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Laser Heamorrhoidoplasty benefits and drawback

DR.Akeel abd ali Al-omery
(F.I.B.M.S)(F.I.C.M.S)(D.S)
AL-Nassyriah General Hospital
Akeelabdali1234@gmail.com

Abstract

The superior hemorrhoidal arteries were engorged with blood, the hemorrhoidal venous plexus would enlarge. . Heamorrhoids can be categorized as internal, external, or mixed, depending on their location in the anal canal relative to the dentate line. The dentate line, also known as the anorectal junction, is the site of internal heaorrhoid.

Internal heamorrhoids. They are thereafter categorized into four stages according to their severity and degree of prolapse.

Grade I: Absence of prolapse, increased venous presence.

Grade II: Prolapse occurs under stress and resolves spontaneously.

Grade III: Prolapse occurs and requires physical assistance.

Grade IV: Extremely elevated risk of prolapse and irreducibility.

External heamorrhoids are found in anal canal, below the dentate line [1,2].

The laser (LH) procedure is an innovative outpatient treatment for hemorrhoids that ceases blood supply to the hemorrhoidal plexus through by coagulation of the hemorrhoid pedicle. Consequently, the prolapsed hemorrhoidal veins diminish without causing discomfort. This treatment enhances postoperative recovery, reduces operating room duration, minimizes intraoperative blood loss, and subsequent pain.

Men exhibit a higher propensity than women for prevalent symptoms such as rectal bleeding, anal pruritus, pain, anal irritation, thrombosis, and a prolapsed mass.

The primary concept of LH involves utilizing a diode laser a 980 nm beneath the skin to assess the extent of reduction in the hemorrhoidal vascular convolute. This study sought to record our experience for hemorrhoidal laser ablation on 200 symptomatic grade II, III, and IV, at three medical centers in Thi-Qar City from 2022 to 2024, to evaluating the efficacy and safety of this novel technique [3,4].

Key words: diode laser,heamorrhoid,complications

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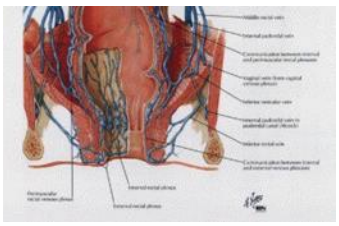
Introduction

Hemorrhoidal disease is the most common anorectal problems that surgeons see. Hemorrhoids are a form of vascular plexus that can be found in the anal canal. They are arranged in three columns: mucosal lining, connective tissue, smooth muscle, and blood vessels. They have two main jobs: first, they protect the mucosa of the anal canal, and second, they keep the anal canal closed so that it stays closed while you sleep (figure1). The causes of hemorrhoids is not thoroughly understood. Straining, pregnancy, weightlifting, disorders that raise intra-abdominal pressure, and genetic predispositions may raise the risk of incidents. The patients show dilatation and engorgement, which makes the hemorrhoidal veins stick out [5,6].

Amen are more likely than women to contract this disease. Bleeding from the rectum, itching, soreness, discomfort, irritation, thrombosis, and a prolapsed mass are all common signs.

People with grade I and II hemorrhoids(figure 2,3) usually treated conservatively at an outpatient clinic. Surgery is only done when conservative treatments don't work or problems happen, such as thrombosis, especially in grades III and IV, to help with their symptoms (figure 4,5). These treatments include band ligation, electrocautery, stapled hemorrhoidopexy, photocoagulation, infrared laser therapy, sclerotherapy, Doppler-guided artery ligation, cryosurgery, and surgical excision. These procedures were associated with complications, including severe pain, hemorrhage, infection, stenosis, and recurrence [7,8].

Our research is to reduce the duration of surgery, bleeding, and improve postoperative quality of life. The laser beam is a technology that is minimally invasive and painless. It can vaporize or cut out hemorrhoids, close small blood vessels and nerve endings near on the surface, and provide the patient a bloodless field and less pain after surgery. The diode laser's energy is absorbed by water in the tissue of pile, which causes the tissue to vaporize. The heat that is transferred to other tissues causes them to constrict and die. In a short amount of time, this treatment often made the illness go away completely or partially. The effectiveness of the treatment is contingent upon the optical configuration of the laser application, encompassing characteristics such as laser power, pulse duration, pulse energy, and pulse count. The study aimed to assess the benefit and limitations of diode laser therapy of hemorrhoids [9,10].

