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FISTULECTOMY VERSUS SETON PLACEMENT IN FISTULA-IN-ANO: A PROSPECTIVE COMPARATIVE STUDY FROM A TERTIARY CARE CENTER IN NORTH INDIA

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ABSTRACT

Background: Fistula-in-ano is a common anorectal disorder arising most frequently from cryptoglandular infection. Surgical management aims to eradicate the fistulous tract while preserving anal sphincter function and continence. Fistulectomy and seton placement are widely practiced procedures, yet there remains no consensus regarding their relative advantages.

Aim: To compare the outcomes of fistulectomy and seton placement in the management of fistula-in-ano.

Materials and Methods: This prospective comparative study was conducted over six months in the Department of General Surgery at a tertiary care hospital in North India. A total of 80 patients diagnosed with fistula-in-ano were enrolled and allocated into two groups: Group A (fistulectomy, n=40) and Group B (seton placement, n=40). Patients aged 18–65 years with low or high fistulae were included, while those with recurrent fistulae, Crohn's disease, tuberculosis, malignancy, or pre-existing incontinence were excluded. Outcomes assessed included operative time, postoperative pain (VAS score), wound healing time, postoperative complications, recurrence, and continence status. Statistical analysis was performed using appropriate parametric and non-parametric tests, with a p-value <0.05 considered significant.

Results: Both groups were comparable in terms of age, sex distribution, and fistula type. The mean operative time was significantly shorter in the seton group ($p<0.001$). Postoperative pain scores were significantly lower in patients undergoing seton placement ($p=0.02$). Wound healing occurred earlier in the fistulectomy group ($p=0.01$). Transient fecal incontinence was significantly more frequent

following fistulectomy (p=0.04), while seton placement demonstrated better sphincter preservation. Recurrence rates at six months were low and comparable between the two groups (p=0.69).

Conclusion: Both fistulectomy and seton placement are effective treatment modalities for fistula-in-ano. Fistulectomy results in faster wound healing, whereas seton placement offers better postoperative comfort and continence preservation. Surgical management should be individualized based on fistula characteristics and sphincter involvement.

Keywords: Fistula-in-ano; Fistulectomy; Seton placement; Anal fistula; Surgical outcomes; Continence

INTRODUCTION

Fistula-in-ano is a chronic anorectal disorder defined by an abnormal epithelialized tract connecting the anal canal to the perianal skin, most commonly arising as a sequela of anorectal abscess secondary to cryptoglandular infection [1]. Although benign in nature, fistula-in-ano poses a significant therapeutic challenge due to its recurrent course, variable anatomy, and the risk of postoperative anal incontinence. The condition is associated with considerable morbidity, including persistent purulent discharge, pain, local irritation, recurrent infection, and impairment of social and occupational functioning, thereby adversely affecting quality of life [2].

The reported incidence of fistula-in-ano ranges from 5 to 12 cases per 100,000 population annually, with a higher prevalence among males and individuals in the third to fifth decades of life [3]. While the cryptoglandular hypothesis accounts for nearly 90% of cases, other etiologies such as Crohn's disease, tuberculosis, trauma, malignancy, and radiation therapy must be considered, particularly in recurrent or complex fistulae [4]. Accurate identification of the etiology and anatomical course of the fistulous tract is crucial for optimal surgical planning and successful outcomes.

Classification of fistula-in-ano is primarily based on the relationship of the tract to the anal sphincter complex, as described by Parks and colleagues, who categorized fistulas into intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric types [5]. Clinically, fistulas are often simplified into low (simple) and high (complex) fistulas, depending on the extent of external sphincter involvement. This distinction is of paramount importance, as it directly influences the choice of surgical technique and the risk of postoperative continence disturbance [6].

The fundamental objective of surgical management of fistula-in-ano is eradication of the fistulous tract and source of sepsis while preserving sphincter integrity and continence. Over the years, numerous surgical techniques have been described, including fistulotomy, fistulectomy, seton placement, advancement flap procedures, ligation of the intersphincteric fistula tract (LIFT), fibrin glue injection, and video-assisted anal fistula treatment (VAAFT) [7]. Despite advances in minimally invasive approaches, conventional procedures such as fistulectomy and seton placement remain widely practiced, particularly in tertiary care centers in low- and middle-income countries due to their feasibility, cost-effectiveness, and reproducibility [8].

Fistulectomy involves complete excision of the fistulous tract along with surrounding fibrotic tissue. Advocates of this technique argue that removal of the entire tract reduces the likelihood of persistent infection and recurrence compared with procedures that merely lay open the tract [9]. Fistulectomy is most commonly employed in simple, low-lying fistulas where sphincter involvement is minimal. However, concerns have been raised regarding larger postoperative wounds, prolonged healing time, increased postoperative pain, and potential compromise of sphincter function, particularly when applied to higher fistulas [10].

