



Original Research Article

Comparison of Postoperative Outcomes with Closed Versus Open Lateral Internal Sphincterotomy in Patients with Chronic Anal Fissure

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Abstract: **Background:** The chronic anal fissure is a common anorectal condition characterized by severe anal pain during or after defecation and passage of bright red blood per rectum. When conservative management fails, lateral internal sphincterotomy is considered the standard surgical treatment, which can be performed using either the open or closed technique. **Objectives:** To compare postoperative outcomes with closed versus open lateral internal sphincterotomy in patients with chronic anal fissure. **Study design & Setting:** This study was conducted at Department of General Surgery Bakhtawar Amin Medical & College, Multan from 14 May 2025 to 14 August 2025. **Methodology:** A total of 70 patients aged 18–60 years with chronic anal fissure of more than three months duration not responding to conservative treatment were included in the study. Patients were allocated into two groups with 35 patients in each group. Group A underwent open lateral internal sphincterotomy, while Group B underwent closed lateral internal sphincterotomy. Patients were followed for six weeks postoperatively and assessed for pain using the visual analog scale (VAS), anal bleeding, and seroma formation. Data were analyzed using SPSS version 23. Quantitative variables were presented as mean $\pm$ SD, while qualitative variables were presented as frequencies and percentages. The Chi-square test was applied to compare outcomes between groups with a significance level of $p \leq 0.05$. **Results:** The mean age of patients was 35.92 ± 9.14 years in the open LIS group and 36.48 ± 8.67 years in the closed LIS group. Postoperative pain was observed in 25.7% of patients in the open group and 11.4% in the closed group ($p=0.12$). Anal bleeding occurred in 28.6% of patients in the open group compared with 8.6% in the closed group ($p=0.03$). Seroma formation was observed in 20.0% of patients in the open group and 5.7% in the closed group ($p=0.07$). **Conclusion:** Closed lateral internal sphincterotomy showed relatively lower postoperative complications compared with the open technique and may be considered a safer surgical option for chronic anal fissure.

Keywords: Anal fissure, Chronic anal fissure, Closed lateral internal sphincterotomy, Open lateral internal sphincterotomy, Postoperative complications.

INTRODUCTION

Anal fissure is defined as “the presence of visible transverse internal anal sphincter fibers at the base of an anal fissure of duration not less than 6 weeks”.¹ Patients usually present with pain in the

anal region during or after defecation and passage of bright red blood per anus.² It affects all age groups and both genders, but is more commonly found in young adults.³ Posterior midline is the commonest site and the most common etiology is constipation.⁴

Patients with anal fissure have a high resting anal pressure in the anal canal which may be due to chronic overactivity of the internal sphincter.⁵ In females, it is usually triggered during pregnancy and following childbirth.⁶

The open technique involves making an incision across the inter-sphincteric groove, separating the internal sphincter from the anal mucosa by blunt dissection and dividing the internal sphincter using scissors⁷ while the closed technique involves making a small incision at the inter-sphincteric groove, inserting a scalpel with the blade parallel to the internal sphincter and advancing it along the inter-sphincteric groove and then rotating the scalpel towards the internal sphincter and dividing it.⁸ In both techniques the lower one-third to one-half of the internal sphincter is divided to lower the resting pressure without destroying the effect of the sphincter.

Bansal AR et al. studied 40 patients with chronic anal fissure dividing them into two equal groups [Group A – standard closed lateral internal sphincterotomy (CLIS), Group B – standard open lateral internal sphincterotomy (OLIS)]. Mean pain score was found to be significantly higher in group B compared to group A at 3 weeks and at 6 weeks (2.15 ± 0.68 vs 0.95 ± 0.887 and 1.40 ± 0.59 vs 0.45 ± 0.605).¹⁰ Kachavi HS et al. compared the open and closed techniques of lateral internal sphincterotomy including 60 patients with chronic anal fissure (30 in each group). Bleeding, seroma, hematoma and abscess formation were less in the closed group compared to the open group (7%, 7%, 7%, 3% vs 30%, 33%, 40%, 7% respectively).¹¹

