



PRIMARY RESEARCH

Outcome evaluation of lateral internal sphincterotomy versus manual dilatation of anus in anal fissure

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Abstract. By convenience (non probability) sampling 60 patients of anal fissure were divided into two equal groups, one each for manual dilatation and lateral internal sphincterotomy. Anal fissure secondary to specific pathology i.e. syphilis, tuberculosis, crohn's disease were excluded from study. Data was collected on specific proforma and was put to "SPSS" version 10.0- on computer. It was analyzed for frequency, percentages and mean \pm standard deviation. Chi-square test was applied and $p \leq 0.05$ was considered significant. In this study 30 patients were male and 30 were females. Minimum age was two years and maximum was 70 years with mean \pm standard deviation of 33.60 ± 14.88 . Duration of symptoms was from 4 to 18 months with mean \pm standard deviation of 10.38 ± 4.488 . In thirty patients, lateral internal sphincterotomy was done and manual anal dilatation was done to others. In 14 patients existing posterior anal tag was also removed. In one patient haemorrhoidectomy and lateral internal sphincterotomy were simultaneously done with good results. Complete pain relief was found in 29 patients in lateral internal sphincterotomy group as compared to 17 patients of manual anal dilatation group with $p = 0.001$ which is highly significant. Flatus incontinence, cloth soiling and recurrence were significantly less in lateral internal sphincterotomy group. Fissure healing was much better in lateral internal sphincterotomy group with significant p value of 0.002. The results of the present study concluded that lateral internal sphincterotomy is surgical treatment of choice for patients with anal fissure. It has a very high cure and very low complication rate as compared to manual anal dilatation. At the same time, it avoids damaging external anal sphincterotomy which is unavoidable in manual anal dilatation.

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INTRODUCTION

Anal Fissure is an elongated ulcer in long axis of lower anal canal. It usually presents in 3rd & 4th decade of life. It is very distressing condition associated with spasm of internal anal sphincter [1]. It is common in both sexes and can be found in infants and elderly people. 90% of the fissures are present in posterior midline and 10% fissures are present in anterior midline. Women of child bearing age have more chances of getting anterior anal fissure specially soon after pregnancy or vaginal delivery [2]. It is, most probably, result of damage and weakening of the pelvic floor muscles and attenuation of perineal body. Most of the ulcers are primary and cause is thought to be ischemia of lower anal canal secondary to spasm of internal sphincter as blood vessels traverse through it. Constipation predisposes to the development of anal fissure because of its pressure effect on anal mucosa or may lead to the tear of anal valve of Ball. Other causes include incorrectly performed haemorrhoidectomy in which too much skin is cut resulting in anal stenosis which gives rise to

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tear of anal mucosa on subsequent defecation. Sexually transmitted diseases, tuberculosis, Crohn's disease, and local or systemic malignancies are other causes of anal fissure. In these cases, fissures are usually multiple and other symptoms and signs of primary disease may be present [3]. Acute fissure usually presents as severe perianal pain, during and after defecation which lasts for one to two hours and suddenly ceases. There may be periods of remission for days or weeks until patient passes another motion. Bleeding is in the form of minimal streak of red blood on stool or toilet paper. Pruritis ani and mucous discharge may be present in chronic cases. Constipation may be the presenting feature as severe pain associated with defecation that causes fear in patient's mind and he prefers to be constipated rather than going through the agony of passing stools. Passage of hard stool further injures the already compromised and damaged anal mucosa. In acute cases, the fissure is seen as tear in anal mucosa by gently aparting the buttocks. As the anal opening is puckered and tightly closed and causes severe pain on digital rectal examination so it is not performed in outpatient department. Fissures should be confirmed under local or general anaesthesia before starting any treatment. In acute fissure, edema and inflammation are minimal and spasm of internal anal sphincter is more marked. In chronic anal fissure, a posterior anal tag can be usually seen hiding in the lower margin of fissure. Edema and inflammation are present and edges of the ulcer can be palpable. Furthermore scarring and fibrosis can be seen in some cases and internal anal sphincter is visible in few cases. Treatment options include conservative and surgical management. Conservative management includes bulk laxatives with or without lignocain cream, analgesics, hydrocortisone creams and chemical sphincterotomy with Glyceryl Trinitrate cream or diltiazem cream. The main problem with GTN cream is headache felt by the patients during its use. This is sufficient in many cases to stop treatment. Diltiazem is superior to GTN in this aspect and is being increasingly used [1]. Injection of botulinum toxin into and around anal sphincter causes paralysis of internal sphincter for 2 - 3 months. During this time the anal pressure is low and fissure gets healed in many cases. Main side effect is 10-15% of flatus incontinence which improves with time and there is no permanent damage [4]. Surgical options include manual anal dilatation, lateral internal sphincterotomy and posterior anal flap [5]. Manual anal dilatation is less controlled method and damages both external and internal anal sphincter and does cause unacceptably high level of incontinence. Failure and recurrence rates are also high [6]. Lateral internal sphincterotomy is a surgical procedure in which only internal anal sphincter muscle is cut in left or right lateral position away from the fissure. The procedure is successful in healing 90-95% of cases. It is superior to both GTN and manual anal dilatation [5-6]. Although it is performed usually under general anaesthesia but it can be done as a day case procedure under local anaesthesia in outpatient department. In this way there is no need for hospital stay, thus saving expenditure in this era of economic burden [7]. It is superior to manual anal dilatation in terms of incontinence, soiling of cloths, urinary retention and other complications. Furthermore there is no risk of faecal incontinence as external sphincter remains intact [6-8-9]. The purpose of the study was to compare the benefits and drawbacks of both procedures. This will help to set high levels of care and treatment for the patients of anal fissure. This will also help to setup standard protocols for the treatment of anal fissure.

