

COMPARISON OF EFFICACY OF TOPICAL 0.2% GLYCERYL TRINITRATE VS. LOCAL OINTMENT (LIGNOCAINE) IN THE MANAGEMENT OF ACUTE ANAL FISSURE

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Abstract

Objective: To compare the efficacy of 0.2% topical glyceryl trinitrate versus local ointment in the management of acute anal fissure."

Methods: This randomized controlled trial was conducted at the Department of Surgery, GMMC/Civil Hospital, Sukkur, between January 1st 2025 to 1st June 2025. Seventy patients with acute anal fissures were enrolled using a non-probability consecutive sampling technique. Ethical approval was obtained, and informed consent was collected from all participants. Inclusion criteria included patients with acute anal fissures, while those with ischemic heart disease, migraine, pregnancy, perianal fistula, perianal abscess, inflammatory bowel disease, or a recent hemorrhoidectomy were excluded. Demographic data, including age, sex, weight, height, and medical history (smoking, diabetes, hypertension, constipation), were collected. Patients were randomly assigned to two groups: Group A received 0.2% glyceryl trinitrate ointment, and Group B received local lignocaine compound ointment, both applied twice daily for 8 weeks. After 8 weeks, patients were reassessed for fissure healing (epithelialization) and pain relief (VAS score < 2). Non-healing patients were considered non-responders. Data were recorded using a proforma, and outcomes documented.

Results: Out of 70 patients with acute anal fissures, 40 were male and 30 were female, with a mean age of 42.93 ± 12.75 years. Patients were randomly and equally divided into two groups (35 each): Group A received 0.2% glyceryl trinitrate ointment, while Group B received local lignocaine compound ointment. After 8 weeks, 29 patients (82.9%) in Group A achieved complete healing, compared to only 17 patients (48.6%) in Group B. This difference was highly significant ($p = 0.003$). Additionally, Group A had significantly lower mean pain scores (3.00 ± 1.16) compared to Group B (5.60 ± 1.09), with a mean difference of -2.60 ($p = 0.000$). Subgroup analyses showed that glyceryl trinitrate was more effective in both males and females, across various residence types, and for patients with diabetes and constipation. Furthermore, patients with sedentary lifestyles in Group A had significantly higher healing rates (17 out of 20) compared to Group B (12 out of 25) ($p = 0.010$). Dietary patterns, particularly home-made food, were also associated with better outcomes for Group A. These findings emphasize the greater efficacy of glyceryl trinitrate in healing acute anal fissures and reducing pain.

Conclusion: The study provides adequate evidence that 0.2 % glyceryl trinitrate is much deeper compared to the local lignocaine ointment in the healing of acute anal fissures. GTN is more effective in terms of complete healing and better analgesia, and also can support a wide range of patients and clinical variables.

These findings are consistent with other existing data, which reveal that GTN is an effective form of treatment. Future research aimed at enhancing the treatment process will also rely on studies examining long-term outcomes and potential side effects.

INTRODUCTION

Acute anal fissures are a common and disabling condition that can have a severe impact on the quality of life of a victim. The anorectal skin ulcers lead to intense pain in the region, bloody diarrhea, and other distasteful symptoms. Whereas in other cases the condition develops on its own, in most cases of the ailment, individuals are affected by the condition and require treatment as a means of improving their recovery, recurrence, and symptom suppression (1). Therapy alternatives may be either mild, such as a change of diet and stool softeners, or more intrusive. The pharmacological management is one of the conservative approaches, and the first line of treatment is the topical medications (2). There are two frequently available topical agents to use in treating acute anal fissures: 0.2 % glycerol trinitrate and local lignocaine ointment. The two have been widely researched on their efficacy, with the comparative effectiveness remaining an object of clinical research (3).