The closed technique has the advantage of a smaller wound. Both techniques can be performed under local anesthesia. The data available from various studies investigating chronic anal fissures are very heterogeneous, with large variation in healing rates. We have planned this comparative study to assess the outcome (in terms of pain, healing, bleeding, seroma, hematoma and abscess) associated with either procedure in patients presenting with chronic anal fissure at our local setting. This will help surgeons choose the most suitable technique with more benefits while dealing with chronic anal fissure. Objective is to compare postoperative outcomes with closed versus open lateral internal sphincterotomy in patients with chronic anal fissure. The hypothesis was that the frequency of postoperative bleeding was higher in patients undergoing open lateral internal sphincterotomy compared with those undergoing closed lateral internal sphincterotomy.

MATERIALS AND METHODS

This quasi-experimental study was conducted following approval from the Institutional

Review Board (Ref. No. 0901-25/E.C./BAM&DC, dated 14th May, 2025) at the Department of General Surgery Bakhtawar Amin Medical & College, Multan from 14 May 2025 to 14 August 2025. This study was conducted in the Department of General Surgery at Bakhtawar Amin Medical and Dental Hospital over a period of six months after approval of the synopsis. The sample size was calculated using the WHO sample size calculator for two-group proportion hypothesis testing. The expected frequency of bleeding in open LIS was 30% and in closed LIS was 7%, with a power of study of 80% and a significance level of 5%, resulting in a total sample size of 70 patients, with 35 patients in each group.¹⁰ Non-probability consecutive sampling was used for patient selection. Patients aged 18–60 years of either gender with chronic anal fissure of more than three months duration not responding to conservative management were included in the study. Patients with fissures during pregnancy, inflammatory bowel disease, HIV infection, or malignancy were excluded.

After obtaining ethical approval from the institutional review committee, a total of seventy patients fulfilling the inclusion criteria were enrolled after obtaining informed consent. Baseline characteristics including age, gender, and duration of illness were recorded. Patients were allocated to group A (open lateral internal sphincterotomy) and group B (closed lateral internal sphincterotomy). All surgical procedures were performed by a consultant surgeon with five years of experience under general anesthesia according to hospital protocol. Postoperatively, patients were followed up in the outpatient department at two-week intervals for six weeks. During follow-up visits, patients were assessed for postoperative pain using the visual analog scale, anal bleeding, and seroma formation by the consultant surgeon. All data were recorded on a structured proforma.

Chronic anal fissure was operationally defined as patients presenting with pain described as sharp, tearing, cutting, or burning with a visual analog scale (VAS) score greater than 3, along with blood-stained feces or fresh blood during defecation, and a deeper tear in the anal mucosa detected on clinical examination with a duration of more than eight weeks. Postoperative outcomes were assessed in terms of bleeding, pain, and seroma formation. Bleeding was defined as the presence of bright red blood on the stool or toilet paper after a bowel movement within six weeks postoperatively. Pain was defined as pain during defecation or within one to two hours after defecation with a VAS score greater than 3 at six weeks postoperatively. Seroma formation was defined as a collection of clear fluid around the surgical incision site within six weeks postoperatively confirmed by needle aspiration.

Data analysis was performed using SPSS version 23. The normality of data was assessed using the Shapiro–Wilk test. Quantitative variables such as age and duration of illness were presented as mean $\pm$ standard deviation. Qualitative variables including gender, pain, bleeding, and seroma formation were presented as frequencies and percentages. The Chi-square test was applied to compare postoperative

pain, bleeding, and seroma formation between the two groups. Stratification was performed with respect to age groups, gender, and duration of illness to evaluate their effect on postoperative complications. A p-value of less than 0.05 was considered statistically significant for all comparisons.

RESULTS

A total of 70 patients with chronic anal fissure were included in the study, with 35 patients in each group. The mean age of patients in the open LIS group was 35.92 ± 9.14 years, while in the closed LIS group it was 36.48 ± 8.67 years ($p=0.78$). The mean duration of illness was 4.86 ± 1.21 months in the open LIS group and 4.74 ± 1.33 months in the closed LIS group ($p=0.64$). Regarding gender distribution, 21 (60.0%) patients were male and 14 (40.0%) were female in the open LIS group, whereas 20 (57.1%) were male and 15 (42.9%) were female in the closed LIS group ($p=0.81$), as given in Table 1.

