

Comparative Study of Short-Term Outcome between Laser Hemorrhoidoplasty and Milligan-Morgan Hemorrhoidectomy

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ABSTRACT

Background: Due to the fear of postoperative pain and complications associated with open Milligan-Morgan (MM) surgery, mildly symptomatic patients often hesitate and delay undergoing surgical treatment for internal haemorrhoids. Laser Hemorrhoidoplasty (LHP) has been gaining popularity recently in the management of hemorrhoid. This study aimed to evaluate the efficacy of the LHP compared with MM surgery in the management of internal haemorrhoids.

Materials and methods: This multi-center, open label, randomized controlled trial included 60 patients with second- and third-degree internal haemorrhoids. The patients were randomized in a 1:1 ratio to receive either LHP (Group I) or conventional MM hemorrhoidectomy (Group II). Primary outcome parameter was postoperative pain assessed by Visual Analogue Scale (VAS) at 24 hours, 7 days and 30 postoperative days.

Results: Both the groups were comparable in terms of the demographic characteristics. The mean operation time was significantly lower in group I than group II (19.13±3.42 vs. 28.67±4.54 minutes, $p<0.001$). The mean VAS score of pain at 24 hours and 7 days postoperative were significantly lower in group I than in group II ($p<0.001$ and $p<0.004$, respectively). At postoperative, 30 days the mean VAS scores were similar in both groups ($p=0.722$). The mean total days of consumed analgesic were significantly shorter in group I than in group II (7.94±5.79 vs. 11.01±2.96 days, $p<0.001$). The mean time to return to regular activity was significantly earlier in group I than in group II (8.76±3.58 vs. 13.6±3.47, $p<0.001$). Postoperative bleeding was less in group I than in group II (6.6% vs. 26.7%). The mean length of hospital stay, rate of complete resolution and need for medical treatment for residual symptom and repeated surgery were similar between two groups.

Conclusion: LHP was associated with reduction of postoperative pain, postoperative bleeding, and administered with analgesics. So, if available LHP is preferred to open hemorrhoidectomy.

Key words: Hemorrhoid; Laser hemorrhoidoplasty; Milligan-Morgan; Pain.

Introduction

Hemorrhoidal disease is a widespread anorectal condition affecting millions of people around the world

and representing a major medical and socioeconomic issue, influencing patients' quality of life.¹ Due to the fear of postoperative pain and complications associated with Milligan-Morgan surgery, symptomatic patients often hesitate and delay undergoing surgical treatment for this benign disease.^{2,3}

Recent evidence has supported the LHP treatment modality for symptomatic internal haemorrhoids. It is reported that the application of laser technology in the treatment of internal haemorrhoids will be safe, effective and painless and resulted in partial to complete resolution within a short time.⁴ LHP is based on the application of the laser beam inside the hemorrhoidal tissue. After making a 1-mm opening at the cutaneous anal edge of the hemorrhoidal pile, the fiber is introduced inside the tissue parallel to the anal sphincter as well as to the rectal axis. The fiber is then pushed up to the upper part of the piles and three pulses at a power of 15 W are delivered. This maneuver is repeated thorough the same hole but in different directions. The laser beam induced a shrinkage of underlying tissues up to approximately 5 mm of depth.^{5,6} LHP seems to reduce postoperative pain, intraoperative bleeding and

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the need of postoperative analgesics if compared with MM procedure, with a complete resolution of symptoms in about 70% of cases, associated with shorter operative time and less postoperative pain and quick return to daily activity.⁵⁻⁷

LHP is recently introduced in Chittagong Medical College Hospital and some other private hospitals in Chattogram, where the usual practice was MM surgery for symptomatic haemorrhoid. Although the exciting and promising results, the LHP had been insufficiently analyzed in our country. As new procedure studies were needed to adequately assess its efficacy and superiority. Considering this knowledge gap, this randomized clinical study was conducted to compare the outcomes of LHP and MM surgery for haemorrhoids.

