

IMPACT OF LATERAL INTERNAL ANAL SPHINCTEROTOMY ON URINE FLOW : A PROSPECTIVE OBSERVATIONAL STUDY

Urology

Dr Hrishi Kumar	Senior Resident, Department of Urology Kalinga Institute of Medical Science, Bhubaneswar, Odisha
Dr Bhawana Kumari	Assistant Professor, Department Of General surgery ESIC Medical College ,Bihta, Bihar
Dr Kumar Vaibhav Sharma	Assistant Professor, Department of Urology Kalinga Institute of Medical Science, Bhubaneswar, Odisha

ABSTRACT

Background- Chronic anal fissure is associated with internal anal sphincter hypertonia. Lateral internal anal sphincterotomy (LIS) reduces anal canal pressure and promotes healing. Due to shared pelvic floor dynamics, LIS may influence urinary function. However, evidence on Urine flow changes remains limited. **Aim & Objectives-** To evaluate the impact of LIS on uroflowmetry parameters and post void residual urine (PVRU) **Material and Method-** A prospective observational study was done, total of 60 patients including 34 males and 26 females were selected considering inclusion and exclusion criteria, urine routine and culture was done to rule out any urinary tract infection, ultrasound was done to rule out any major genitourinary disease and predict post void residual urine. Pre-operatively: uroflowmetry, post void residual urine estimation were done, same were repeated two weeks after surgery. Relevant statistical analysis were done and result tabulated. **Result-** Female patients demonstrated significant improvement in Qmax, Qavg, and PVRU, whereas male patients showed significant improvement only in PVR.

KEYWORDS

Lateral Internal Sphincterotomy(LIS), Uroflowmetry, Post Void Residual Urine(PVR), Q max, Q avg, International Prostate Symptom Score (IPSS)

INTRODUCTION

Chronic anal fissure is a painful anodermal disorder that commonly presents with pain during defecation, rectal bleeding, and avoidance of bowel movements. Persistent contraction of the internal anal sphincter can impair local perfusion and interfere with normal healing, thereby maintaining the cycle of pain and sphincter spasm. Conservative measures such as dietary modification, stool regulation, topical vasodilators, and botulinum toxin are useful in selected patients, but surgery remains an important treatment when symptoms persist despite medical therapy.¹⁻³ Lateral internal anal sphincterotomy is an established surgical treatment for chronic fissure that remains symptomatic despite conservative management. By reducing resting sphincter pressure, LIS improves the local conditions required for healing and provides effective symptom relief. Although its anorectal benefits are well established, the possible influence of LIS on other pelvic floor functions, particularly urinary function, has received much less attention.⁴ The anorectal region and lower urinary tract are closely linked through shared pelvic floor muscles and neural pathways. Normal urination requires coordinated relaxation of the pelvic floor muscles and urinary sphincter along with effective bladder contraction. Increased anal sphincter tone and pelvic floor muscle overactivity may interfere with this coordination, potentially affecting urinary flow. Therefore, surgical reduction of anal sphincter tone may have a beneficial effect on voiding dynamics in selected patients.^{5,7}

Uroflowmetry is a simple, non-invasive, and reliable test used to evaluate urinary flow patterns. Parameters such as maximum flow rate (Qmax), average flow rate (Qavg), voided volume, and post-void residual urine provide objective information regarding lower urinary tract function. Because the test is easy to perform and reproducible, it is widely used to assess treatment-related changes in urinary function.⁸ Only a limited number of studies have investigated whether LIS alters uroflowmetry parameters after surgery, and the available evidence remains inconclusive. Better understanding of this relationship may help clinicians appreciate the broader functional effects of LIS beyond fissure healing. Therefore, the present prospective observational study aims to compare uroflowmetry parameters and post void residual urine before and after lateral internal anal sphincterotomy in patients with chronic anal fissure. The findings may provide valuable evidence regarding the interaction between anorectal surgery and lower urinary tract function and contribute to improved patient care.^{9,10}

Aim:

To evaluate the impact of LIS on urine flow

Objectives:

To evaluate effect on uroflowmetry parameters and post voidal

residual urine post lateral anal sphincterotomy

Outcomes:

Primary: Change in Qmax and Q average

Secondary: Change in Post voidal residual urine(PVR)

Study Design:

Prospective observational study done at two centres, ESIC medical college bihta, Patna, department of general surgery and department of urology KIMS Bhubaneswar

Inclusion Criteria:

1. Adults 30–60 years with chronic anal fissure
2. Failure of medical management
3. Ambulatory patient
4. Absence of genitourinary disease

Exclusion Criteria:

1. Patient with moderate and severe LUTS
2. Urinary tract infection
3. Absence of neurological disease

Sample Size: 60

Methodology

Patients were selected considering inclusion and exclusion criteria, urine routine and culture was done to rule out any urinary tract infection, ultrasound was done to rule out any major genitourinary disease. Lower urinary symptoms severity were accessed by IPSS symptom score. Pre-operatively: Uroflowmetry, post voidal residual urine estimation was done. Two weeks after surgery same was repeated.