REVIEW OF LITERATURE

Etiology and Pathophysiology

In order to understand etiology and mechanism resulting in anal fissure, the knowledge of anatomy and physiology of anal canal is much necessary. Anal canal starts at the level

where rectum pierces the muscles of pelvic floor and ends at the anal verge. Internal anal sphincter is actually a thickened continuation of circular muscle coat of rectum and is 2.5 cm long. This involuntary muscle extends from pelvic diaphragm to anal orifice. It is supplied by autonomic nerves and is pearly white in color in live subjects. This muscle is surrounded on its outer side by external anal sphincter which is pink in color. The space between the two muscles is known as inter-sphincteric plane. The blood vessels pass through the IAS to reach anal mucosa. The spasm of internal sphincter leads to increased resting anal pressure which in turn obstructs the blood vessels, thus reducing the blood supply to the anal mucosa. The ischemic mucosa tears to the pressure of passing faecal matter, resulting in anal fissure [1-4-12-13-14]. Increased spasm and anal pressure are also documented, by many other studies, to be the causes of anal fissure [15-16-17]. *Roma et al.* found that after a month of lateral internal sphincterotomy, 52% patients had normal resting anal pressure while 32% patients had hypertonia [17]. As fissure usually heals within 3-6 weeks before hypertonia reoccurs, this will not affect long term healing rates by lateral internal sphincterotomy. In other study resting anal pressure gradually returned back to normal level but healing of fissure was not affected as lateral internal sphincterotomy allowed enough time for this to occur [18].

In a long term manometric study, it was revealed that LIS significantly reduced the resting anal pressure. The pressure gradually increased back over a year, but was still lower than before surgery. This signifies that increased anal pressure caused by increased tone of internal sphincter is the major factor in pathogenesis of anal fissure [13]. This also leads to decreased blood flow to posterior anal canal which is already a watershed area. This causes ischemic damage to the epithelium of posterior anal canal and underlines internal anal sphincter resulting in mucosal tear and fissure [19-20]. Reduction in maximum squeeze pressure by BT also caused healing which indicates the role of hypertonia of IAS in pathogenesis of anal fissure [21]. Another proposed mechanism is that sharp posterior curve of anal canal at its commencement from rectum predisposes the mucosa on posterior aspect to pressure by a passing hard faecal matter. This mucosa is greatly stretched when a scybalous mass is pushed out and receives ischemic damage as arterial anastomosis already scars dorsally [22]. Some cases may be associated with tearing down of anal value of Ball by hard faecal matter resulting from chronic constipation [23-24]. Straining at stools may also cause over stretching of anal mucosa and cause fissure. Furthermore insertion of a foreign body or severe, chronic diarrhea may cause anal fissure. Infection and excessive anal probing may also be a cause. Anal fissure is common in women of child bearing age and is mostly in anterior midline [2-10]. As the pelvic floor is damaged and perineal body is attenuated so there is decreased support for anal mucosa in these patients. Another cause is incorrectly performed haemorrhoidectomy in which too much skin is cut, results in anal stenosis which leads to tear when hard faecal matter passes through it. So fissure may be position or multiple [25]. Chronic fissure may also result in cases of colorectal tuberculosis and is accompanied by other symptoms and signs of this particular disease [26]. Sexually transmitted disease e.g. syphilis can present as anal fissure as a predominant symptom [3-27]. It is usually less painful than primary fissure and history of contact may be hidden by patient and these should be offered screening for HIV after counseling. Colorectal malignancy can present initially as anal fissure or hemorrhoids in which case biopsy from fissure site is advisable. Chemotherapy and systemic malignancy may cause anal fissure [28]. Inflammatory bowel disease (especially Crohn's disease) can present as anal fissure but the position of fissure may be eccentric or multiple fissures can be present [11-29]. Pain is less prominent symptom. The upper end of fissure ends