Table 1: Baseline Characteristics of Patients (n = 70)

Variable	Open LIS (n = 35)	Closed LIS (n = 35)	p-value
Age (years), Mean $\pm$ SD	35.92 ± 9.14	36.48 ± 8.67	0.78
Duration of illness (months), Mean $\pm$ SD	4.86 ± 1.21	4.74 ± 1.33	0.64
Gender			
Male	21 (60.0%)	20 (57.1%)	0.81
Female	14 (40.0%)	15 (42.9%)	

Postoperative pain at six weeks was observed in 9 (25.7%) patients in the open LIS group compared with 4 (11.4%) patients in the closed LIS group, while the remaining 26 (74.3%) and 31 (88.6%) patients in the respective groups had no pain ($p=0.12$), as given in Table 2.

Table 2: Postoperative Pain at 6 Weeks in Patients Undergoing Open and Closed LIS (n = 70)

Pain (VAS >3)	Open LIS (n = 35)	Closed LIS (n = 35)	p-value
Yes	9 (25.7%)	4 (11.4%)	0.12
No	26 (74.3%)	31 (88.6%)	

Postoperative anal bleeding was reported in 10 (28.6%) patients in the open LIS group and 3 (8.6%) patients in the closed LIS group, whereas bleeding was absent in 25 (71.4%) and 32 (91.4%) patients respectively ($p=0.03$), as given in Table 3.

Table 3: Postoperative Anal Bleeding at 6 Weeks in Patients Undergoing Open and Closed LIS (n = 70)

Anal Bleeding	Open LIS (n = 35)	Closed LIS (n = 35)	p-value
Yes	10 (28.6%)	3 (8.6%)	0.03
No	25 (71.4%)	32 (91.4%)	

Seroma formation at six weeks postoperatively was observed in 7 (20.0%) patients in the open LIS group and 2 (5.7%) patients in the closed LIS group, while the majority of patients did not develop seroma, including 28 (80.0%) in the open LIS group and 33 (94.3%) in the closed LIS group ($p=0.07$), as given in Table 4.

Table 4: Seroma Formation at 6 Weeks in Patients Undergoing Open and Closed LIS (n = 70)

Seroma Formation	Open LIS (n = 35)	Closed LIS (n = 35)	p-value
Yes	7 (20.0%)	2 (5.7%)	0.07
No	28 (80.0%)	33 (94.3%)	

Data are presented as n (%) or mean $\pm$ SD. Chi-square test was applied for categorical variables and independent t-test for continuous variables. A p-value ≤ 0.05 was considered statistically significant.

DISCUSSION

Chronic anal fissure is a painful linear tear of the

distal anal canal, usually caused by hypertonia and ischemia of the internal sphincter. It commonly

presents with severe pain, bleeding per rectum, and spasm during defecation. Conservative measures often fail in chronic cases, necessitating surgical intervention. Lateral internal sphincterotomy (LIS) is considered the gold standard for treatment with high healing rates. It can be performed using either the open technique under direct vision or the closed technique through a stab incision. Both approaches aim to reduce sphincter pressure, but their postoperative outcomes remain debated.¹¹

The present study compared postoperative outcomes between open and closed lateral internal sphincterotomy in 70 patients with chronic anal fissure. The mean age of patients in our study was 35.92 ± 9.14 years in the open LIS group and 36.48 ± 8.67 years in the closed LIS group, which is comparable with the findings of Ahmed et al. (2018), who reported mean ages of 41.40 ± 11.6 years in the open LIS group and 39.12 ± 12.34 years in the closed LIS group.¹³ Similarly, Mohsin et al. (2025) reported a mean age of 38.29 ± 10.74 years among patients with chronic anal fissure, which is also close to the age distribution observed in our study.¹⁹