In Pakistan, the burden of anal fissures is very high, and their prevalence rates are 20-30 % of the population of the country, who have suffered the anal fissures at one stage of their lives (4). As per the statistics of the local hospitals, 5-7 % of all outpatient visits to colorectal clinics are associated with the anal fissure. This is necessary, considering the socioeconomic and healthcare challenges associated with Pakistan (5). There is also an emerging patient with chronic anal fissure, which is more difficult to treat, and most of them do not notice or even take any measures to help themselves because they take too long before they consult medical care. Such permanent fissures can lead to complications such as constant pain, anal spasm, and in some severe cases anal fistulas or anal fistulas (6).

Glyceryl trinitrate (GTN) is a nitrate-based agent that has been widely applicable in the treatment of vascular disease and is now being considered an effective means of managing anal fissure. The

principal action of the work of GTN in this vision is relaxation of the internal anal sphincter, reduction of pressure at the fissure site, and healing is increased by the blood flow improvement (7). Literature has shown that 0.2% glyceryl trinitrate ointment is of considerable effect in reducing pain and enhancing healing of patients with acute anal fissures in case of an ointment applied topically. This one takes place by the relaxation of smooth muscles and an anal sphincter that is of low tone, which is a crucial part of the pathogenesis of anal fissures (8).

The application of GTN is not only popular in Pakistan, but studies have found that 60 to 70 % of patients have healed completely after a span of 6-8 weeks. Its use is, however, limited by side effects like headaches, hypotension, or local irritation, especially in patients with cardiovascular disease. The failure rate of GTN to alleviate the symptoms and induce fissure healing is also a disadvantage; however, its usefulness as a treatment method is ascertained (9).

Lidocaine or also lignocaine, is a local anesthetic and it is a blocker of sodium channels, which prevents the passage of pain signals. It is applicable in the symptomatic management of acute anal fissure to give immediate relief, instead of treating the root cause. Lignocaine ointment is rubbed on the fissure as it provides local anesthesia and allows the patient to pass stools with minimum pain (10).

Although lignocaine is effective in pain relief, it does not promote healing in the fissure like glyceryl trinitrate. It is often administered during the acute stage, since its effect occurs almost instantaneously, and there is a reasonably low rate of side effects. Lignocaine is also very common in the treatment of Pakistan due to its affordability and availability. It is usually given with other interventions such as stool softeners or dietary interventions (11).

Research shows that 50-60 % of patients experience great relief when using lignocaine to relieve pain. Its curing effect is, however, not as great as that of GTN, especially in chronic cases. This has led lignocaine to mostly be included in a multi-faceted treatment process, whereby other therapies are frequently employed alongside lignocaine in an attempt to alleviate the symptoms, as other medicines are used to treat the causes (12).

In a comparative clinical study of the effectiveness of topical 0.2% glyceryl trinitrate and local lignocaine ointment, available literature indicates that there is a greater success rate of GTN in healing. Nevertheless, the selection of treatment is usually based on the respective symptoms of the patient, his/her preferences, and the fissure severity (13). Lignocaine is superior in terms of giving quick pain relief, although GTN is better in long-term healing. The combination of lignocaine with immediate analgesic effects and GTN to heal during the period after the acute symptoms fade away is used by some clinicians in clinical practice (14).

In Pakistan, side effects, availed resources, and cost can be the main factors when deciding between these two treatment methods since the available healthcare resources are usually limited. GTN could offer superior long-term results, although it has the potential for side effects such as headaches and hypotension. Instead, lignocaine is simpler, better tolerated, and more readily obtainable, but needs long-term therapy to fully recover (9).

Methodology:

This randomized controlled trial study was conducted at the Department of Surgery, GMMC/Civil Hospital, Sukkur, between January 1st to June 30th, 2025, by employing a non-probability consecutive sampling approach. A total of 70 acute anal fissure patients were recruited, and the ethics committee of the hospital approved the study. All the participants gave informed consent. The inclusion criteria comprised patients suffering acute anal fissures, with the exclusion criteria including patients with ischemic heart disease, migraine, pregnancy,

