



COMPARATIVE STUDY BETWEEN TOPICAL GLYCERYL TRINITRATE (0.2%) AND LATERAL ANAL SPHINCTEROTOMY IN TREATMENT OF FISSURE IN ANO

Dr. K. AnuPriya

House surgeon, Konaseema institute of Medical sciences, Amalapuram.

Dr G. Chandana

House surgeon, Konaseema institute of Medical sciences, Amalapuram.

Dr P. Naresh Kumar

M.S. Professor, Department of General surgery, Rangaraya medical college, Kakinada.

ABSTRACT

An anal fissure is a common and painful condition that affects the anal canal. It is characterized by a tear or crack in the mucosa that exposes the underlying muscle. The main symptom is severe pain during and after defecation, often accompanied by bleeding. An anal fissure can be acute or chronic, depending on the duration and healing of the lesion. A chronic anal fissure is defined as a fissure that persists for more than six weeks and is associated with hypertonia and spasm of the internal anal sphincter. The treatment of chronic anal fissures aims to relieve pain, promote healing, and prevent recurrence. The standard surgical treatment is lateral internal sphincterotomy, which involves cutting a part of the internal anal sphincter to reduce the resting pressure and improve blood flow to the fissure. However, this procedure has some drawbacks, such as the risk of incontinence, infection, and recurrence. Therefore, alternative treatments have been sought to avoid surgery and its complications. One of the most promising alternatives is the use of topical glyceryl trinitrate (GTN), a nitric oxide donor that causes relaxation of the smooth muscle, and chemical sphincterotomy. GTN ointment is applied to the perianal area, usually twice a day, for several weeks. Several studies have shown that GTN can heal chronic anal fissures in 50 to 70% of cases, with minimal side effects, such as headache and dizziness. However, GTN has some limitations, such as poor compliance, low healing rate, and high recurrence rate. This study aims to compare the efficacy and safety of topical GTN (0.2%) and lateral internal sphincterotomy in the treatment of anal fissures.

AIM:

To Evaluate and compare the effectiveness between topical glyceryl trinitrate (0.2%) ointment vs. lateral internal anal sphincterotomy in treatment of patients with chronic anal fissure.

OBJECTIVES:

- Comparative study of topical GTN (0.2%) over Lateral Internal anal sphincterotomy.
- To identify the Complications associated with medical and surgical management.

KEYWORDS :

INTRODUCTION:

The term "Fissure-in-Ano" refers to a mucosal split that runs from the anal margin to the dentate line and was initially used by Lockhart-Mummery in 1934. Among adults, it is the most common cause of severe ano-rectal discomfort, with an estimated 0.11% annual incidence. An ulcer or little tear in the anal canal lining is the hallmark of a frequent ailment called a fissure in ano. It normally appears close to the anus and can be extremely painful and uncomfortable.

The Most Common Causes Are:

Constipation: Chronic straining during bowel movements can lead to the development of fissures. **Hard Stools:** Passing hard or large stools can traumatize the delicate anal tissue.

Anal Trauma: Injury due to excessive wiping, insertion of foreign objects, or forceful dilation during childbirth. **Spasm of Anal Sphincter:** Persistent muscle spasm around the anus can impair blood flow and delay healing.

Pathophysiology:

Initial Trauma: A rip in the anal mucosa is an example of an early trauma that frequently precedes fissure-in-ano. Things like hard stools, constipation, or undue straining during bowel movements might cause this stress.

Sphincter Hyper tonicity: Following the first injury, the internal anal sphincter (IAS) frequently experiences hyper tonicity. Increased muscle tone in the IAS exacerbates pain and the fissure.

Local Ischemia: Local ischemia, or decreased blood flow, is caused by a compromised blood supply to the affected area. Ischemia prolongs the pain-spasm cycle and hinders tissue repair.

Changing Pattern: The fissure initiates a never-ending cycle in

which pain exacerbates hyper tonicity and ischemia by inducing muscle spasm. This erratic behaviour keeps the symptoms on-going.

Males and females both have fissures at the same frequency. With a mean age of onset of 39.9 years, fissures are most frequently observed in middle-aged and younger patients. Elderly people and youngsters can also develop fissures. The posterior midline is the most prevalent spot for both males and females; over 75% of cases occur here. The anterior site accounts for around 25% of fissures, and these are more prevalent in women. Atypical fissures are those that make up less than 1% of all fissures and are situated apart from the midline location. Crohn's illness, ulcerative colitis, anal cancer, TB, HIV, syphilis, herpes, and leukemia. The posterior midline is the most typical location for primary anal fissures, and there are various explanations explaining this phenomenon. The external sphincter's elliptical posterior configuration, which provides the anal canal with less support, is one potential reason. The relative ischemia of the anal canal's posterior commissure is another potential reason. Less blood flow has been observed in post-mortem angiographic studies to the posterior commissure of the anal canal, which could also account for the higher incidence of posterior midline fissure. Additionally, there might be a contusion of the blood vessels that go through the posterior midline's internal sphincter muscle vertically, which would compromise the blood supply and raise anal tone. Thirteen Blood flow to the posterior midline is smaller than to other areas of the anal canal, as demonstrated by Doppler laser flowmetry in conjunction with anal manometry. Additionally, there is an inverse association between blood flow to the posterior commissure and increased sphincter tone.

MANAGEMENT OF THE FISSURE:

