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Outcome of Rubber Band Seton in the Treatment of Anal Fistula

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Abstract

Anal fistulas pose significant therapeutic challenges, particularly high trans-sphincteric variants where recurrence and incontinence risks complicate management. Conventional seton techniques, while effective, often require multiple adjustments. The rubber band seton offers potential advantages through gradual, controlled cutting action, potentially reducing morbidity while maintaining therapeutic efficacy, warranting detailed clinical evaluation. A cross-sectional, descriptive study was conducted in the Department of Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from October 2012 to March 2013, to assess the outcomes of rubber band seton in the treatment of anal fistula. A total of 50 patients with high trans-sphincteric anal fistulas were included in this study. The rubber band seton was inserted through the fistula tract as a single strand and secured with 4-5 tight knots. Patient demographics, clinical presentation, treatment outcomes, and postoperative complications were systematically recorded. Among 50 patients, the median age was 40 years; 82% were males. High trans-sphincteric fistulas were observed (30% anterior, 70% posterior). Postoperative complications were minimal (4% urinary retention), with all patients discharged within 24 hours without narcotics. Cutting time was 1-3 months, with 10% experiencing premature loosening that healed spontaneously. Complete healing rates reached 46% at 1 month and 100% by 3 months, with 4% recurrence and 16% developing transient mild incontinence. Preliminary results suggest rubber band setons effectively treat high anal fistulas while preserving continence through gradual sphincter cutting. This method eliminates postoperative adjustments required with conventional setons, offering a promising alternative.

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Introduction

Anal fistula remains a significant clinical challenge, with a well-documented male predominance across studies. The male-to-female ratio typically ranges from 2:1 to 7:1.[1,2] Population-based research by Sainio examining 510,000 individuals over a decade found incidence rates of 12.3 per 100,000 for men compared to 5.6 per 100,000 for women.[3] The cryptoglandular hypothesis continues to dominate etiological discussions, proposing that anal fistulas originate from infected anal glands.[4,5] While this theory was strongly advocated by Parks and colleagues, who suggested cystic dilatation of anal glands as a precursor to infection,[6,7] our understanding of these glands remains incomplete. Notably, perianal cysts lined by anal gland epithelium are exceptionally rare, with an incidence of just 0.05%.[8] The pathogenesis of anal fistula involves complex anatomical considerations. Morgan & Thompson proposed that infection spreads along the fibers of the longitudinal anal muscle,[9] while research suggested microbial penetration through submucosal spaces into perirectal areas.[10] However, evidence showed that intersphincteric abscess was present in only 16% cases of anorectal sepsis challenging the universality of the cryptoglandular theory.[11] Shafik further complicated the discussion by proposing that

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anal intramuscular glands might be developmental vestiges rather than functional structures,[12] though it was contested by subsequent histological studies.[13,14] In management, accurate preoperative assessment remains crucial, with digital examination proving 71-84% accurate in identifying fistula components.[15] While various diagnostic techniques have been employed, from methylene blue injection to fistulography, MRI has emerged as the gold standard for comprehensive evaluation.[16,17] Treatment approaches have diversified considerably.[15] Traditional fistulotomy, while effective for low fistulas, carries significant incontinence risks.[18] Alternative sphincter-preserving techniques have gained prominence, including the Ayurvedic Kshara sutra method and advancement flap procedures, which show promising results with recurrence rates as low as 2%.[19,20] However, optimal treatment strategies for complex fistulas remain debated, particularly regarding long-term outcomes and functional preservation. Under the circumstances, we proposed this study to assess the outcomes of rubber band seton in the treatment of anal fistula.

Methods

This cross-sectional, descriptive study was conducted in the Department of Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, between October 2012 and March 2013. During the study period, a total of 50 patients were admitted to different colorectal surgical units of BSMMU Hospital. Of them, 50 cases were selected purposively according to inclusion and exclusion criteria. We adopted a convenient purposive sampling technique. We included all adult patients of either sex with high anorectal fistulas. However, we excluded complex fistulas (horseshoe, low, Crohn "s-related, malignant) and recurrent cases. Patients with uncontrolled comorbidities (diabetes, hypertension) were optimized preoperatively. Preoperative preparation included clinical evaluation, a liquid diet until 10 PM, fasting, and an enema. Postoperatively, patients received i.v. fluids, analgesics (diclofenac/pethidine), and antibiotics (ceftriaxone/metronidazole). Oral liquids began at 4 hours, progressing to low-residual, then regular diet. Dressings were changed daily after 24 hours of removal. Patients were instructed to perform sitz baths thrice daily, particularly after defecation, for optimal wound care. Under spinal anesthesia, the surgical approach was tailored to fistula anatomy. Follow-up was done after 8 days, 30 days, and monthly for 3 months. Outcomes included: (1) healing rate (complete epithelialization at 3 months); (2) incontinence scores (Jorge-Wexner); (3) complications; and (4) time for seton cutting (1-3 months). Recurrence was defined as fistula reappearance near the original tract. The primary endpoint was healing success; secondary endpoints were incontinence changes, complications, and healing duration. Data was collected, compiled, coded and analyzed using MS-Excel sheet. Data was expressed as frequency and percentage. The study was approved by the Institutional Review Board of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh.

