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Original Article

Efficacy and Long-term Outcome of Laser hemorrhoidoplasty (LHP) for Symptomatic Grade II to IV Hemorrhoids

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Abstract:

Hemorrhoidal disease is a very common anorectal condition affecting thousands of people around the world. Patients have been offered medical therapy as a first-line treatment, with procedural interventions reserved for those with refractory symptoms. Conventional excisional hemorrhoidectomy is an effective treatment for hemorrhoids, but their drawback is severe postoperative pain and other complications. Laser energy is a novel technique that is being increasingly used in treating hemorrhoids. The aim of our study is to analyze the feasibility and efficacy of "laser hemorrhoidoplasty" in patients with grade II to IV hemorrhoids, which reflects our initial experience with this minimally invasive treatment. This prospective observational study was conducted in Faridpur Medical College Hospital, Faridpur, and some private hospitals of the city. Total 100 cases were operated on over one and a half years. All operations were performed by the principal author. A visual analog scale 0–10 was used to assess postoperative pain. All patients were followed up 3 years postoperatively. A common postoperative complication was per rectal seromucoid discharge, which resolves over time. No spontaneous bleeding was reported postoperatively. Post-operative pain was minimum and as the day passed, 98% of patients returned to their normal activity within a week. Only 7% of patients required oral NSAID at 2 weeks after surgery. Submucosal hematoma is the only peroperative complication. The procedure was almost bloodless. During first and second year follow-up, there was no recurrence. Only 2 patients (2%) came back at the end of the third year with recurrence. LHP is very safe and associated with very few complications when performed methodically with judicious application of laser energy at the proper tissue plane. Mucopexy gives additional benefit in terms of reducing the pile mass and possibly reducing the recurrences.

Key words: Hemorrhoids, Laser hemorrhoidoplasty, Post-operative pain, Recurrence.

Introduction:

Hemorrhoidal disease (HD) is a very common anorectal condition affecting thousands of people around the world; considered a major medical and socioeconomic issue that influences patient's quality of life. Its worldwide prevalence is between 2.9% and 27.9%, of which 4% are symptomatic[1]. In the United Kingdom, hemorrhoids were reported to affect 13% to 36% of the general population[2]. Still, its incidence seems to be underestimated. Hemorrhoids are cushions containing

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soft tissues and vessels; those gradually prolapsed to become more symptomatic[3]. In many instances, patients have been offered conservative or medical therapy as a first-line treatment, with procedural interventions including surgery reserved for those with refractory symptoms. Since the first description of a hemorrhoidal operation in 460 BC by Hippocrates, numerous surgical options have been described[4-6]. Conventional excisional hemorrhoidectomy is an effective treatment for hemorrhoids, but their drawback is severe postoperative pain and other complications. Minimal invasive hemorrhoidal procedures, i.e., stapled hemorrhoidopexy (Longo), hemorrhoidal artery ligation (HAL), etc. offer relatively less pain as a result of less injury to the somatically innervated anoderm but a possible high chance of disease recurrence. Laser energy is a novel technique that is being increasingly used in treating benign anal conditions. Probes are used to produce short, high-energy pulses of light that are transformed into heat energy when absorbed by surrounding tissues. The anal cushions are de-arterialized with or without mucopexy blindly or with the use of doppler assistance. Laser hemorrhoidoplasty (LHP) was first described between 2007 and 2009 separately by Salfi and Plapler et al.[7], and so on. Superiority in terms of early postoperative outcome has clearly been demonstrated in different studies. Our research aims to analyze the feasibility and efficacy of LHP in patients with grade II to IV hemorrhoids that reflect our initial experience with this minimally invasive treatment.

Materials and Methods:

This prospective observational study was conducted in Faridpur Medical College Hospital, Faridpur, and in some private hospitals of the same city. One hundred patients were selected for this study and operated from July 2019 to December 2020. Surgically fit adult patients of >18 years with grade II to IV hemorrhoids that were not improved by medical treatment were submitted to laser hemorrhoidoplasty (LHP) under subarachnoid block. Patients with associated anal conditions, i.e., anal fissure, fistula, anal incontinence, and ODS, were excluded from enrolment. Recurrent, thrombosed, or hemorrhoids with IBD were also carefully avoided. Patients were optimized, admitted, and received enema simplex at least 8 hours before surgery. Every patient underwent proctoscopic evaluation, and colonoscopy was reserved for a selected group. Patients were thoroughly counseled about the use of LASER radiation, possible outcomes, and other surgical options, and written consent was obtained. Intravenous Ceftriaxone injection was used as a prophylactic antibiotic. All operations were performed by the principal author using a 1470 nm diode laser generator (LASOTRONIX, Poland). Patients with grade IV hemorrhoids and grade III hemorrhoids with bulky pedicles underwent suture mucopexy in addition to standard laser hemorrhoidoplasty. All patients received one or two doses of intramuscular Diclofenac injection in the postoperative period and were discharged from the hospital 12 to 15 hours postoperatively. Patients were advised to take oral Naproxen if required. Nalbuphine hydrochloride IM injection was used routinely for sedation at least 6 hours after surgery after recording the first VAS score. Visual analogue scale (VAS) 0–10 was used to assess pain. The first postoperative visit was ensured 3 weeks after surgery, then after two months, and then yearly for the next 3 years. Data and perioperative information were recorded. The majority of patients who had no postoperative complaints or dissatisfaction attended second and onward follow-up over telephone or online video consultation. No patient was dropped out.

