



Original Article



Outcomes Following the Cutting Seton Procedure for High Anal Fistula

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ARTICLE INFO

Keywords:

High Anal Fistula, Cutting Seton, Incontinence, Parks Incontinence Score

How to Cite:

Khan, H., Shah, F. O., Raza, T. A., Mehmood, A., Khattak, N., Saleem, A., & Abdullah, . (2026). Outcomes Following the Cutting Seton Procedure for High Anal Fistula: Cutting Seton Procedure for High Anal Fistula. *Pakistan Journal of Health Sciences*, 7(3), 81-86. <https://doi.org/10.54393/pjhs.v7i3.3723>

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Received Date: 19th December, 2025

Revised Date: 30th January, 2026

Acceptance Date: 3rd February, 2026

Published Date: 31st March, 2026

ABSTRACT

Fistula in ano is a prevalent perianal condition caused by infection of the anal glands between the sphincter muscles, leading to substantial morbidity. It is reportedly more prevalent in males globally. Surgical management of high anal fistula remains challenging, and the cutting seton technique continues to be used as a treatment option. **Objective:** To evaluate the outcomes following the cutting seton procedure for high anal fistula. **Methods:** This cohort study was carried out at the Department of General Surgery, Hayatabad Medical Complex, Peshawar, and involved 171 patients who were diagnosed with high anal fistula, and the cutting seton procedure was performed on them. The demographic data, clinical characteristics, and surgical outcomes were documented. The pain was rated with the help of the Visual Analogue Scale (VAS), and recurrence and incontinence were recorded in the course of follow-up. The chi-square test was used, keeping p-value > 0.05 as statistically significant. **Results:** The mean age of patients was 42.3 ± 11.4 years, with 60.8% being male. Postoperative pain was reported in 55.0% of patients. Recurrence occurred in 12.9%, and incontinence was observed in 18.1%, primarily to flatus. Stratification showed no significant associations between outcomes and demographic or clinical variables (p>0.05 for all). **Conclusions:** Seton is a safe and efficient intervention in high anal fistula, and results are satisfactory regardless of the demographics of patients and are largely dependent on the surgical approach and fistula features.

INTRODUCTION

Fistula in ano is a prevalent perianal condition that is accompanied by severe discomfort and morbidity. It usually comes as a result of the nonspecific infection of the anal glands within the intersphincteric area [1]. Reportedly more prevalent among males globally. Anorectal infections are regarded as the cause of about 80% [2]. The prevalence is 18-34% in the United States and 25% in Western countries. Comparatively, it is also lower in the developing countries at about 12% [3, 4]. A survey of Quetta, Baluchistan, had determined a prevalence of 10% with a higher prevalence in males. Fistula in ano can also be linked to certain diseases like tuberculosis, Crohn's disease,

malignancies, and HIV infection. Other risk factors are trauma, foreign bodies, radiation exposure, and long-term steroid use [5]. There are several classification systems of the anal fistula, which are the Parks, Standard, Milligan-Morgan, Goodsell, and the Mill and Thompson classification. Among these, Parks classification is the most popular, according to which fistulae can be divided into four different categories: intersphincteric, transsphincteric, suprasphincteric, and extrasphincteric [6]. A fistula in ano is clinically characterized, in most cases, by pain around the anus, swelling, purulent discharge, bleeding, and excoriation of the skin. The

