	5.0
	Hypertension	2	5.0

**Table 2:** Comparison of Intra-Operative Data between Groups and 1<sup>st</sup> day postoperative:

		Group A (n= 20)		Group B (n= 20)		Test value	P-value
		N	%	N	%		
Intra-Operative							
Operative time (min)	Mean±SD	28.6±0.82		30.8±0.41		10.7317	0.0001
	Range	27–29		30–31			
Postoperative Day 1							
		Group A (n= 20)		Group B (n= 20)		Test value	P-value
		N	%	N	%		
	Bleeding	0	0	0	0	-	-
	Infection	0	0	0	0	-	-
	Edema	0	0	0	0	-	-
VAS Score	Median (IQR)	4.0		8.0		12.073	less than 0.0001
	Range	4-7		6–10			

Using: *t*-Independent Sample *t* test for Mean±SD; Chi square test: *p*-value >0.05 is insignificant; \*: *p* value <0.05 is significant; \*\*: *p*-value <0.01 is highly significant.

**Table 3:** Comparison of Postoperative Outcomes at 1 Week between Groups:

		Group A (n=20)		Group B (n=20)		Test value	P-value
		N	%	N	%		
Follow up at 1 week							
	Bleeding	0	0	1	5.0	0.612	0.235
	Infection	0	0	0	0	-	-
	Edema	3	15.0	4	20.0	0.612	0.235
VAS Score	Median (IQR)	5.0(4-7)		8.0(5-10)		4.7255	less than 0.0001
	Range	4-7		5-10			

Using: *t*-Independent Sample *t* test for Mean±SD; Chi square test: *p*-value >0.05 is insignificant; \*: *p*-value <0.05 is significant; \*\*: *p*-value <0.01 is highly significant.

**Table 4:** Comparison of Postoperative Outcomes at 1 month between Groups:

Table 4: Comparison of Postoperative Outcomes at 1 month between Groups.						
	Group A (n= 20)		Group B (n= 20)		Test value	P-value
	N	%	N	%		
	Follow up at 1 month					
Infection	0	0	0	0	-	-
Healing	19	95.0	15	75.0	0.891	0.184

Using: Chi square test; *p*-value >0.05 is insignificant; \*: *p*-value <0.05 is significant; \*\*: *p*-value <0.01 is highly significant.

## DISCUSSION

For patients with bothersome haemorrhoids, especially those with grade III and IV haemorrhoids, haemorrhoidectomy is a popular surgical procedure. Due to its high success rate in removing haemorrhoidal tissue, the classic Milligan-Morgan haemorrhoidectomy, created in (1937), has long been regarded as the gold standard. Significant postoperative discomfort, a lengthier recovery time, and an increased risk of complications including bleeding and infection are all linked to it<sup>[2]</sup>.

On the other hand, a relatively recent procedure that has become more well-liked since it is minimally invasive is laser hemorrhoidoplasty with mucopexy. To elevate and secure the mucosal tissue, mucopexy is used in conjunction with laser ablation of hemorrhoidal tissue. This approach is marketed as having a lower risk of complications, a faster recovery, and less postoperative discomfort<sup>[14]</sup>.

A comparison of Milligan-Morgan haemorrhoidectomy and laser hemorrhoidoplasty with mucopexy has provided important new information on the efficacy and patient outcomes of these surgical procedures. Operative time, postoperative discomfort, postoperative bleeding, infection rates, and overall patient satisfaction were the main topics of the analysis. A thorough grasp of the benefits and drawbacks of each approach is offered by each of these metrics.

This prospective comparative research was conducted in the Colorectal Unit, General Surgery Department, Ain Shams Hospitals, and involved patients with haemorrhoids of the second and third degrees. The patients were divided into two groups randomly; group A underwent laser hemorrhoidoplasty with mucopexy, whereas group B had Milligan-Morgan haemorrhoidectomy. When assessing the cases, factors such as operating time, postoperative pain, bleeding, infection, oedema, healing time, and early recurrence were all taken into account.

