

Original Research Article

A prospective study on the outcomes of lateral internal sphincterotomy for chronic anal fissure

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ABSTRACT

Background: An anal fissure is a common problem caused due to an elongated tear in the longitudinal axis of the lower anal canal. It causes severe pain during defecation and anal bleeding that stains the tissue or streaks the stool. Medical and conservative treatment methods may be sufficient for acute anal fissures. However, in chronic anal fissures, Lateral internal sphincterotomy (LIS) is the standard treatment that results in healing in the maximum number of cases. The present study aims to seek the safety of lateral internal sphincterotomy along with studying its early and late complications, factors affecting the recurrence and incontinence in patients of lateral internal sphincterotomy and methods to avoid incontinence in such patients.

Methods: The study was planned by selecting a total of 100 patients who underwent lateral internal sphincterotomy with an equal number of males and females.

Results: The study revealed that early complications (viz. pain, post-operative bleeding, urinary retention, infection and hematoma) and late complications (viz. abscess formation, anal incontinence, anal stenosis and recurrence) were observed in some of the patients. All the early and late complications were managed by following the standard procedures during the follow-up period. No major complication persisted in the patients under study.

Conclusions: The study concluded that the procedure of lateral internal sphincterotomy is an effective and safe procedure for the problem of chronic anal fissures.

Keywords: Anal tag, Anal Incontinence, Anal stenosis, Chronic anal fissure, Epithelization, Lateral internal sphincterotomy, Post operative bleeding

INTRODUCTION

An anal fissure is one of the most common anorectal diseases resulting from a longitudinal tear in the anoderm below the dentate line. The most frequent site for anal fissure is midline posteriorly followed by midline anteriorly.¹ An anal fissure is more common in adults than in children or the elderly and causes severe pain during defecation, rectal bleeding that stains or streaks the stools and resulting in emotional stress which leads to a reduction in the overall quality of life.² When an anal fissure persists for more than four weeks without healing, it is classified as chronic. A chronic anal fissure is a non-

healing tear of distal anal mucosa below the dentate line. Induration within the margins of the fissure, the presence of internal sphincter fibers at the base and the presence of a sentinel polyp or fibroepithelial polyp are findings in favor of fissure chronicity.³ It was reported that 10% of the visits to the colorectal clinical units are for anal fissures and it is more frequent between 20-39 years of age. It usually occurs because of factors such as constipation, explosive diarrhea, receptive intercourse, anal trauma and surgery all of which cause trauma at the anal canal. Chronic anal fissure has traditionally been treated by surgery, an effective and standard procedure that results in healing in 90-95% of the cases. Several

pharmacological sphincter relaxants have been introduced and claimed to show good results but surgical treatment is frequently needed.⁴

LIS is attributed to be the gold standard for surgical management of chronic anal fissures when conservative and medical treatment fails.^{4,5} This procedure involves cutting a portion of the internal anal sphincter to relieve sphincter spasm, promoting fissure healing and providing significant symptomatic relief. Studies have shown that LIS is effective in healing 90-95% of chronic anal fissures, making it a highly recommended treatment option when conservative methods fail.

However, like any surgical intervention, LIS is associated with certain risks of complications such as incontinence, infection, bleeding or recurrence of the fissure. The main objective of this prospective study is to assess the results of LIS for persistent anal fissures, answering a number of important concerns, including as Is the LIS a suitable and safe choice. Or what are the most prevalent early and late complications of LIS. Or what are the variables influencing incontinence and recurrence in people who have LIS. What steps may be taken to prevent incontinence.

METHODS

Study design

A total of 100 patients (50 men and 50 women) participated in the research study. This prospective study involved 100 patients treated for chronic anal fissures from January to December 2023 at the Department of General Surgery, Government Medical College and Hospital, Amritsar, Punjab. The research included patients of both sexes aged 15–80 years who had persistent anal fissures that did not improve with conventional treatment. The research excluded patients who had anal stenosis, a history of faecal incontinence, an acute fissure or were pregnant. There was no history of anal or rectal cancer in the individuals. A questionnaire asking about their symptoms was given to the patients to complete. Anal pain was assessed before the treatment and at follow-up visits using a linear visual analog pain score as previously reported by 6.