at dentate line. As the epithelium below dentate line is stratified squamous and is richly supplied by spinal nerves so fissure is very painful condition [15]. In acute fissure, there is tear along long axis of anal mucosa and skin of anal margins. Although edema or indurations are less but there is definite spasm of internal sphincter and resulting anal P exceeds 30mmHg and thus results in decreased posterior anal blood flow [19-20]. In chronic anal fissure, there are repeated tears of mucosa resulting in edema, induration, finally resulting in scarring [30] and the internal sphincter muscle may be visible. The fissure is usually guarded by anal tag, which may become edematous and there may be fibrosis of internal sphincter or infection in fissure and nearby mucosa [30].

Incidence

It is very common condition and because of pain associated with disease, patients present early [31-32]. Many people may not present to doctors and may use laxatives and analgesics by themselves, so the actual incidence of disease may be higher than what is quoted [33]. It is more common in females of child bearing age and many of them have anterior anal fissure [2-10]. It is common in children and infants after constipation and some of the cases presented with acquired megacolon [24-34].

Clinical Features

Pain

As fissure is located in the area of sensitive epithelium, so pain is the symptom. Pain is very severe and overwhelming in intensity. It starts as the patient passes stools and remains for one to two hours. This is the most important and common symptom for which patients seek medical advice. Pain is so severe that many of the patients postpone the act of defecation and as a result get constipated. Patient and attending doctor both want pain relief as quickly as possible. Many studies have been conducted on this issue [15-18]. In chronic cases like Crohn's or sexually transmitted disease, pain may not be a much pronounced presentation. In sexually transmitted diseases, history of contact can often be elicited [3].

Constipation

Because of severe pain during defecation, patients are afraid of going to toilet. Slowly and gradually they prefer to be constipated rather than going through the agony of constipation. When constipated, patient passes a hard stool, it again causes a lot of pain because of tear it produces in already damaged anal canal. This is especially relevant in small children and infants and may present as acute abdominal pain [23-24]. In Crohn's disease, the symptoms of indigestion, abdominal cramps and episodes of diarrhea are present and usually the anal fissure may or may not be accompanied by pain but soiling, mucus discharge and itching may be present [11-29]. In tuberculosis, there may or may not be pain during defecation but symptoms of intestinal tuberculosis i.e. abdominal pain, diarrhea and weight loss may be more conspicuous [26].

Rectal bleeding

Bleeding per rectum is always a very alarming situation for any patient. In anal fissure, bleeding is slight, in the form of red streaks on the stool or toilet paper. In general population, anal fissure is one cause of rectal bleeding and other serious diseases like colorectal carcinoma must be excluded. Careful clinical examination and investigation avoid the pit-fall of missing diseases like colorectal carcinoma. Many studies have been conducted to evaluate incidence of different diseases presenting as rectal bleeding in general popula-

tion and medical practice [35-36].

Discharge

Mucus discharge is present in many cases in chronic anal fissure and pruritis may be present when there is prolonged mucus discharge. Infection and scarring may occur which may require fissurectomy and is one factor resulting in treatment failure [22-30]. In infants and children, presentation may be of abdominal pain with guarding and constipation. A diagnosis can generally be made by anal examination and abdominal complaints settle with treatment of anal fissure [34].

Examination

In acute cases, the fissure is not palpable and anus is tightly closed and puckered. In chronic cases, posterior anal tag is seen and lower end of fissure can usually be seen by gently aparting the buttocks [30]. As digital rectal examination is painful so not recommended in outpatients department. But if real doubt exists about diagnosis, it can be done after applying a cotton wool soaked with lignocain gel keeping it in anal canal for five minutes. The fibrosis at base, scarring and edges of fissure can be felt in this way [22-30]. In Crohn's disease and sexually transmitted diseases i.e. syphilis or herpes simplex, ulcers may be multiple [11-27]. In tuberculosis, ulcer has undermined edges and can be located anywhere [26]. In females of child bearing age, fissure is usually anterior [2]. Hemorrhoids and other pathologies can be seen [10-37].

Differential diagnosis

Carcinoma of anus in its early stage presents as anal fissure but is usually not much painful and biopsy of ulcer should be done if real doubt exists [28]. Tuberculosis ulcer is already discussed. Proctalgia fugax can cause episodic pain usually in young doctors but no fissure is found on examination. Multiple fissures are usually seen in inflammatory bowel disease or as a complication of skin diseases or scratching [11]. Similarly Homosexuals do get multiple ulcers because of fisting, sodomy and sex toys [3].