Statistical Analysis

Paired t-test was done for pre operative and post operative Q max and Q avg while independent t-Test was done for male and female comparison. Value of $p < 0.05$ was considered significant.

RESULT

A total of 60 patients were included in the study, comprising 34 males (56.7%) and 26 females (43.3%), who underwent lateral internal sphincterotomy (LIS) for chronic anal fissure. Uroflowmetry parameters, including maximum urinary flow rate (Qmax), average urinary flow rate (Qavg), and post-void residual urine (PVR), were evaluated preoperatively and at two weeks postoperatively. The mean age of male group was 45.82 years while that of female was 46.65 years. Pre operative Q max and Q avg was higher in female (Mean

23.27 vs 19.00 and 14.08 vs 11.24). Mean pre operative post voidal residual urine was higher in male group (19.91 ml vs 5.42 ml)

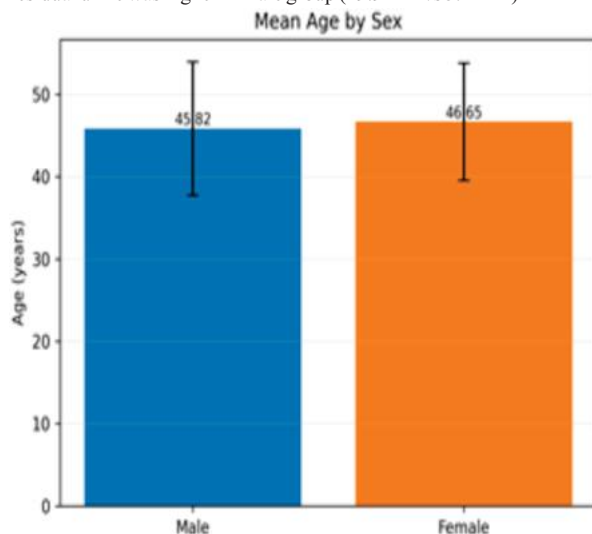


Figure 1: Sex Wise Distribution

Among the 34 male patients, the mean pre-operative Qmax was 19.00 mL/s, which increased slightly to 19.21 mL/s after surgery; however, this difference was not statistically significant (paired t-test, $p = 0.451$). Similarly, the mean Qavg increased from 11.24 mL/s to 11.47 mL/s, without reaching statistical significance ($p = 0.058$). In contrast, the mean post-void residual urine (PVR) decreased significantly from 19.91 mL pre-operatively to 13.09 mL post-operatively ($p = 0.002$).

Table 1: Male -

	Pre Operative	Post Operative	P- Value	Interpretation
Q MAX	19.00	19.21	0.451	Not Significant
Q AVG	11.24	11.47	0.058	Not Significant
PVRU	19.91	13.09	0.002	Significant

Among the 26 female patients, significant improvements were observed in all uroflowmetry parameters. The mean Qmax increased from 23.27 mL/s to 25.46 mL/s ($p < 0.001$), while the mean Qavg increased from 14.08 mL/s to 15.27 mL/s ($p < 0.001$). Mean PVR also showed a significant reduction from 5.42 mL to 1.92 mL ($p = 0.010$).

Table 2: Female:

	Pre Operative	Post Operative	P- Value	Interpretation
Q MAX	23.27	25.46	<.001	Highly Significant
Q AVG	14.08	15.27	<.001	Highly Significant
PVRU	5.42	1.92	.010	Significant

In the male subgroup, the mean preoperative Qmax was 19.00 mL/s, which showed a marginal increase to 19.21 mL/s postoperatively. This improvement was not statistically significant ($p = 0.451$). Similarly, the mean Qavg increased from 11.24 mL/s preoperatively to 11.47 mL/s postoperatively, but the difference did not reach statistical significance ($p = 0.058$). In contrast, the mean PVR decreased significantly from 19.91 mL before surgery to 13.09 mL after surgery ($p = 0.002$), indicating improved bladder emptying following relief of anal sphincter spasm.