.. 

(Figure 1) normal anatomy

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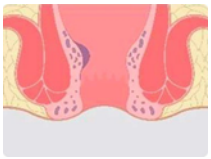


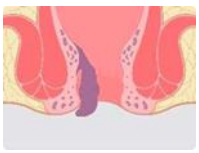


(Figure2) Grade **1** **(figure 3)**Grade **11** **(figure4)**Grade **111** **(figure 5)** Grade **1V** **(figure6)** external pile

Patients and Methods:

This study involved 200 patients exhibiting symptomatic hemorrhoids, comprising 111 individuals with degree three and four hemorrhoids, as well as second degree hemorrhoids unresponsive to conservative treatment. Laser hemorrhoidoplasty was performed at private hospitals in Thi-Qar City over a two-year period, from January , 2020, to January 2022. There were 150 males (75%) and 50 women (25%), all aged between 25 and 65, with a mean age of 41. Hemorrhaging rectum, mucosal prolapse, and chronic constipation persisted for many years despite multiple unsuccessful conservative interventions, representing the most common clinical manifestations among patients.

Laser Specifications:

The diode laser utilized in our work operates at a wave length range of(980–1470 nm), with a power output of(20 watts) ,(figure 7) and functions in a pulsatile wave mode. It operates by employing a designated probe to establish contact with the epidermis. Each blast endures for 3 seconds and emits (18 joules) of energy. Each hemorrhoid pouch received between 3 and 6 injections, depend on its size, with an energy level ranging from (250 to 300 Joules) . A handpiece equipped a(100 mm) was utilized to concentrate the laser beam on the target tissue, achieving a spot size of 0.2 mm. Prior to the utilization of the laser, the personnel donned specialized anti-diode laser eyewear (goggles) [11,12].

Fig. (7): The diode laser system displays the diode laser and focusing handpiece utilized in the present study.

Prior to the surgery, all patients had blood , stool investagation, a rectal examination by (PR) or proctoscopy. Fifty individuals (aged ≥45 years) required a colonoscopy to exclude any causes of bleeding unrelated to hemorrhoids and to identify rectal lesions that resulted in secondary hemorrhoids. Prior to the treatment, all patients executed a designated informed consent form and consented to undergo diode laser hemorrhoidoplasty[13,14]. Under spinal or general anesthesia and in the lithotomy position, all cases involved examine of the anorectal region to exclude additional problems such as malignancy, fistula, fissures, or rectal prolapse. Laser hemorrhoidoplasty consists of three stages :

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Step A involves the coagulation of the hemorrhoidal feeding vessel. The procedure involved inserting the laser bare fiber into the anus and administering around 80 joules while ensuring no contact with the mucosa to prevent injury. (figure 8)[15,16]

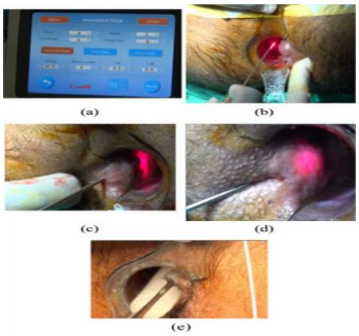
Figure 8: Coagulation of the feeding vessel

Step B The laser probe created a puncture in the skin around 0.3 cm from the anal verge at the base of each hemorrhoid within the subcutaneous layer.(figure 9)

Figure 9: laser probe puncture

Step C: The probe was inserted via the apuncture in the submucosal tissue and pushed until it reached the region of the distal rectal mucosa. Pulses that are effective (about 100 joules, 8 watts, and a wavelength range of 980–1470 nm). (figure 10)

Subsequently, an additional 80–100 joules were applied to the cushion to facilitate the reduction of the hemorrhoids. The overall energy for each hemorrhoid was approximately 250–300 joules[17,18].