Materials and methods

This study was a multi-center, open label, randomized controlled trial, carried out in Department of Surgery of Chittagong Medical College and Hospital, Chattogram and other selected private hospitals of Chattogram from May 2021 to April 2022. All patients gave written informed consent. The Ethical Review Committee of Chittagong Medical College approved the study protocol.

A total of 60 patients with grade I and III hemorrhoids, age more than 18 years were included in the study. Exclusion criteria were patients with perianal fistula, anal fissure, or abscess, with previous history of anorectal surgery, regular use of immunosuppressant, with neurologic deficit or chronic pain syndrome and inflammatory bowel disease.

After consenting, patients were recruited randomly to one of the two treatment arms-Group I and Group II. In group I patients were subjected to LHP by using Lasotronix Smart M (Poland) as a type of diode laser, which is composed of laser generator device, hand piece, optical bar fiber of 400 μm . Patients in the group II had MM surgery. The procedures were standardized as far as possible to allow comparability. The operations were performed under standardized spinal anesthesia with the patient in lithotomy position.

As the primary outcome measure, pain was assessed within the first postoperative 24 hours using VAS scoring system, with 0 corresponding to 'no pain' and 10 representing 'maximum pain'. Intraoperative events and postoperative complications, including bleeding were evaluated. The operating time was assessed (min). Patients were discharged after the surgery when oral feeding was well tolerated with no postoperative complications. Pain and other outcome parameters were assessed on postoperative day 1, day 7 and day 30.

Data were collected by using a structured case record form and were analyzed by using SPSS statistical software, version 22.0 (IBM Corp). To compare the incidence rates between the two randomized groups, we used Chi-square test or Fisher's exact test. The duration of the surgical procedure, and length of hospital stay were compared using unpaired t tests. Statistical significance was defined as p-value < 0.05.

Results

Out of the enrolled 60 patients in the study, all were available for final 30-days outcome assessment. Table I shows the distribution of the study patients by demographic profile. The mean age was around 45 years and there were male preponderance in both groups. Both the groups were comparable in terms of their mean age and sex distribution.

Table I Distribution of the study patients by demographic profile

Demographic variables	Group I (n=30)	Group II (n=30)	p value
Age (Years)	46.06 \pm 18.25	44.77 \pm 14.28	0.761 ^a
Sex			
Male	23 (76.6)	24 (80.0)	0.754 ^b
Female	7 (23.4)	6 (20.0)	

Group I: Laser hemorrhoidoplasty, Group II: Milligan-Morgan, Data were presented as mean \pm SD or frequency (%), ^aUnpaired t-test, ^bFisher's exact test.

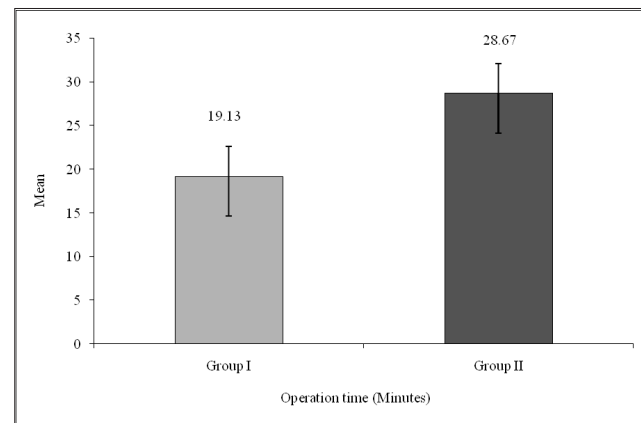


Figure 1 Bar diagram shows the study patients by operation time (Group I: Laser hemorrhoidoplasty, Group II: Milligan-Morgan)

The mean operation time was 19.13 \pm 3.42 minutes in group I and 28.67 \pm 4.54 minutes in group II. The difference was statistically significant (p<0.05) between two groups (Figure 1).