The management for chronic anal fissure is surgical and

nonsurgical. Each has its own advantages and disadvantages. Surgical treatment involves cutting or disrupting the internal anal sphincter, either partially or completely, to reduce the sphincter tone and increase the blood supply to the fissure. The most commonly performed procedure is lateral internal sphincterotomy (LIS), which has been shown to be highly effective in healing chronic anal fissure, with success rates ranging from 92 to 100%. However, LIS is associated with some risks and complications, such as postoperative pain, bleeding, infection, and anal incontinence. The incidence of anal incontinence after LIS varies from 0 to 35%, depending on the definition, assessment method, and follow-up duration. Moreover, some patients may be reluctant to undergo surgery due to fear, stigma, or preference. Nonsurgical treatment involves the use of pharmacological agents that act on the smooth muscle of the internal anal sphincter, causing relaxation and chemical sphincterotomy. The most widely used agents are glyceryl trinitrate (GTN), calcium channel blockers (CCBs), and botulinum toxin (Botox). These agents can be applied topically, orally, or by injection, depending on the formulation and availability. The main advantages of nonsurgical treatment are the avoidance of surgery and its complications, the ease of administration, and the low cost. However, nonsurgical treatment has some limitations, such as lower efficacy, variable response, poor compliance, side effects, and high recurrence rate. The effectiveness and safety of topical GTN and LIS in the treatment of chronic anal fissures have been compared in numerous trials. GTN is a nitric oxide donor that causes the internal anal sphincter to relax and vasodilate. For six to eight weeks, the perianal area is treated with GTN ointment (0.2%), usually twice a day. With a mean of 54%, the reported healing rates for GTN vary from 34 to 68%. Headache is the most frequent side effect of GTN, affecting 35 to 79% of patients. It can reduce treatment compliance and tolerance. Skin irritation, hypotension, and dizziness are other adverse effects. With a mean of 34%, the anal fissure recurrence rate after GTN treatment is considerable, ranging from 12 to 58%. LIS is the gold standard treatment for chronic anal fissure, as it has the highest healing rate and the lowest recurrence rate. However, LIS is not without drawbacks, as it may cause anal incontinence, which can affect the patient's quality of life and social functioning. Therefore, the choice of treatment between GTN and LIS should be based on the patient's preference, expectations, and risk-benefit analysis. Some factors that may influence the decision are the severity and duration of symptoms, the presence of comorbidities, the availability and accessibility of the treatment, and the patient's willingness to undergo surgery or tolerate side effects. In conclusion, GTN and LIS are two effective and safe treatment options for chronic anal fissure, with different advantages and disadvantages. GTN is a nonsurgical option that can heal the majority of anal fissures, but with lower efficacy, higher recurrence rate, and frequent headache. LIS is a surgical option that can heal almost all anal fissures, but with the risk of anal incontinence and other complications. The choice of treatment should be individualized and tailored to the patient's needs and preferences.

MATERIALS& METHODS

The current study was done in Konaseema institute of medical sciences, amalapuram and govt. general hospital, Kakinada in patients with fissure in ano.

Study Period: November 2024 – March 2025.

Type Of The Study: Prospective randomised interventional open-label study was taken up to compare the efficacy of lateral sphincterotomy with topical 0.2% GTN in the treatment of anal fissure.

Source Of The Data: 100 patients with fissure in ano attending the department of General Surgery are included in the study.

Hence a total of 100 patients who willingly gave their informed consent were included in assessment of outcome.

Inclusion Criteria: All patients who will be presented with fissure in ano and having the following criteria are included.

Age group > 18 years

Sex: both males and females included.

Patients who have given consent are included.

Anal fissure associated with features of chronicity like sentinel pile, hypertrophied papillae or exposure of horizontal fibres of internal sphincter.

Pathology: fissure in ano – chronic.

Exclusion Criteria: Patients with following criteria are excluded

The other causes of bleeding PR like haemorrhoids and fistula in ano, inflammatory bowel disease and rectal malignancy.

Previous surgeries in anal canal.

Patients below the age < 18 years Acute fissure in ano.

Patients on certain drugs aminoglycosides, baclofen, dantrolene, diazepam, anticoagulants and other vasodilators.

Persons who have known hypersensitivity reaction to GTN.

Methodology:

The 100 patients included this study were subjected to preoperative assessment including the following:

Complete history taking: pain, bleeding, constipation, pruritus, and discharge.

Clinical examination (general and local): Anorectal examination, to detect the site of the fissure confirming its nature and presence of associated anal pathology.

Laboratory investigations: It included hemoglobin%, TC, DC, PLTC, BT, CT, INR, urine albumin, sugar, RFT, LFT, and FBS, CXR, ECG.

All patients were categorized into mild, moderate, and severe according to the perception of pain. A total of 100 patients were randomly allocated into two groups of 50 patients each.

Group A (0.2% topical GTN).

Group B (LIS group).

The 50 patients in group B were surgically treated with open internal sphincterotomy (LIS); the procedure was performed under general anaesthesia without the use of muscle relaxants. Four hours after the procedure, the patient began a liquid diet, and eight hours later, the anal dressing was taken off. Before defecating, a local anaesthetic cream was used. On the next postoperative day, the patients in this group were given instructions on a high residue food, painkillers, and warm sitz baths.

Application guidelines for the GTN were provided. For eight weeks, all patients in group A were instructed to apply 0.2% GTN ointment on the external anal margin three times a day. The usage of stool softeners and a high-fibre diet were recommended. Patients whose fissures had not healed at the time of the initial review were asked to stay on GTN for an additional four weeks before being reviewed once more.

Follow-up Criteria:

Patients were followed up inopn for relief of pain, fissure

healing, post treatment bleeding, infection, and incontinence, as well as recurrence and satisfaction. Follow-up was carried out at one week, second week, 1st month, 2nd month, and 3rd month after treatment. During the follow-up, the success of treatment and improvement of the previous symptoms were evaluated. Healing and recurrence rates were determined, the healing defined as complete re-epithelialization of the fissure site as documented by the physician. Recurrence was defined as fissure identified after documentation of complete healing. Incontinence was categorized as soiling of underclothing or lack of flatus control. Follow-up criteria: Patients were followed up inopn for relief of pain, fissure healing, post treatment bleeding, infection, and incontinence, as well as recurrence and satisfaction. Follow-up was carried out at one week, second week, 1st month, 2nd month, and 3rd month after treatment. During the follow-up, the success of treatment and improvement of the previous symptoms were evaluated. Healing and recurrence rates were determined, the healing defined as complete re-epithelialization of the fissure site as documented by the physician. Recurrence was defined as fissure identified after documentation of complete healing. Incontinence was categorized as soiling of underclothing or lack of flatus control.

Ethical Considerations:

Approval was obtained from the institutional ethics.

All the participants were fully informed about the study's purpose, procedures, and their rights, including confidentiality.

RESULTS

Groups: Among the 100 subjects that were included in the study, 50 subjects with anal fissure who received topical glyceryl trinitrate (0.2%) were categorised as Group A.

50 subjects with anal fissure had undergone lateral sphincterotomy and are categorised as Group B.