perianal fistula, perianal abscess, inflammatory bowel disease, and those who had undergone hemorrhoidectomy in the previous year. Demographic information was also gathered, such as age, sex, weight, height, and medical history (smoking, diabetes, high blood pressure, and constipation). Lifestyle issues, such as the level of activity, exercise, and diet, were also noted. The patients were split into two groups (35 patients in each group) at random and equally by assigning 0.2% glyceryl trinitrate ointment to Group A, which was required to apply the ointment twice a day during the 8 weeks, and the local lignocaine compound ointment to Group B, which was required to apply the ointment in the same manner. After 8 weeks of therapy, patients were evaluated again in terms of fissure healing, which was epithelialization or loss of the fissure, and pain relief, which was a score of < 2 on a Visual Analog Scale (VAS) of pain. The non-healing patients were treated as non-responders. All the information was entered in a pro forma, and the results of the treatment were noted.

Results:

Out of 70 patients diagnosed with acute anal fissure, 40 were male, accounting for 57.1% of the total sample, while 30 were female, representing 42.9% overall. The overall mean age of the patients was 42.93 ± 12.75 years. The mean weight was 66.73 ± 22.95 kg, with a mean height of 168.54 ± 4.43 cm. The average BMI was 23.46 ± 7.85 . Following initial assessment, the patients were randomly divided into two equal groups. In **Group A**, patients were advised to apply diltiazem ointment directly to the fissure site twice daily for a period of 8 weeks. In Group B, patients were instructed to use local lignocaine compound ointment (Knoll®) in the same manner, **twice daily for 8 weeks**, to evaluate and compare the therapeutic outcomes of the two treatment approaches.

In terms of place of residence, in Group A (Glyceryl Trinitrate), 12 patients were from **urban** areas (34.3%), 17 from **rural** areas (48.6%), and 6 from **semi-urban** areas (17.1%). In **Group B (Lignocaine)**, 10 patients were from **urban** areas (28.6%), 20 from **rural** areas (57.1%), and 5 from

semi-urban areas (14.3%). Overall, 22 patients resided in urban areas (31.4%), 37 in rural areas (52.9%), and 11 in semi-urban areas (15.7%) (Table 1).

Regarding medical history, in Group A, 5 patients had a history of smoking (14.3%), 7 had hypertension (20.0%), 5 had diabetes (14.3%), 4 had constipation (11.4%), and 14 had a family history of fissures (40.0%). In Group B, 4 patients had a history of smoking (11.4%), 5 had hypertension (14.3%), 5 had diabetes (14.3%), 4 had constipation (11.4%), and 17 had a family history of fissures (48.6%). Across both groups, a total of 31 patients had a family history of fissures (44.3%), 9 had a smoking history (12.9%), 12 had hypertension (17.1%), 10 had diabetes (14.3%), and 8 had constipation (11.4%) (Table 1).

For lifestyle factors, in Group A, 20 patients were sedentary (57.1%), 10 were active (28.6%), and 5 were sportsman/gym-goers (14.3%). In Group B,

25 patients were sedentary (71.4%), 7 were active (20.0%), and 3 were sportsman/gym-goers (8.6%). In total, 45 patients were sedentary (64.3%), 17 were active (24.3%), and 8 were sportsman/gym-goers (11.4%) (Table 1).

Finally, concerning diet patterns, in Group A, 21 patients followed a home-made diet (60.0%), 7 had mess food (20.0%), and 7 consumed street food (20.0%). In Group B, 21 patients had a home-made diet (60.0%), 8 had mess food (22.9%), and 6 ate street food (17.1%). Overall, 42 patients followed a home-made diet (60.0%), 15 had mess food (21.4%), and 13 consumed street food (18.6%) (Table 1).

Regarding the duration of the fissure, in Group A (Glyceryl Trinitrate), the mean duration was 34.77 ± 7.30 weeks, while in Group B (Lignocaine), the mean duration was 37.46 ± 8.64 weeks (Table 1).

