MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2024.9.500.504

A Comparative Study of use of Diode Laser and Conventional Surgical Technique in Hemorrhoids, Fissures and Fistula in ANO

[1]P. Maneesha, [2]Prajapati Rajesh, [3]Singh Manisha and [4]Shrivastava Prashant

[1-4]Department of General Surgery, Gajra Raja Medical College, Gwalior, Madhya Pradesh, India

ABSTRACT

The emergence of laser technique has been used in the treatment of various conditions like hemorrhoids, anal fissures, fistula in ano, pilonidal sinus etc. Conventional techniques have been used for ages due to their ease of use, accuracy and minimal damage to surrounding tissue, but they cannot provide hemostasis in highly vascular conditions. On the other hand laser provides greater precision, relatively bloodless surgical and postsurgical course, minimal or no suturing and much less or no surgical pain. To compare the effectiveness of treatment with laser surgery to the conventional type of surgery. A prospective study was conducted on patients admitted with Hemorrhoids, fissures and fistula in ano in J. A. Hospital, Gwalior. A total of 156 patients underwent surgery, evenly split between Diode Laser ablation and conventional surgical techniques. The Diode Laser group had a mean age of 43.2 years, while the conventional surgery group had a mean age of 40.3 years. The Diode Laser ablation group had a significantly shorter mean surgery duration (27.6 minutes) and less intraoperative blood loss (3.18 ml) compared to the conventional surgery group (39.6 minutes and 25.7 ml, respectively). Postoperative bleeding was also much lower in the Diode Laser group, with only 6 patients experiencing bleeding (3ml) compared to 88.46% of conventional surgery patients. Additionally, the Diode Laser group reported less postoperative pain, with 56.4% of patients experiencing no pain, compared to 32.1% and 30.8% of conventional surgery patients reporting pain levels of 4 and 5, respectively. According to our study Laser surgery had lesser intra and postoperative blood loss, post operative pain, infection and chances of recurrence. Hence Laser surgery was found to be better than Conventional surgical techniques for hemorrhoids, fissures and fistula-in-ano.

OPEN ACCESS

Key Words
Technique, surrounding, hemostasis, postsurgical

Corresponding Author
Shrivastava Prashant,
Department of General Surgery, Gajra Raja Medical College, Gwalior, Madhya Pradesh, India

Author Designation
[1]Final Year Resident
[2]Professor
[3,4]Professor and HOD

Received: 26 July 2024
Accepted: 26 August 2024
Published: 28 August 2024

Citation: P. Maneesha, Prajapati Rajesh, Singh Manisha and Shrivastava Prashant, 2024. A Comparative Study of use of Diode Laser and Conventional Surgical Technique in Hemorrhoids, Fissures and Fistula in ANO. Res. J. Med. Sci., 18: 500-504, doi: 10.36478/makrjms.2024.9.500.504

INTRODUCTION

Anorectal diseases, common in general surgical practice, cause significant pain, anxiety and embarrassment, often deterring patients from seeking medical help, suggesting a higher actual prevalence. Traditional anorectal surgery uses scalpels and electro-surgery units for their precision and minimal tissue damage, but scalpels are ineffective for hemostasis in highly vascular tissues. Lasers, which offer better hemostasis by creating a coagulated tissue layer, have emerged as an alternative[1].

Laser use in proctology started in the 1960s with the Nd: YAG laser, followed by advancements like the CO2 laser and pulsed/scanned lasers, improving surgical outcomes. Laser techniques have revolutionized treatments of coloproctological conditions particularly diverticular disease, anal fissures, fistula in ano and pilonidal sinus. For hemorrhoidal disease, specific laser treatments include Laser Hemorrhoidectomy, Laser Hemorrhoidoplasty and Doppler-guided Hemorrhoidal Laser Dearterialization. Laser Hemorrhoidoplasty is a minimally invasive treatment showing early postoperative benefits over traditional methods[2]. Although the application of laser energy on hemorrhoidal tissue is still debated, limited studies on chronic anal fissures and anal stenosis have shown promising results. Laser technology in proctology is evolving, demonstrating efficacy and potential benefits for benign anal conditions. Challenges remain in optimizing laser-tissue interactions and ensuring consistent outcomes[3].

Reports reveal that Diode Laser treatment successfully resolves hemorrhoidal symptoms in 72-100% of patients. It is also used to treat anal fistulas with techniques like fistula laser closure and photo dynamic therapy, the latter showing up to 88% success in treating anal warts when combined with Nd: YAG or CO2 lasers. Diode laser treatment for anal fissures, fistulas, and hemorrhoids offers a minimally invasive alternative to conventional surgery. It reduces postoperative pain, intraoperative bleeding and infection risk while allowing quicker recovery. In fissures, it helps in healing by lowering sphincter tone. For fistulas, the laser closes the tract while preserving continence. In hemorrhoids, laser hemorrhoidoplasty shrinks and causes fibrosis of hemorrhoidal tissue. Overall, diode laser procedures are faster and cause less discomfort, making them a preferred option for many patients.

