

Comparative study of laser versus open lateral internal sphincterotomy in the treatment of anal fissure



Rajkumar Verma¹, Pooja Prajapati², Prashant Kumar³

¹Professor, ^{2,3}Junior Resident, Department of Surgery, M.L.B. Medical College, Jhansi, Uttar Pradesh, India

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ABSTRACT

Background: Anal fissure is a common proctological problem that causes anal pain during and after defecation. An anal fissure is a linear ulcer that presents at the anal verge. It is more common in females than males and can be seen either in the anterior or posterior midline, just distal to the dentate line. **Aims and Objectives:** Comparison of Laser versus Open lateral internal sphincterotomy (LIS) in the treatment of anal fissures. **Materials and Methods:** The study was conducted in 50 cases of Open LIS compared with 50 cases of laser LIS (LLIS) in patients admitted to the Department of Surgery, M.L.B. Medical College, Jhansi (UP), India, between January 2021 and June 2022. **Results:** Out of 50 cases of open LIS, 10 patients presented with bleeding, 10 patients presented with hematoma/perianal swelling and 5 patients presented with pain as compared to 50 cases of LLIS, hematoma/perianal swelling (1 patient) and pain (2 patients) were found as an early post-operative complication. Mean hospital stay was 2.84 ± 1.128 days in Open LIS as compared to 1.02 ± 0.141 days in LLIS. The pain was presented in 1 patient as the only late post-operative complication in LLIS as compared to pain (25 patients), bleeding (10 patients), infection (2 patients), and flatus incontinence (1 patient) in Open LIS, at 2 weeks follow-up and recurrence in 1 patient in laser and in 3 patients in open LIS at 6 weeks follow up. **Conclusion:** LLIS significantly reduces early postoperative complications such as postoperative pain, bleeding, and hematoma as compared to open LIS. The duration of hospital stay was significantly less in LLIS in comparison to open LIS. None of the patients presented with the flatus or stool incontinence who had undergone LLIS while in Open LIS, 12% of patients presented with flatus incontinence, and 2% of patients presented with stool incontinence during follow-up in 2–6 weeks.

Key words: Incontinence; Anal fissure; Lateral internal sphincterotomy

INTRODUCTION

Anal fissure is a common proctological problem, which presents with pain in the anal region during and after defecation. Anal fissure is a linear ulcer which presents at the anal verge. It is more common in females than males, it can be seen either in the anterior or the posterior midline just distal to the dentate line. In females, 89% of fissures occur posteriorly, and only 10% of the fissures are seen in the anterior midline.

While in males 98% of fissures are posterior and 2% are anterior.¹⁻⁴ The pathogenesis of this condition is still not fully explained, but it appears to be related to the passage of hard stool or prolonged diarrhea with stretching of the anal canal resulting in a split in the anoderm.⁴

The explanation for this phenomenon is both anatomic and functional. The posterior commissure of the anoderm is less well-perfused than other anodermal regions. Chronic fissures are characterized by a sentinel tag, hypertrophic

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Address for Correspondence:

Dr. Pooja Prajapati, Department of Surgery, M.L.B. Medical College, Jhansi, Uttar Pradesh, India. **Mobile:** +91-8791335272.

E-mail: poojakrj3206@gmail.com

anal papillae, anal spasm, or fibrosis of the internal sphincter muscle, so surgery performed for chronic anal fissure is lateral internal anal sphincterotomy, which may be performed by open and laser method.

Aims and objectives

Aims

- Comparison of Laser versus Open lateral internal sphincterotomy (LIS) in the treatment of anal fissures.

Objectives

- To compare the post-operative pain among patients undergoing laser versus open LIS
- To compare the post-operative bleeding pattern among patients undergoing laser versus open LIS
- To compare the risk of developing incontinence to flatus and/or stool in patients undergoing LIS in the two groups (laser vs. open)
- To compare the risk of recurrence in patients undergoing LIS in the two groups (laser vs. open)
- To compare the risk of developing fistula in patients undergoing LIS in two groups (laser vs. open).

MATERIALS AND METHODS

The prospective study was conducted in 50 cases of Open LIS, compared with 50 cases of Laser LIS (LLIS) in patients admitted to the Department of Surgery, Maharani Laxmi Bai Medical College, Jhansi between January 2021 and June 2022.

Inclusion criteria

- The patient above 18 years with a primary chronic anal fissure, with or without blood in stools
- Patients giving informed consent
- Patient who had previous surgery for anal fissure.

Exclusion criteria

- Patients with fissures secondary to other diseases such as Crohn's disease, ulcerative colitis, tuberculosis, or anal warts
- Any comorbid condition (diabetes Mellitus, Malignancies).

