



Original Article

Short-Term Outcomes Following Intraspincteric Injection of Botulinum Toxin in Patients with Chronic Anal Fissure

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Abstract

Introduction: Chronic anal fissure is a common benign anorectal condition characterized by severe pain during defecation, bleeding, and impaired quality of life. Botulinum toxin injection has emerged as a minimally invasive alternative to lateral internal sphincterotomy by inducing temporary chemical sphincterotomy and reducing resting anal sphincter pressure. This study aims to evaluate the short-term clinical outcomes of intraspincteric botulinum toxin injection in patients with chronic anal fissure.

Methods: This quasi-experimental study was conducted in the Department of Colorectal Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh, between January 2023 and January 2024. Fifty-five adult patients with chronic anal fissure refractory to medical therapy were included. Botulinum toxin was injected into the internal anal sphincter as an office-based procedure. Patients were followed at 1, 4, and 12 weeks. Outcome measures included pain relief, bleeding, incontinence, fissure healing, and recurrence.

Results: The mean age of the patients was 43.9 ± 9.5 years, and 81.8% were female. The most common fissure location was posterior (78.2%). Pain was present in 25.5% of patients at 1 week and 1.8% at 4 weeks, while no patient reported pain at 12 weeks. Temporary flatus incontinence occurred in one patient (1.8%) during the first week and resolved completely thereafter. No postoperative bleeding was observed. Fissure healing was achieved in 49.1% of patients at 1 week, 74.5% at 4 weeks, and 92.7% at 12 weeks. Recurrence was observed in four patients (7.3%).

Conclusion: Intraspincteric botulinum toxin injection is a safe and effective minimally invasive treatment for chronic anal fissure, providing high healing rates with minimal morbidity, negligible incontinence, and low recurrence during short-term follow-up.

Keywords: Chronic anal fissure; Botulinum toxin; Chemical sphincterotomy; Healing; Incontinence; Recurrence.

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Introduction

Anal fissure is a longitudinal tear or ulcer in the anoderm distal to the dentate line and is one of the most common benign anorectal disorders encountered in colorectal practice. It typically presents with severe pain during defecation, rectal bleeding, and significant impairment of quality of life. Although acute fissures may heal spontaneously or respond to conservative treatment, chronic anal fissures are characterized by persistence of symptoms for more than 6–8 weeks and are often associated with sentinel pile, hypertrophied anal papilla, exposed internal sphincter fibers, and elevated resting anal sphincter pressure. Chronic anal fissure affects individuals of all age groups but is most frequently observed among young and middle-aged adults. The posterior midline is the most

common site, accounting for approximately 90% of cases, whereas anterior fissures are more common in women. Atypical fissures should raise suspicion of underlying pathology such as Crohn's disease, tuberculosis, HIV infection, sexually transmitted diseases, or anorectal malignancy ^{1,2}.

The pathophysiology of chronic anal fissure is multifactorial. Trauma to the anoderm caused by the passage of hard stool has traditionally been considered the initiating event. However, subsequent studies have demonstrated that persistent hypertonia of the internal anal sphincter plays a crucial role in the development and persistence of the disease. Increased resting anal pressure reduces anodermal blood flow, particularly in the posterior midline where vascular perfusion is naturally lower, resulting in local ischemia and impaired wound healing ^{3,4}. This ischemic cycle perpetuates pain, sphincter spasm, and delayed healing, ultimately leading to chronic fissure formation.

Management of chronic anal fissure aims to interrupt this cycle by reducing internal anal sphincter tone and improving local blood supply. Initial treatment includes dietary modification, fiber supplementation, stool softeners, sitz baths, and topical agents such as glyceryl trinitrate, diltiazem, and nifedipine. Although these treatments can achieve satisfactory healing in many patients, recurrence and medication-related adverse effects remain common ^{5,6}. Lateral internal sphincterotomy (LIS) has long been regarded as the gold-standard treatment, achieving healing rates exceeding 90%. However, permanent sphincter division may be associated with varying degrees of fecal and flatus incontinence, especially in women, elderly patients, and those with pre-existing sphincter dysfunction ^{7,8}.