Visual analogue scale (VAS) was used to measure the postoperative pain intensity, which was considered the main outcome variable. Postoperative pain was assessed at 6 and 12 hours after surgery when the patient was completely recovered from spinal anesthesia & afterwards, on the third, seventh, and three weeks after surgery. Use of analgesics was noted on the same follow-up. Mean operative time was recorded in minutes. Any per rectal bleeding or per rectal discharge of any kind was evaluated. Patients were asked to inform when he would return to his or her daily activity, which was noted. Any complaints suggesting recurrence, i.e., visible prolapse or persistent per rectal bleeding, was taken into account.

Results:

Between September 2019 and December 2020, one hundred selected patients were operated on with diode laser energy, which is called laser hemorrhoidoplasty (LHP) in Faridpur Medical College Hospital, Faridpur, and in some private hospitals of the same city. Among them, 18 (18%) patients had grade II, 10 patients (10%) had grade IV, and the majority of 72 patients (72%) had grade III hemorrhoids. Male patients were 64% with an age of 18-65 years (mean 42.4 years), while females were 36% with an age of 34-60 years (mean 46 years). All patients had prolapse of different grades. Among them, 82% presented with per rectal bleeding (Table-I).

Table I: Distribution of patients according to demographic character and symptoms (n=100)

Characteristics	Number of patients (%)	
Gender	Male	64 (64%)
	Female	36 (36%)
Preoperative main symptoms	Prolapse	100 100%
	Bleeding	82 82 %
Hemorrhoid grade	Grade II	18 (18%)
	Grade III	72 (72%)
	Grade IV	10 (10%

The mean operating time was 28 minutes (20-50 minutes). Postoperative pain was minimum (VAS 3.5-0) (Table II), and as the day passed, 98% of patients returned to their normal activity within a week (Fig 1).

Table II: Distribution according to pain score (Visual analogue scale VAS)

Time	6 hours	12 hours	3rd POD	7th POD	3rd week
Mean VAS	3.5	3	3	0.4	Nil

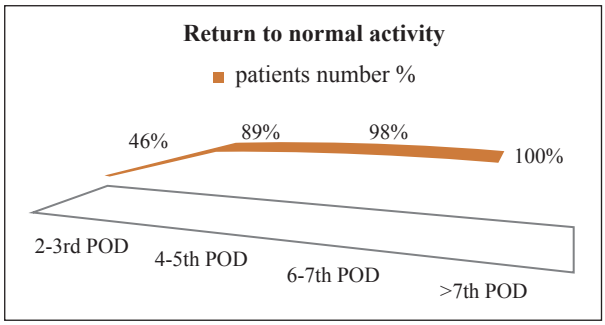

Figure-1: Return to normal activity

Two weeks after surgery, 93% of patients became pain-free, and 7% of patients required oral NSAIDs (Fig. 2).

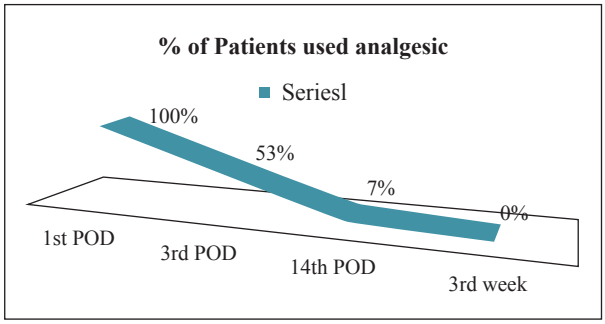

Figure-2: Analgesic use at home

Submucosal hematoma is the only peroperative complication. The procedure is almost bloodless. Total 18 patients required suction of blood from an anal canal during surgery (Table III).