In terms of operative time, our study observed that laser hemorrhoidoplasty with mucopexy generally required less time compared to the Milligan-Morgan hemorrhoidectomy. The reduced operative time could be attributed to the minimally invasive nature of the laser procedure, which allows for more precise and quicker interventions. With a mean of 30.8 minutes, Group B's operative time was longer than Group A's, which was 28.6 minutes. The *p*-value of less than 0.0001 indicates that this difference is statistically significant. The time difference in real life is actually not much being less than two minutes between the means of the two groups and though being statistically significant, still might not be reproducible with a larger group of patients.

According to a meta-analysis by Wee *et al.*,<sup>[14]</sup> that found this to be consistent with other studies that highlighted how much shorter the operative time is in the case of laser hemorrhoidoplasty, the group that underwent laser hemorrhoidoplasty had a significantly shorter operative time (7 studies,  $n=556$ ) than the group that underwent conventional haemorrhoidectomy (mean difference [MD], -12.65 minutes; 95% CI, -16.00 to -9.29 minutes;  $P<0.001$ ). Abdelhamid *et al.*,<sup>[15]</sup> also observed similar findings, finding that the laser group's average operating time was 29.58 minutes, whereas the average operating time for a conventional haemorrhoidectomy was 33.52 minutes. Although the change was not clinically significant, the statistical analysis showed that it was significant ( $P=0.004$ ).

Postoperative pain is a significant concern for patients undergoing hemorrhoid surgery. The results in our study indicated that patients who underwent laser hemorrhoidoplasty with mucopexy experienced less postoperative pain compared to those who had the Milligan-Morgan hemorrhoidectomy. Using VAS scoring system at first postoperative day, Group A's median VAS pain score was much lower than Group B's, at 4, as opposed to 8, with a  $p$ -value of less than 0.0001, indicating statistical significance. At one week after surgery, Group A's VAS pain levels were still lower than Group B's, with a median score of five vs eight. The  $p$ -value was less than 0.0001, which is still statistically significant. Group A's second-week VAS pain levels were somewhat lower than Group B's, with a median score of 3 as opposed to 4, although the difference was still statistically significant.

This difference is likely due to the less invasive nature of the laser procedure, which causes minimal tissue damage and inflammation. The reduced pain levels contribute to faster recovery times and improved patient comfort during the postoperative period.

The study by Jain *et al.*,<sup>[12]</sup> found that the Laser Hemorrhoidoplasty group had decreased defecation pain ratings on days 1 ( $P=0.010$ ), 2 ( $P<0.001$ ), 3 ( $P<0.001$ ), and 4 ( $P=0.001$ ), and considerably lower mean expected pain levels on days 1 ( $P<0.001$ ) and 2 ( $P<0.001$ ). The two groups did not vary statistically significantly on the other days. Additionally, as day 10 approached, the difference between the two groups narrowed. According to Gambardella *et al.*,<sup>[16]</sup> LHP patients saw statistically substantial reductions in postoperative pain during the 30-day postoperative period ( $p<0.0001$ ), analgesic use ( $p<0.0001$ ), and recovery time (2.1 vs 5.8 days,  $p<0.0001$ ).

Even though the laser group had significantly less postoperative third-hour pain than the Milligan

Morgan haemorrhoidectomy group, Cemil *et al.*,<sup>[17]</sup> did not find a significant difference in the first and 7-day pain levels between the two groups, in contrast to other studies in the literature. However, it was demonstrated that patients who had a Milligan Morgan haemorrhoidectomy required significantly more rescue analgesics between the third hour and the seventh day after surgery. It was shown that those who had laser hemorrhoidoplasty were more likely to benefit from the use of postoperative rescue analgesics.