Botulinum toxin type A has emerged as an effective sphincter-preserving alternative for the treatment of chronic anal fissure. By inhibiting acetylcholine release at the neuromuscular junction, botulinum toxin induces temporary paralysis of the internal anal sphincter, thereby lowering resting pressure and improving anodermal perfusion. This process creates a reversible chemical sphincterotomy that promotes fissure healing while avoiding permanent damage to the sphincter complex ⁹. Several studies have demonstrated healing rates ranging from 60% to 90%,

with a low incidence of adverse effects and minimal risk of permanent incontinence ^{10–12}. Furthermore, botulinum toxin can be administered as an outpatient procedure without anesthesia, making it an attractive option for both patients and surgeons.

Despite increasing international evidence supporting the use of botulinum toxin, there remains a paucity of data from Bangladesh regarding its clinical effectiveness and safety profile. Evaluation of local outcomes is important because demographic characteristics, disease presentation, and healthcare delivery systems may differ from those reported in Western populations. Therefore, this study was undertaken to assess the short-term outcomes of intrasphincteric botulinum toxin injection in patients with chronic anal fissure, focusing on pain relief, healing rate, complications, incontinence, and recurrence.

Materials and Methods

This quasi-experimental study was conducted in the Department of Colorectal Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from January 2023 to January 2024. Fifty-five adult patients with chronic anal fissure who had failed conservative medical treatment were enrolled using purposive sampling. Patients with inflammatory bowel disease, sexually transmitted diseases, pregnancy, or colorectal malignancy were excluded. After obtaining informed written consent, all patients underwent clinical assessment and received intrasphincteric botulinum toxin injection as an office-based procedure. Follow-up evaluations were performed at 1 week, 4 weeks, and 12 weeks using history taking and anorectal examination. Data regarding pain, bleeding, incontinence, fissure healing, and recurrence were recorded and analyzed using SPSS version 25.0. Ethical approval was obtained from the Institutional Review Board of BMU.

Results

A total of 55 patients were included in the study. The mean age was 43.9 ± 9.5 years, and most patients belonged to the 41–50-year age group (45.5%). Female patients predominated (81.8%), resulting in a male-to-female ratio of 1:4.5. Most patients were housewives (70.9%), and the mean BMI was 24.0 ± 2.4 kg/m². Constipation, anal pain, and bleeding were present in all patients, while itching was reported by 10.9% (Table I).

Table I: Baseline demographic and clinical characteristics of the study population (N=55)

Variable	Frequency (n)	Percentage (%)
Age Group (years)		
≤30	5	9.1
31–40	14	25.5
41–50	25	45.5
51–60	8	14.5
>60	3	5.5
Mean age ± SD (years)	43.9 ± 9.5	
Sex		
Male	10	18.2
Female	45	81.8
BMI (kg/m ²)		
18.5–24.9	35	63.6
25.0–29.9	20	36.4
Mean BMI ± SD (kg/m²)	24.0 ± 2.4	
Duration of symptoms (months)		
≤6	3	5.5
7–12	52	94.5

The majority of patients had symptoms for 7–12 months (94.5%). Posterior fissures were the most common (78.2%), and 90.9% had a single fissure. Sentinel tags and hypertrophied anal papillae were present in 85.5% of cases. The mean procedure duration was 11.2±2.3 minutes.

Table II: Clinical & anorectal examination findings (n=55)

Variable	Frequency (n)	Percentage (%)
Presenting symptoms		
Pain during defecation	55	100.0
Bleeding per rectum	55	100.0
Constipation	55	100.0
Itching	6	10.9
Location of fissure		
Posterior	43	78.2
Anterior	7	12.7
Anterior + Posterior	5	9.1
Number of fissures		
Single	50	90.9
Multiple	5	9.1
Sentinel tag	47	85.5
Hypertrophied anal papilla	47	85.5
Induration	21	38.2
High sphincter tone	55	100.0

Pain progressively improved during follow-up, decreasing from 25.5% at one week to 1.8% at four weeks and resolving completely by 12 weeks (Table III). Temporary flatus incontinence occurred in one patient (1.8%) at one week and resolved completely thereafter. No bleeding complications were observed during follow-up. Healing rates increased from 49.1% at one week to 74.5% at four weeks and 92.7% at twelve weeks. Recurrence occurred in four patients (7.3%) during the follow-up period (Table V).