Randomization

Random allocation of age- and sex-matched patients (sample size=50) presenting with symptoms suggestive of anal fissure and recurrent cases of LIS, will be done into two groups. The two groups will be as follows:

- Group A: Open LIS (n=50)
- Group B: LLIS (n=50).

Pre-operative preparation included

Complete blood count, fasting blood sugar, urea, and electrolytes. Patients will be given either general anesthesia

or regional anesthesia and were placed in the lithotomy position. Skin preparation with povidone iodine followed by appropriate droppings. Palpation will be done using the operating surgeon's index finger and the tight distal internal sphincter and intersphincteric groove will be identified.

Laser technique

The procedure is performed under general or regional anesthesia, patients were positioned in the lithotomy position, insertion of a bivalve type of anal speculum, the tight distal internal sphincter is palpable as a tight band within the anal canal. The intersphincteric groove, which marks the distal end of the internal sphincter is easily palpable. An incision is made over intersphincteric groove at 3° clock position with laser beam and internal sphincter is hooked with right-angled forceps and is cut using a diode laser of wavelength 1470 nm and energy of 10 W/s/mm in continuous wave (CW) operating mode (Figure 1).

The full thickness of the internal sphincter is divided with a laser and checked for hemostasis. In addition, the chronic fibrosed scar is also debrided with laser along with excision of the skin tag. This prevents any long-term discomfort and enables a quicker recovery. This procedure is almost bloodless and the surgeon has good control over the operation site. Laser specifications for LIS-

Laser type-

- Diode laser
- Wavelength - 1470 nm
- Energy - 10 w/s/mm
- Operation mode - CW
- Laser fibers - bare fibers.

Advantages of LLIS-

- Internal sphincter cut under vision which decreases incontinence
- Bloodless field
- No lateral spread of current as seen with electrocautery (>2 cm)
- No chances of partial sphincterotomy.

Open technique

In the open method, patients were positioned in the lithotomy position, sterilization of the anal region, insertion of a bivalve type of anal speculum to place the internal sphincter on a slight stretch to assist in its identification. A radial incision is made laterally at the lower border of the internal sphincter over the intersphincteric groove. The distal internal sphincter is grasped with Allis forceps and bluntly freed. The lower one-third to one-half is divided with scissors (Figure 2).

Visual analog scale (VAS)

Operationally, a VAS is usually a horizontal line, 100 mm in length, anchored by word descriptors at each end, as illustrated in Figure. The patient marks the point on the line that they feel represents their perception of their current state of pain. The VAS score is determined by measuring in millimeters from the left-hand end of the line to the point that the patient marks.

Statistical analysis

The data were summarized as mean values with standard deviations (SD). The statistical analysis was performed using Student’s t-test and Chi-square test. The SPSS 11.0 for Windows computer software (SPSS Inc., Chicago, IL) was used for statistical analysis. P<0.05 will be considered statistically significant.

RESULTS

Out of 50 cases of open LIS, 10 patients presented with bleeding, 10 patients presented with hematoma/

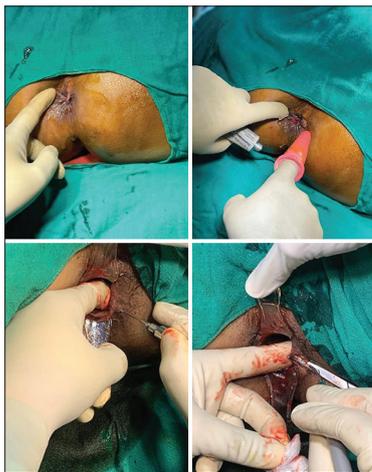


Figure 1: Laser lateral internal sphincterotomy procedure

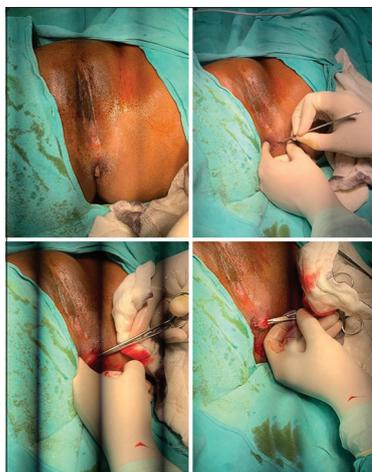


Figure 2: Open lateral internal sphincterotomy procedure

perianal swelling and 5 patients presented with pain as compared to 50 cases of LLIS, hematoma/perianal swelling (1 patient) and pain (2 patients) was found as an early post-operative complication. Mean hospital stay was 2.84±1.128 days in Open LIS as compared to 1.02±0.141 days in LLIS. The pain was presented in 1 patient as the only late post-operative complication in LLIS as compared to pain (25 patients), bleeding (10 patients), infection (2 patients), and flatus incontinence (1 patient) in Open LIS, at 2 weeks’ follow-up and recurrence in 1 patient in laser and in 3 patients in open LIS at 6 weeks’ follow-up.