diagnosis is done by a combination of physical examination (digital rectal examination), anal manometry, fistulography, CT scan, endoluminal ultrasonography, and MRI [7]. The low anal fistulae are normally treated surgically by fistulectomy or fistulotomy, and the recovery and functional results are generally favourable. Nevertheless, high anal fistulae are more difficult to treat, and are treated with more than 20 methods, such as fistulectomy with protective colostomy, staged fistulotomy, advancement flap repair, the use of fibrin glue or punches, and the placement of a seton. These methods are linked to a greater rate of failure and a high probability of functional disability [8, 9]. The sutures that are used in managing fistula are usually made of silk sutures, silicone, rubber, or elastic substances. Setons are either draining or cutting functionally. Seton draining is used to manage local sepsis, tract patency, and facilitate tract maturation [10]. It is particularly useful in complicated cases that assist in subsequent definitive treatment and reduce the size of external wounds. A cutting seton, on the other hand, is firmly clamped in the fistulous tract, exerting increasing pressure on the muscle fibers so as to push it through, augmenting fibrosis. The seton is commonly tightened with time (e.g., after every two weeks) until full fistulotomy and exteriorization of the tract [11]. According to a study by Shirah and Shirah out of a total number of 372 patients who were treated using cutting seton, 80.1% were men, and 19.9% were women. The symptoms lasted between 3 and 21 months. Full recovery was observed in 97.6% of the patients, and 15.6% had flatus but not feces incontinence. Only 2.4% reoccurred [12].

Despite the widespread use of the cutting seton technique for the management of high anal fistula, there remains limited evidence, particularly from developing countries, regarding its short-term postoperative outcomes, including pain, recurrence, and continence status. Moreover, it is unclear whether these outcomes are influenced by patient demographics and baseline clinical characteristics or are primarily determined by surgical and fistula-related factors. This study aims to evaluate the short-term outcomes following cutting seton placement in patients with high anal fistula and to assess their association with demographic and clinical variables.

METHODS

This cohort study was done in the Department of General Surgery, Hayatabad Medical Complex, Peshawar, between 1st April 2025 and 30th August 2025, after getting approval under Ref No. 2526. The sample size was 171 patients, according to the Open Epi sample size calculator. Based on the 2.4% recurrence rate after high anal fistula seton procedure [12], the confidence interval was calculated as 95%, and the margin of error is set to 2.3% [13]. The formula

used for sample size calculation is $n = DEFF \times N \times p(1-p)/d^2/Z^2_{1-\alpha/2} \times (N-1) + p(1-p)$. The sampling method used was a non-probability consecutive sampling method. A high anal fistula was an aperture that occurred at a site above the dentate line and was diagnosed with magnetic resonance imaging (MRI). A seton was referred to as a substance composed of silk suture, silastic, Marceline rubber, or an elastic band to treat a fistula. Pain, recurrence, and incontinence were considered as the main outcomes of this study after three months of the cutting seton procedure. Pain intensity was assessed using the Visual Analogue Scale (VAS), scored from 0 (no pain) to 10 (worst pain imaginable). Patients marked a point on the scale corresponding to their perceived pain. For analysis, a score of >3 was considered as the presence of pain. The VAS is a validated and reliable tool for assessing pain intensity in clinical studies [14]. The recurrence was determined as the presence of the fistula at the same location within the three months of follow-up. Incontinence was defined as the involuntary loss of control over flatus or feces and was assessed at three months postoperatively using the Parks Incontinence Score. The Parks score classifies continence into four categories: Category 1: continent to solid stool, liquid stool, and flatus; Category 2: incontinent to flatus only; Category 3: incontinent to liquid stool (with or without flatus incontinence); and Category 4: incontinent to solid (formed) stool. The inclusion criteria were patients aged between 18-70 years of either sex or ethnicity who were diagnosed with high anal fistula according to the operational definition. Patients with comorbidities related to Crohn, tuberculosis, malignancy, HIV infection, or complex fistulae, with more than one external opening, or those patients with an internal opening high in the pelvis were excluded. Patients presenting on referral from other hospitals were also excluded to ensure a homogeneous study population, as referred cases often represent more complex disease or prior interventions that could influence postoperative outcomes. After receiving the approval of the Institutional Review Board (IRB), the patients in the General Surgery Ward diagnosed with high anal fistula were eligible after receiving informed written consent. An elaborate history of age, gender, body mass index (BMI (kg/m^2), socioeconomic status, profession and comorbidities like diabetes and hypertension were all noted. Perineal examination, including the digital rectal examination and proctoscopy, was done, and an MRI was performed to verify the diagnosis. Patients were hospitalized once diagnosed and made to take fluids and semi-solid food a day before surgery and kept nil after midnight. A consultant surgeon performed a cutting seton procedure by general or spinal anesthesia in the lithotomy