Treatment

Many fissures are short lived and can heal spontaneously [31]. In others, treatment is necessary as patients feel a lot of pain during defecation. Every patient should be fully evaluated regarding diagnosis and suitability for both medical or surgical management and treatment should be individualized. This view is supported by a study in India [38].

Different Treatment Options

Conservative treatment

Initial therapy

Initially local creams are used to lubricate or anaesthetize the anal mucosa. Hydrocortisone cream is very useful as it reduces the inflammation and pain at the site of fissure. In infants and children, it is useful initial option. Oral or local analgesics suppositories will help reduce pain and inflammation. Increased fiber intake, stool softeners and warm sits bath can help initially in the healing of fissure and reducing the discomfort during defecation [39] recurrence [22]. These features are present in many patients of the chronic anal fissure so role of GTN in patients with chronic anal fissure is doubtful [45].

Diltiazem cream

Diltiazem is also calcium channel blocker like GTN and is being developed as an alternate of GTN. It is approximately equally effective in healing of acute fissures. Furthermore, headache is negligible in patients using it, thus increasing compliance and success rates [1, 28]. Some studies are available where alpha receptor antagonists were used but still this is in development [14]. Cholinergic receptor agonist is also being evaluated as one treatment option [32]. Very recently sildenafil is used to relax internal sphincter in isolation. Principle is same as that of GTN as it also provides nitric oxide as neurotransmitter. It can relax internal sphincter and can increase blood supply to posterior anal canal. More studies are required for further evaluation of sildenafil as adverse effects of this treatment may be minimal [49].

Botulinum injection

Botulinum is a toxin which is used to weaken the striated muscles by chemical denervation, but also has been shown to weaken the smooth muscles of gastrointestinal tract [50-51]. The toxin acts on pre-synaptic terminals to prevent release of acetylcholine, thus interrupting the transmission of neuromuscular impulses until growth of new axon terminal after two to three months [50-52]. In anal fissure, healing time ranges roughly from 1 - 3 months, so fissure gets healed within time provided by BT. Intrasphincteric injection of BT was first described by Jost and schimrigh and was found to be effective [53]. Another advantage is that it can be injected anywhere in and around internal sphincter muscles but anterior injections may be more useful. Scarring and fibrosis in post part of IAS may have destroyed nerve terminals rendering anterior injection more useful [4-54]. BT has been shown to be more effective than nitroglycerine ointment in healing of fissure [30-55]. It has been shown to be equally effective to LIS with negligible incontinence rates [4]. Healing rate in BT is in range of 70–80% [5-43]. In one study, post anal tag was excised, tissue base was curetted and then BT injection was given and achieved success rate of 93%. Transient incontinence ranged from 7–12% [30]. It was shown that favorable points in treatment with BT injection were posterior location of fissure, significant reduction in anal pressure after injection and short duration of symptom i.e. less than 12 months [21]. In infants, treatment of constipation and maintaining soft stool also help in fissure healing [39]. Diarrhea is avoided and diapers are changed frequently, thus maintaining good anal hygiene. Use of moist wipe instead of dry, perfumed tissue paper also helps in healing and prevention of fissure. Avoiding constipation is also helpful in adults as hard faeces definitely cause injury to already fragile anal mucosa [23]. Application of local creams is troublesome for both patients and doctors and compliance of twice daily application of cream may be difficult. Furthermore, local anaesthetics like lignocain dry soon and can cause contact dermatitis in some patients. This further increases inflammation in already diseased area and this adds to the problem [40]. So compliance, low success rate and recurrence of fissure when treatment is stopped are problems in local creams [33].

Glyceryl trinitrate creams

Local creams of Glyceryl Trinitrate (0.2% by weight) were used on concept that aim of treatment is to relax the sphincter and increase blood supply. GTN supplies the nitric oxide, the neurotransmitter that relaxes the internal sphincter. It also causes vasodilatation, thus increasing blood flow to the fissure area [15]. Creams are applied 2 -3 times per day to anal canal. Fissures heal in 2–3 months by this method and treatment is successful in 60–70% cases [5-15-32-33-41-42].

Advantages

1. It is easy to apply and non-irritating.
2. There are no chances of any sort of incontinence as the relaxation of internal sphincter is temporary.
3. It is also very effective in fissure of inflammatory bowel disease, where surgery is usually avoided [31].
4. Different strengths of cream (0.1%), (0.2%), and (0.4%) can be used but definite advantage of one over other is doubtful [41].
5. Nitroglycerine can be combined with (with 73% success) pneumatic dilatation of anal canal. Success rate can be further increased by combining it with injection of botulinum toxin. This achieves 94% healing [43].
6. It can also be combined with sphincter sparing surgical procedures, thus avoiding incontinence and increasing healing rate. [44].
7. There is no need for admission to hospital [33].