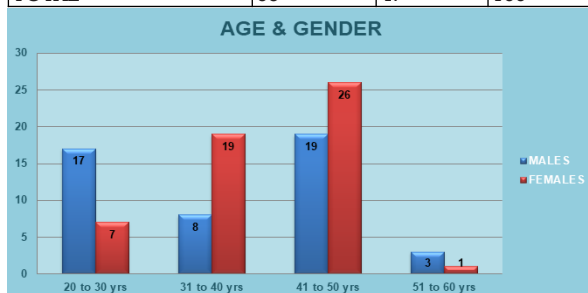
Table 1: Subjects Categorisation

TREATMENT	FREQUENCY	PERCENT
Topical glyceryl trinitrate 0.2% (group A)	50	50%
Lateral sphincterotomy (group B)	50	50%
Total	100	100%

Age & Gender:

Out of the 100 patients, there were 53 females and 47 males. The male to female ratio in the present study is 0.88 implicating female predominance of the disease presentation. The commonest age group presented with anal fissure in the study was 41 to 50 years followed by 31 to 40 years in both the genders. Number of females affected with anal fissure is higher when compared to males and is significant.

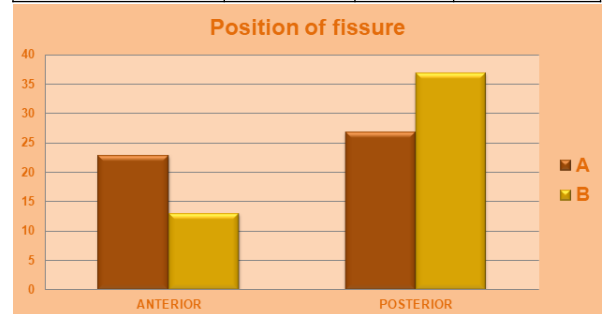
AGE CATEGORY	FEMALE	MALE	TOTAL
20 to 30	7	17	24
31 to 40	19	8	27
41 to 50	26	19	45
51 to 60	1	3	4
TOTAL	53	47	100



Position Of Fissure:

The anal fissure is posteriorly present anatomically in 64% of study group. This is the commonest presentation. 36% of study population had it anteriorly. Among 36 patients with anteriorly located fissure in ano, 23 (63.8%) patients were treated with topical glyceryl trinitrate solution. In patients with anal fissures which were posteriorly present anatomically, 37 (57%) patients were treated with lateral sphincterotomy. There is significant difference in patients with anal fissure who presented either anteriorly or posteriorly.

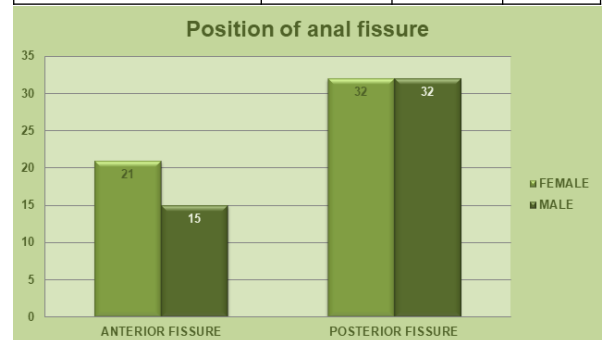
Position of fissure	GROUP		Total
	A	B	
Anterior	23	13	36
Posterior	27	37	64
TOTAL	50	50	100



Gender And Position Of Fissure:

Among 36% of the patients, in whom the fissure was present anteriorly, 21 (58%) were females and 15 (41%) were males. Among 64% patients in whom the anal fissure was present posteriorly, males and females were equally distributed (50% each). Though differences exist in the frequency of males and females with respect to position of anal fissure, no significant association is seen.

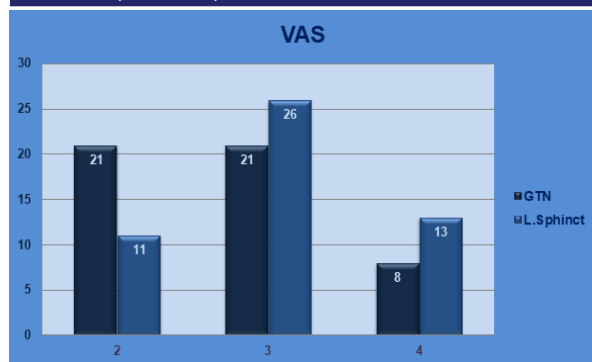
Position of fissure	Gender		Total
	Female	Male	
Anterior	21	15	36
Posterior	32	32	64
TOTAL	53	47	100



Pain (VAS) after 24 hours of treatment:

VAS score is 4 in 21% of study subjects where in 61% (13) of them were treated with lateral sphincterotomy. Among 47 subjects with VAS score of 3, 55% (26) have been treated with lateral sphincterotomy. Among 32 subjects with VAS score of 2, majority (65%) had topical nitrate as the treatment. Majority of patients who received topical nitrate for anal fissure had pain at low level (VAS- 2) Majority of patients who received lateral sphincterotomy for anal fissure had pain at higher level (VAS- 4, 3) But this difference in pain level among the two treatment groups is non-significant.

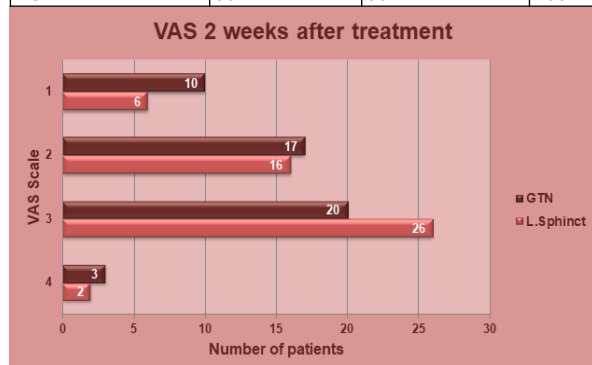
Pain after 24 hours of treatment	Treatment		Total
	GTN	sphincterotomy	
2	21	11	32
4	21	26	47
3	8	13	21
TOTAL	50	50	100



Pain At 2 Weeks After Treatment:

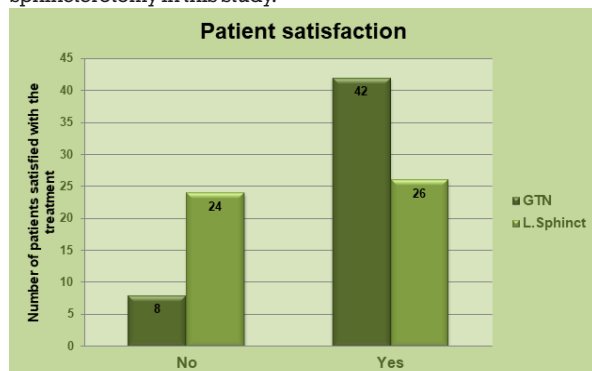
Among 50 subjects treated with topical GTN, 3 (6%) subjects had pain rated as 4, 20 subjects (40%) had pain rated as 3, 17 subjects (34%) had pain rated as 2 and 10 subjects (20%) had pain rated as 1 after 2 weeks of treatment. More than 90% subjects treated managed topical GTN were having pain scale ≤ 3 . Among 50 subjects managed with lateral sphincterotomy, 2 subjects (4%) had pain rated as 4, 26 subjects (52%) had pain rated as 3, 16 subjects (32%) had pain rated as 2, 6 subjects (12%) had pain rated as 1 after 2 weeks of treatment. Only half of the subjects treated with lateral sphincterotomy were having pain rated as 2 even after 2 weeks of treatment. There is No significant difference in pain perception in both the groups at 2 weeks after treatment.