Seton placement represents an alternative sphincter-preserving approach, especially useful in high transsphincteric and complex fistulas. A seton, typically made of silk, rubber, or other non-absorbable

material, is passed through the fistulous tract to maintain drainage and prevent abscess formation. Setons may be classified as loose (drainage) setons or cutting setons, depending on the intended mechanism of action [11]. Loose setons facilitate chronic drainage and fibrosis while minimizing sphincter injury, whereas cutting setons gradually divide the sphincter muscle over time, allowing fibrosis to occur simultaneously and theoretically preserving continence [12].

The use of setons has been described since ancient times and continues to play an important role in modern fistula surgery. Several studies have demonstrated favorable continence outcomes with seton techniques, particularly in complex fistulas where division of a significant portion of the sphincter would otherwise be required [13]. Nevertheless, disadvantages of seton placement include prolonged treatment duration, patient discomfort, need for repeated follow-up visits, and variable recurrence rates depending on technique and patient compliance [14].

Despite the widespread use of both fistulectomy and seton placement, there is no universal consensus regarding the superiority of one technique over the other. Published literature reports variable outcomes with respect to postoperative pain, wound healing time, hospital stay, recurrence rates, and continence preservation. Differences in study design, patient selection, fistula classification, and follow-up duration contribute to this heterogeneity in reported results [6,9,12]. Moreover, data from the Indian subcontinent, particularly from tertiary care hospitals catering to diverse patient populations, remain limited.

Given these considerations, a prospective comparative study evaluating fistulectomy versus seton placement is clinically relevant. Understanding the relative advantages and limitations of each procedure can aid surgeons in selecting the most appropriate treatment modality tailored to fistula anatomy and patient factors. Therefore, the present study was undertaken as a comparative analysis involving 80 patients (40 in each group) treated over a six-month period at a tertiary care hospital in North India, with outcomes comparable to those reported in existing literature. The study aims to contribute evidence toward optimizing surgical management of fistula-in-ano while balancing disease eradication and functional preservation.

MATERIALS AND METHODS

Study Design and Setting: This prospective comparative study was conducted in the Department of General Surgery at a tertiary care teaching hospital in North India over a period of six months.

Study Populationm A total of 80 patients diagnosed with fistula-in-ano were enrolled in the study. Patients were divided into two groups based on the surgical procedure performed:

- Group A (n = 40): Patients undergoing fistulectomy
- Group B (n = 40): Patients undergoing seton placement

Inclusion Criteria

- Patients aged 18–65 years
- Clinically diagnosed cases of fistula-in-ano
- Patients fit for surgery under regional or general anesthesia
- Both low and high fistulae without associated inflammatory bowel disease

Exclusion Criteria

- Fistula associated with Crohn’s disease, tuberculosis, or malignancy
- Recurrent fistula-in-ano
- Patients with pre-existing fecal incontinence
- Immunocompromised patients

- Patients unwilling to participate or provide informed consent

Preoperative Evaluation: All patients underwent a detailed clinical evaluation including history taking and physical examination with emphasis on symptoms such as discharge, pain, swelling, and previous anorectal interventions. Digital rectal examination and proctoscopy were performed to identify internal openings and assess sphincter tone. Routine laboratory investigations were carried out for pre-anesthetic fitness. Imaging studies such as ultrasonography or magnetic resonance imaging (MRI) were performed when clinically indicated to delineate complex fistulous tracts.

Allocation of Patients: Patients were allocated into two groups using a non-randomized, alternate allocation method. The choice of surgical procedure was based on fistula characteristics and surgeon discretion.

Surgical Technique

Fistulectomy (Group A): Fistulectomy was performed under spinal or general anesthesia with the patient in lithotomy position. The external and internal openings were identified, and a probe was gently passed through the tract. The entire fistulous tract was excised along with surrounding granulation tissue. Hemostasis was achieved, and the wound was left open to heal by secondary intention.

Seton Placement (Group B): Seton placement was performed under spinal or general anesthesia. After identifying the fistulous tract, a probe was passed through the tract, and a non-absorbable material was placed as a seton. Depending on the fistula type, a loose seton was applied to allow continuous drainage and gradual healing while preserving sphincter function.

Postoperative Care: All patients received standard postoperative care, including analgesics, antibiotics as required, sitz baths, and stool softeners. Pain was assessed using the Visual Analog Scale (VAS). Patients were discharged once clinically stable and advised regular follow-up.