position on the next day. Since there was no commercially available seton material in the area, Prolene I was used and probed through the fistulous tract. Both extremities were closely knotted at the rectum. Post-operative bleeding monitoring was done, and patients were discharged the next day with the instructions to revisit the outpatient department every two weeks to have the seton tightened until the tract was fully cut. A follow-up (3 months after surgery) was done on the patients. Data regarding pain, recurrence, and incontinence during the follow-up visits were recorded through a designed questionnaire.

Statistical analysis was performed using SPSS version 27.0. Mean \pm standard deviation (SD) was calculated for continuous variables such as age, and BMI. Frequencies and percentages were computed for categorical variables including gender, socioeconomic status, profession, comorbidities, and fistula location (anterior or posterior) and pain score. Outcomes of pain, recurrence, and incontinence were stratified against age, gender, BMI, socioeconomic status, profession, and fistula location. Post-stratification, the chi-square test was applied, with a p-value of ≤ 0.05 considered statistically significant.

RESULTS

A total of 171 patients were included in the study which an average age of 43.1 ± 14.0 years. The majority of participants were aged between 31 and 40 years (26.3%), followed by 41 and 50 years (22.8%) and 18–30 years (18.7%). Most patients were male (60.8%), and a higher proportion belonged to the poor socioeconomic class (64.3%). Regarding occupation, housewives represented the largest group (35.1%), followed by individuals working in the private sector (16.4%) and laborers (12.9%), table 1.

Table 1: Demographic Characteristics (n=171)

Variable	Category	n (%)
Age (Years)	18-30	32 (18.7%)
	31-40	45 (26.3%)
	41-50	39 (22.8%)
	51-60	29 (17.0%)
	61-70	26 (15.2%)
Gender	Female	67 (39.2%)
	Male	104 (60.8%)
Socioeconomic Status	Middle Class	61 (35.7%)
	Poor	110 (64.3%)
Profession	Housewife	60 (35.1%)
	Laborer	22 (12.9%)
	Private Job	28 (16.4%)
	Government Employee	14 (8.2%)
	Businessman	11 (6.4%)
	Unemployed	18 (10.5%)
	Student	18 (10.5%)

Among clinical characteristics, 28.1% of the patients had

diabetes, and 30.4% were hypertensive. In terms of body mass index (BMI), 41.5% had normal weight, 31.6% were overweight, 19.9% were obese, and 7.0% were underweight. Posterior fistulas were more commonly observed (65.5%) than anterior fistulas (34.5%), table 2.

Table 2: Clinical Profile and Comorbidities (n=171)

Variable	Category	n (%)
Comorbidities	Diabetes	48 (28.1%)
	Hypertension (HTN)	52 (30.4%)
BMI (kg/m ²)	Underweight (<18.5)	12 (7.0%)
	Normal (18.5–24.9)	71 (41.5%)
	Overweight (25–29.9)	54 (31.6%)
	Obese (≥ 30)	34 (19.9%)
Location of Fistula	Anterior	59 (34.5%)
	Posterior	112 (65.5%)

A total of 55.0% of patients experienced pain (VAS>3), while recurrence of the condition was observed in 12.9%. Incontinence was reported in 18.1% of patients, out of which 12.3% had flatus incontinence and 5.8% had feces incontinence. However, no patient developed isolated liquid stool incontinence during follow-up, table 3.