In the female subgroup, postoperative improvement was more pronounced. The mean Qmax increased significantly from 23.27 mL/s preoperatively to 25.46 mL/s postoperatively ($p < 0.001$). Likewise, the mean Qavg improved significantly from 14.08 mL/s to 15.27 mL/s ($p < 0.001$). The mean PVR decreased from 5.42 mL to 1.92 mL, demonstrating a statistically significant reduction ($p = 0.010$). These findings suggest that female patients experienced greater postoperative improvement in urinary flow parameters than male patients.

Overall, lateral internal sphincterotomy was associated with improved voiding efficiency, particularly reflected by a reduction in residual urine volume. While female patients demonstrated significant improvements in all uroflowmetry parameters, male patients exhibited a significant improvement only in PVR, suggesting sex-related differences in postoperative urinary functional recovery.

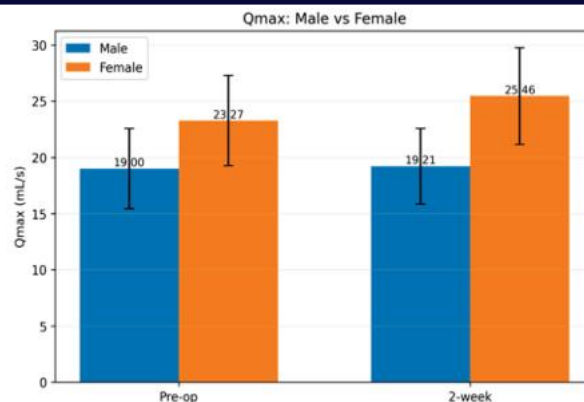


Figure 2: Q max Comparison of Male and Female

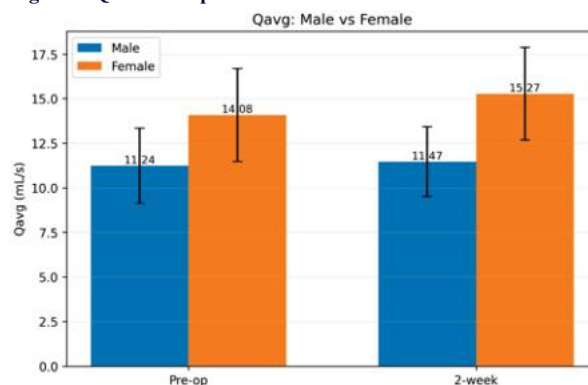


Figure 3: Q Avg Comparison of Male and Female

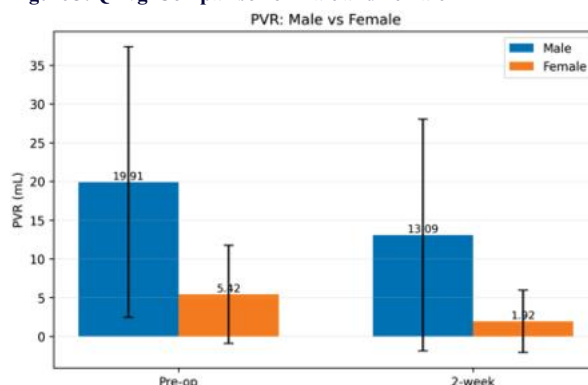


Figure 4: Post Void Residual Urine in Males and Females

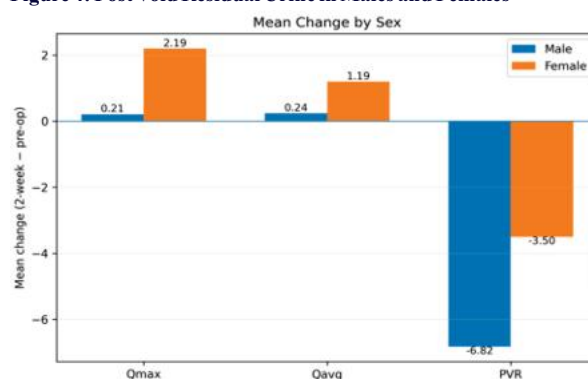


Figure 5: Mean Change by Sex

Interpretation

- Male patients: Significant improvement was observed only in PVR, while changes in Qmax and Qavg were not statistically significant.
- Female patients: Significant improvements were observed in Qmax, Qavg, and PVR, indicating a greater functional response following surgery.

DISCUSSION

The present study evaluated the effect of lateral internal sphincterotomy on uroflowmetry parameters in patients with chronic anal fissure. Chronic anal fissure is characterized by persistent internal anal sphincter hypertonicity, which may induce reflex pelvic floor muscle contraction and interfere with normal voiding dynamics. Relief of sphincter spasm through LIS may therefore improve lower urinary tract function in addition to promoting fissure healing.