DISCUSSION

Anal fissure is defined as a tear in the skin of anal canal distal to the dentate line. The main presenting symptom is pain during defecation which may last for few seconds to few hours. Spasm and persistent hypertonia of IAS may develop in chronic cases leading to impairment of blood supply to the affected area and subsequent poor wound healing and recurrence. A number of pharmacological sphincter relaxants have been introduced and claimed to show good results but surgical treatment is frequently needed. In our study, we have compared surgical treatment in 50 patients in group A (open LIS) versus 50 patients in group B LLIS.

Age

In our study, in Group A (Open), 4% were in 1–20 years, 74% in 21–40 years, 18% in 41–60 years, 4% in >60 years. In Group B (Laser), 14% in 1–20 years, 48% in 21–40 years, 28% in 41–60 years, 10% in >60 years. The mean age of the patient in Group A was 34.54±12.630 and in Group B was 38.92±18.551 (Tables 1 and 2). There was no significant difference between the two groups on the basis of age distribution (P≥0.05) and

Table 1: Age distribution in the study group

Age	Group A (Open)		Group B (Laser)	
	No	Percentage	No	Percentage
1–20 years	2	04	7	14
21–40 years	37	74	24	48
41–60 years	9	18	14	28
>60 years	2	04	5	10
Total	50	100	50	100

Table 2: Sex distribution in study group

Sex	Group A (Open)		Group B (Laser)	
	No	Percentage	No	Percentage
Male	25	50	30	60
Female	25	50	20	40
Total	50	100	50	100

maximum number of patients were in 21–40 years of age in both the groups.

Our study is comparable to Kortbeek et al.,⁵ Sarhan,⁶ Fateh et al.,⁷ and Verma et al.,⁸ with respect to the age of presentation with most common age group between 21 and 40 years with mean age 34.54 ± 12.630 years in

Table 3: Early postoperative complication

Parameters	Group A (Open)		Group B (Laser)	
	n	%	n	%
Bleeding	10	20	0	0
Hematoma/Perianal swelling	10	20	1	2
Pain	5	10	2	4

Table 4: Mean visual analog score

VAS pain score	Group A (open) (Mean±SD)	Group B (laser) (Mean±SD)	P-value
6 h	5.62±0.490	5.28±0.497	0.008 (S)
12 h	4.58±0.538	4.18±0.523	0.003 (S)
24 h	4.12±0.627	3.18±0.523	0.001 (S)
36 h	3.26±0.527	2.34±0.658	0.001 (S)
48 h	2.46±0.613	0.48±0.707	0.001 (S)

Table 5: Mean hospital stay (in days) in a study group

Mean hospital stay	Group A (open)	Group B (laser)	P-value
Mean±SD	2.84±1.218	1.02±0.141	0.001 (S)

Table 6: Late complications during follow-up at a surgical clinic in 2 weeks

Follow after 2 weeks	Group A (open)		Group B (laser)	
	No	Percentage	No	Percentage
Pain	25	50	2	4
Bleeding	10	20	0	0
Perianal abscess	0	0	0	0
Infection	2	4	0	0
Flatus incontinence	1	2	0	0
Stool incontinence	0	0	0	0
Pruritus ani	0	0	0	0

Table 7: Late complications during follow-up at the surgical clinic in 6 weeks

Follow after 6 weeks	Group A (open)		Group B (laser)	
	No	Percentage	No	Percentage
Fistula	0	0	0	0
Recurrence	3	6	1	2
Infection	2	4	0	0
Flatus incontinence	6	12	0	0
Stool incontinence	1	2	0	0
Pruritus ani	1	2	0	0

group A (open) and 38.92 ± 18.551 years in group B (laser) (Table 2).

Sex

In our study, in Group A (Open), males were 50% and females were 50% and in Group B (Laser), males were 60% and females were 40% (Table 3). In our study, we found the equal incidence of anal fissure in males (50%) and females (50%) in group A (open) and more incidence of anal fissure in males (60%) than females (40%) in group B (laser), which is comparable to Verma et al.⁸

Early post-operative complications

In our study, in Group A (Open), 10% of patients presented with pain in the early postoperative period, 20% of patients presented with bleeding and 20% of patients presented with hematoma. In group B (Laser), 4% of patients presented with pain and 2% of patients presented with hematoma. No patient presented with bleeding in the early postoperative period in Group B (Laser). The true incidence of early postoperative complications has not been known as we have not found any study which has been done comparing early postoperative complications in open LIS versus LLIS.