Pain at 2 weeks	Treatment		Total
	GTN	sphincterotomy	
1	10	6	16
2	17	16	33
3	20	26	46
4	3	2	5
TOTAL	50	50	100



Patient Satisfaction:

Among 50 subjects managed with topical GTN, 42 (84%) of them were satisfied; only 8 (16%) of them were not satisfied. Among 50 subjects managed with lateral sphincterotomy, 26 (52%) of them were satisfied; 24 (48%) of them were not satisfied. Significant numbers of subjects were satisfied with the application of topical GTN when compared to lateral sphincterotomy in this study.

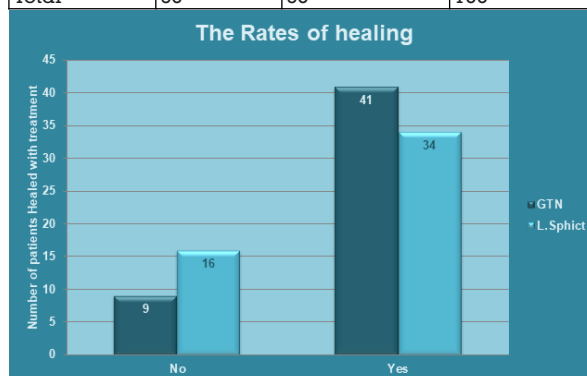


Patient satisfaction at 1 st month	Treatment		Total
	GTN	sphincterotomy	
No	8	24	32
Yes	42	26	68
TOTAL	50	50	100

The Rates Of Healing:

Among 50 subjects who were treated with topical GTN, 41 (82%) of them were healed and only 9 (18%) of them were not healed. Among 50 subjects treated with lateral sphincterotomy, 34 (68%) of them were healed. Among 50 subjects treated with lateral sphincterotomy, 16 (32%) of them were not healed. Rate of healing in patients belonging to group A & B is 82% and 68% respectively. Hence the rate of healing was more in patients who were treated with topical GTN when compared to lateral sphincterotomy but is not significant.

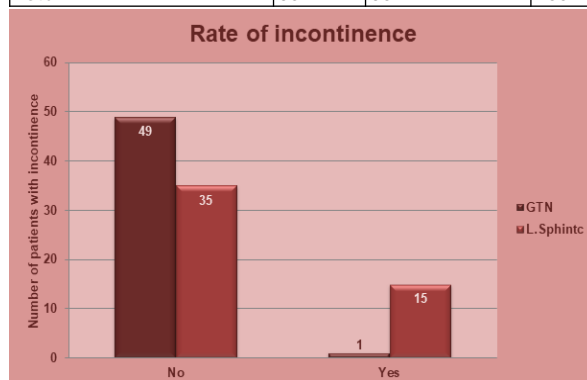
HEALING	Treatment		Total
	GTN	sphincterotomy	
No	9	16	25
Yes	41	34	75
Total	50	50	100



Incontinence:

One patient (2%), out of fifty patients treated with topical GTN, remained incontinent even after six months of treatment. Among 50 subjects treated with lateral sphincterotomy, 15 (30%) of them had incontinence. Among 16 patients who had rectal incontinence, majority (15 [93%] patients) were belonging to group B. Hence the rate of rectal incontinence was more in patients who received lateral sphincterotomy which is significant.

Incontinence at 6 months	Treatment		Total
	GTN	sphincterotomy	
No	49	35	84
Yes	1	15	16
Total	50	50	100

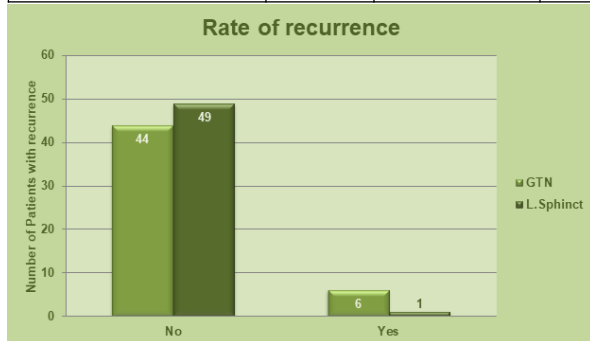


Rate Of Recurrence:

Among 50 subjects treated with topical GTN, 6 (12%) patients had recurrence of anal fissure. Among 50 subjects treated with lateral sphincterotomy, 1 (2%) patient with anal fissure had recurrence. Among 7 patients who had recurrence of anal

fissure, majority (6 [85%] patients) were belonging to group A. Hence the rate of recurrence was less in patients who received lateral sphincterotomy which is significant.

	Treatment		
Recurrence at 6 months	GTN	sphincterotomy	Total
No	44	49	93
Yes	6	1	7
Total	50	50	100



Duration Of Hospital Stay:

Among 50 patients with anal fissure who were treated with topical GTN, duration of hospital stay was increased in 5 (10%) patients. Forty-one (82%) of the fifty patients with anal fissure who underwent lateral sphincterotomy had longer hospital stays. Of the 54 patients with anal fissure who were in the hospital for a normal amount of time, most were in group A. Hence more number of patients belonging to group B had prolonged duration of hospital stay and is highly significant.

	Treatment		
HEALING	GTN	sphincterotomy	Total
No	5	41	46
Yes	45	9	54
Total		50	100



DISCUSSION

Anal fissure is a prevalent issue in health care that plagues both patients and doctors. Majority heal by conservative treatment but a considerable percentage become chronic. A total of 100 patients with chronic anal fissure attending OPD of General Surgery department in Konaseema institute of medical sciences and research foundation, Amalapuram and Govt. general hospital, Kakinada were studied. Effect of topical GTN (0.2%) and lateral sphincterotomy in treatment of anal fissure is compared.