Results

A total of 50 patients were treated with the rubber band seton for high fistula in ano. The highest age was 60 years, and the lowest age was 31 years. The mean age was 40 years. Most of the patients belonged to the 31–40 years age group (48%). A male predominance was observed (78%). Most of the patients were day labourer (38%), followed by shopkeeper (26%) and farmer (18%). Previous ano-

rectal abscess was the most common cause of fistula in ano, which was undergone spontaneous rupture or inadequately treated. The main presenting complaints were perianal discharge (76%), pain (10%), swelling (8%) and pruritus ani (6%). 90% of patients had purulent discharge, 6% blood mixed discharge 4% had serous discharge. In all patients, we could make out an external opening. Per rectal and proctoscopic examination showed the presence of an internal opening in all patients. 35(70%) had high posterior and 15(30%) had high anterior type of fistula (Table-I).

Table-I: Demographic and clinical characteristics of the patients (N=50)

Variables	Frequency	Percentage
Age group (in years)		
31-40	24	48
41-50	15	30
51-60	11	22
Sex		
Male	39	78
Female	11	22
Occupation		
Day labourer	19	38
Farmer	9	18
Shopkeeper	13	26
Services	5	10
Housewife	3	6
Student	1	2
Anorectal abscess		
Spontaneous ruptured	40	80
Incision and drainage	10	20
Symptoms		
Swellings	4	8
Discharge	38	76
Pain	5	10
Pruritis ani	3	6
Types of discharge		
Purulent	45	90
Blood mixed	3	6
Serous	2	4
External opening from anal verge		
Within 2.5 cm	11	22
Beyond 2.5 cm	39	78
Internal opening		
At the dentate line	15	30
Above the dentate line	35	70
Types of fistula		
High anterior	15	30
High posterior	35	70

Among all radiological examination, 38% had fistulogram (Table-II). Only 2(4%) patients required catheterization post-rubber band seton; 9(18%) had transient urinary retention relieved by analgesics. All were discharged within 24 hours. The rubber band seton cut through in 1–3 months, with 10% experienced early loosening. Healing rates were 46% at 1 month and 100% by 3 months postoperatively. We did not encounter any complications like hemorrhage or stricture. However, disturbance in continence was reported by 16%, while early recurrence rate was observed in 4% patients (Table-III).

Table-II: Radiological examination

Variables	Frequency	Percentage
Fistulogram	19	38
MRI	-	
EUS	-	

Table-III: Outcome of surgical intervention

Variables	Frequency	Percentage
Urine passed (in hours)		
12-24	9	18
24-36	-	-
Catheterization required	2	4
Duration of healing		
Within 1 month	23	46
Within 3 months	27	54
Complications		
Disturbance of continence	8	16
Within 3 months	2	4

Discussion

This study demonstrates the rubber band seton's potential as an effective treatment for high anal fistulas, showing high success rates (100% healing by 3 months) with minimal complications. The technique utilizes elastic tension to achieve gradual sphincter division, functioning as a controlled primary fistulotomy without requiring staged procedures. Its simplicity eliminates postoperative adjustments while

preserving anal anatomy and continence – only 16% of patients developed mild incontinence, with no significant score changes. Initially tested in low-risk patients, these promising results suggest potential applications for complex cases, including Crohn's disease or recurrent fistulas. High anal fistulas remain a surgical challenge, lacking the standardized approaches available for low fistulas. Seton techniques thus remain fundamental, yet conventional options are problematic.[21] Drainage setons merely palliate chronic sepsis,[21,22] chemical setons offer no advantage, and traditional cutting setons require periodic tightening with high incontinence rates[21] (e.g., up to 75%). Our rubber band technique improves upon historical methods. Hanley first described elastic setons requiring manual tightening,[23] while Culp used Penrose drains with 16% incontinence rates.[24] Dziki later modified this with thread-tightened bands.[25] Our innovation employs 4-5 "sweet-tight" knots that maintain optimal tension without adjustments. This continuous pressure enables slow, stable cutting – differing fundamentally from conventional setons' intermittent trauma. The biological advantage lies in allowing organized fibrosis during gradual division, potentially explaining our superior continence preservation compared to Garcia-Aguilar's 75% incontinence rate with traditional methods.[26] Technical outcomes were notable. Premature loosening occurred in 10% (5 cases), all of which healed uneventfully. Healing progressed from 46% at 1 month to 100% by 3 months, with minimal pain due to the initial skin incision. The 16% minor incontinence rate (8 patients) without score deterioration contrasts sharply with conventional seton outcomes. This likely reflects the physics of elastic cutting – unlike static setons causing jagged divisions, rubber bands produce even pressure distribution, minimizing muscular disruption.

The procedure's simplicity enhances its practicality. No specialized equipment is needed beyond standard surgical rubber bands. Operative time is comparable to conventional seton placement, and postoperative care involves only routine wound management with sitz baths. The absence of major complications (hemorrhage, stricture) in our series further supports its safety profile. Study limitations include the single-arm design and lack of manometry, which future research should address. However, the maintained continence scores strongly suggest functional preservation. The technique appears particularly suited for transsphincteric fistulas involving 30-50% of the sphincter complex, where balance between radical cure and function is crucial.[21]

Conclusion

The rubber band seton demonstrates promising potential for treating high anal fistulas, combining effective healing with preserved continence through gradual sphincter division. This technique eliminates the need for postoperative adjustments required with conventional setons, offering both practical and functional advantages. While these initial results are encouraging, further refinement and comparative studies will help establish its role in modern fistula management.

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