Table II shows the distribution of the study patients by VAS score. It was observed that almost half (43.3%) patients reported 3 VAS score of pain at 24 hours in

group I and 8(26.6%) patients in group II. The mean VAS score of pain at 24 hours was 2.73 ± 1.2 in group I and 4.33 ± 0.99 in group II. Almost two third (60%) patients were 2 VAS score of pain at 7 days in group I and 7(23.3%) in group II. The mean VAS score of pain at 7 days was 2.03 ± 1 in group I and 2.97 ± 0.93 in group II. Majority (90%) patients had 0 VAS score of pain at 30 days in group I and 26(86.6%) in group II. The mean VAS score of pain at 30 days was 0.1 ± 0.3 in group I and 0.13 ± 0.35 in group II. The differences of VAS of pain at 24 hours and 7 days were statistically significant ($p < 0.05$) between groups.

Table II Distribution of the study patients by VAS score (n=60)

VAS Score	24 hours postoperative		7 days postoperative				30 days postoperative					
	Group I		Group II		Group I		Group II		Group I		Group II	
	n	%	n	%	n	%	n	%	n	%	n	%
0	0	0.0	0	0.0	1	3.3	0	0.0	27	90.0	26	86.6
1	3	10	0	0.0	6	20.0	1	3.3	3	10.0	4	13.4
2	10	33.3	0	0.0	18	60.0	7	23.3	0	0.0	0	0.0
3	13	43.3	8	26.6	3	10.1	16	53.3	0	0.0	0	0.0
4	2	6.6	7	23.3	0	0.0	5	16.6	0	0.0	0	0.0
5	0	0	12	40	2	6.6	0	0.0	0	0.0	0	0.0
6	2	6.6	3	10	0	0.0	1	3.3	0	0.0	0	0.0
Mean±SD	2.73 ± 1.2		4.33 ± 0.99		2.03 ± 1		2.97 ± 0.93		0.1 ± 0.3		0.13 ± 0.35	
p value	0.001 ^a		0.004 ^a				0.722 ^a					

Group I: Laser hemorrhoidoplasty, Group II: Milligan-Morgan, ^aUnpaired t-test, Significant values were in Bold face.

Table III shows the distribution of the study patients by secondary outcomes. The mean total days of consumed analgesic were 7.94 ± 5.79 days in group I and 11.01 ± 2.96 days in group II. The mean length of hospital stay was 0.2 ± 0.4 days in group I and 0.63 ± 1.27 days in group II. The mean time to return to regular activity was 8.76 ± 3.58 days in group I and 13.6 ± 3.47 days in group II. Two (6.6%) patients had bleeding in group I and 8(26.7%) in group II. Majority (90.0%) patients had complete resolution in group I and 27(90.0%) in group II. Six (20.0%) patients had medical treatment for residual symptom in group I and 9(30%) in group II. One (3.3%) patient had reoperation for symptomatic hemorrhoid in group I and not found in group II. The differences of total days of consumed analgesic, time to return to regular activity and post operative bleeding were statistically significant ($p < 0.05$) between groups.

Table III Comparison of the secondary outcomes between two groups

Outcome parameters	Group I (n=30)	Group II (n=30)	p value
Total days of consumed analgesic (Days)	7.94 ± 5.79	11.01 ± 2.96	0.012 ^a
Length of hospital stay (days)	0.2 ± 0.4	0.63 ± 1.27	0.082 ^a
Time to return to regular activity (Days)	8.76 ± 3.58	13.6 ± 3.47	0.001 ^a
Post operative bleeding			
Yes	2 (6.6)	8 (26.7)	0.037 ^b
No	28 (93.4)	22 (73.3)	
Complete resolution			
Present	27 (90.0)	27 (90.0)	1.00 ^b
Absent	3 (10.0)	3 (10.0)	
Medical treatment for residual symptom			
Present	6 (20.0)	9 (30.0)	0.372 ^c
Absent	24 (80.0)	21 (70.0)	
Reoperation for symptomatic hemorrhoid			
Present	1 (3.3)	0 (0)	0.313 ^b
Absent	29 (96.6)	30 (100.0)	

Group I: Laser hemorrhoidoplasty, Group II: Milligan-Morgan, Data were presented as mean \pm SD or frequency (%), ^aUnpaired t-test, ^bFisher's exact test, ^cChi-square test, Significant values were in Bold face.