The Milligan Morgan haemorrhoidectomy group experienced only one postoperative haemorrhage event, which was managed conservatively. One week following the operation, there was bleeding, but it was not deemed clinically significant ( $p$ -value= 0.235). Two weeks following surgery, none of the patients had any bleeding episodes.

Differing outcomes are recorded when comparing postoperative hemorrhage. According to Sadra *et al.*,<sup>[18]</sup> the Laser group saw decreased postoperative hemorrhage. But according to Alsisy *et al.*,<sup>[19]</sup> there was no change. Cemil *et al.*,<sup>[17]</sup> also found no discernible difference.

Cheng *et al.*,<sup>[13]</sup> meta-analysis of twelve trials revealed that the laser group experienced a reduced incidence rate of postoperative bleeding than the traditional group (95% CI: 0.10 to 0.28;  $p<0.00001$ ).

Infection rates are a critical factor in assessing the safety of surgical procedures. There is lack of information in literature review in comparing both groups in terms of postoperative infection and edema.

According to the study, there was only one case of infection in the MMH group during the second week, with no statistical significance, and no infection in either group during the first week. Antibiotics and appropriate dressings were used to treat this case. In the first week after surgery, oedema was somewhat more prevalent in the MMH group (20%) than in the LHM group (15%), but the difference was not statistically significant ( $p$ -value= 0.235). which, with the exception of one instance each group, almost disappeared over the next week's follow-up.

Abdelhamid *et al.*,<sup>[15]</sup> agrees with us with no significant difference in both groups when it comes to postoperative infection with only one case in conventional method group developing infection.

Most of the studies did not compare rate of infections in both groups, however, postoperative discharge was commented upon by multiple studies where Alsisy *et al.*,<sup>[19]</sup> described 3 cases out of 30 in

Milligan Morgan group suffering from postoperative discharge in comparison to no cases in the laser group.

According to Gambardella *et al.*,<sup>[16]</sup> no patients in the LHP group had seromucous discharge throughout the follow-up period since there were no open surgical wounds. However, 70 patients (76%) in the MM group had seromucous discharge.

In terms of healing, return to normal life activities, our study revealed at two weeks postoperative that patients who underwent laser hemorrhoidoplasty with mucopexy reported healing in 85% of the cases in comparison to 70% of cases in the Milligan Morgan group which was found significant with *p*-value of 0.048.

However, at 1 month follow up although the healing rates were higher in laser group, with 95% of patients achieving complete healing compared to 75% in Milligan Morgan group, this difference in healing rates was not statistically significant, with a *p*-value of 0.184.

We discovered no recurrences in either group throughout the three-month follow-up. Similarly, at three months of follow-up, Alsisy *et al.*,<sup>[19]</sup> showed no statistically significant differences in recurrence. In a randomized controlled trial comparing Milligan-Morgan hemorrhoidectomy versus laser intra-hemorrhoidal coagulation with a one-year follow-up, Naderan *et al.*,<sup>[5]</sup> demonstrated similar outcomes in terms of symptom relief and long-lasting cure.

One year after surgery, no patients had recurrence, according to Abdelhamid *et al.*,<sup>[15]</sup> research. A 0% recurrence rate was also seen by Jahanshahi and colleagues<sup>[22]</sup> during the 1-year follow-up following laser hemorrhoidoplasty. Additionally, in line with our findings, Shabahang and colleagues<sup>[21]</sup> discovered that no patients had recurrence six months after laser or surgery.

## LIMITATIONS

The small number of patients in both research groups and the absence of long-term follow-up where most of the patients were only followed up for three months, are two of our study's shortcomings.

## CONCLUSION

In summary, the comparison of Milligan-Morgan hemorrhoidectomy and laser hemorrhoidoplasty with mucopexy indicates that the laser technique has several benefits, such as a faster recovery period and less

discomfort following surgery. These results underline the need for more study to validate these advantages in broader, more varied patient groups and support the rising trend towards less invasive surgical procedures.

## CONFLICT OF INTEREST

There are no conflicts of interest.

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