This study compares the use of Diode Laser and conventional surgical procedures for hemorrhoids, anal fissures and fistula in ano. It evaluates the advantages of Diode Laser in terms of postoperative pain, bleeding, recurrence rate, and duration of hospital stay, while also examining complications associated with both techniques.

Aims and Objectives:

- To evaluate the effectiveness of Diode Laser surgeries in the management of hemorrhoids, anal fissures and fistula in ano.
- To compare the complications associated with laser and conventional surgical treatment of hemorrhoids, anal fissures and fistula in ano.
- To assess the drawbacks in both techniques and steps to overcome them.

MATERIALS AND METHODS

Cases of Hemorrhoids, Anal fissures and Fistula-in ano admitted under Department of General Surgery in a government tertiary care centre were studied in this Prospective study with a sample size of 78 in each group.

Inclusion Criteria:

- Grade 1 and 2 Hemorrhoids, Chronic Anal fissures and Fistula in ano. patients were included after obtaining written informed consent from the patient.

Exclusion Criteria:

- Patients who were unwilling to participate in the study.
- Patients diagnosed with these conditions and associated with malignancy.
- Patients under the age of 14 years.
- Grade 3 and 4 hemorrhoids.

This comparative study evaluates patients admitted in General Surgery in J. A Group of Hospitals during the duration of 1 year and 6 months from October 2022-April 2024, after being diagnosed with Hemorrhoids, Anal fissures and Fistula-in-ano.

Preoperative evaluation of symptoms included digital rectal examination and proctoscopy to diagnose hemorrhoids, fissure in ano and fistula in ano, with proctoscopy avoided for non-cooperative patients and those with acute anal fissure. Radiographic studies like Sinogram and MR fistulogram were conducted as needed. During surgery, the type of procedure, anesthesia, duration and intraoperative blood loss were assessed. Blood loss was estimated using the Gauze Visual Analogue method, based on the study by Ali Algadiem[4].

Postoperatively blood loss, pain, infection, other postoperative complications and postoperative duration of stay was assessed. Pain was assessed using the Numeric Pain Rating Scale (NPRS), as referenced from the study by Rodriguez CS[5] (2001).

Patients were followed up for six months on an outpatient basis. Pain and bleeding were assessed during a follow-up visit after seven days. The recurrence rate was monitored over the six-month period.

All the findings were recorded and plotted on the data sheet and level of significance (p value) was set at 0.05. All the collected data was analysed using SPSS for Windows Version 16.0.Ethical clearance was taken from the Institution to conduct the study.