Surgical procedure

The patient had been positioned in the lithotomy posture. The intersphincteric groove had been palpable at the anal verge. The procedure was conducted using an open approach. A circumferential incision of 1-2 cm had been made over the free edge of the internal sphincter. Blunt dissection had been employed to open the plane both inside and outside the internal sphincter for its liberation. Subsequently, the free lower edge of the internal sphincter had been grasped and drawn into the wound and its distal portion had been divided. The sentinel skin

tag at the lower end of the fissure had been excised. Finally, a tight T-bandage was applied after dressing.

Post-operative management and follow-up

After surgery, patients were prompted to begin oral intake six hours post-operation. Non-opioid analgesics were used for pain control, with pain severity monitored using the visual analog score (VAS), ranging from 0 (no pain) to 10 (worst imaginable pain). Any post-operative complications, such as urinary retention or bleeding, were carefully documented.

The initial dressing was removed on the first day following surgery. Patients resumed a normal diet and began lactulose 20 ml daily on the second postoperative day, continuing this regimen for two weeks. Discharge criteria included patient comfort on oral pain medication, normal mobility, tolerance of a regular diet and normal bowel movements.

Follow-up was conducted through outpatient visits. The first visit occurred within a week of discharge, followed by a second visit one week later. Additional follow-ups were scheduled at six weeks post-operation and then monthly for up to six months. Each visit included assessment for expected complications, as well as examinations to detect anorectal sepsis, incontinence to flatus, fecal soiling and anal stenosis.

All follow-up findings were recorded and analyzed. The primary outcome measured was the time to complete wound healing (epithelization). Secondary outcomes included operative time, duration of hospital stay, anal continence and time to pain relief. Complications such as urinary retention, infection, abscess formation, incontinence and any recurrence were also monitored throughout the follow-up period.

The study protocol was approved by the institutional Ethics Committee (Number: 10853/D-26/2021 Date: 03 April 2023). A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of Institutional Ethical Committee.

RESULTS

A total of 100 patients participated in the study, with an equal distribution of 50 males and 50 females. All individuals presented with a history of chronic anal fissure. The average age was 36.1 years, with a standard deviation of 8.96 years and ranged from 15 to 80 years. Among the study group, 67 patients (35 males and 32 females) were identified as having an anal tag associated with their fissure prior to surgery. Pain was the primary complaint reported during the postoperative period, typically occurring during or after defecation. The intensity of postoperative pain varied (Table 1). The mean visual analog pain score for both males and females

were 4, indicating moderate pain overall. Complications observed during follow-up period, were systematically documented among the 100 patients included in the study

were shown in Table 2. Complete epithelization was achieved within a mean duration (SD) of 12.59±2.77 days, with a range between 8 and 18 days.

Table 1: Showing the intensity of postoperative pain.

Pain	Male	Female	Total
Mild	2	18	40
Moderate	22	25	47
Severe	4	6	10
Worst	2	1	3

Table 2: Most common complications reported during the 6 months follow up period.

Complications	Number	Male	Female
Anal tag	67	35	32
Urinary retention	12	9	3
Post-operative bleeding	11	5	6
Hematoma	6	5	1
Infection	4	4	0
Abscess formation	2	1	1
Incontinence	6	2	4
Anal stenosis	0	0	0
Recurrence	0	0	0

DISCUSSION

Anal fissure is a common condition that can cause significant discomfort, impacting the quality of life even in otherwise healthy individuals. It is a frequent cause of pain and rectal bleeding, often resulting in considerable distress and disability. Although several pharmacological sphincter relaxants have been introduced and are reported to provide satisfactory outcomes, surgical intervention is often required for lasting relief. This study was designed to evaluate the effectiveness of LIS in the management of chronic anal fissure, with a particular focus on identifying associated complications and the factors that contribute to their development.

The majority of patients in this study (52%) were between the ages of 31 and 45, with 29 females and 23 males represented in this group. This distribution aligns with the findings of previous research, which identified the average age for anal fissure patients as 39 years.⁷ In addition to treating chronic anal fissures, associated conditions such as anal tags were addressed during the surgical intervention.