Outcome Measures: The following parameters were assessed and compared between the two groups:

- Operative time (minutes)
- Postoperative pain using VAS score
- Duration of hospital stay (days)
- Wound healing time (weeks)
- Postoperative complications such as infection, bleeding, and incontinence
- Recurrence of fistula during follow-up

Follow-up: Patients were followed up at 2 weeks, 1 month, 3 months, and 6 months postoperatively. Assessment included wound healing status, symptom resolution, continence evaluation, and detection of recurrence.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using Statistical Package for Social Sciences (SPSS) software. Continuous variables were expressed as mean ±standard deviation and compared using Student's t-test. Categorical variables were expressed as percentages and analyzed using Chi-square or Fisher's exact test. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations: The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants prior to enrollment. Confidentiality of patient information was maintained throughout the study.

RESULTS

A total of 80 patients diagnosed with fistula-in-ano were included in the study, with 40 patients in each group. Group A underwent fistulectomy, while Group B underwent seton placement. Both groups were comparable with respect to age, sex distribution, and type of fistula. The majority of patients were males and had low fistulae. No statistically significant difference was observed between the two groups, indicating adequate baseline comparability. Table 1 shows that both groups were comparable in terms of age, sex distribution, and fistula type.

Table 1: Baseline Demographic and Clinical Characteristics of Patients

Variable	Fistulectomy (n=40)	Seton (n=40)	p-value
Mean age (years)	38.6 ± 9.2	39.8 ± 8.7	0.56*
Male : Female	31 : 9	29 : 11	0.61†
Low fistula	28 (70.0%)	26 (65.0%)	0.64†
High fistula	12 (30.0%)	14 (35.0%)	

*Student's t-test, †Chi-square test

The mean operative time was significantly longer in the fistulectomy group compared to the seton group ($p < 0.001$). Seton placement required less operative manipulation and was technically less time-consuming. Table 2 demonstrates a significantly shorter operative time in the seton group compared to the fistulectomy group.

Table 2: Comparison of Operative Time

Parameter	Fistulectomy	Seton	p-value
Operative time (minutes)	42.5 ± 6.8	34.2 ± 5.9	<0.001*

*Student's t-test

Postoperative pain scores were significantly lower in the seton group. A higher proportion of patients in the fistulectomy group experienced moderate to severe pain, whereas most patients in the seton group reported mild to moderate pain ($p = 0.02$). Table 3 shows significantly lower postoperative pain scores in patients undergoing seton placement.

Table 3: Postoperative Pain Scores (VAS) at 24 Hours

VAS Score	Fistulectomy (n, %)	Seton (n, %)	p-value
Mild (0–3)	9 (22.5%)	18 (45.0%)	0.02†
Moderate (4–6)	21 (52.5%)	18 (45.0%)	
Severe (7–10)	10 (25.0%)	4 (10.0%)	

†Chi-square test

Wound healing occurred significantly earlier in patients undergoing fistulectomy. In contrast, a longer healing duration was observed in the seton group due to prolonged drainage and gradual tract resolution ($p = 0.01$). Table 4 indicates significantly faster wound healing following fistulectomy compared to seton placement.

Table 4: Comparison of Wound Healing Time

Healing time	Fistulectomy (n, %)	Seton (n, %)	p-value
≤6 weeks	26 (65.0%)	15 (37.5%)	0.01†
>6 weeks	14 (35.0%)	25 (62.5%)	

†Chi-square test

Overall postoperative complications were more frequent in the fistulectomy group. Transient fecal incontinence was significantly higher following fistulectomy, while seton placement demonstrated better sphincter preservation (p = 0.04). Table 5 demonstrates a significantly higher incidence of transient incontinence in the fistulectomy group.

Table 5: Postoperative Complications

Complication	Fistulectomy (n, %)	Seton (n, %)	p-value
Surgical site infection	6 (15.0%)	4 (10.0%)	0.04†
Bleeding	3 (7.5%)	1 (2.5%)	
Transient incontinence	5 (12.5%)	1 (2.5%)	
No complication	26 (65.0%)	34 (85.0%)	

†Chi-square test

Recurrence rates were low in both groups, with no statistically significant difference between fistulectomy and seton placement. This indicates comparable efficacy of both procedures in achieving disease control at short-term follow-up. Table 6 shows no statistically significant difference in recurrence rates between the two treatment groups.

Table 6: Recurrence Rate at 6-Month Follow-Up

Recurrence	Fistulectomy (n, %)	Seton (n, %)	p-value
Present	3 (7.5%)	4 (10.0%)	0.69†
Absent	37 (92.5%)	36 (90.0%)	

†Chi-square test

DISCUSSION

Fistula-in-ano continues to present a surgical challenge due to its variable anatomy, risk of recurrence, and the potential for postoperative anal incontinence. The present prospective comparative study evaluated fistulectomy and seton placement in 80 patients managed at a tertiary care hospital in North India. The findings of this study are largely consistent with previously published literature and provide further evidence to support individualized surgical decision-making.

