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Clinicodemographic profile and treatment outcomes among children with anal fissures

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Abstract

Background: Anal fissures in children, often due to constipation, cause significant discomfort. Treatment includes stool softeners, sitz baths, and topical medications. While 2% lidocaine gel provides symptom relief, 0.4% glyceryl trinitrate (GTN) ointment aids healing by reducing sphincter pressure. However, studies comparing their efficacy in pediatric patients are limited. This study aimed to evaluate the clinicodemographic profile and treatment outcomes among children with anal fissures.

Methods: This prospective, comparative study was conducted at the Outpatient Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from March 2022 to August 2023. A total of 52 children aged 3 to 16 years with anal fissures were enrolled and equally divided into two groups: Group I received 0.4% GTN ointment, and Group II received 2% lidocaine gel. Standard conservative management was provided to both groups. Treatment outcomes were assessed at 1, 4, and 8 weeks. Data analysis was performed using SPSS version 23.0.

Results: The mean age was 6.56 ± 3.06 years in Group I and 7.6 ± 2.61 years in Group II. Female predominance was noted in both groups. Perianal pain was present in all cases, with constipation affecting 88.5% in Group I and 73.1% in Group II. At 8 weeks, complete healing was significantly higher in Group I (80.8%) compared to Group II (26.9%) ($p < 0.05$). Headache (15.4%) and postural hypotension (7.7%) were reported as side effects in Group I.

Conclusion: 0.4% GTN ointment was more effective in achieving symptomatic relief and complete healing of anal fissures compared to 2% lidocaine gel. However, the potential side effects of GTN should be considered.

Keywords: Anal fissure, children, glyceryl trinitrate, lidocaine, pediatric surgery, treatment outcome

Introduction

An anal fissure is a common perianal condition affecting children of both genders equally, often leading to significant discomfort and reduced quality of life [1]. It presents as a linear tear in the anal canal mucosa, typically extending from the dentate line to the anal verge, causing pain, rectal bleeding, and distress during defecation. If untreated, acute fissures can progress to chronic fissures, characterized by fibrosis, hypertrophic anal papillae, and sentinel tags. Constipation is the leading cause of anal fissures in children. Dietary modifications, including increased fiber and hydration, while avoiding processed and fast foods, play a crucial role in preventing constipation and reducing trauma to the anoderm [2, 3]. The posterior midline is the most affected site due to lower perfusion and increased sphincter pressure [4]. In rare cases, fissures may be linked to conditions such as inflammatory bowel disease, leukemia, tuberculosis, or HIV, requiring further evaluation when healing is delayed or atypical locations are observed [5]. The pathophysiology of anal fissures involves trauma-induced hypertonicity of the internal anal sphincter (IAS), resulting in elevated resting pressure and localized ischemia, which hinders healing [6]. The conventional surgical treatment, lateral internal sphincterotomy, has shown high success rates; however, it carries a risk of fecal incontinence, affecting up to 30% of patients [7]. Therefore, non-surgical approaches targeting sphincter relaxation and symptom relief have gained popularity. Conservative treatment remains the first-line approach, involving stool softeners, sitz baths, analgesics, behavioral therapy, and dietary counseling. However, these

methods may have high recurrence rates. Pharmacological treatments focus on reducing anal canal pressure to facilitate healing. Glyceryl trinitrate (GTN) and lidocaine are two widely used topical agents for this purpose [8]. GTN is an organic nitrate that acts as a nitric oxide donor, promoting smooth muscle relaxation. It stimulates guanylate cyclase in vascular smooth muscle cells, reducing venous return, facilitating blood flow, and redistributing circulation to ischemic areas. When applied to the anal mucosa, GTN lowers maximal anal resting pressure, improves anodermal blood flow, and reduces pain from sphincter spasm. However, systemic absorption can cause headaches, which are reported in 22% of cases, alongside occasional postural hypotension, pruritus, and gastrointestinal symptoms [1, 9]. Despite these side effects, randomized controlled trials support its efficacy, with healing rates of up to 84% in pediatric patients [10]. Lidocaine, a widely used amide local anesthetic, primarily provides symptomatic relief by blocking voltage-gated sodium channels, leading to a reversible nerve conduction blockade. It also possesses anti-inflammatory and antithrombotic properties, reducing pain and discomfort associated with anal fissures. Lidocaine is generally well-tolerated, with minor side effects such as local irritation or unusual sensations. Systemic reactions are rare but may include central nervous system effects such as dizziness and drowsiness [11]. Several studies have compared the efficacy of GTN and lidocaine in pediatric anal fissure management. While lidocaine primarily offers pain relief, GTN actively promotes healing by reducing internal anal sphincter pressure. Research supports GTN as a more effective treatment, with superior healing rates and lower recurrence compared to lidocaine gel [12]. However, GTN's side effects, particularly headaches, may limit its use in some children. Given the impact of anal fissures on children's well-being and the potential adverse effects of available treatments, further research is needed to refine pharmacological management. Understanding the comparative efficacy and safety profiles of GTN and lidocaine will help optimize treatment strategies for pediatric patients, ensuring both symptomatic relief and long-term healing outcomes.