Postoperative pain score

In our study, in group A (Open), the mean postoperative pain score on VAS at 6 h was 5.62 ± 0.490 , at 12 h score was 4.58 ± 0.538 , at 24 h score was 4.12 ± 0.627 , at 36 h score was 3.26 ± 0.527 and at 48 h score was 2.46 ± 0.613 . In group B (Laser) mean postoperative pain score on VAS at 6 h was 5.28 ± 0.497 , at 12 h 4.18 ± 0.523 , at 24 h 3.18 ± 0.523 , at 36 h 2.34 ± 0.658 , at 48 h 0.48 ± 0.707 (Table 4). The mean postoperative pain score on VAS was significantly less at 6–48 h in group B (laser). Our study is comparable to Gupta et al.,⁹ by Fateh et al.,⁷ and Verma et al.,⁸ with respect to the postoperative pain being significantly less in group B (Laser) as compared to group A (open).

Mean hospital stay

In our study, in group A (Open), the mean hospital stay was 2.84 ± 1.218 days and in Group B (Laser), mean hospital stay was 1.02 ± 0.141 days (Table 5), which is comparable with Gupta et al.,⁹ showed mean duration of stay was 2.38 ± 1.33 days in patients undergoing closed sphincterotomy compared with 3.38 ± 2.45 days in open sphincterotomy group ($P=0.004$).

Late complication during follow-up at surgical clinical in 2 weeks

In our study, in group A, 50% of patients presented with pain, 20% of patients presented with bleeding per rectum, 2% of patients presented with infection and 1%

of patients presented with flatus incontinence during follow-up in 2 weeks. In group B (Laser), 2% of patients presented with pain during follow-up in 2 weeks were significantly less in group B (Laser) in comparison to Group A (Open) (Table 6).

In a study by Al-Hawaz and Kata,¹⁰ 10% of patients complained of pain in the closed method while 6% of patients in the open method. Bleeding was in 4% of patients in the closed method and in 8% of patients in the open method. Infection was in 6% of patients in each method. No fecal incontinence only flatus incontinence in closed method, i.e., 20% of patients while 28% of patients in open method. Recurrence was in 8% of patients in closed method and 8% of patients in open method.

Late complication during follow-up in 6 weeks

In our study, in Group A (Open), 6% of patients presented with recurrence, 4% of patients presented with infection, 12% of patients presented with flatus incontinence, 2% of patients presented with stool incontinence, 2% of patients presented with pruritus ani during follow-up in 6 weeks. In group B (Laser), 2% of patients presented with recurrence during follow-up in 6 weeks, which is compared with Acar et al.,¹¹ showed In the early postoperative period, rectal bleeding was a common problem in 182 patients (34.1%). In addition, three patients had a perianal abscess and two patients who used anticoagulants (i.e., clopidogrel or acetylsalicylic acid) had a perianal hematoma. These patients were relieved after drainage of the abscess and hematoma. In long-term follow-up, recurrence occurred in 15 patients (3.6%) (12 males, three females) and eight patients (1.9%) who developed incontinence (four with gas, four with soiling, and seven females, one male). The recurrence rate was higher in anterior fissures (67%). Of the patients with recurrence, nine of them had one and two of them had two prior surgeries. All females with incontinence had prior vaginal deliveries and the male with incontinence had prior anorectal surgery. The complaints of all patients with gas incontinence and a patient with fluid incontinence (male) regressed in the postoperative 4th month, whereas three patients (all females) had permanent fluid incontinence.

In our study, only recurrence was present in one patient as the late complication during follow-up in 6 weeks in group B (Laser) which was significantly less as compared to patients in Group A (Open) (Table 7).

Limitations of the study

This was a single-centered study.

CONCLUSION

While assessing all the parameters, LLIS was found to be superior as it significantly reduces post-operative complications such as postoperative pain, bleeding, and hematoma without reporting post-operative flatus or stool incontinence in any patient and with a short duration of hospital stay (1 day).

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RV, PP, PK- Concept and design of the study, prepared first draft of manuscript; interpreted the results; reviewed the literature and manuscript preparation; concept, coordination, preparation of manuscript and revision of the manuscript.

Work attributed to:

M. L. B. Medical College, Jhansi - 284 128, Uttar Pradesh, India.

Orcid ID:

Rajkumar Verma -  <https://orcid.org/0009-0002-4645-4529>

Pooja Prajapati -  <https://orcid.org/0009-0008-7972-7566>

Prashant Kumar -  <https://orcid.org/0009-0001-8404-4398>

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