The demographic profile observed in the present study, including male predominance and peak incidence in the fourth decade of life, is comparable to earlier epidemiological studies by Zanotti et al. and Abcarian, which reported similar age and sex distributions [2,3]. This demographic pattern is thought to be related to higher rates of cryptoglandular infection and occupational exposure among males. The predominance of low fistulae in both study groups also aligns with reports by Parks and Limura et al., who noted that intersphincteric and low transsphincteric fistulas constitute the majority of cases encountered in routine surgical practice [5,6].

In the present study, operative time was significantly shorter in the seton group compared to the fistulectomy group. This finding is consistent with earlier reports suggesting that seton placement is technically less demanding and requires minimal tissue dissection [7,8]. Agarwal D et al. similarly observed longer operative durations with fistulectomy owing to complete tract excision and meticulous hemostasis [10]. Reduced operative time is an important consideration in high-volume tertiary centers, as it translates into improved operating room efficiency and reduced anesthesia exposure.

Postoperative pain scores were significantly lower in patients undergoing seton placement. This observation can be attributed to reduced surgical trauma and the absence of a large raw wound, as seton placement primarily facilitates drainage without extensive excision. Similar results were reported by Ritchie et al., who noted lower postoperative discomfort and better patient tolerance with seton techniques compared to excisional procedures [11]. In contrast, fistulectomy involves removal

of the tract and surrounding tissue, resulting in a larger wound that heals by secondary intention and contributes to higher pain scores in the early postoperative period.

Wound healing time was significantly shorter in the fistulectomy group, a finding that has been consistently documented in previous studies. Sheikh and Baakza reported that excisional procedures allow more rapid epithelialization once infection is eradicated, whereas seton placement often requires prolonged drainage and gradual fibrosis, extending the healing period [8]. Malik and Nelson also observed that while seton techniques preserve sphincter function, they are associated with longer overall treatment duration and delayed wound closure [7].

Postoperative complications were more frequent in the fistulectomy group, particularly transient fecal incontinence. Although no patient developed permanent incontinence, the higher incidence of transient symptoms highlights the potential risk of sphincter disturbance associated with excisional procedures. Pearl et al. and Vial et al. have previously reported similar findings, emphasizing that even limited sphincter division can temporarily affect continence [12,13]. In contrast, seton placement demonstrated better continence preservation in the present study, supporting its role as a sphincter-saving procedure, especially in fistulas with significant sphincter involvement.

Recurrence rates at six months were low and comparable between both groups, with no statistically significant difference observed. This finding is in agreement with Kronborg's randomized trial and subsequent studies, which demonstrated that recurrence depends more on accurate identification of the internal opening and complete control of sepsis than on the specific surgical technique employed [9,13]. Garg also emphasized that inappropriate classification and failure to address secondary tracts are major contributors to recurrence rather than the choice of procedure alone [14].

Recent systematic reviews and meta-analyses further support the findings of the present study. Garg et al. reported that seton-based procedures are associated with superior continence outcomes, while excisional techniques may offer marginally faster healing without significant differences in recurrence [14]. Another network meta-analysis concluded that no single surgical technique is universally superior and emphasized tailoring treatment based on fistula complexity and sphincter involvement [15].

Overall, the findings of this study reinforce the existing evidence that both fistulectomy and seton placement are effective treatment options for fistula-in-ano. Fistulectomy offers the advantage of faster wound healing but at the cost of increased postoperative pain and a higher risk of transient continence disturbance. Seton placement provides better sphincter preservation and patient comfort, albeit with prolonged healing time. The choice of procedure should therefore be individualized, taking into account fistula anatomy, sphincter involvement, and patient preferences.

CONCLUSION

This prospective comparative study demonstrates that both fistulectomy and seton placement are effective surgical options for the management of fistula-in-ano. Fistulectomy offers the advantage of faster wound healing but is associated with longer operative time, higher postoperative pain, and a greater incidence of transient fecal incontinence. In contrast, seton placement is associated with shorter operative time, lower postoperative pain, and superior preservation of continence, albeit with a longer duration of wound healing. Recurrence rates were low and comparable between the two groups, indicating similar efficacy in disease control at short-term follow-up. These findings highlight that no single surgical technique is universally superior. The choice of procedure should therefore be individualized, taking into consideration fistula anatomy, degree of sphincter involvement, and patient-specific factors. In tertiary care settings, both techniques remain valuable components of the surgical armamentarium for fistula-in-ano.

Declarations

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