DEMOGRAPHICS:

Mean age of subjects in group A is 39.14 ± 7.5 years. Mean age of subjects in group B is 38.6 ± 11.0 years. Out of the 100 patients there were 53 females and 47 males. In the current study, there are more females affected with anal fissures than males, and this difference is significant. A prospective randomized interventional study was done by Bansal among patients with chronic anal fissure to compare the two therapeutic options available. The study observed a mean age of 34.6 ± 12.8 in patients with anal fissure treated with topical glyceryl trinitrate 0.2% ointment. The mean age of

patients who had undergone lateral internal anal sphincterotomy for chronic anal fissure was 32.12 ± 11.57 years. The study authors observed no difference in the mean age of both the groups. Also, the number of females and males were equally distributed. This is in contradiction to the present study. Studies done by Reddy et al, Yetisir et al and Tauro et al also reported that commonest age group to be affected with anal fissure was 40 to 50 years. This is in similarity to the present study. In a prospective study done in South India, the number of females was comparatively higher than males. This is in similarity to the present study. Evidences point toward the fact that anal fissures occur commonly in middle age group people with equal predisposition in both the genders. But in the present study and study by Paul VA, female preponderance of disease presentation is seen. Similar figures were also observed in studies done by Reddy et al, Yetisir et al and Tauro et al. As anal fissures are seen in middle aged population, women of that age group also have the chances of getting pregnant. During the second and third trimesters of pregnancy, relaxin is released which explains the female preponderance of anal fissures. Mean age of subjects in group A is 39.14 ± 7.5 years. Mean age of subjects in group B is 38.6 ± 11.0 years. No significant difference in the mean age of the study subjects is observed. Out of the 100 patients there were 53 females and 47 males. In the current study, there are more females affected with anal fissures than males, and this difference is significant. A prospective randomized interventional study was done by Bansal among patients with chronic anal fissure to compare the two therapeutic options available. The study observed a mean age of 34.6 ± 12.8 in patients with anal fissure treated with topical glyceryl trinitrate 0.2% ointment. The mean age of patients who had undergone lateral internal anal sphincterotomy for chronic anal fissure was 32.12 ± 11.57 years. The study authors observed no difference in the mean age of both the groups. Also, the number of females and males were equally distributed. This is in contradiction to the present study. Studies done by Reddy et al, Yetisir et al and Tauro et al also reported that commonest age group to be affected with anal fissure was 40 to 50 years. This is in similarity to the present study. In a prospective study done in South India, the number of females was comparatively higher than males. This is in similarity to the present study. Evidences point toward the fact that anal fissures occur commonly in middle age group people with equal predisposition in both the genders. But in the present study and study by Paul VA, female preponderance of disease presentation is seen. Similar figures were also observed in studies done by Reddy et al, Yetisir et al and Tauro et al. As anal fissures are seen in middle aged population, women of that age group also have the chances of getting pregnant. During the second and third trimesters of pregnancy, relaxin is released which explains the female preponderance of anal fissures.

POSITION OF FISSURE:

The anal fissure is always primary and it typically occurs at the midline posteriorly. Small percentage of cases may have it anteriorly in the midline. Other atypical locations (atypical or secondary fissures) are caused by underlying conditions which require further workup.

The anal fissure is posteriorly present anatomically in 64% of the study population. This is the commonest presentation. 36% of the study population had it anteriorly. Among 36 patients with anteriorly located fissure in ano, 23 (63.8%) patients were treated with topical glyceryl trinitrate solution. In patients with anal fissures which were posteriorly present anatomically, 37 (57%) patients were treated with lateral sphincterotomy. There is significant difference in number of patients with anal fissure present either anteriorly or posteriorly and is significant in the present study.

In study by Bansal AR, 88% of patients belonging to group

A(treated with topical GTN) had the anal fissure at posterior midline while only 12% had it in anterior midline. Among the patients intervened surgically by lateral sphincterotomy, 100% had posteriorly. Skin tags were seen in 56% patients in group A while 52% in group B. In study by Paul VA, among 60 patients 88.3% had fissure in ano in posterior location and 5.33% had anterior fissure. In 3% cases, mixed presentation) both anterior and posterior fissure in ano) is seen.

PAIN AFTER INTERVENTION:

Pain is assessed with the help of visual analogue scale in the present study. It is assessed 24 hours after the intervention (Topical GTN treatment and lateral sphincterotomy) and 2 weeks after the intervention.

VAS score is 4 in 21% of study subjects where in 61% (13) of them were treated with lateral sphincterotomy. Among 47 subjects with VAS score of 3, 55% (26) have been treated with lateral sphincterotomy. Among 32 subjects with VAS score of 2, majority (65%) had topical nitrate as the treatment. Majority of patients who received topical nitrate for anal fissure had pain at low level (VAS- 2). Majority of patients who received lateral sphincterotomy for anal fissure had pain at higher level (VAS- 4, 3). But this difference in pain level among the two treatment groups is non-significant assessed 24 hours after the intervention in the present study. Among 50 subjects treated with topical GTN, 3 (6%) subjects had pain rated as 4 after 2 weeks of treatment. Among 50 subjects managed with topical GTN, 20 subjects (40%) had pain rated as 3 after 2 weeks of treatment. Among 50 subjects managed with topical GTN, 17 subjects (34%) had pain rated as 2 after 2 weeks of treatment. Among 50 subjects managed with topical GTN, 10 subjects (20%) had pain rated as 1 after 2 weeks of treatment. More than 90% subjects treated managed topical GTN were having pain scale ≤ 3 . Among 50 subjects managed with lateral sphincterotomy, 2 subjects (4%) had pain rated as 4 after 2 weeks of treatment. Among 50 subjects managed with lateral sphincterotomy, 26 subjects (52%) had pain rated as 3 after 2 weeks of treatment. Among 50 subjects managed with lateral sphincterotomy, 16 subjects (32%) had pain rated as 2 after 2 weeks of treatment. Among 50 subjects managed with lateral sphincterotomy, 6 subjects (12%) had pain rated as 1 after 2 weeks of treatment. Only half of the subjects treated with lateral sphincterotomy were having pain rated as 2 even after 2 weeks of treatment. No significant difference existed in pain perception in both the groups at 2 weeks after treatment. In a prospective study done by Paul VA to evaluate the effectiveness of topical glyceryl nitrate over lateral sphincterotomy, 33.3% of total participants had pain after the intervention was reported. All these 33.3 % were surgical intervened with lateral sphincterotomy. No patient who was treated with topical GTN had pain after the treatment. This is in contradiction to the present study wherein pain is seen in two groups. Also, the tools used for assessing the pain or grade of pain the patient experienced after the intervention is not reported in study by Paul VA. In study by Bansal, mean of pain scores done at first follow up done at 72 hours by using VAS is 8.40 ± 1.19 . A decrease in mean Vas scores is reported upon subsequent follow ups done at 1st week, 3rd week and 6th week (7.56; 3.00 and 1.64). Among patients with fissure in ano treated with lateral sphincterotomy the mean VAS score was 3.68 at first follow up. Similar to group A, a decrease in pain score is observed in this group patients also (1.4 at 1st week, 0.52 at 3rd week and 0.24 at 6th week). VAS scores decrement pattern is seen in both the groups but the decrease in VAS scores in group B is significant was reported by the authors. Also, a number of patients with pain relief who had undergone surgical sphincterotomy is significant when compared to chemical sphincterotomy in study by Bansal A R. This is in contradiction to the present study. In a prospective study Javed S et al done in patients with anal fissure comparing the effectiveness of metronidazole and GTN in comparison with GTN, 92% of patients experienced perianal