Discussion

In the current study, the LHP demonstrated its superiority concerning postoperative pain, bleeding, and return to normal daily activity compared to the conventional MM hemorrhoidectomy. Naderan et al. demonstrated that intrahemorrhoidal coagulation with 980-nm diode laser has some benefits over MM hemorrhoidectomy in treating patients for symptomatic refractory haemorrhoids.⁶ This laser ablation technique has shorter operative time, less severe postoperative pain, and comparable regression of hemorrhoid columns.

One of the important benefit of LHP over MM hemorrhoidectomy is that, LHP is surgeons friendly. A recent systemic review reported that, the mean operative time for 905 nm laser ablation procedures was shown to be 15.1 min which was considerably shorter than the mean operative time for the conventional techniques.⁷ In this current study mean operation time was about 10 minutes shorter in the LHP group than the MM group. The shorter operation time in LHP was also reported by the earlier studies.^{5,6,8-10}

Conventional open hemorrhoidectomy was associated with significant pain and bleeding.^{11,12} Postoperative anal pain remains a distressing problem for patients after surgery for anal conditions with significant impact on quality of life.¹³ Recent studies have concluded that less postoperative pain resulted in higher patient

satisfaction, earlier mobilization, fewer drug complications, elimination of adverse events, faster recovery and decreased health care cost.¹⁴ Previous studies showed significantly lower pain after laser treatment compared with open technique.^{9,10,15-18} The current study confirmed that, LHP was associated with significantly less pain in the immediate postoperative period than the MM group. As the LHP was associated with less postoperative pain, the requirement of postoperative would be less than the MM hemorrhoidectomy. The mean total days of consumed analgesic was significantly lower in LHP group than the open hemorrhoidectomy group in the current study, which was in agreement to other studies.^{8,10,19}

It could be assumed that, due to less postoperative pain in LHP, patients would be able to return to their regular activity earlier following LHP than the open hemorrhoidectomy. Current study found that the mean time to return to regular activity was five days earlier following LHP than in the MM hemorrhoidectomy.^{6,8,10} Another benefit of the LHP was less postoperative bleeding which was found in the present study and in the previous studies.⁷

It is to be noted that, recurrence is an issue following LHP which was observed in 5.5% to 36% of the patients.^{19,20} However, only one patient in LHP group needed reoperation for symptomatic hemorrhoid in this current study.

Limitations

The study population was selected from few hospitals in Chattogram city, so that the results of the study may not reflect the exact picture of the country. Other than the small sample size, short follow-up period was another limitation of the present study

Conclusion

This study was undertaken to evaluate the efficacy of the LHP compared with MM surgery in the management of internal hemorrhoids. The study demonstrated that, LHP had better clinical outcomes for grade 2 and 3 hemorrhoids with lower rates of postoperative pain and bleeding compared to MM hemorrhoidectomy.

Recommendation

Based on the current study findings, we suggested if available LHP is preferred to open hemorrhoidectomy. Nevertheless, assessment of cost effectiveness, safety, feasibility, patient expectation and satisfaction are important areas for future research.

Disclosure

The authors declared no conflicts of interest.