Table 1: Demographic and Clinical Characteristics of Participants in Group A (0.2% Glyceryl Trinitrate) and Group B (Lignocaine)

Categories	Group A (0.2% Glyceryl Trinitrate) n=35	Group B (Lignocaine) n=35	Total (n=70)
Gender			
Male	21 (60.0%)	19 (54.3%)	40 (57.1%)
Female	14 (40.0%)	16 (45.7%)	30 (42.9%)
Age in years (mean $\pm$ SD)	42.93 $\pm$ 12.75		
Weight in kg (mean $\pm$ SD)	66.73 $\pm$ 22.95		
Height in cm (mean $\pm$ SD)	168.54 $\pm$ 4.43		
BMI in kg/m² (mean $\pm$ SD)	23.46 $\pm$ 7.85		
Place of Residence			
Urban	12 (34.3%)	10 (28.6%)	22 (31.4%)
Rural	17 (48.6%)	20 (57.1%)	37 (52.9%)
Semi-Urban	6 (17.1%)	5 (14.3%)	11 (15.7%)
History			
Smoking	5 (14.3%)	4 (11.4%)	9 (12.9%)
Hypertension	7 (20.0%)	5 (14.3%)	12 (17.1%)
Diabetes	5 (14.3%)	5 (14.3%)	10 (14.3%)
Constipation	4 (11.4%)	4 (11.4%)	8 (11.4%)
Family History of	14 (40.0%)	17 (48.6%)	31 (44.3%)

Fissures			
Lifestyle Factors			
Sedentary	20 (57.1%)	25 (71.4%)	45 (64.3%)
Active	10 (28.6%)	7 (20.0%)	17 (24.3%)
Sports/Gym going	5 (14.3%)	3 (8.6%)	8 (11.4%)
Diet Patterns			
Home-made Diet	21 (60.0%)	21 (60.0%)	42 (60.0%)
Mess Food	7 (20.0%)	8 (22.9%)	15 (21.4%)
Street Food	7 (20.0%)	6 (17.1%)	13 (18.6%)
Fissure Duration in weeks (mean $\pm$ SD)	34.77 $\pm$ 7.30	37.46 $\pm$ 8.64	

The efficacy of the treatments was assessed in by healing at eight weeks (defined as epithelialization or the disappearance of the fissure) and by self-reported defecatory pain, measured by a Visual Analog Scale (VAS) pain score of < 2 .

In terms of healing at 8 weeks, 29 patients (82.9%) in Group A (Glyceryl Trinitrate) experienced complete healing, while only 17 patients (48.6%) in Group B (Lignocaine) achieved the same. A statistical comparison using the Chi-Square test showed that this difference was highly significant, with a Pearson Chi-Square value of 9.130 ($p = 0.003$) (Table 2).

Furthermore, when comparing pain scores, the results showed a clear difference between the two groups. In Group A, the mean pain score was 3.00 ± 1.16 , while in Group B, the mean pain score was significantly higher at 5.60 ± 1.09 . The Independent Samples t-Test revealed a significant difference between the two groups ($t = -9.649$, $p = 0.000$), with a mean difference of -2.60 (95% CI: -3.14 to -2.06). This suggests that patients in Group A experienced significantly less pain compared to those in Group B, further supporting the greater efficacy of Glyceryl Trinitrate in reducing symptoms (Table 2).

Table 2: Efficacy Parameters Following Treatment in Group A (0.2% Glyceryl Trinitrate) and Group B (Lignocaine)

Efficacy Parameters following treatment	Group A (0.2% Glyceryl Trinitrate) n=35	Group B (Lignocaine) n=35	p-value
Complete Healing (8 weeks)	29 (82.9%)	17 (48.6%)	0.003*
Mean Pain Score (mean $\pm$ SD)	3.00 $\pm$ 1.16	5.60 $\pm$ 1.09	0.000*, $t = -9.649$, Mean Difference: -2.60 (95% CI: -3.14 to -2.06)

The subgroup analyses further elucidated the treatment outcomes in patients with acute anal fissures. The gender distribution showed that Group A (Glyceryl Trinitrate) had 16 male patients who experienced healing at eight weeks, while 5 male patients did not. In contrast, Group B (Lignocaine) had 8 male patients healed and 11 male patients who did not experience healing. For female patients, Group A had 13 patients

healed and 1 non-healed, while Group B had 9 healed and 7 non-healed. A Chi-Square Test showed that in both genders, the results were statistically significant ($p = 0.028$ for males and $p = 0.024$ for females), indicating that Glyceryl Trinitrate was more effective in promoting healing across both genders (Table 3).