Urinary retention was observed in 12 patients (9 males and 3 females), making it the most common postoperative complication in this cohort. This issue was effectively managed through urinary catheterization. The frequency and gender distribution of urinary retention observed are consistent with the reports by Toyonaga et al and Kiyak et al with the latter noting an incidence rate of approximately 18.6% and a higher likelihood among males.^{8,9} Postoperative bleeding occurred in 11 patients

(5 males and 6 females) out of 100. These cases were managed by administering postoperative injections of tranexamic acid, a treatment that has long been established for minimizing the need for blood transfusions in surgical patients.¹⁰ LIS is a surgical procedure commonly used to treat anal fissures and its primary goal is to alleviate the pain associated with increased sphincter tonicity. Notaras et al proposed that by performing a lateral internal sphincterotomy, the reduced sphincter tone would help in relieving the chronic pain caused by anal fissures.¹¹ This view has been widely supported by subsequent studies, which highlight the effectiveness of this procedure in reducing pain, promoting healing and improving the quality of life for patients.¹²⁻¹⁵

In the present study, authors observed a varied distribution of postoperative pain, with moderate pain being the most common. This aligns with several studies that indicate that while the majority of patients experience significant pain relief following LIS, some may still experience mild to moderate discomfort during the recovery period. The use of NSAIDs (non-steroidal anti-inflammatory drugs) is a common strategy to manage postoperative pain, as they help in controlling inflammation and providing analgesia.¹⁵

The similar pain scores between males and females suggest that gender may not significantly influence the level of postoperative pain experienced after this procedure. However, individual variations in pain perception and response to analgesics may still contribute to differences within the patient population. In the study,

6% of patients (5 males and 1 female) developed hematomas. This complication is generally self-limiting and was managed conservatively in all cases, consistent with previous reports. The higher incidence in males warrants further exploration of potential anatomical or physiological factors. Overall, despite the low occurrence, hematomas remain a manageable complication in LIS with careful postoperative monitoring.¹⁹ In this study, out of 100 patients who underwent lateral internal sphincterotomy for chronic anal fissure, infections were observed in 4 patients, all of whom were male. This finding suggests a possible male predisposition to postoperative infection following this procedure. With an overall infection rate of 4%, lateral internal sphincterotomy remains a generally safe intervention; however, it highlights the importance of vigilant postoperative monitoring, especially in male patients. The underlying causes for this increased rate of infections in males may be multifactorial. Anatomical differences, such as a denser anal sphincter complex in males, could potentially impact the healing process and increase susceptibility to infection. Other contributing factors might include suboptimal hygiene, prolonged wound exposure to moisture or inadequate postoperative care, all of which can facilitate bacterial colonization. Additionally, compromised immune responses, the use of immunosuppressive medications or other comorbidities could further predispose these patients to infections. Variations in how male patients manage the surgical site postoperatively, as well as differences in postoperative care practices, may also play a role.¹⁶⁻¹⁹

Two patients one male and one female in this research had the unusual but serious side effect of abscess development following lateral internal sphincterotomy. A bacterial infection, inadequate wound care or insufficient drainage of the surgical site might all contribute to the development of an abscess and hinder the healing process.^{20,21} Even though they are uncommon, these incidents highlight how crucial careful postoperative management and prompt problem detection are to ensuring the best possible recovery for both male and female patients.²²

In this study, 6 patients (2 male and 4 female) developed anal incontinence following lateral internal sphincterotomy, a known but relatively uncommon complication of the procedure. The higher incidence in females may be attributed to anatomical and physiological differences, including a potentially weaker anal sphincter muscle and a higher likelihood of pre-existing pelvic floor dysfunction.