Postoperative pain in our study was observed in 25.7% of patients in the open LIS group and 11.4% in the closed LIS group at six weeks postoperatively ($p=0.12$), indicating relatively less pain in the closed technique, although the difference was not statistically significant. These findings are consistent with the results reported by Ahmed et al. (2018), who demonstrated significantly lower postoperative pain scores in the closed LIS group at 12 hours (5.76 ± 0.91 vs 6.45 ± 0.79 , $p<0.0001$) and at 24 hours (2.00 ± 0.29 vs 2.39 ± 0.61 , $p<0.0001$). Similarly, Kachavi et al. (2022) observed that postoperative pain after 48, 60, 72 and 96 hours was lower in the closed LIS group compared with the open technique.²⁰

In the present study, postoperative bleeding was observed in 28.6% of patients in the open LIS group compared with 8.6% in the closed LIS group ($p=0.03$), indicating a higher frequency of bleeding with the open technique. Our findings are partially comparable with those reported by Zafar et al. (2021), who found that postoperative bleeding and pain were statistically insignificant between the two groups ($p=0.145$), although they reported a significantly higher infection rate in the open sphincterotomy group (15.6%) compared with the closed group (4.4%) ($p=0.013$).¹⁴ Similarly, Nasir et al. (2022) reported that patients undergoing closed LIS experienced less postoperative pain, bleeding, and flatus incontinence ($p=0.04$), although infection and recurrence rates were not significantly different between groups.¹⁵

Seroma formation in our study occurred in 20.0% of patients in the open LIS group compared with 5.7% in the closed LIS group ($p=0.07$), demonstrating a

lower complication rate with the closed technique. Similar findings were reported by Kachavi et al. (2022), who observed lower rates of postoperative complications including seroma, hematoma, and abscess formation in patients treated with closed lateral internal sphincterotomy compared with the open technique.²⁰

Although our study primarily evaluated postoperative complications, previous studies have also investigated healing and recurrence rates after lateral internal sphincterotomy. Naqvi et al. (2024) reported a healing rate of 95.12% and recurrence rate of 4.88% following lateral internal sphincterotomy among 41 patients, which is consistent with the generally favorable outcomes reported for this procedure.¹² Similarly, a meta-analysis by Asefa et al. (2023) reported an overall healing rate of 90.2%, recurrence rate of 3.7%, and postoperative incontinence rate of 8.9% after LIS. The same meta-analysis suggested that closed LIS may have lower rates of postoperative incontinence (RR 0.60, 95% CI 0.37–0.96), although differences in recurrence rates between the two techniques were not statistically significant.¹⁶

Shah et al. (2022) also reported superior outcomes with the closed technique, where normal healing was observed in 97.61% of patients undergoing closed LIS compared with 92.85% in the open LIS group, while fecal incontinence was substantially higher in the open group (21%) compared with the closed group (4%).¹⁷ Similarly, Tanveer et al. (2024), in a pooled analysis of 16 trials involving 1,711 patients, reported that closed LIS was associated with significantly lower risks of delayed fissure healing (OR 0.28, 95% CI 0.10–0.77, $p=0.01$), postoperative pain (OR 0.56, 95% CI 0.35–0.91, $p=0.02$), and overall complications (OR 0.33, 95% CI 0.19–0.55, $p<0.0001$), as well as shorter hospital stay (MD -0.82 days, $p<0.00001$).¹⁸

Overall, the findings of the present study demonstrate that both open and closed lateral internal sphincterotomy are effective surgical procedures for chronic anal fissure; however, the closed technique tends to be associated with lower postoperative pain and fewer complications such as bleeding and seroma formation. These observations are largely consistent with the majority of previously published studies, which have reported improved postoperative outcomes and lower complication rates with the closed lateral internal sphincterotomy technique.

CONCLUSION

Closed and open lateral internal sphincterotomy were both effective surgical procedures for the management of chronic anal fissure. However, the closed technique was

associated with relatively lower postoperative pain, bleeding, and seroma formation compared with the open technique. Therefore, closed lateral internal sphincterotomy may be considered a safer and preferable option for the treatment of chronic anal fissure.

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