When considering place of residence, Group A showed a higher healing rate in urban and rural

areas, with 10 urban and 15 rural patients healed, compared to Group B, where healing occurred in 8 urban and 9 rural patients. However, in semi-urban areas, Group A had a higher rate of healing (4 out of 6), while Group B showed less healing with only 0 out of 5 healed. The Chi-Square Test revealed statistically significant results for rural areas ($p = 0.006$) and semi-urban areas ($p = 0.022$), highlighting the effectiveness of Glyceryl Trinitrate in rural and semi-urban populations (Table 3).

Regarding medical history, the presence of diabetes and constipation appeared to influence healing outcomes. In patients with diabetes, Group A showed a higher healing rate (4 out of 5) compared to Group B, where only 0 out of 5 patients healed. A Chi-Square Test confirmed a significant difference ($p = 0.010$). Similarly, for patients with constipation, Group A had a significantly better outcome with 4 healed out of 4, whereas Group B showed only 0 out of 4 healed. The Chi-Square Test for constipation also revealed significant results ($p = 0.005$) (Table 3).

Analyzing the lifestyle factors, patients with a sedentary lifestyle showed notable differences in

healing between the two groups. In Group A, 17 out of 20 sedentary patients healed, compared to 12 out of 25 in Group B, with a statistically significant result ($p = 0.010$). However, for active sportsmen and/regular gym attendees, the differences were not significant. The results emphasize that Glyceryl Trinitrate may be more effective in individuals with sedentary habits, although the influence of lifestyle on healing needs further exploration (Table 3).

Finally, the diet pattern showed some variation, particularly in patients who consumed mess food. Group A had a higher healing rate (7 out of 7) for patients on a home-made diet, compared to 10 out of 21 in Group B. The results for mess food and street food also showed statistical significance ($p = 0.054$ and $p = 0.053$, respectively), suggesting that diet might play a role in the healing outcomes, but this requires further investigation for a conclusive understanding (Table 3).

Table 3: Healing at 8 Weeks by Various Factors in Group A (0.2% Glyceryl Trinitrate) and Group B (Lignocaine)

	Healed at 8 weeks	Groups		Total	p-value
		A (0.2% Glyceryl Trinitrate)	B (Lignocaine)		
Place of Residence					
Urban	Yes	10	8	18	0.840
	No	2	2	4	
Rural	Yes	15	9	24	0.006*
	No	2	11	13	
Semi-Urban	Yes	4	0	4	0.022*
	No	2	5	7	
Gender					
Male	Yes	16	8	24	0.028*
	No	5	11	16	
Female	Yes	13	9	22	0.024*
	No	1	7	8	
History					
Smoking	Yes	4	3	7	0.858
	No	1	1	2	

Hypertension	Yes	6	4	10	0.793
	No	1	1	2	
Diabetes	Yes	4	0	4	0.010*
	No	1	5	6	
Constipation	Yes	4	0	4	0.005*
	No	0	4	4	
Family history of fissure	Yes	11	10	21	0.242
	No	3	7	10	
Lifestyle					
Sedentary	Yes	17	12	29	0.010*
	No	3	13	16	
Active	Yes	8	3	11	0.115
	No	2	4	6	
Sports/Gym going	Yes	4	2	6	0.673
	No	1	1	2	
Diet pattern					
Home-made Diet	Yes	16	10	26	0.057*
	No	5	11	16	
Mess Food	Yes	7	5	12	0.070
	No	0	3	3	
Street Food	Yes	6	2	8	0.053*
	No	1	4	5	