This finding is consistent with other studies, which suggest that while lateral internal sphincterotomy is generally safe, it can lead to transient or persistent incontinence, particularly when there is over-resection of the internal anal sphincter.^{23,24} Careful patient selection and precise surgical technique are crucial to minimizing this risk. A high incidence of long-term success without

serious problems is shown by the fact that no patients in this research experienced anal stenosis or recurrence after lateral internal sphincterotomy. Careful surgical technique, the right sphincterotomy size and good postoperative care reduce the likelihood of scarring and recurrence, which is why these problems are absent.^{25,26} This is consistent with research showing that, when done correctly and with sufficient follow-up, lateral internal sphincterotomy can effectively prevent stenosis and recurrence. In a study of 100 patients undergoing lateral internal sphincterotomy for chronic anal fissure, complete epithelialization typically occurs within a range of 8 to 18 days. This variation depends on factors such as individual healing response, the extent of tissue damage and the presence of comorbidities. Studies, including those by Ebinger et al and Sungurtekin et al suggest that most patients exhibit complete healing within this timeframe, with optimal healing occurring closer to 14 days under ideal conditions.^{27,28}

Despite the valuable insights provided by this study on the outcomes and complications of LIS for chronic anal fissure, certain limitations should be acknowledged. The research was conducted at a single center, which may limit the generalizability of its findings to broader populations. Furthermore, the follow-up period was restricted to six months, which may not be adequate to identify late-onset complications or long-term recurrence rates. Patient-reported outcomes, such as pain and quality of life, were assessed but could be influenced by subjective factors and recall bias. Finally, potential confounding factors, including differences in postoperative care, comorbidities or surgical technique variations among practitioners could impact the incidence and severity of complications observed.

CONCLUSION

LIS is an effective surgical intervention for chronic anal fissure, providing significant pain relief and promoting healing. The study demonstrated a low incidence of major complications, with no cases of anal stenosis or recurrence and a manageable rate of minor complications such as urinary retention, hematomas and infection. The observed higher incidence of anal incontinence in females highlights the need for careful patient selection and precise surgical technique to minimize this risk. Overall, LIS remains a safe and reliable treatment for chronic anal fissure when performed with meticulous care and appropriate follow-up.

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REFERENCES

- Collins EE, Lund JN. A review of chronic anal fissure management. *Techn Coloproctol.* 2007;3:209-23.