Disadvantages

1. Many studies have inducted that healing rate achieved by GTN can also be achieved with placebo, thus rendering it doubtful [28-32-45]. Many studies have also shown the healing rate of less than 50% [46].
2. Headache is one of the major adverse effects of this treatment [32]. In one study, it was calculated in up to 40% patients. Many patients stop using it for this reason [47].
3. Compliance is also a problem both for patient and doctor. Patient has to apply cream over anal mucosa, which may be painful and maintaining twice daily applications is also difficult. Doctor has to assess repeatedly about the progress of fissure healing by repeated anal examination which is time consuming and labor intensive [33-48].
5. Recurrence of fissure is also a problem [33]. Although exact mechanism is not known, scarring and fibrosis and presence of anal tag are bad prognostic factors favouring. Furthermore dose of BT injection can be increased from 20 – 50 units to get healing rate of 90% without causing any increase in complications [56].

Gonyautoxin injection

It is phytotoxin which is produced by dinoflagellates. It causes paralysis of internal sphincter. In one study, acute fissures healed within 15 days and chronic within 30 days with only one relapse. But there is need for further studies to fully evaluate its benefits and drawbacks [57].

Surgical Treatment Options

Different surgical treatments are used with main concern related to fear of incontinence associated with them [28-58]. They include manual anal dilatation, LIS, fissurectomy and anal advancement flap.

Manual anal dilatation

This is the simplest procedure in which index and middle fingers of each hand are inserted into anal canal and it is stretched gently and carefully, so that anal diameter should never be more than 4-finger breadth. This is performed usually under GA. Great care and judgment are required, so that sphincter is never over-stretched [6-8-9-59-60-61]. One benefit of manual anal dilatation is that it gives appreciable pain relief. This may be related to laxity of sphincters, as stool can easily pass through the lax sphincter mechanism [9-59-62].

Some studies also show increased healing rates and only negligible complications like flatus incontinence which is also transient [62]. But as it is less controlled method, so it can tear both internal and external sphincters, thus causing unacceptably high rates of incontinence. Healing rates are also low and recurrence is high as sphincter may be over- or under-stretched [28]. It is not recommended now in routine and especially in patients who have weak sphincters. Why to stretch external anal sphincter which has no role in pathogenesis of anal fissure [60]? Many studies have suggested the incontinence rate of 15 – 30% and also include faecal incontinence which can be very troublesome [6-8-9-28]. Furthermore damage to external sphincter is inevitable and this has been proved by many studies [63-64].

Lateral internal sphincterotomy

The basic aim in treatment of anal fissure is to decrease anal pressure by relaxing the IAS. LIS was developed to cut the IAS in isolation from EAS thus decreasing its spasms and helping in fissure healing.

Technique

In this method, usually under general anesthesia, a small 1cm vertical incision is made on either left or right lateral position to anal opening, away from fissure itself. A plan is developed between IAS and EAS and then IAS is separated from mucosa of anal canal. IAS is then cut up to level of dentate line. IAS may be grasped in artery forceps for one to two minutes to decrease bleeding before cutting it. Now a gap can be felt on digital palpation of anal mucosa. Wound may be closed with one or two stitches or left open. No dressing is usually applied. It was first introduced by Eisenhammer in 1951 and was later re-defined by Notaras [65-66].

Advantages

1. It has very high healing rates i.e. ranging from 80–95%. This is because of long term decrease in resting anal pressure after surgery. Many fissures heal during this period. Healing time usually ranges from 3–12 weeks [4-36-37-67-68]. Some studies have shown early return of anal pressure back to normal [17-18].
2. Pain relief is quick and patients feel a lot of satisfaction after getting rid of severe pain associated with fissure [9].
3. It can be performed even under local anaesthesia in outpatient department if surgeon is experienced. Lignocain solution is injected in both ischiorectal fossae to block pudendal nerve on both sides of anal canal. In this way burden of hospital stay and bed occupancy can be greatly reduced [7-69].
4. It can be combined with other anorectal procedures i.e. haemorrhoidectomy, excision of anal tag and biopsy of fissure without causing any increase in morbidity [37].
5. It is superior to manual anal dilatation in terms of success rate, recurrence and complication [6-59-60].
6. It has been shown to be superior to GTN in terms of fissure healing, recurrence and complication rates [5-46-48-70-71].
7. Its judicious use is allowed in cases of Crohn's disease that do not respond to Medical treatment [10].

Disadvantages

1. Many studies have demonstrated that it is associated with some sort of flatus inconti-

nence [36-37-58-68]. Incontinence is mostly mild i.e. categorized as grade I 6. Mostly it is for flatus and doesn't require any treatment [67].