RESULTS AND DISCUSSIONS

A total of 156 patients underwent surgical treatment, evenly split between the two types of surgeries. Specifically, 78 patients (50.0%) received Diode Laser ablation and 78 patients (50.0%) underwent conventional surgical techniques. The mean age of patients in the Diode Laser ablation group was 43.2 years (SD: 11.4), while the mean age in the conventional surgery group was 40.3 years (SD: 11.6). The gender distribution of patients was similar between the Diode Laser ablation group and the conventional surgery group and is shown in (Table 1)
The mean duration of surgery was 27.6 minutes (SD: 6.5) for the Diode Laser ablation group, compared to 39.6 minutes (SD: 12.5) for the conventional surgery group.
In our study the mean intraoperative blood loss was significantly lower in the Diode Laser ablation group (3.18 ml, SD: 0.75) compared to the conventional surgery group (25.7 ml, SD: 14.5). The amount of postoperative bleeding,
measured in millilitres, showed a stark difference between the Diode Laser ablation group and the conventional surgery group. Only 6 patients among the 78 who underwent Laser ablation had post operative bleeding which was about 3ml while 88.46% of patients who underwent conventional procedure had post operative bleeding of which 30.76% had bleeding of about 12 ml postoperatively.
56.4% of patients (44 out of 78) in the Diode Laser ablation group, reported no pain postoperatively while 32.1% of Conventional surgical group had pain of 4 and 30.8% had pain of 5 according to NPRS scoring system. Rate of infection is shown in (Table 2)
The median hospital stay was 2 days for the Diode Laser ablation group and 3 days for the conventional surgery group. Recurrence rate in both groups is compared in (Table 3).
Hemorrhoids, anal fissures and anal fistulas impact many globally, with hemorrhoids being the most common due to age and lifestyle factors. Anal fissures and fistulas, though less frequent, also pose significant health challenges. Effective prevention and management are essential for improving patient outcomes. Minimally invasive laser techniques, such as laser hemorrhoidoplasty and laser ablation, are becoming popular alternatives to conventional surgeries due to their precision, reduced pain, minimal bleeding and faster recovery times. Research shows that laser treatments are effective and offer advantages over traditional methods in managing these common anal conditions.
The present study shows a significant difference in surgical duration between Diode Laser ablation and conventional surgery for treating fissures, fistulas and hemorrhoids. Diode Laser ablation averages 27.6 minutes (SD: 6.5), while conventional surgery averages 39.6 minutes (SD: 12.5), indicating that Diode Laser ablation is generally quicker. This was statistically significant and was in accordance with a similar study done by Basim Ghaib Hussein[6].
In this study Diode Laser ablation resulted in significantly lower blood loss, with a mean of 3.18 mL (SD: 0.75), compared to conventional surgery, which had a mean blood loss of 25.7 mL (SD: 14.5). This was similar to a study done by Basim Ghaib Hussein[6] where the mean blood loss in laser surgery was 8 ml and in traditional surgery was 20 ml.
In our study, 92.3% of patients in the Laser group experienced no postoperative bleeding, a statistically significant result. This aligns with similar studies by Basim Ghaib Hussein[6] and Yassin[7], where 96.7% of patients who underwent laser treatment reported no postoperative bleeding.
Majority of the Diode Laser ablation group did not report pain postoperatively while the conventional surgery group experienced moderate to severe pain levels, with substantial percentages reporting NPRS Scores 4, 5 and 6. This was similar to a study done by Kaushal[8] and Verma[9].
Comparing Diode Laser ablation to conventional surgery, postoperative infection rates were lower in the Diode Laser group, with only 1 patient affected

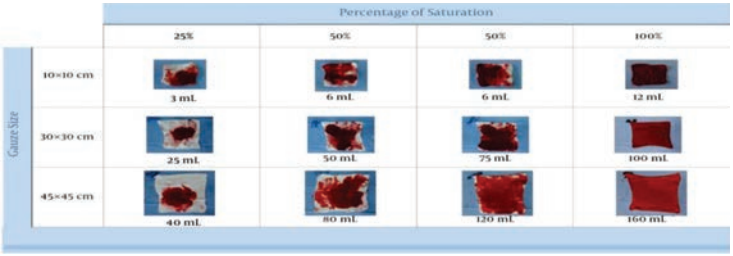

Fig. 1: Visual Guide for Determining Blood Loss for Three Different Sizes of Gauze(Courtesy: study by Ali Algadiem[4])

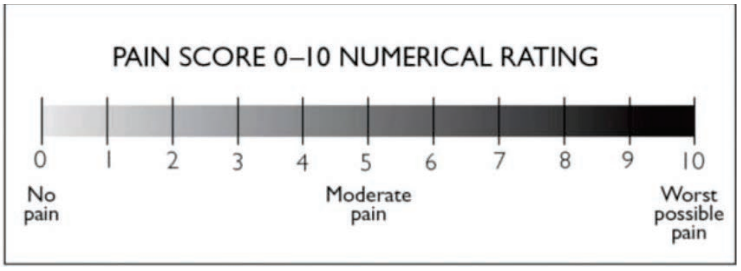

Fig. 2: Numeric Pain Rating Scale (Courtesy: study by Rodriguez CS)

Table 1: Gender distribution

	Laser Ablation (n =78)		Conventional Surgery (n=78)	
	N	%	N	%
Female	27	34.6	26	33.3
Male	51	65.4	52	66.7

Table 2: Infection

	Laser Ablation (n =78)		Conventional Surgery (n=78)	
	N	%	N	%
No	77	98.7	72	92.3
Yes	1	1.28	6	7.69

Pearson chi2(1) = 3.6068., p-value = 0.053

Table 3: Recurrence

	Laser Ablation (n =78)		Conventional Surgery (n=78)	
	n	%	N	%
No	76	97.4	70	89.7
Yes	2	2.56	8	10.3

Pearson chi2(1) = 3.6., p-value = 0.035

versus 6 patients in the conventional group. This suggests Diode Laser ablation may reduce the risk of postoperative infections, highlighting an advantage in minimizing infectious complications. These findings align with a study by Basim Ghaib Hussein[6].

Patients undergoing Diode Laser ablation had a median hospital stay of 2 days, whereas those who underwent conventional surgery stayed a median of 3 days post-operatively.

No other postoperative complications were reported in patients who underwent Laser procedures while 4 out of 78 (5.06%) of patients who underwent Conventional surgical procedures had other complications also.