2. O'Connell PR, McCaskie AW, Sayers RD. Bailey & Love's short practice of surgery. CRC Press. 2023.
3. Acheson AG, Scholefield JH. Anal fissure: the changing management of a surgical condition. *Langenbeck's Arch Surg*. 2005;390:1-7.
4. Hsu TC, MacKeigan JM. Surgical treatment of chronic anal fissure: a retrospective study of 1753 cases. *Dise Colon Rectum*. 1984;27:475-8.
5. Skandalakis JE, Skandalakis LJ, Skandalakis PN, Mirilas P. Hepatic surgical anatomy. *Surgical Clinics*. 2004; 84(2):413-35.
6. Pescatori ES, Silingardi V, Galeazzi GM, Rigatelli M, Ranzi A, Artibani W. Audiovisual sexual stimulation by virtual glasses is effective in inducing complete cavernosal smooth muscle relaxation: a pharmacocavernosometric study. *Int J Impot Res*. 2000;12(2):83-8.
7. Oh C, Divino CM, Steinhagen RM. Anal fissure: 20-year experience. *Diseases of the Colon Rec*. 1995; 38(4):378-82.
8. Toyonaga T, Matsushima M, Sogawa N, Jiang SF, Matsumura N, Shimojima Y, et al. Postoperative urinary retention after surgery for benign anorectal disease: potential risk factors and strategy for prevention. *Int J Colorec Dis*. 2006;21:676-82.
9. Kiyak G, Korukluoğlu B, Kuşdemir A, Şişman İÇ, Ergül E. Results of lateral internal sphincterotomy with open technique for chronic anal fissure: evaluation of complications, symptom relief and incontinence with long-term follow-up. *Digestive Dis Sci*. 2009;54:2220-4.
10. Ockerman A, Vanassche T, Garip M, Vandenbriele C, Engelen MM, Martens J, et al. Tranexamic acid for the prevention and treatment of bleeding in surgery, trauma and bleeding disorders: a narrative review. *Thrombo J*. 2021;19:1-6.
11. Notaras MJ. The treatment of anal fissure by lateral subcutaneous internal sphincterotomy—a technique and results. *British J Surg*. 1971;58(2):96-100.
12. Yucel T, Gonullu D, Oncu M, Koksoy FN, Ozkan SG, Aycan O. Comparison of controlled-intermittent anal dilatation and lateral internal sphincterotomy in the treatment of chronic anal fissures: a prospective, randomized study. *Int J Surg*. 2009;7(3):228-31.
13. Alawady M, Emile SH, Abdelnaby M, Elbanna H, Farid M. Posterolateral versus lateral internal anal sphincterotomy in the treatment of chronic anal fissure: a randomized controlled trial. *Int J Col Dis*. 2018;33:1461-7.
14. Acar T, Acar N, Güngör F, Kamer E, Güngör H, Candan MS, et al. Treatment of chronic anal fissure: Is open lateral internal sphincterotomy (LIS) a safe and adequate option. *Asian J Surg*. 2019;42(5):628-33.
15. Al-Thoubaity F. Safety and efficacy of the treatment of chronic anal fissure by lateral internal sphincterotomy: A retrospective cohort study. *Ann Med Surg*. 2020;57:291-4.
16. Kang GS, Kim BS, Choi PS, Kang DW. Evaluation of healing and complications after lateral internal sphincterotomy for chronic anal fissure: marginal suture of incisions. open left incision: prospective, randomized, controlled study. *Dis colon Rect*. 2008;51(3):329-33.
17. Patel SD, Oxenham T, Praveen BV. Medium-term results of anal advancement flap compared with lateral sphincterotomy for the treatment of anal fissure. *Int J Colorect Dis*. 2011;26:1211-4.
18. Patel HS, Chavda J, Parikh J, Naik N. Study of operated patients of lateral internal anal sphincterotomy for chronic anal fissure. *J Clin Diagnos Res*. 2013;7(12):2863.
19. Asefa Z, Awedew AF. Comparing closed versus open lateral internal sphincterotomy for management of chronic anal fissure: systematic review and meta-analysis of randomised control trials. *Scientific Rep*. 2023;13(1):20957.
20. Sahebally SM, Walsh SR, Mahmood W, Aherne TM, Joyce MR. Anal advancement flap versus lateral internal sphincterotomy for chronic anal fissure—a systematic review and meta-analysis. *Int J Surg*. 2018;49:16-21.
21. Tanveer A, Arshad S, Fakhir N, Farooq DA, Afyouni A, Kamran A, et al. Close lateral internal sphincterotomy versus open lateral internal sphincterotomy for chronic anal fissure: a systematic review and meta-analysis. *Ann Med Surg*. 2024;86(2):975-85.
22. Hoffmann DC, Goligher JC. Lateral subcutaneous internal sphincterotomy in treatment of anal fissure. *Br Med J*. 1970;3(4):673-5.
23. Nyam DC, Pemberton JH. Long-term results of lateral internal sphincterotomy for chronic anal fissure with particular reference to incidence of fecal incontinence. *Dis Colon Rectum*. 1999;42:1306-10.
24. Garg P, Garg M, Menon GR. Long-term continence disturbance after lateral internal sphincterotomy for chronic anal fissure: a systematic review and meta-analysis. *Colorect Dis*. 2013;15(3):104-17.
25. Jonas M, Scholefield JH. Anal fissure. *Gastroenterol Clin North America*. 2001;30(1):167-81.
26. Saeed MM, Khan SS, Ali ZA, Mumtaz R. A comparison between the results of fissurectomy and lateral internal sphincterotomy in the surgical management of chronic anal fissure. *PJMHS*. 2018;12(2):607-10.
27. Ebinger SM, Hardt J, Warschkow R, Schmied BM, Herold A, Post S, et al. Operative and medical treatment of chronic anal fissures—a review and network meta-analysis of randomized controlled trials. *J Gastroenterol*. 2017;52:663-76.
28. Sungurtekin U, Ozgen U, Sungurtekin H. Prospective, randomized, controlled trial of ultra-modified internal sphincterotomy vs closed lateral internal sphincterotomy for chronic fissure-in-ano. *American Surg*. 2022;88(9):2388-96.

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