(Figure 10) pulsing probe

Tissue forceps are employed to grasp the hemorrhoid at the mucocutaneous junction and extrude it from the anus. The hemostat artery is clamping the hemorrhoidal pedicle, and a puncture incision is created on the skin. The laser is precisely directed, and the point of the indication laser is elevated towards the neck of the pile. The laser is configured to pulsatile mode. The power is configured at 980 nm using a 1000-micron

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optical cable, delivering 13 Wt of energy over 1.2 seconds with 0.6-second intervals between emissions. The probe is extracted gradually, yielding 5 mm of depth coagulation[19,20].

The interaction of the laser with tissue is contingent upon the employed wavelength. Hemoglobin and water exhibit superior absorption of diode lasers (980 nm) compared to other materials, resulting in accurate coagulation without extensive heat injury. This provides the operator with more control and less chance of collateral harm. The defocused beam of the diode laser accomplished total hemostasis without the need of sutures; only dressings were applied to all patients. Ice packs should be inserted into the anus to have a cooling effect and mitigate postoperative irritation resulting from laser heat [21,22].

For IV-degree hemorrhoids, mucopexy was conducted to facilitate the reduction of the hemorrhoid via continuous suturing with 3/0 vicryl sutures, affecting only the mucosa and submucosa. All patients were administered antibiotics (Cefotaxime 1 gram IV and Metronidazole 500 mg pill) for three days post-surgery. They were administered basic analgesics as required. Patients were discharged 3 to 7 hours post-surgery and monitored every 4 months (at 4, 14day, and 1st, 2nd, 3rd, and 4th months post-operative)(fig 11,12,13,14) to assess their recovery and identify any complications [23,24].

The assessment considers the following criteria: pain, bleeding, infection, anal stenosis, incontinence, and recurrence.

1-Pain was mild to moderate on the first postoperative day, requiring only basic analgesia.

2- Hemorrhage: No patient encountered substantial primary bleeding. A minor hemorrhage occurred as a reaction[25,26].

3- Infection: Only two patients developed an infection in their wounds, necessitating a 7-day course of antibiotics.

4- Home Retention: All patients were able to ambulate the day following the operation and were released home on the same day as the surgery. They all returned to their homework after three days.

5-Urinary retention: Four patients (16%) reported this condition; one (4%) required catheterization, while the other three (12%) were treated with fluid restriction[27] .

6- stenosis of anal canal :Six patients (12%) suffering from anal stenosis, which treated with finger dilation[28].

7- Fecal incontinence : Two individuals (8%) exhibited minor incontinence that resolved within 10 days; however, significant incontinence was not observed in this study[29].

8- Recurrence: The current investigation did not detect any recurrence throughout the follow-up period [30].

(Fig.11) At time of operation

(fig 12) during operation

(fig.13)one day post operation

(fig.14) one month post operation

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Results

We did the LHP procedure on 200 patients in a row. This study included 150 men (75%) and 50 women (25%) who had diode laser hemorrhoidoplasty. The patients' ages ranged from 25 to 65 years, with the most patients being between the ages of 35 and 50 years, with an average age of (41 years), as shown in(table 1)

(Table 1.) age

Age(year)	25-35 year	35-50 year	50-65 year	Total %
Male	40	80	30	75%
Femal	15	27	8	25%
Total	55	107	38	100%

The symptoms of hemorrhoids lasted for 6 months to a year before the patient came in. More than 180 patients with third and fourth degree (table 2,3).

(Table 2).heamorrhoid grades

Grade	NO.of patients	Percentage(%)
1st degree	0	0
2nd degree	20	10%
3rd degree	140	70%
4th degree	40	20%
Total	200	100%

(Table 3) complaints that were made. (Distribution of symptoms)

Symptoms	No.of patients	Percentage(%)
Bleeding	95	47.5%
Bleeding+prolapase	70	35%
Bleeding+prolapase+constipation	35	17.5%
Total	200	100%

In all cases of laser hemorrhoidoplasty, 50 patients (25%) with spinal anesthesia, while the other 150 patients (75%) refused spinal anesthesia (especially women) dueto they were embarrassed. Instead, the procedure was done with general anesthesia. The majority of patients (140 cases) presented with hemorrhoids situated at the conventional positions of 3, 7, and 11 o'clock. The duration of the procedure varied from 15 to 30 minutes, depending on the grade of the hemorrhoids, with a mean duration of 20 minutes. The average length of stay in the hospital after surgery was 5 hours, with a range of 3 to 9 hours. This was because all cases were treated as day cases. After surgery, there were problems and follow-up of the Patients at the 4th and 14th postoperative days, followed by assessments at the 1st, 2nd, 3rd, and 4th months.