References

1. Sun Z, Migaly J. Review of hemorrhoid disease: Presentation and management. *Clinics in colon and rectal surgery*. 2016;29(01):022-029.
2. Hourigan J, Luchtefeld M. Excisional hemorrhoidectomy. In *Seminars in Colon and Rectal Surgery*. 2007;18(3):165-175.
3. Joshi GP, Neugebauer EA. Evidence-based management of pain after haemorrhoidectomy surgery. *Journal of British Surgery*. 2010;97(8):1155-1168.
4. Gallo G, Grossi U, Sturiale A, Di Tanna GL, Picciariello A, Pillon S et al. E-consensus on telemedicine in proctology: A RAND/UCLA-modified study. *Surgery*. 2021;170(2):405-411.
5. Maloku H, Gashi Z, Lazovic R, Islami H, Juniku-Shkololli A. Laser hemorrhoidoplasty procedure vs open surgical hemorrhoidectomy: A trial comparing 2 treatments for hemorrhoids of third and fourth degree. *Acta Informatica Medica*. 2014;22(6):365.
6. Naderan M, Shoar S, Nazari M, Elsayed A, Mahmoodzadeh H, Khorgami Z. A randomized controlled trial comparing laser intra-hemorrhoidal coagulation and Milligan–Morgan hemorrhoidectomy. *Journal of investigative surgery*. 2017;30(5):325-331.
7. Lakmal K, Basnayake O, Jayarajah U, Samarasekera DN. Clinical outcomes and effectiveness of laser treatment for hemorrhoids: A systematic review. *World Journal of Surgery*. 2021;45(4):1222-1236.
8. Alsisy AA, Alkhateep YM, Salem IE. Comparative study between intrahemorrhoidal diode laser treatment and Milligan–Morgan hemorrhoidectomy. *Menoufia Medical Journal*. 2019;32(2):560-565.
9. Maloku H, Lazovic R, Terziqi H. Laser hemorrhoidoplasty versus Milligan-Morgan hemorrhoidectomy: Short-term outcome. *Vojnosanitetski pregljed*. 2019;76(1):8-12.
10. Poskus T, Danys D, Makunaite G, Mainelis A, Mikalauskas S, Poskus E, et al. Results of the double-blind randomized controlled trial comparing laser hemorrhoidoplasty with sutured mucopexy and excisional hemorrhoidectomy. *International Journal of Colorectal Disease*. 2020;35(3):481-490.
11. Lohsiriwat V. Treatment of hemorrhoids: A coloproctologist's view. *World Journal of Gastroenterology: WJG*. 2015;21(31):9245-9252.
12. Majumder KR, Karmakar R. Short Term and Long-Term Outcome Following Stapled Haemorrhoidopexy. *Mymensingh Medical Journal: MMJ*. 2019;28(4):866-871.

13. Jayarajah U, Wickramasinghe DP, Samarasekera DN. Anal incontinence and quality of life following operative treatment of simple cryptoglandular fistula-in-ano: a prospective study. *BMC research notes*. 2017;10(1):1-5.
14. Chierici A, Frontali A. Post-Hemorrhoidectomy Pain Management: The Latest News. *Reviews on Recent Clinical Trials*. 2021;16(1):32-38.
15. Majeed S, Naqvi SR, Tariq M, Ali MA. Comparison of Open And Closed Techniques of Haemorrhoidectomy in Terms of Post-Operative Complications. *Journal of Ayub Medical College, Abbottabad: JAMC*. 2015;27(4):791-793.
16. Plapler H, Hage R, Duarte J, Lopes N, Masson I, Cazarini C, et al. A new method for hemorrhoid surgery: Intrahemorrhoidal diode laser, does it work?. *Photomedicine and laser surgery*. 2009;27(5):819-823.
17. Leardi S, Pessia B, Mascio M, Piccione F, Schietroma M, Pietroletti R. Doppler-guided transanal hemorrhoidal dearterialization (DG-THD) versus stapled hemorrhoidopexy (SH) in the treatment of third-degree hemorrhoids: clinical results at short and long-term follow-up. *Journal of Gastrointestinal Surgery*. 2016;20(11):1886-1890.
18. Crea N, Pata G, Lippa M, Chiesa D, Gregorini ME, Gandolfi P. Hemorrhoidal laser procedure: Short-and long-term results from a prospective study. *The American Journal of Surgery*. 2014;208(1):21-25.
19. De Nardi P, Tamburini AM, Gazzetta PG, Lemma M, Pascariello A, Asteria CR. Hemorrhoid laser procedure for second-and third-degree hemorrhoids: Results from a multicenter perspective study. *Techniques in coloproctology*. 2016;20(7):455-459.
20. Faes S, Pratsinis M, Hasler Gehrler S, Keerl A, Nocito A. Short and long term outcomes of laser haemorrhoidoplasty for grade II–III haemorrhoidal disease. *Colorectal Disease*. 2019;21(6):689-696.