Methodology

This prospective, comparative study was conducted in the Outpatient Department of Paediatric Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from March 2022 to August 2023. A total of 52 children aged 3-16 years with diagnosed anal fissures were included using purposive sampling. The patients were equally divided into two groups: Group I received topical 0.4% glyceryl trinitrate (GTN) ointment, while Group II was treated with 2% lidocaine gel. Both groups received standard conservative therapy, including sitz baths, stool softeners, analgesics, behavioral therapy, and dietary advice. Patients were instructed to apply the ointment just inside the anal canal and around the anus (1 cm circumferentially) twice daily for eight weeks. The first dose was administered under supervision, followed by a six-hour observation period. Parents were advised to report any unusual symptoms. Clinical assessments were conducted at 1, 4, and 8 weeks to monitor symptom resolution and complications. Patients with acute anal fissures were included, while those with secondary fissures or associated perianal pathology were excluded.

Ethical approval was obtained, and data were analyzed using SPSS version 23.0.

Result

In our study, the majority of patients were aged 5-10 years, with 14 (53.8%) in Group I and 18 (69.2%) in Group II. The mean age was 6.56 ± 3.06 years in Group I and 7.6 ± 2.61 years in Group II. Female predominance was noted, with 69.2% in Group I and 57.7% in Group II. All patients (100%) in both groups experienced perianal pain. Perianal bleeding was reported in 50% of Group I and 38.5% of Group II. Itching was more common in Group I (65.4%) compared to Group II (46.2%). Constipation affected 88.5% of Group I and 73.1% of Group II. Regarding symptomatic improvement, 53.8% in Group I and 61.5% in Group II showed improvement after one week. At four weeks, 69.2% in Group I and 42.3% in Group II had improved. After eight weeks, 80.8% of Group I and 26.9% of Group II showed significant symptomatic relief ($p < 0.05$). Complete healing was observed in 38.5% of Group I and 11.5% of Group II at four weeks. At eight weeks, 80.8% of Group I and 26.9% of Group II achieved complete healing, with a statistically significant difference ($p < 0.05$). Among 28 patients who achieved complete healing, 52.4% in Group I and 57.1% in Group II required more than one month for improvement, though this difference was not statistically significant ($p > 0.05$). Side effects were reported only in Group I, where 15.4% experienced headaches and 7.7% had postural hypotension. No side effects were observed in Group II.

Table 1: Distribution of demographic profile (N=52)

Status	Group I		Group II	
	(n=26)		(n=26)	
	n	%	n	%
Age (Years)				
<5 Yrs.	8	30.8%	3	11.5%
5-10 Yrs.	14	53.8%	18	69.2%
11-15 Yrs.	4	15.4%	5	19.2%
Mean \pm SD	6.56 \pm 3.06		7.6 \pm 2.61	
Gender				
Male	8	30.8%	11	42.3%
Female	18	69.2%	15	57.7%

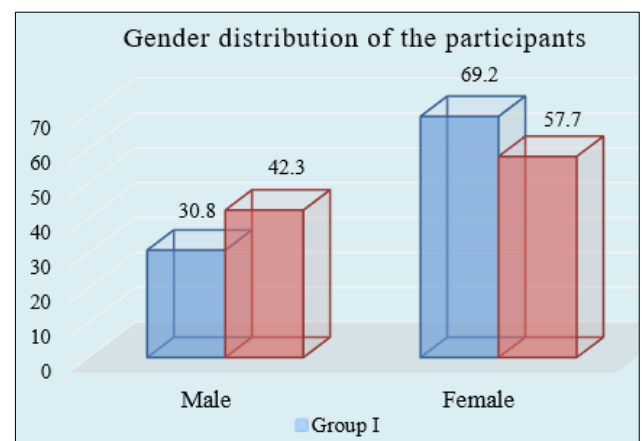


Fig 1: Column chart showed gender wise patients distribution (N=52)

Table 2: Distribution of clinical Presentation (N=52)

Type	Group I		Group II	
	n	%	n	%
Perianal pain				
Yes	26	100%	26	100%
No	0	0	0	0%
P/R bleeding				
Yes	13	50%	10	38.50%
No	13	50%	16	61.50%
Itching				
Yes	17	65.40%	12	46.20%
No	9	34.60%	14	53.80%
Diarrhea				
No	26	100	26	100
Constipation				
Yes	23	88.50%	19	73.10%
No	3	11.50%	7	26.90%

Table 3: Distribution of symptomatic improvement/response (N=52)

Response	Group I		Group II		p-value
	n	%	n	%	
Response at follow-up after 1 week					
Yes	14	53.8%	16	61.5%	0.575 ^{ns}
No	12	46.2%	10	38.5%	
Response at follow-up after 4 weeks					
Yes	18	69.2%	11	42.3%	0.051 ^{ns}
No	8	30.8%	15	57.7%	
Response at follow-up after 8 weeks					
Yes	21	80.8%	7	26.9%	0.001 ^s
No	5	19.2%	19	73.1%	