2. Mucous discharge and soiling of clothes have been demonstrated in some studies. This is usually temporary and resolves with passage of time [72-73].

3. Localized infection and abscess formation is demonstrated by some studies while others have noted urinary retention [74].

Many of the studies have demonstrated that if the cutting of sphincter is limited up to the upper limit of fissure, then risk of incontinence is minimized [31]. Some have demonstrated that even full cutting of sphincter up to dentate line does not increase the chances of incontinence [75]. Closed method of lateral internal sphincterotomy is also becoming popular [68-76]. In this method, incision is very small and knife is introduced through it and turned to cut internal sphincter. It is minimally invasive [76-77]. Some studies showed more chances of infection and other complications in closed LIS group [78]. Post operative care usually includes analgesic, antibiotics and bath sits with mild antiseptic added to plain water [37].

Anal advancement flap

In this method, fissure is excised and a square of full thickness flap of perianal skin is mobilized and sutured to the defect. The risk of recurrence is minimal. There are no complications like incontinence as internal sphincter is left undisturbed. It is particularly useful in patients with weak sphincters because it is very safe and simple [79]. The suitability of this method is being evaluated in old people and women with multiple vaginal deliveries as both these groups have weak or no perianal muscles. Cryosurgery is being evaluated in CAF [80]. The advantage of this cryosurgery over traditional surgery is debatable. Furthermore, cost and unavailability of the equipment required for this procedure are also drawbacks. This is especially relevant to the remote areas of developing countries as the economic sources are limited. In one study, fissurectomy was done, base curetted and anal tag excised followed by BT injection. It showed promising results in patients where GTN failed. This has been regarded as sphincter sparing procedure.³⁰ In this method neither internal nor external sphincter is cut, so chances of complications like faecal and flatus incontinence are minimal. This is being evaluated in different centers and if early promising results continued to be proved by long term studies and other authors, this will become the surgical treatment of choice for chronic anal fissure. Factors favouring non-healing include infection, fibrosis and scarring at tissue site [22]. In another study, direct current was applied to internal haemorrhoid which was present along with chronic anal fissure. This resulted in resolution of internal haemorrhoid and at the same time healing of the chronic anal fissure. The exact mechanism could not be appreciated [81]. Recurrence of fissure is prevented by avoiding constipation, increased fiber intake in form of unprocessed bran and maintaining good anal hygiene [32- 82]. The objective of this study was to compare the outcome of manual dilatation of anus and lateral internal sphincterotomy in anal fissure.

MATERIAL AND METHOD

The study was conducted in department of surgery, Ayub Teaching Hospital, Abbottabad. It is situated on Silk Road and is a tertiary care hospital with three established general surgical units with more than 150 beds. A good amount of elective and emergency operations are performed daily. It provides both undergraduate and postgraduate teaching facilities. Hospital drains patients from wide spread area i.e. from Hassan Abdal to Northern Areas.

Every surgical unit is run by a Professor, an Associate Professor, two Assistant Professors, one Senior Registrar, eight to ten postgraduate trainees and 10–15 house surgeons. Sixty patients of anal fissure admitted in surgical units of Ayub Teaching Hospital, Abbottabad. They were divided in the following two groups:

Group A: Thirty patients for M.A.D.

Group B: Thirty patients for L.I.S

All patients with anal fissure were admitted to surgery department of Ayub Teaching Hospital, Abbottabad. Their particulars like name, age and sex were recorded. Complaints like perianal pain during and after defecation, bleeding per rectum, mucus discharge, constipation and any other feature like pruritis ani were recorded. Duration of complaint was also noted. After that fissure was confirmed on anal examination either under local anaesthesia or by gently aparting the buttocks. Doubtful cases were examined under GA just before surgery. Patients were divided in two groups:

Group A: Odd numbers of patients were assigned in this group.

Group B: Even numbers of patients were assigned in this group.

General physical and systemic examination was done to check fitness for spinal or GA and to exclude tuberculosis, syphilis and colorectal carcinoma. All routine laboratory investigations like blood CP, urea, sugar, urine R.E, HBs Ag, Anti HCV, HIV and serology for syphilis were done. Chest x-rays and ECG were also done. After informed written consent, all patients were operated day after admission. Patients of group A were subjected to M.A.D and group B were subjected to L.I.S. For group A, under spinal or G.A, digital rectal examination and proctoscopy were done to confirm fissure and rule out other pathologies like anorectal carcinoma, tuberculosis and syphilis.