Table III: Distribution of patients according to per operative events (n=100)

Events	Number of patients (%)
Submucosal hematoma	8 (8%)
Mean operating time (minutes)	28 (20-50)
Bleeding required suction	18 (18%)
Mucopexy done	52(52%)

The common postoperative complication was a little per rectal seromucoid discharge, which resolves over time (Fig 3).

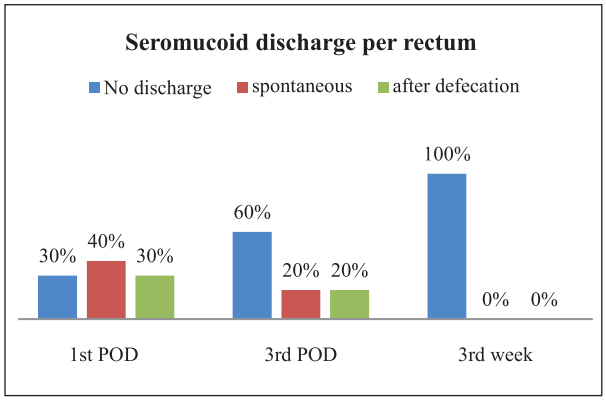

Figure-3: Seromucoid per rectal discharge

No spontaneous bleeding was reported postoperatively. Total 30 (30%) of patients noticed few drops of blood after defecation on the 1st postoperative day (POD) that became nil after the 3rd POD (Table IV).

Table IV: Distribution of patients according to post-operative bleeding (n=100)

Post-operative bleeding	1st POD Number (%)	3rd POD Number (%)	3rd week Number (%)
No bleeding	70(%)	100 (%)	98 (%)
Spontaneous	0 (%)	0 (%)	0%
After defecation	30 (%)	0%	2(%)

First- and second-year follow-up was recurrence-free. Only 2 patients (2%) came back at 3rd year with recurrence (Fig 4).

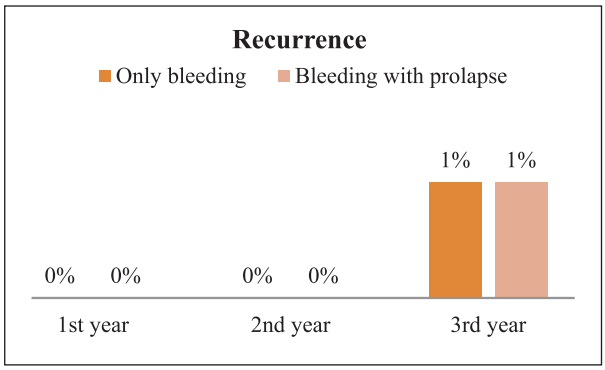

Figure-4: Recurrence during 3 years follow up

Discussion:

This study evaluated the efficacy of laser hemorrhoid surgery with long-term follow-up. Postoperative pain, time to resume their normal activity, and recurrence rate were recorded and analyzed.

The ideal choice of treatment for hemorrhoidal disease is not straightforward. While non-excisional procedures were reported to reduce pain and faster recovery, the results of many studies are conflicting about the long-term outcome and efficacy[8, 9]. The traditional excisional hemorrhoidectomy has been accepted as a gold standard, and complete remission of hemorrhoidal disease can be achieved with an estimated recurrence of 2% to 16% for grade II to IV hemorrhoids at 1 year. But the procedure resulted in considerable postoperative pain and discomfort[10].

The first important study was published in 2007 to assess the results of laser hemorrhoidoplasty (LHP) and reported a success rate of 88% at 1-year follow-up after the procedure[11]. Since then until now, many systematic reviews show even more promising results for patients treated with laser hemorrhoidoplasty, ranging from a 70 to 100% success rate in symptomatic relief[12].

One of the remarkable advantages of LHP is that it is free from anal wounds. This procedure is not associated with any type of tissue excision. Both of these factors contribute to reducing postoperative pain after LHP. Anshuman Kaushal and colleagues showed better pain scores in laser compared to stapler hemorrhoidectomy[13]. The mean postoperative pain score VAS at 12 hours was 2.64 and at 24 hours was 1.88. Majumder KR and colleagues found that the mean postoperative pain score VAS at 24 hours was 2.6 and at 1 week was 0.46[14]. In our study, the pain scores after 12 hours and after a week are almost similar. However, we observed that patients with higher grades of hemorrhoids who underwent mucopexy were associated with increased postoperative pain. Patients often describe a burning and/or heavy sensation in the anal region after the operation. Karahaliloglu used a 980-nm laser diode in treating patients with grade I and II hemorrhoids and found the method painless, resulting in the total recovery of patients[11].