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The following factors will be looked at when making a decision: pain, bleeding, infection, anal stenosis, incontinence, and recurrence. (table 4)

1-Pain was mild to moderate on the first day after surgery, and I needed only simple painkillers.

2- Bleeding: No patient suffering from primary bleeding. There was some mild bleeding as a reactionary.

3- Infection: Only 25 patients got an infection in their wounds, which meant they had to keep taking antibiotics for 7 days.

4. Walking: All of the patients were able to walk on the day after their surgery and went back to their normal activities three days later.

5. Urine retention: Four patients (16%) said they had trouble urinating. One of them (4%) needed a catheter, while the other three (12%) were treated by restriction of their fluid intake and encouraging them to urinate.

6- stenosis of anal canal: 30 patients (12%) got mild anal stenosis that got better with finger dilation.

7- Fecal incontinence: 25 patients (12.5%) had mild incontinence that went away on its own within 10 days. Major incontinence was not seen in this study.

8- Recurrence: The current study did not observe any instances of recurrence during the follow-up period.

(Table 4) complications

symptumes	NO.Patiants	Percentage(%)
Pain	70	35%
Bleeding	50	25%
Infection	25	12.5%
Ambulation	0	0%
Retension of urine	4	2%
Anal stenosis	30	15%
Incontinence	25	12.5%
Recurrent	0	0%

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Discussion:

Every way to treat hemorrhoids has pros and cons, as well as limits and problems. The most common problem after hemorrhoidoplasty is a pain. In general, agood result of hemorrhoidoplasty is a beneficial for both the patient and the surgeon. in this study that diode laser treatment for hemorrhoids leads to a significantly reduced incidence of complications in comparison to traditional hemorrhoidectomy, although surgeons have differing opinions on the optimal treatment method. These methods included rubber band ligation, staplling, ultrasonic scalpel, traditional surgery, and laser therapy. All of these are meant to ease pain and speed up healing after surgery.

In proctology, diode lasers with wavelengths of(980 nm and 1470 nm) have been used a lot in the last few years. The 980 nm wavelength absorbs by water and hemoglobin, which carbonizes and hardens the target tissue. doesn't harm the mucosa or sphincter.The laser's strong absorption ability lets it work at low power, which cuts down on the need for cooling and makes the work area safer for both the operation team and the patient. In the present study, only a limited number of cases exhibited complications following treatment with diode laser.

There were 70 patients who had mild to moderate pain, 50 who had mild bleeding, 25 who had an infection, 4 who had urine retention, and 30 who had mild anal stenosis.There were 25 patients who had m incontinence (mild) that went back to normal within ten days, and there were no recurrences.

The significant complication that concerns the patients and refused the surgery is postoperative pain. In the present study, diode laser hemorrhoidoplasty resulted in postoperative pain that was mild to moderate in all cases, in contrast to conventional hemorrhoidectomy.This technique offers hemostatic properties, rapid healing, minimal impact on adjacent structures, reduced hemorrhage, and decreased stenosis. Here are the pros and cons of diode lasers:

Pros:

-Diode lasers are less invasive, resulting in less pain after surgery.
-Less time in surgery.
-Low blood loss during the operation.
-Faster healing and getting back to normal activities.
-It can be done with local anesthesia.

Drawbacks:

-Some studies indicate that recurrence rates are higher than with excisional methods.
-The situation is less clear in cases of advanced-grade hemorrhoids.

This approach is particularly beneficial for patients with(Grade II-III) hemorrhoids, especially those who have comorbidities that complicate more extensive surgery.

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Conclusions:

You may get rid of them without surgery by using LHP. It is a safe treatment with little problems after surgery. Pain, shorter duration of time, and fast recovery time with improved the quality of life, but its requires expensive tools (diode laser system) and well-trained surgeons.

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