Any coexisting haemorrhoids and posterior anal tags were also noted in few cases. Anal tags were removed first in cases where those were present. Then four finger dilatation of anal canal was done with suitable force that anal diameter was never more than four finger breadth. No dressing was applied. For group B, DRE and proctoscopy were done with same intent as that for group A. Anal tags and coexisting haemorrhoids were also noted. Anal tags were removed when present. Then one centimeter vertical incision was made at left lateral side of anal canal. Then scissor was introduced in plan between mucosa and I.A.S and then between I.A.S and E.A.S. Then I.A.S was grasped in haemostat up to a length just at the level of upper limit of fissure. Haemostat was left closed for 2–5 minutes to reduce bleeding and then was released. I.A.S was divided with fine surgical blade up to the level of upper limit of the fissure. Haemostasis was secured by diathermy in few cases. Wound was left open and no dressing was applied. Post operative recovery was uneventful in all cases. All patients were given perioperative antibiotics, analgesics and were discharged after 24 hrs of surgery with advice of bath sits, antibiotics and analgesics. All of them were later followed in OPD at three, six and twelve weeks after surgery. They were asked for any pain during and after defecation. Inquiry was also made about any involuntary loss of faeces or flatus during this period. Any history of mucus discharge or clothes soiling with mucus or faeces was specifically asked. Finally anal region was examined for evidence of healing of ulcer. Healing was defined as evidence of scarring at the fissure site. Recurrence of fissure was noted at six and twelve weeks in patients where evidence of healing was present at three and six weeks. If there appeared ulcer or cut in previously scared area, it was taken as recurrence. Main outcome measures were faecal or flatus incontinence, clothes soiling with mucus or faecal material, pain relief, fissure healing and recurrence of disease.

Data Analysis

All data were put to "SPSS" version 10.0 on computer. Frequencies and percentages of qualitative variables i.e. gender, pain relief, faecal incontinence, flatus incontinence, clothes soiling, fissure healing and recurrence were presented. Mean \pm standard deviation was presented for the age and duration of symptoms of the patients. Chi-square test was applied to compare qualitative variable and p value ≤ 0.05 was taken as significant.

RESULTS

A total of 30 cases were subjected to M.A.D and 30 were subjected to L.I.S. 30(50%) patients were males and 30(50%) were females. L.I.S was done in 13 males and 17 females. M.A.D was done in 17 males and 13 females. p value was 0.302 which is not significant. Basic demographic data (age and duration of complaints) of patients are given in Table 1.

TABLE 1 . Basic demographic data of patients with anal fissure

Variables	Number of cases	Percentages	Mean \pm S.D
Group (Years)			
<20	8	13.3	33.60
20 - 40	38	63.4	\pm
40 - 60	14	23.3	14.688
No of Symptoms (Months)			
4 - 8	27	45	10.38
8 - 12	8	13.3	\pm
12 - 18	25	41.7	4.488

Ages of patients ranged from 02 to 70 years with a mean age of 33.60 ± 14.688 . 36 patients (63.4%) belonged to age group 20-40 years. p value was not significant for both groups. Duration of complaints ranged from 4-18 months with mean of 10.38 ± 4.488 . p value 0.933 was not significant for both groups.

TABLE 2 . Clinical presentations of patients with anal fissure

Variables	Number of cases	Percentages	
Painful defecation	Yes	60	100
	No	0	0
Mucus discharge	Yes	17	28.3
	No	43	71.7
Bleeding Per Rectum	yes	57	95
	No	3	5
Constipation	Yes	58	96.7
	No	2	3.3
Abdominal pain	Yes	1	1.7
	No	59	98.3
Pruritis ani	Yes	12	20
	No	48	80
Anal Tag	Yes	14	23.3
	No	46	76.7

Painful defecation was present in all cases. Bleeding per rectum and constipation were also present in high percentage of patients i.e. 95% and 96.7% respectively. Only one (1.7%) patient had abdominal pain. Anal tag was present in 14 (23.3%) cases. One female patient also had 2nd degree haemorrhoids and one patient had 1st degree haemorrhoids.

TABLE 3 . Location of fissure in patients with anal fissure

Variables	Number of cases	Percentages
Location of fissure		
Anterior	5	8.3
Posterior	54	90
Multiple	1	1.7
Total	60	100

TABLE 4 . Previous treatment used by patients of anal fissure

Variables	Number of cases	Percentages
Laxatives	39	65
Anal Dilatation	4	6.7
Local Creams	9	15
All above three	8	13.3
Total	60	100

Location or site of fissure in patient is presented in table 3. Any type of previous treatment used is presented in table 4. Out of these, 12 patents previously had M.A.D done and seven of these were then subjected to L.I.S and 05 were again put to M.A.D. Three weeks after surgery, 29 patients got complete and one patient had partial pain relief in lateral internal sphincterotomy group. In M.A.D group, 14 patients had complete, 14 had partial and two had no pain relief. *p* value for difference between two groups was 0.0001 which is highly significant. After six weeks, pain relief was same in lateral internal sphincterotomy group while in M.A.D group, 16 patients had complete, 13 had partial and one had no pain relief. *p* value is still 0.001 which is significant.