Although it is non-excisional surgery, it is not free from major or minor complications. Immediate or delayed postoperative bleeding is the most discussed problem after laser hemorrhoidoplasty, and it is nearly 0.6-10%[15]. Edward Ram et al. published one study in 2023 that reported 13 (7.98%) patients presented with immediate post-operative bleeding that required re-intervention in six patients (4.2%)[16]. But many other series have a much lower incidence of postoperative bleeding, and it is about 0.5 to 3%[10]. Moheb S et al. show a slightly higher rate of 7.5%, but bleeding was only on day 1 and no in the next two months' follow-up[17]. We have as many as 30% of patients in our study with minimum bleeding that happened only after defecation on the 1st day. No patient required further hospital admission or any reintervention.

Delayed hemorrhage after the first week is rare in LHP. We have only 2 patients (2%) with single episode delayed hemorrhage after 3 weeks, which was not significant.

Some patients in our study noticed per rectal seromucoid discharge that resolved spontaneously after the second week. This may be as a result of anal mucosal irritation following submucosal laser application.

The unique complication related to LHP that occurred during the operation is submucosal hematoma. In our series, eight patients (8%) developed submucosal hematoma mostly at the 11 o'clock position, and most likely it resulted from inadequate laser application to point A (without touching the mucosa over the root of the hemorrhoidal pedicle) and pricking the hemorrhoidal veins.

Patients who underwent laser surgery for hemorrhoids can return to their normal activity significantly faster than any other type of surgery. The mean time to return to activity after Milligan–Morgan (MM) operation was 26.2 ±4.3 days, in stapled hemorrhoidopexy (SH) was 17.2±4.5 days, and in laser hemorrhoidoplasty (LHP) was 11.3±2.4 days[9]. In other studies, it was even less than a week after laser hemorrhoidoplasty[18,19]. In our study, > 98% of patients return to normal activity within a week.

Postoperative pain is remarkably low in laser hemorrhoidoplasty. In our study, 93% of patients became pain-free; only 7% of patients required mild analgesia until 2 weeks after surgery. Mohammad Naderan et al. show only 43.3% of patients consume analgesics after surgery, with a mean duration of 5.4 days postopeartively[20]. The difference in duration of analgesic use is probably due to liberal use of mucopexy. The intensity and duration of pain directly correlate with mucopexy, but it helps in reducing recurrences in some groups of patients. Although Ansuman and Kushal show non-significant elevation of pain intensity even after mucopexy[13]. Application of laser energy more than the recommended dose and duration below the dentate line may also contribute to increased postoperative pain.

Studies with longer follow-up periods have also reported the effectiveness of lasers for the treatment of hemorrhoids. There are many available studies of various durations (6 months to 5 years) that show recurrence rates ranging from 3 to 10%[10,19]. A systematic review that includes seven studies with 1052 patients reported long-term follow-up results and were found to be satisfactory in terms of symptom relief and recurrence[21]. We have only 2 patients (2%) with recurrence after long 3-year follow-up, and it was at the end of the 3rd year. One patient had per rectal bleeding only and one with prolapse and bleeding. The reason behind the lower recurrence is possibly due to the smaller number of grade IV patients included. The good results can be attributed to liberal use of mucopexy, done in almost 50% of the patients. Ayeberk Dursun et al. have also shown the importance of mucopexy in reducing recurrence after laser hemorrhoidoplasty[22].

Conventional open hemorrhoidectomy, initially described by Milligan-Morgan (MM), is still regarded by literature in the modern era as the current gold standard surgical treatment[23]. Laser hemorrhoidoplasty is a relatively new procedure. There are many randomized controlled trials (RCT) and comparative studies published in the last 5 years. The majority of trials found laser surgery is safe, less painful, and has fewer postoperative complications than MM procedure[24-26]. Some studies have shown even superior postoperative quality of life and found it more tolerable than MM[27]. In the last 20 years or more, hemorrhoids were being dealt with stapled hemorrhoidopexy. When compared with laser hemorrhoidoplasty, LHP offers better results as compared to SH. It was associated with a shorter hospital stay and an early return to work. No significant complications were noted in LHP compared to SH[13].

Conclusion:

Our study demonstrates a very promising short-terum and long-term result of laser hemorrhoid surgery. It is a very safe and associated with very few complications when performed methodically with judicious application of laser energy at the proper tissue plane. Mucopexy gives additional benefit in terms of reducing the pile mass and possibly reducing the recurrences. Although evidence is being published in favor of laser hemorrhoid surgery, more RCTs should be conducted with longer follow-up comparing different surgical techniques prior to setting it as a ‘standard’ of hemorrhoid surgery.

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