pain with VAS 6.01 ± 2.35 , which significantly decreased by the use of topical therapy in both groups; however, VAS was significantly less in patients who underwent metronidazole treatment. Similar results were seen in study by Saba et al also.

Effectiveness of the interventions: Healing: Rate of healing is assessed at the end of one week post intervention in the present study. In patients treated with topical GTN for anal fissures, the healing rate is 83%; in patients treated with lateral sphincterotomy, the rate is 68%. Higher rate of healing is observed in group treated with topical GTN but is non-significant. This implicates that both the interventions had similar healing rates. In study by Bansal AR, complete healing is not attained in patients who, were treated during the first follow-up (one week following the intervention) with any of the research interventions. After three weeks of the intervention, a second follow-up was conducted, and the rate of healing was 8 patients in group A and 24 patients in group B, respectively. During third follow up done after completion of 6 weeks post intervention, rate of healing is 75% in patients with fissure in ano treated with topical GTN while it is 100% in patients who were treated with lateral sphincterotomy. The study authors also reported that rate of healing is much higher when intervened with surgical sphincterotomy when compared with chemical sphincterotomy and is also significant. This is in contradiction to the present study.

INCONTINENCE:

Rectal incontinence is also assessed at the end of one week post intervention in the present study. Among patients that were treated with topical GTN, rate of rectal incontinence is observed to be 2% while it is 30% in those who were treated with lateral sphincterotomy. Higher rate of incontinence is observed in group treated with lateral sphincterotomy and is significant. This implicates that, topical GTN is better compared to lateral sphincterotomy with respect to rectal incontinence. Rectal incontinence while passing either faeces or flatus was reported among 6% of subjects treated with lateral sphincterotomy in study by Muhammad et al. In a comparative study done by Leo et al, among patients with fissure in ano treated with lateral sphincterotomy, 10% of patients had rectal thereby having faecal seepage post intervention.

RECURRENCES:

Six (85%) of the seven patients who experienced an anal fissure recurrence belonged to group A and received topical GTN treatment in the current investigation. In a research by Bansal AR, after three months of intervention at the same location, 11.1% (6) of the 75% (18 out of 25) patients who were healed in group A (treated with topical application of GTN) experienced a recurrence of anal fissure. Comparably, group B has a 100% recovery rate (25 patients), 2 of whom experienced recurrence following a 3-month intervention. The frequency of recurrence did not, however, differ significantly between the two groups. This runs counter to the current research.

HOSPITALISATION:

A duration of 3 days in-hospitalisation is mandated for every patient with anal fissure included in the study. More than 3 days of in-hospitalisation is considered as increased stay. Out of 50 patients who were treated with topical GTN, duration of hospital stay was increased in 5 (10%) patients, while those who were treated with lateral sphincterotomy, duration of hospital stay was increased in 41 (82%) patients. Hence more number of patients belonging to group B had prolonged duration of hospital stay and is highly significant. Duration of 3 days in-hospitalisation is mandated for every patient with anal fissure included in the study. More than 3 days of in-hospitalisation is considered as increased stay. Out of 50 patients who were treated with topical GTN, duration of

hospital stay was increased in 5 (10%) patients, while those who were treated with lateral sphincterotomy, duration of hospital stay was increased in 41 (82%) patients. Hence more number of patients belonging to group B had prolonged duration of hospital stay and is highly significant.

SAFETY OF INTERVENTION:

Head ache is the only adverse event encountered among patients treated with chemical sphincterotomy (5 patients out of 50) while hematoma seen in 4 patients out of 50 is observed among patients with anal fissure intervened by lateral sphincterotomy in the present study. In the study by Bansal AR, side effect observed with GTN ointment among patients with anal fissure was head ache most commonly. 36% of the patients reported headache after the treatment. The authors reported that no patient treated with GTN had to stop medication because of this side effect. While in patients treated with lateral internal sphincterotomy, haematoma (one patient) was observed as an adverse event. Similar to this, 25% of individuals in a research by Mishra R et al. reported mild headaches or local burning sensations after using 0.2% GTN ointment. Also, among patients with anal fissure, treated with lateral sphincterotomy; 60% had untoward events encountering due to surgery like bleeding, hematoma, wound site infection. Mishra R et al also reported that adverse events were significantly higher in proportion among patients surgically treated with sphincterotomy when compared to chemical sphincterotomy. In study done by Muhammad et al., 66% of the patients with fissure in ano treated with topical GTN had untoward events like head ache, mild irritation of skin. Mild head ache was seen in 20% subjects in study by Leo et al.,

PATIENT SATISFACTION:

Among 50 subjects managed with lateral sphincterotomy, 26 (52%) of them were satisfied. Among 50 subjects managed with lateral sphincterotomy, 24 (48%) of them were not satisfied. Significant numbers of subjects were satisfied with topical GTN when compared to lateral sphincterotomy in the present study.

SUMMARY

Mean age of subjects in group A & B is 39.14 vs. 38.6 years. Both the groups were comparable with respect to age.

The commonest age group affected with acute anal fissure in the present study is 41 to 50 years followed by 31 to 40 years in both the genders

The male to female ratio in the present study is 0.88 implicating female predominance of the disease presentation.

The anal fissure is posteriorly present anatomically in 64% of the study population.

Difference in pain level 24 hours post treatment among the two groups is non-significant.

No significant difference existed in pain perception in both the groups at 2 weeks after treatment.

Significant numbers of subjects were satisfied with topical GTN when compared to lateral sphincterotomy in the study.