Moreover, we further analyzed significant differences in pain scores between the two treatment groups. In both male and female patients, Group A (Glyceryl Trinitrate) consistently showed lower mean pain scores compared to Group B (Lignocaine). Males in Group A had a mean of 2.90 ± 1.26 , while Group B had 5.84 ± 1.07 ($p = 0.000$). Similarly, females in Group A reported 3.14 ± 1.03 , while those in Group B had 5.31 ± 1.08 ($p = 0.000$) (Table 4). Next, we analyzed pain scores based on the place of residence. In urban areas, Group A reported a mean of 2.67 ± 1.30 , compared to 5.70 ± 1.06 for Group B ($p = 0.000$). In rural areas, Group A had 3.24 ± 1.03 , while Group B reported 5.50 ± 1.19 ($p = 0.000$). In semi-urban areas, Group A had 3.00 ± 1.26 , while Group B showed 5.80 ± 0.84 ($p = 0.002$). These results indicate that Glyceryl Trinitrate was more effective in reducing pain across all areas (Table 4).

In terms of medical history, significant differences in pain scores were observed across various conditions. Smokers in Group A had 3.00 ± 1.00 , while Group B had 5.25 ± 0.96 ($p = 0.011$). Hypertensive patients in Group A reported 3.29 ± 1.25 , compared to 5.20 ± 0.84 in Group B ($p = 0.014$). Diabetic patients showed a mean of 3.00 ± 1.41 for Group A, compared to 6.00 ± 1.00 for Group B ($p = 0.005$). Similarly, constipation patients in Group A had 3.50 ± 0.58 , while Group B had 6.00 ± 1.41 ($p = 0.017$). In those with a family history of fissures, Group A had 2.71 ± 1.27 , while Group B reported 5.59 ± 1.18 ($p = 0.000$). These findings suggest that Glyceryl Trinitrate is more effective in reducing pain in patients with various medical conditions (Table 4).

Lifestyle factors also influenced pain scores. In sedentary individuals, Group A reported 2.90 ± 1.17 , while Group B had 5.32 ± 1.07 ($p = 0.000$). Active individuals in Group A showed $3.30 \pm$

1.25, compared to 6.29 ± 0.76 in Group B ($p = 0.000$). In sportsmen/gym-goers, Group A had 2.80 ± 1.10 , while Group B reported 6.33 ± 1.15 ($p = 0.005$). These results highlight the superior efficacy of Glyceryl Trinitrate in reducing pain across all lifestyle categories (Table 4).

Finally, we examined pain scores based on dietary patterns. In patients on a home-made diet, Group A had 2.90 ± 1.26 , while Group B reported 5.52 ± 1.08 ($p = 0.000$). For those on a mess diet,

Group A had 2.86 ± 1.21 , compared to 6.00 ± 0.76 in Group B ($p = 0.000$). In the street food group, Group A showed 3.43 ± 0.79 , while Group B had 5.33 ± 1.51 ($p = 0.014$). These results demonstrate that Glyceryl Trinitrate was more effective in reducing pain across all dietary patterns, especially for patients consuming home-made and mess food (Table 4).

Table 4: Comparison of Pain Scores between 0.2% Glyceryl Trinitrate and Lignocaine Across Different Variables

Variables	Groups	N	Pain Scores (Mean ± SD)	p-value
Gender				
Male	0.2% Glyceryl Trinitrate	21	2.90 ± 1.26	0.000*
	Lignocaine	19	5.84 ± 1.07	
Female	0.2% Glyceryl Trinitrate	14	3.14 ± 1.03	0.000*
	Lignocaine	16	5.31 ± 1.08	
Place of Residence				
Urban	0.2% Glyceryl Trinitrate	12	2.67 ± 1.30	0.000*
	Lignocaine	10	5.70 ± 1.06	
Rural	0.2% Glyceryl Trinitrate	17	3.24 ± 1.03	0.000*
	Lignocaine	20	5.50 ± 1.19	
Semi-urban	0.2% Glyceryl Trinitrate	6	3.00 ± 1.26	0.002*
	Lignocaine	5	5.80 ± 0.84	
History				
Smoking	0.2% Glyceryl Trinitrate	5	3.00 ± 1.00	0.011*
	Lignocaine	4	5.25 ± 0.96	
Hypertension	0.2% Glyceryl Trinitrate	7	3.29 ± 1.25	0.014*
	Lignocaine	5	5.20 ± 0.84	
Diabetes	0.2% Glyceryl Trinitrate	5	3.00 ± 1.41	0.005*
	Lignocaine	5	6.00 ± 1.00	
Constipation	0.2% Glyceryl Trinitrate	4	3.50 ± 0.58	0.017*
	Lignocaine	4	6.00 ± 1.41	
Family History of Fissures	0.2% Glyceryl Trinitrate	14	2.71 ± 1.27	0.000*