In our study, female patients demonstrated significant improvement in Qmax, Qavg, and PVR, whereas male patients showed significant improvement only in PVR. These findings indicate that postoperative restoration of pelvic floor relaxation may be more evident in females. Anatomical differences in the lower urinary tract, including a shorter urethra and lower outlet resistance in women, may contribute to a greater improvement in urinary flow following relief of anal sphincter hypertonia.

The significant reduction in PVR observed in both sexes suggests enhanced bladder emptying after surgery. Elevated residual urine is an important indicator of impaired voiding efficiency and has been associated with urinary tract infections and chronic lower urinary tract symptoms. The reduction in PVR following LIS supports the concept that anal sphincter hypertonicity may influence coordinated pelvic floor function and bladder outlet relaxation.¹¹

The absence of significant improvement in Qmax and Qavg among male patients may reflect higher baseline outlet resistance related to prostatic and urethral anatomy. Previous physiological studies have shown that voiding function is influenced by multiple factors beyond pelvic floor relaxation, including detrusor contractility and urethral resistance.¹² Consequently, the effect of LIS on urinary flow may be less pronounced in men despite improvement in bladder emptying.

Our findings are consistent with reports demonstrating that pelvic floor dysfunction and chronic anorectal pain can adversely affect lower urinary tract function and that treatment of the underlying anorectal pathology results in measurable improvement in urinary symptoms.^{13,15} Similar improvements in uroflowmetry parameters after pelvic floor relaxation have also been reported in studies evaluating anorectal surgery and biofeedback therapy.¹⁶

The present study is strengthened by its prospective design and objective assessment using uroflowmetry. However, the relatively short follow-up period and single-center nature of the study limit the generalizability of the findings. Future multicenter studies with longer follow-up and larger sample sizes are warranted to determine the long-term impact of LIS on lower urinary tract function and to further explore sex-related differences in postoperative recovery.

Overall, the results suggest that lateral internal sphincterotomy not only relieves anal fissure symptoms but also improves voiding function, particularly by reducing post-void residual urine and enhancing urinary flow in female patients.

REFERENCES

- Nelson RL. Operative procedures for fissure in ano. *Cochrane Database Syst Rev*. 2010;(1):CD002199.
- Schouten WR, Briel JW, Auwerda JJ. Relationship between anal pressure and anodermal blood flow in chronic anal fissure. *Dis Colon Rectum*. 1994;37(7):664-9.
- Stewart DB, Gaertner W, Glasgow S, et al. Clinical Practice Guideline for the Management of Anal Fissures. *Dis Colon Rectum*. 2017;60(1):7-14.
- DeLancey JO. Anatomy and biomechanics of the pelvic floor. *Curr Opin Obstet Gynecol*. 1994;6(4):313-8.
- Shafik A. Pelvic floor anatomy and physiology. *World J Surg*. 1997;21(7):698-705.
- Bø K, Berghmans B. Nonpharmacologic treatments for overactive bladder and pelvic floor dysfunction. *Urology*. 2000;55(5A):7-13.
- Abrams P, Cardozo L, Wagg A, Wein A, editors. *Incontinence*. 6th ed. Bristol: International Continence Society; 2017.
- Jain BK, Vaibhaw K, Garg PK, Gupta S, Mohanty D. Comparison of lateral internal sphincterotomy and topical diltiazem for chronic anal fissure. *ANZ J Surg*. 2012;82(5):325-8.
- Permikoff BJ, Eisenstat TE, Rubin RJ, Oliver GC. Reappraisal of partial lateral internal sphincterotomy. *Dis Colon Rectum*. 1994;37(12):1291-5.
- Gibbons CP, Read NW. Anal hypertonia in fissures: Pathophysiology and treatment. *Br J Surg*. 1986;73(6):443-5.
- Drake MJ, Doumouchtsis SK, Hashim H, Gammie A. Fundamentals of urodynamic practice. *Neurourology Urology*. 2018;37(S6):S50-S60.
- Wein AJ, Kavoussi LR, Partin AW, Peters CA, editors. *Campbell-Walsh-Wein Urology*. 12th ed. Philadelphia: Elsevier; 2021.
- Wald A. Pelvic floor dysfunction and functional anorectal disorders. *Gastroenterol Clin North Am*. 2008;37(3):569-86.
- Sun WM, Read NW, Donnelly TC. Impaired pelvic floor coordination in patients with anorectal disorders. *Gut*. 1990;31(8):960-5.
- Bharucha AE, Lee TH. Anorectal and pelvic floor disorders. *Gastroenterology*. 2016;150(6):1430-1442.

- Rao SS, Patcharatrakul T. Diagnosis and treatment of dyssynergic defecation. *J Neurogastroenterol Motil*. 2016;22(3):423-435.