Rate of healing was more in patients who received topical GTN when compared to lateral sphincterotomy but not significant.

Rate of rectal incontinence was more in patients who received lateral sphincterotomy which is significant.

Rate of recurrence was less in patients who received lateral

sphincterotomy which is significant.

More number of patients belonging to group B had prolonged duration of hospital stay and is highly significant.

CONCLUSION

Anal fissure is a common problem vexing patients and treating physician.

Majority heal by conservative interventions but a significant proportion turn chronic and can have negative impact on quality of life

While lateral anal sphincterotomy is the gold standard for the management of chronic fissure in ano, a number of non-surgical techniques have developed without subjecting the patients to surgery.

Topical glyceryl trinitrate is one among the non-surgical techniques which is safe and cost effective.

It is easier to apply, well tolerated with minimal side effects

Although higher rates of healing can be achieved without the risk of incontinence; the slower rate of symptomatic relief and longer duration of treatment will result in lower compliance and higher recurrence.

Lateral anal sphincterotomy is superior to non-surgical therapies offering early symptomatic relief, rapid healing, better compliance providing permanent cure of fissure with lesser recurrence rates.

Therefore topical GTN/ medical sphincterotomy can be considered as an initial choice of treatment for fissure in ano.

It can be considered as first option in patients with high chances of incontinence before surgery, who are not willing for surgery and not fit for surgery.

Lateral anal sphincterotomy can be reserved for patients with severe disabling pain, not responding to medical therapy and in recurrent and persistent anal fissures achieving quick curative results.

REFERENCES

1. Evans, J., Luck, A. & Hewett, P. Glyceryl trinitrate vs. lateral sphincterotomy for chronic anal fissure. *Dis Colon Rectum* 44, 93-97 (2001).
2. Website, N. (2023, April 18). Treatment. Nhs.uk. <https://www.nhs.uk/conditions/anal-fissure/treatment>.
3. Sadiq, I., Shakir, M., Khan, R. N., Ahmed, M. A., Ashfaq, S. S., & Ijaz, A. (2021). Comparison of Glyceryl Trinitrate Ointment versus Internal Lateral Sphincterotomy for Anal Fissure Pain Relief. *Pakistan Journal of Medical and Health Sciences*, 15(10), 2600-2601.
4. El-Labban, G. M. (2022). Local glyceryl trinitrate versus lateral internal sphincterotomy in management of anal fissure. *Scuegypt*. https://www.academia.edu/74649711/Local_Glyceryl_Trinitrate_Versus_Lateral_Internal_Sphincterotomy_in_Management_of_Anal_Fissure.
5. Agur AMR, Lee MJ, Grant JCB. Grant's Atlas of Anatomy. 10th Ed. London, UK: Lippincott Williams and Wilkins; 1999.
6. Sinnatamby CS. Last's Anatomy: Regional and Applied. 10th Ed. Edinburgh: Churchill Livingstone; 1999.
7. Romanes GJ. Thorax and Abdomen. Cunningham's Manual of Practical Anatomy. 15th Ed. New York, NY: Medical Publications, Oxford University Press; 1986. Vol II.
8. Gray H, Lewis WH. Gray's Anatomy of the Human Body. 20th ed. New York, NY: Bartleby; 2000.
9. Jamshidi R. Anorectal Complaints: Hemorrhoids, Fissures, Abscesses, Fistulae. *Clin Colon Rectal Surg*. 2018 Mar;31(2):117-120.
10. Stewart DB, Gaertner W, Glasgow S, Migaly J, Feingold D, Steele SR. Clinical Practice Guideline for the Management of Anal Fissures. *Dis Colon Rectum*. 2017 Jan;60(1):7-14.
11. Hananel N, Gordon P H. Re-examination of clinical manifestations and response to therapy of fissure-in-ano. *Dis Colon Rectum*. 1997;40(2):229-233.
12. Gordon P H, Nivatvongs S. St. Louis, MO: Quality Medical Publishing, Inc.; 1999. Principles and Practice of Surgery for the Colon, Rectum and Anus, 2nd ed; p. 218. [Google Scholar]
13. Klosterhalfen B, Vogel P, Rixen H, Mittermayer C. Topography of the inferior rectal artery: a possible cause of chronic, primary anal fissure. *Dis Colon Rectum*. 1989;32(1):43-52. [PubMed] [Google Scholar]