Table 4: Distribution of healing of fissure (N=52)

Healing	Group I		Group II		p-value
	n	%	n	%	
Complete follow-up after 4 weeks					
Yes	10	38.50%	3	11.50%	0.025 ^s
No	16	61.50%	23	88.50%	
Complete follow-up after 8 weeks					
Yes	21	80.80%	7	26.90%	0.001 ^s
No	5	19.20%	19	73.10%	

Table 5: Distribution of the complete healing patients according to duration of improvement (N=52)

Duration	Group I		Group II		p-value
	n	%	n	%	
≤ 1 month	10	47.6%	3	42.9%	0.827 ^{ns}
> 1 month	11	52.4%	4	57.1%	

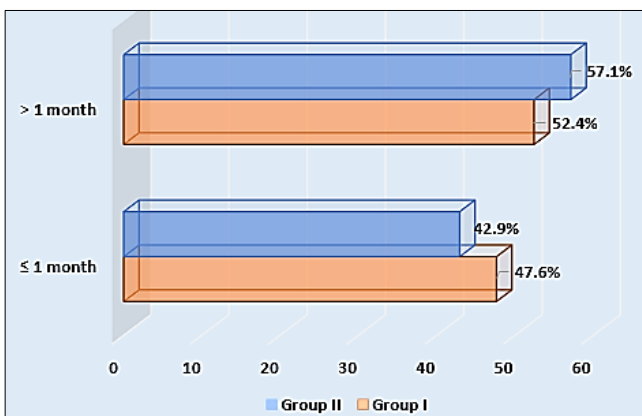


Fig 2: Bar chart showed complete healing patients according to duration of improvement (N=52)

Table 6: Distribution of the study cases by side effects following treatment (N=52)

Parameter	Group I		Group II	
	n	%	n	%
Headache				
Yes	4	15.4%	0	0%
No	22	84.6%	0	0%
Postural hypotension				
Yes	2	7.7%	0	0%
No	24	92.3%	0	0%
Dizziness				
No	26	100%	0	0%

Discussion

Anal fissures are a common anorectal condition in children, often associated with constipation and painful defecation. The present study compared the efficacy of 0.4% glyceryl trinitrate (GTN) ointment and 2% lidocaine gel in treating pediatric anal fissures. Our findings demonstrated that GTN ointment was significantly more effective in achieving symptomatic relief and complete healing compared to lidocaine gel. In our study, the mean age of the participants was 6.56±3.06 years in Group I (GTN) and 7.6±2.61 years in Group II (lidocaine). This finding aligns with previous studies that reported anal fissures commonly affect children aged 5-10 years [13]. A female predominance was observed in both groups, which is similar to previous findings reporting a higher prevalence of anal fissures in girls due to dietary and bowel habits [14]. Perianal pain was the most common symptom, reported by all patients (100%) in both groups, which is consistent with previous research [15]. Rectal bleeding was observed in 50% of Group I and 38.5% of Group II, while itching was more frequent in Group I (65.4%) compared to Group II (46.2%). Constipation was highly prevalent, affecting 88.5% of Group I and 73.1% of Group II, similar to findings that emphasize the strong association between constipation and anal fissures in children [16]. Regarding symptomatic improvement, 53.8% of patients in Group I and 61.5% in Group II showed improvement after one week. However, by eight weeks, 80.8% of patients in Group I and only 26.9% in Group II had achieved symptomatic relief, with a statistically significant difference ($p < 0.05$). Similar results were observed in studies where GTN ointment demonstrated superior efficacy over lidocaine gel in fissure healing [4]. Complete healing rates were significantly higher in the GTN group, with 80.8% achieving full recovery by eight weeks, compared to 26.9% in the lidocaine group ($p < 0.05$). These findings corroborate previous studies that reported an 84% healing rate with GTN after eight weeks [6]. The ability of GTN to relax the internal anal sphincter and enhance blood flow to the fissured area contributes to its superior healing effects [14]. In our study, side effects were observed only in the GTN group, with 15.4% of patients experiencing headaches and 7.7% reporting postural hypotension. Similar adverse effects, particularly headaches, have been documented in previous research, with incidence rates ranging from 10% to 22% [17]. However, these side effects were mild and transient, resolving with simple analgesics. Lidocaine gel primarily provides symptomatic relief without addressing the underlying pathophysiology of anal fissures. As shown in our study, although it offered temporary pain relief, its long-term efficacy in fissure healing was significantly lower compared to GTN. Previous studies have also indicated that lidocaine is effective as an anesthetic

but does not promote sphincter relaxation or enhance mucosal blood flow ^[18].

Conclusion & Recommendation

The study demonstrated that 0.4% GTN ointment is significantly more effective than 2% lidocaine gel in achieving symptomatic relief and complete healing in pediatric anal fissures. Although mild side effects such as headaches were observed with GTN, its benefits outweigh the risks. GTN should be considered as a first-line treatment for anal fissures in children.

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