	Lignocaine	17	5.59 ± 1.18	
Lifestyle				
Sedentary	0.2% Glyceryl Trinitrate	20	2.90 ± 1.17	0.000*
	Lignocaine	25	5.32 ± 1.07	
Active	0.2% Glyceryl Trinitrate	10	3.30 ± 1.25	0.000*
	Lignocaine	7	6.29 ± 0.76	
Sports/Gym	0.2% Glyceryl Trinitrate	5	2.80 ± 1.10	0.005*
	Lignocaine	3	6.33 ± 1.15	
Diet pattern				
Home-made Diet	0.2% Glyceryl Trinitrate	21	2.90 ± 1.26	0.000*
	Lignocaine	21	5.52 ± 1.08	
Mess Food	0.2% Glyceryl Trinitrate	7	2.86 ± 1.21	0.000*
	Lignocaine	8	6.00 ± 0.76	
Street Food	0.2% Glyceryl Trinitrate	7	3.43 ± 0.79	0.014*
	Lignocaine	6	5.33 ± 1.51	

Discussion:

This study aimed to compare and contrast the effectiveness of topical glycerol trinitrate (GTN) 0.2% and local lignocaine ointment in the treatment of acute anal fissures. We have found that GTN was much better than lignocaine with respect to healing and analgesia. The findings are in line with the accumulated body of literature that indicates that GTN is suitable for acute anal fissures because it is effective in curing and providing analgesia. Such results are in line with the previous research results that also reveal that GTN enhances wound healing as it raises blood flow to the fissure point owing to its vasodilatory influence on the anal sphincter and wound to initiate epithelialization.

At the 8-week follow-up, the percentage of patients who were completely cured was 82.9% in the GTN but 48.6% in the lignocaine. This was much different ($p = 0.003$), which proved that GTN was much more efficient in the case of fissure healing facilitation. These are also complementary to several earlier research studies in which Akıncı et al. (2020) and Mohab et al.

(2021) had documented 70-85% healing among patients who had undergone GTN to help treat chronic anal fissures (8, 15). However, the efficacy of lignocaine, a local anesthetic whose effect on healing was unknown, was significantly lower, and only 48.6% of patients managed to reach full epithelialization. The leading action of Lignocaine is pain relief, as opposed to tissue regeneration, and this could be the reason why it showed poor healing outcomes (16).

Also, the subgroup analysis showed that greater healing effects of GTN were also observed to be consistent among different patient populations, such as gender, place of residence, and medical patient populations with conditions such as constipation and diabetes. An example is the situation in patients with constipation, whereby GTN resulted in total healing in all the cases, but no cases in the lignocaine group. This justifies the notion that the pharmacologic effect of GTN is advantageous in patients who have risk factors that can interfere with the healing process, like persistent constipation, which can result in

elevated anal sphincter tone and decreased blood circulation to the fissure area (17).

Concerning pain relief, the GTN group almost always reported a lower VAS pain score than the lignocaine group. The average score of pain in the GTN was 3.00 ± 1.16 , but in the lignocaine group, the pain was much higher, with a score of 5.60 ± 1.09 . These were statistically significant ($p = 0.000$) differences, indicating that GTN is more effective in healing the fissure and also alleviates pain associated with the same. This conforms to the report of Shrestha et al. (2017) that found that GTN was a significant analgesic agent in anal fissure patients, because it was found to relax the anal sphincter and reduce spasm, which is a significant cause of pain during defecation (18).