14. Schouten WR, Briel J, Wauwerda JJ. Relationship between anal pressure and anodermal blood flow. The vascular pathogenesis of anal fissures. *Dis Colon Rectum*. 1994;37(7):664-669.
15. Stewart, D. B., Gaertner, W. B., Glasgow, S. C., Migaly, J., Feingold, D. L., & Steele, S. R. (2017). Clinical Practice Guideline for the Management of Anal Fissures. *Diseases of the Colon & Rectum*, 60(1), 7-14.
16. Beatty J. S., Shashidharan M. : Anal Fissure. *Clin Colon Rectal Surg.* , 2016; 29(1): 30-37.
17. Paul, V. A., Reddy, K. N., & Chandra, A. S. (2020). A comparison of efficacy between 0.2% of topical glyceryl trinitrate and lateral anal sphincterotomy. *International Surgery Journal*, 7(9), 2864.
18. Nelson, R. Anal fissure and lateral internal sphincterotomy. *coloproctology* 42, 445-449 (2020).
19. Evans, J., Luck, A. & Hewett, P. Glyceryl trinitrate vs. lateral sphincterotomy for chronic anal fissure. *Dis Colon Rectum* 44, 93-97 (2001).
20. Sadiq, I., Shakir, M., Khan, R. N., Ahmed, M. A., Ashfaq, S. S., & Ijaz, A. (2021b). Comparison of Glyceryl Trinitrate Ointment versus Internal Lateral Sphincterotomy for Anal Fissure Pain Relief. *Pakistan Journal of Medical and Health Sciences*, 15(10), 2600-2601.
21. Okasha, H. H., Pawlak, K. M., Abou-Elmagd, A., Elmeligui, A. M., Atalla, H., Othman, M. O., Elenin, S. A., Alzamzamy, A., & Mahdy, R. E. (2022). Practical approach to linear endoscopic ultrasound examination of the rectum and anal canal. *Endoscopy International Open*, 10(10), E1417-E1426.
22. Gupta, K. (2022). *Surgical Anatomy of Anal Canal*. In: *Lasers in Proctology*. Springer, Singapore.
23. Andrew Barleben, Steven Mills, *Anorectal Anatomy and Physiology*, Surgical Clinics of North America, Volume 90, Issue 1, 2010, Pages 1-15, ISSN 0039-6109.
24. Skandalakis JE, Gray SW, Rowe JS Jr. *Anatomical Complications in General Surgery*. New York: McGraw-Hill, 1983.
25. Moonka, R., & Carmichael, J. C. (2018). *Anorectal anatomy and Physiology*. In Springer eBooks (pp. 1-21).
26. Salati, S. A. (2021). Anal Fissure – an extensive update. *Polish Journal of Surgery*, 93(3), 1-5.
27. Richard CS, Gregoire R, Plewes EA, Silverman R, Burul C, Buie D, Reznick R, Ross T, Burnstein M, O'Connor BI, Mukraj D, McLeod RS. Internal sphincterotomy is superior to topical nitroglycerin in the treatment of chronic anal fissure: results of a randomized, controlled trial by the Canadian Colorectal Surgical Trials Group. *Dis Colon Rectum*. 2000 Aug;43(8):1048-57.
28. Evans J, Luck A, Hewett P. Glyceryl trinitrate vs. lateral sphincterotomy for chronic anal fissure: prospective, randomized trial. *Dis Colon Rectum*. 2001 Jan;44(1):93-7.
29. Siddique MI, Murshed KM, Majid MA. Comparative study of lateral internal sphincterotomy versus local 0.2% glyceryl trinitrate ointment for the treatment of chronic anal fissure. *Bangladesh Med Res Counc Bull*. 2008 Apr;34(1):12-5.
30. Boland PA, Kelly ME, Donlon NE, Bolger JC, Larkin JO, Mehigan BJ, McCormick PH. Management options for chronic anal fissure: a systematic review of randomised controlled trials. *Int J Colorectal Dis*. 2020 Oct;35(10):1807-1815.
31. Khan RM, Itrat M, Ansari AH, Zulkifle AS. Prevalence of fissure-in-ano among the patients of anorectal complaints visiting nium hospital. *J Community Med Health Educ* 2015;5:2161-711.
32. Bansal AR, Tripura R, Godara R, Jaikaran (2016) Comparative Study of Glyceryl Trinitrate Ointment versus Lateral Internal Sphincterotomy in Management of Chronic Anal Fissure. *Arch Clin Gastroenterol* 2(1):013-016.
33. Reddy S, Sreeramulu PN, Abraham A, Praveen GP, Reddy M, Deepthi R. Surgical management of anal fissure versus glyceryl trinitrate ointment: a comparative prospective study. *Int Surg J*. 2018;5(6):2205-10.
34. Yetisir F, Salman AE, Yurekli B, Aksoy M, Yildirim MB, Kilic M, et al. Comparison of lateral internal sphincterotomy with topical nitroglycerine treatment in patients with chronic anal fissure: a prospective randomised study. *Surgery Curr Res*. 2012;123:1076-77.
35. Tauro LF, Shindhe VV, Aithala PS, Martis JJS, Shenoy D. Comparative study of glyceryl trinitrate ointment versus surgical management of chronic anal fissure. *Indian J Surg*. 2011;73(4):268-77.
36. Paul VA, Reddy KN, Chandra AS. A comparison of efficacy between 0.2% of topical glyceryl trinitrate and lateral anal sphincterotomy. *Int Surg J* 2020;7:2864-7
37. <https://www.google.com/url?sa=i&url=https%3A%2F%2Fcolorectal.surgeonssydney.com.au%2Fconditions%2Fanal-conditions%2Fanal-fissures&psig=AOvVaw2VibZ1URxqSI6XUf8QqU7s&ust=1707501058311000&source=images&cd=vfe&opi=89978449&ved=0CBMQjRxxqFwoTCPCmyqKnnlQDFQAAAAA>
38. <https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.firstclassmed.com%2Farticles%2F2023%2Ffissure-in-ano&psig=AOvVaw2LJZFfLqh2INv3AYA2QCS&ust=1707501452548000&source=images&cd=vfe&opi=89978449&ved=0CBMQjRxxqFwoTCNCS0d6onlQDFQAAAAAAdAAAAABAr>
39. <https://www.google.com/url?sa=i&url=https%3A%2F%2Fclinicaltrials.gov%2Fstudies%2Fstudy%2F2023%2Ffissure-in-ano&psig=AOvVaw34G8Ep00Ly0TZNkIsrui9j&ust=1707546197120000&source=images&cd=vfe&opi=89978449&ved=0CBMQjRxxqFwoTCPj8mbfPnYQDFQAAAAAAdAAAAABAE>
40. Shahid M, Javed S, Javed S, et al. (November 23, 2022) Comparative Efficacy of Topical Metronidazole and Glyceryl Trinitrate Versus Topical Glyceryl Trinitrate Alone in the Treatment of Acute Anal Fissure: A Randomized Clinical trial. *Cureus* 14(11):e31812. doi:10.7759/cureus.31812
41. Saba, S., & Saqib, K. (2022). Role of local antibiotics in the treatment of acute anal fissure. *The Professional Medical Journal*, 29(07), 943-947. <https://doi.org/10.29309/tpmj/2022.29.07.6762>
42. Leo FT, Shindhe VV, Aithala PS, Martis JJS, Shenoy HD (2005) Comparative study of glyceryl trinitrate ointment versus surgical management of chronic anal fissure. *Int J Surg* 73: 268-277.
43. Mishra R, Thomas S, Maan MS, Hadke NS (2005) Topical nitroglycerin versus lateral internal sphincterotomy for chronic anal fissure: prospective randomized trial. *ANZ J Surg* 75: 1030-1031.
44. Siddique MI, Murshed KM, Majid MA (2008) Comparative study of lateral internal sphincterotomy versus local 0.2% glyceryl trinitrate ointment for the treatment of chronic anal fissure. *Bangladesh Med Res Counc Bull* 34: 12-15.
45. Muhammad IA, Pervaiz A, Figueiredo R (2014) Internal sphincterotomy versus topical nitroglycerin ointment for chronic anal fissure. *Asian J Surg* 37: 15-19.
46. Ellabban GM, Elkazaz G, Hokam E (2010) Local glyceryl trinitrate versus lateral internal sphincterotomy in management of anal fissure. *World J Surg* 2: 1-7.
47. Oettle GJ (1997) Glyceryl trinitrate vs. sphincterotomy for treatment of chronic fissure-in-ano: a randomized, controlled trial. *Dis Colon Rectum* 40: 1318-1320.