About 2.56% of patients who underwent Laser procedure had recurrence compared to about 10.3% patients who underwent Conventional surgical procedures during the 6-month follow-up. This was comparable with the study done by Yassin[7] The study observed that while laser procedures offer benefits, they require expertise to avoid surrounding tissue damage. Conventional surgeries had higher intra and postoperative bleeding and pain, leading to longer hospital stays. Effective management of complications involves careful patient selection, skilled technique, thorough preoperative evaluation, comprehensive postoperative care, patient education and regular follow-up.

The future of Diode Laser technology in treating fissures, fistulas and hemorrhoids is promising due to its minimal invasiveness, reduced blood loss and quicker recovery times compared to traditional methods. Continued research and technological advancements are expected to further improve Diode Laser precision and effectiveness. Larger multi-center trials with extended follow-up are needed to validate long-term benefits and safety. Standardizing procedures and ensuring surgeon proficiency through training are critical for consistent outcomes. Establishing guidelines and protocols for Diode Laser use can optimize patient care, potentially making Diode Lasers a preferred treatment over conventional surgery.

Limitations: The study's limitations include being single-center with a small, possibly non-representative sample size, potential selection bias and variations in surgeon skill and equipment. Short follow-up periods might miss long-term effects and subjective measures like patient-reported pain can vary. Lack of blinding and uncontrolled confounding factors, such as patient comorbidities, can also introduce bias.

To overcome these limitations, future studies should be multi-center with larger sample sizes to ensure diversity. Randomization can reduce selection bias and longer follow-up periods can assess long-term outcomes. Standardizing procedures and equipment, implementing blinding, incorporating objective measures alongside patient-reported outcomes and controlling for confounding variables are crucial. Ensuring consistent resources and comprehensive reporting will enhance validity and generalizability.

CONCLUSION

This study entitled A COMPARATIVE STUDY OF USE OF DIODE LASER AND CONVENTIONAL SURGICAL TECHNIQUE IN HEMORRHOIDS, FISSURES AND FISTULA IN ANO is a prospective study and is conducted for a duration of 1.5 years from October 2022-April 2024. The study involved 156 patients, with 78 undergoing Laser ablation and 78 undergoing conventional surgery for hemorrhoids, fissure-in-ano and fistula-in-ano. The cohort included 53 females and 103 males. Preoperative and postoperative symptoms, along with intraoperative and postoperative observations, were recorded and compared. The results indicated that Laser procedures are faster, result in minimal blood loss, cause less postoperative pain and lead to shorter hospital stays compared to conventional surgical techniques. Additionally, Laser procedures showed lower rates of postoperative complications, infections, and recurrence.

REFERENCES

1. Gopal, D.V., 2002. Diseases of the rectum and anus: A clinical approach to common disorders. Clin. Cornerstone, 4: 34-46.
2. Plapler, H., 2008. A new method for hemorrhoid surgery: Experimental model of diode laser application in monkeys. Photo Laser Surg., 26: 143-146.
3. Fleshman, J., 2002. Advanced technology in the management of hemorrhoids. J. Gastr Surg., 6: 299-301.
4. Algadiem, E.A., A.A. Aleisa, H.I. Alsubaie, N.R. Buhlaiqah, J.B. Algadeeb and H.A. Alsneini, 2016. Blood loss estimation using gauze visual analogue. Trauma Monthly, Vol. 21 .10.5812/traumamon. 34131.

5. Rodriguez, C.S., 2001. Pain measurement in the elderly: A review. Pain Manage. Nurs., 2: 38-46.
6. Basim, G.H., I.A. Jameel and A.H. Rabah, 2020. Diode Laser and Conventional Surgery Treatment, A Comparative Study in Anal Diseases. Med legal Upd., Vol. 20, No. 1.
7. Yassin, M.M.G., M.A. Nada, E.F. Ebeid, and A.M. Boutrous, 2022. Comparative study between excisional hemorrhoidectomy and laser hemorrhoidoplasty in third-degree piles. Egy Jour Sur., 41: 1801-1809.
8. Kaushal, A., A. Aakanksha, K. Amanpriya, A. Rajesh and N.K. Dhruv, et al., 2020. "A Prospective Comparative Study: Stapler Hemorrhoidopexy Vs Laser Hemorrhoidoplasty in the Treatment of Hemorrhoids". Jou Adv Med Med Res., 32: 10-23.
9. Rajkumar, V., K. Narendra and M. Vipin, 2024. A comparative study between laser hemorrhoidoplasty with digital-guided hemorrhoidal artery ligation and conventional (Milligan-Morgan) hemorrhoidectomy. Asian Jou of Me Sci., 15: 218-222.