Table 3: Outcomes at 3 Months Post-Procedure (n=171)

Variable	Category	n (%)
Pain Presence (VAS>3)	Yes	94 (55.0%)
	No	77 (45.0%)
Recurrence	Yes	22 (12.9%)
	No	149 (87.1%)
Incontinence	Positive	31 (18.1%)
	Negative	140 (81.9%)
If Incontinence Positive	Flatus incontinence	21 (12.3%)
	Feces incontinence	10 (5.8%)

On stratification of outcomes against various demographic and clinical variables, no statistically significant associations were found. Pain was more frequently reported among patients aged 31–40 years (62.2%) and 51–60 years (58.6%), but the association with age was not statistically significant ($p=0.321$). Gender-wise distribution showed similar rates of pain in males (53.7%) and females (55.8%) ($p=0.605$). Pain was most commonly reported among overweight individuals (57.4%), but again without statistical significance ($p=0.777$). Patients from poor socioeconomic backgrounds reported a slightly higher frequency of pain (58.2%) compared to those from good socioeconomic status (49.2%) ($p=0.430$). Pain prevalence across different professions varied minimally, with the highest percentage among students (66.7%), but with no significant association ($p=0.982$). Pain was slightly more frequent in patients with anterior fistulas (59.3%) compared to posterior (52.7%) ($p=0.541$). Similar trends were observed for recurrence and incontinence. Recurrence was slightly more frequent among students

(22.2%) and obese patients (17.6%), but none of these associations reached statistical significance. Incontinence rates were highest among obese (26.5%) and underweight (25.0%) individuals. Patients with poor socioeconomic status had a higher rate of incontinence (20.9%) compared to those with good status (13.1%),

although this was not statistically significant (p=0.321). No significant associations were observed between the location of fistula and pain (p=0.541), recurrence (p=0.543), or incontinence (p=0.998). Overall, postoperative pain, recurrence, and incontinence were independent of baseline demographic and clinical characteristics, table 4.

Table 4: Stratification of Outcomes by Demographic and Clinical Variables (n=171)

Variables	Category	Pain (Yes), n (%)	p-value	Recurrence (Yes), n (%)	p-value	Incontinence (Positive), n (%)	p-value
Age (Years)	18-30	15 (46.9%)	0.321	4 (12.5%)	0.821	5 (15.6%)	0.745
	31-40	28 (62.2%)		7 (15.6%)		6 (13.3%)	
	41-50	21 (53.8%)		3 (7.7%)		8 (20.5%)	
	51-60	17 (58.6%)		5 (17.2%)		7 (24.1%)	
	61-70	13 (50.0%)		3 (11.5%)		5 (19.2%)	
Gender	Male	36 (53.7%)	0.605	10 (14.9%)	0.792	12 (17.9%)	0.983
	Female	58 (55.8%)		12 (11.5%)		19 (18.3%)	
BMI (kg/m ²)	Under-weight	6 (50.0%)	0.777	1 (8.3%)	0.940	3 (25.0%)	0.616
	Normal	39 (54.9%)		8 (11.3%)		11 (15.5%)	
	Overweight	31 (57.4%)		7 (13.0%)		6 (11.1%)	
	Obese	18 (52.9%)		6 (17.6%)		9 (26.5%)	
Socioeconomic Status	Middle class	30 (49.2%)	0.430	7 (11.5%)	0.872	8 (13.1%)	0.321
	Poor	64 (58.2%)		15 (13.6%)		23 (20.9%)	
Profession	Housewife	33 (55.0%)	0.982	7 (11.7%)	0.914	12 (20.0%)	0.793
	Laborer	12 (54.5%)		3 (13.6%)		4 (18.2%)	
	Private Job	15 (53.6%)		3 (10.7%)		3 (10.7%)	
	Govt. Employee	8 (57.1%)		2 (14.3%)		2 (14.3%)	
	Businessman	5 (45.5%)		1 (9.1%)		2 (18.2%)	
	Unemployed	9 (50.0%)		2 (11.1%)		4 (22.2%)	
	Student	12 (66.7%)		4 (22.2%)		4 (22.2%)	
Fistula Location	Anterior	35 (59.3%)	0.541	9 (15.3%)	0.543	11 (18.6%)	0.998
	Posterior	59 (52.7%)		13 (11.6%)		20 (17.9%)	