The pain scores in the lower range in the GTN group were found to be similar among all groups, gender, place of residence, as well as lifestyle factors. Particularly, patients who have a high risk of developing chronic anal fissures as a result of extended sitting or straining, i.e., sedentary people, were the most affected by GTN treatment. We have found that lifestyle interventions (particularly, physical exercise) can influence the outcomes of pain, and the participants who were not exercising demonstrated a greater response towards GTN. This has also been supported by the study by Nijs et al. (2024), which has indicated that patients who lead a sedentary lifestyle have a higher risk of experiencing more severe pain and will thus be more susceptible to treatment that is geared towards the management of sphincter spasm, as it has been the case with GTN (19).

This paper also established that geographical location and lifestyle were some of the factors that influenced the outcome of treatment. The difference brought about by GTN was more in those patients who reside in rural and semi-urban environments, in which the healing rates vary significantly ($p = 0.006$ and $p = 0.022$, respectively). This is attributed to the various access to healthcare resources or the fact that they may possess dietary and lifestyle habits that may further aggravate the symptoms of fissures in these populations of people (20). Previous literature suggests that the delay in diagnosis or

treatment of patients in rural areas may be a result of inaccessibility to care, which could extend the duration of fissure and the severity of symptoms. Lee et al. (2021) discovered that patients in rural areas are more likely to present with a more severe disease, and it is thus overriding to provide an effective and prompt intervention, which also involves the use of GTN to treat the patient (21).

Diets were also found to affect treatment. The healing rate was also more encouraging in the GTN, where the patients received a homemade diet, and this may indicate the nutritional advantage and influence of a balanced diet on wound healing. This observation is consistent with the study by Xi Net al. (2025), who reported that high-fiber diets could potentially enhance bowel movements and alleviate straining, which worsens anal fissures (22). The patients who ate messy food or street food, which may have had more fat and less fiber, however, healed more slowly, especially in the lignocaine group. This supports the assumption that diet is a factor and aspect of the treatment of anal fissure, among other factors that determine the success of the treatment (23).

Medical disorders, including diabetes and a history of constipation, also affected the healing results. The rate of healing among diabetic patients in the GTN group was much higher than that of the lignocaine group in our study ($p = 0.010$). This is especially so since patients with diabetes usually have poor wound healing as they are likely to have poor circulation and high glucose levels in the blood (24). This enhanced outcome with GTN may stem from its effect in enhancing blood flow within the locality and oxygenating the tissue, as Butt et al. (2024) established that GTN promotes wound healing in diabetic patients because it enhances microvascular circulation (25).

Although the results of the research in support of GTN are high, this study has a number of shortcomings. To begin with, the sample size as sufficient as it is in the initial analyses may not be sufficient to represent the variability of treatment outcomes in a wide range of populations. A multicenter study on a greater scale would have

offered more credible data regarding the effectiveness of GTN. Second, as much as we measured some of the variables that may affect the outcome of the treatments, including lifestyle factors and diet, some of the possible confounders, including the nature of the bowel habits of the patients and the taking of concomitant medications that may affect healing, were not measured (26).

In addition, although GTN proved to be quite effective as a promoter of healing and pain reduction, its side effects, including but not confined to headache or anal irritation, were not properly addressed in the study. The side effects need to be evaluated properly in the future, and the long-term effects of the use of GTN and lignocaine treatment should be compared (27).

Conclusion:

This study presents strong evidence that topical glyceryl trinitrate 0.2 % is highly effective compared to local lignocaine ointment in the management of acute anal fissures. GTN, in addition to enhancing faster and more complete recovery, offers the best pain relief and the advantages cut across a very broad spectrum of patient demographics and clinical variables. The similarity of these findings with the previously existing literature supports the argument for using GTN as the treatment of choice in the case of acute anal fissures. Additional research into the long-term results and adverse effects of GTN medication will be crucial in the adjustment of the treatment regimens related to the treatment of this painful disorder, which is rather common.

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