Table III: Short-term clinical outcomes following botulinum toxin injection (N=55)

Outcome	1 Week n (%)	4 Weeks n (%)	12 Weeks n (%)
Pain present	14 (25.5)	1 (1.8)	0 (0.0)
Flatus incontinence	1 (1.8)	0 (0.0)	0 (0.0)
Bleeding	0 (0.0)	0 (0.0)	0 (0.0)
Fissure healed	27 (49.1)	41 (74.5)	51 (92.7)

Table IV: Overall treatment outcomes and complications (N=55)

Variable	Frequency (n)	Percentage (%)
Complete healing at 12 weeks	51	92.7
Persistent non-healing	4	7.3
Recurrence	4	7.3
Temporary flatus incontinence	1	1.8
Bleeding complication	0	0.0
Mean procedure duration (minutes)	11.2 ± 2.3	

Discussion

The present study evaluated the short-term outcomes of intrasphincteric botulinum toxin injection in patients with chronic anal fissure. It demonstrated favorable clinical results with high healing rates, minimal complications, and low recurrence. The mean age of the study population was 43.9±9.5 years, with the majority of patients belonging to the fourth and fifth decades of life. Similar age distributions have been reported by Soltany et al., who observed a mean age of 38.6 years, and Peeroo et al., who reported a mean age of 41.5 years^{13,14}. The predominance of female patients (81.8%) observed in the present study is also

consistent with findings from Rahman et al., Soltany et al., and Peeroo et al., where female patients constituted approximately 75–85% of the study populations^{14–16}.

Posterior fissures represented 78.2% of all cases in the present series. This observation agrees with established anatomical and physiological evidence demonstrating reduced blood supply to the posterior midline anoderm, making this area particularly vulnerable to ischemia and fissure formation (2,4). Similar rates of posterior fissures have been reported by Soltany et al. (73.6%) and Peeroo et al. (59%)^{13,14}.

One of the principal findings of the current study was the rapid improvement in pain following botulinum toxin injection. Pain was present in only 25.5% of patients at one week and decreased to 1.8% by four weeks, with complete resolution at twelve weeks. These findings support the proposed mechanism of chemical sphincterotomy, which relieves sphincter spasm and improves local perfusion. Comparable reductions in pain have been reported by Rahman et al. and Amorim et al., both of whom demonstrated significant symptomatic improvement following botulinum toxin therapy^{15,17}.

A major concern in the management of chronic anal fissure is the risk of postoperative incontinence. In the present study, only one patient (1.8%) experienced transient flatus incontinence, which resolved spontaneously during follow-up. No patient developed permanent incontinence. These findings compare favorably with the literature, where transient incontinence rates ranging from 2% to 13% have been reported following botulinum toxin injection^{13,18}. In contrast, lateral internal sphincterotomy has been associated with long-term incontinence rates ranging from 5% to 15%, highlighting the sphincter-preserving advantage of botulinum toxin treatment^{7,19}.

The healing rate achieved in this study was particularly encouraging. Healing occurred in 49.1% of patients at one week, increased to 74.5% at four weeks, and reached 92.7% by twelve weeks. This healing rate is comparable to or higher than those reported by Brisinda et al. (77.7%), Soltany et al. (84.9%), and Cinar et al. (84.2%)^{10,13,20}. The high healing rate observed may be attributed to careful patient selection, standardized injection technique, and close postoperative follow-up.

Recurrence remains an important consideration when evaluating non-surgical therapies for chronic anal fissure. In the current study, recurrence occurred in only four patients (7.3%). This finding is consistent with the recurrence rates reported by Barbeiro et al. and Brisinda et al., who documented recurrence rates ranging from 7% to 11% during follow-up^{20,21}. The relatively low recurrence observed in the present study suggests that botulinum toxin can provide durable short-term symptom control and fissure healing.

Overall, the findings of this study support the growing body of evidence indicating that botulinum toxin injection is a safe and effective treatment option for chronic anal fissure. The procedure can be performed on an outpatient basis, avoids permanent sphincter injury, and provides excellent healing with minimal morbidity. Although lateral internal sphincterotomy remains the definitive treatment with the highest healing rates, botulinum toxin may be particularly valuable for patients at increased risk of postoperative incontinence or those wishing to avoid surgery.

Conclusion

Intrasphincteric injection of botulinum toxin is a safe, minimally invasive, and effective treatment for chronic anal fissure. The procedure provides rapid symptom relief, high healing rates, minimal complications, negligible incontinence, and a low recurrence rate. Botulinum toxin may be considered an attractive sphincter-preserving alternative for patients with chronic anal fissure who fail conservative treatment.

Ethical Issue

IRB clearance was taken from the corresponding Hospital

Conflict of Interest

The authors declare no conflict of interest.

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