*p-values ≤ 0.05 are statistically significant

DISCUSSION

In the current study, more than half of the patients (55.0%) reported postoperative pain with a mean Visual Analogue Scale (VAS) score of 4.8 ± 1.6. Pain was not significantly associated with age, gender, BMI, socioeconomic status, or fistula location. These findings are consistent with previous reports suggesting that postoperative pain is a common but highly variable experience. For instance, Khan et al. found comparable mean pain scores among patients undergoing anal fistula repair, and similarly reported no significant differences based on demographic characteristics [15]. Although there are some literature findings that younger age and lower socioeconomic status might have a higher perception of postoperative pain caused by the disparities in healthcare access, this study failed to establish any association, which may be because of the standard care of postoperative pain offered to the sample. Besides, the absence of correlation with the location of fistula is slightly different compared to the work published by Bayrak and Altintas, who have reported that

high trans-sphincteric tracts were more painful after surgery [16]. This difference can indicate the variability in the procedure or be the difference in the complexity of fistulas that were not stratified in the present analysis. This study showed a recurrence rate of 12.9 that is similar to other international literature that reported the range of 10-25% based on technique and case selection. Recurrence was not significantly related to any stratified demographic or clinical variable. These results closely align with the findings of Taskin et al. who reported a 13% recurrence rate using hybrid seton and laser methods and also observed no significant difference across gender, BMI, or age groups [17]. In contrast, Bayrak and Altintas identified male gender, obesity, and previous fistula surgery as independent predictors of recurrence in their LIFT-procedure cohort [16]. One reason for the lack of association in the current study may be the exclusion of recurrent or complex fistulas in the original selection criteria, or limited sample size in certain subgroups, such

as the underweight or business occupation category. The absence of a statistically significant association between recurrence and fistula location (anterior vs posterior) was also consistent with reports from studies using traditional and minimally invasive procedures, where anatomical location alone did not predict outcomes unless coupled with height or branching complexity of the tract [12]. Incontinence was reported in 18.1% of patients, of which 12.3% had incontinence to flatus and 5.8% to feces. This complication was not significantly associated with any of the stratified variables, including gender, BMI, age, or socioeconomic status. These findings are supported by a study by Khan et al. which found a similar incontinence rate of 16% after fistulotomy and fistulectomy procedures, with no clear associations with BMI or age [18]. Moreover, Amato et al. also noted that outcomes of continence after FILAC largely relied on the fistula height and sphincter complex maintenance as opposed to the demographics of patients [19]. This highlights an important aspect that operative technique is more significant to the continuation of continence than preoperative factors. It is also interesting that gender is not associated in this study because previous studies had sometimes suggested higher rates of incontinence in women, possibly because a weaker anal sphincter complex after childbirth caused it, although this is not a consistent finding in more recent controlled studies [20, 21].

Collectively, the lack of statistically significant correlations between the results of the postoperative period and demographic or clinical variables in this research indicates that additional factors, like the complexity of the fistula or the previous surgical procedures and technical peculiarities of the procedure, have a more significant effect on the outcomes than the baseline features. Whilst these findings have been encouraging in the aspects of equity of surgical gain among group of populations, there is still the need to focus future research to encompass the tract morphology, height, and MRI classification systems to enable prediction of exact outcomes in patients.

CONCLUSIONS

The cutting seton procedure is a viable and feasible alternative to the treatment of high anal fistula, with moderate pain, recurrence, and incontinence. Demographic factors and baseline clinical factors did not impact postoperative outcomes significantly, which means that the procedure delivers similar results to patients of various groups. These results confirm cutting seton as an effective treatment modality, especially where resources are few, and highlight the significance of surgical practice and fistula characteristics on outcomes.

Authors' Contribution

Conceptualization: HK

Methodology: FOS, AM, A

Formal analysis: AS

Writing and Drafting: FOS, TAR, NK

Review and Editing: HK, FOS, TAR, AM, NK, AS, A

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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