TABLE 5 . Pain relief after 12 weeks of surgery by operation groups

Variables	Type of operation		Total
	MAD	LIS	
Relief			
Complete	17	29	46
Partial	12	1	13
None	1	0	1
Total	30	30	60

p = 0.001 for the differences of frequencies of pain relief between two groups

TABLE 6 . Flatus incontinence after 12 weeks of surgery by operation groups

Variables	Type of operation		Total
	MAD	LIS	
Flatus: Present	8	0	8
Incontinence : Absent	22	30	52
Total	30	30	60

p = 0.002 for the differences of frequencies of flatus incontinence between two groups at 12 weeks

Difference in pain relief between two groups, at 12 weeks, is presented in Table 5 with $p = 0.001$ which is highly significant. At 03 weeks, faecal incontinence was present in 8 cases in M.A.D and none in L.I.S with $p = 0.002$ which is significant. At six weeks, faecal incontinence was present in 05 cases in M.A.D group and none in L.I.S with p value 0.020 which is significant. At 12 weeks, no patient had faecal incontinence in both groups. At 03 weeks, flatus incontinence was present in 12 patients in M.A.D and 05 patients in L.I.S group. p value turned out to be 0.045 which is significant. At six weeks, flatus incontinence was present in 08 cases in M.A.D group and three in L.I.S group with non-significant $p = 0.095$ value. The frequency of flatus incontinence at 12 weeks is presented in Table 6 with significant p value of .002. Clothes soiling was present in 21 cases in M.A.D and 11 cases in LIS group at 03 weeks. p value turned out to be 0.010 which is significant. At six weeks, 19 cases had cloths soiling in M.A.D and 06 cases in L.I.S group with $p = 0.001$ which is significant. Frequency of clothes soiling at 12 weeks is presented in table 7 with $p = 0.0001$ which is highly significant.

TABLE 7 . Clothes soiling 12 weeks after surgery by operation groups

Variables	Type of operation		Total
	MAD	LIS	
Soling			
Present	13	1	14
Absent	17	29	46
Total	30	30	60

TABLE 8 . Fissure healing 12 weeks after surgery by operation groups

Variables	Type of operation		Total
	MAD	LIS	
Fissure healing			
Present	18	28	46
Absent	12	2	14
Total	30	30	60

$p = 0.002$ for the differences of frequencies of fissure healing between two groups

TABLE 9 . Recurrence 12 weeks after surgery by operation groups

Variables	Type of operation		Total
	MAD	LIS	
Recurrence			
Present	7	1	8
Absent	23	29	52
Total	30	30	60

$p = 0.002$ for the differences of frequencies of fissure healing between two groups

Fissure healing at three weeks was present in 13 patients in M.A.D group and 28 patient in LIS group with $p = 0.0001$ which is highly significant At six weeks, fissure healing was present in 17 patients in M.A.D group and 28 patients in LIS group with $p = 0.001$

which is significant. Frequencies of fissure healing at 12 weeks in both groups is documented in table 08 with $p = .002$ which is significant. Recurrence was present in one case in L.I.S group and in seven cases in M.A.D group at six weeks with $p = .023$ which is significant. At 12 weeks, frequency of recurrence in both groups is shown in table 9 with p value 0.023 which is significant. One patient also had haemorrhoidectomy with L.I.S with no difference in outcome. Anal tags were removed when found in both groups not affecting the results.

DISCUSSION

The results of this study indicate that LIS is surgical treatment of choice in patients of anal fissure who are not responding to conservative measures. This can be explained as follows: In L.I.S only internal sphincter is cut. This decreases the anal pressure and thus can increase blood supply. This will also reduce the pain immediately as the spasm is no more present. All these factors will dramatically favour fissure healing. Furthermore there is no damage to external anal sphincter, so there are no chances of faecal incontinence. As the internal sphincter is cut, the anus may not close completely and pressure is also decreased. This may cause flatus incontinence or maybe there is trickling of faeces or mucus per anus. This can be avoided if the cutting of internal anal sphincter is limited to upper limit of fissure 4. In manual anal dilatation, both internal and external sphincter muscles are stretched and this is less controlled method. The internal and external sphincter muscles are both stretched and damage to external sphincter may be extensive which may lead to faecal incontinence and this may be permanent in some patients. Furthermore, the healing of fissure may also be jeopardized by continuous leakage of mucus and faeces. There may be not enough decrease in anal pressure, if the sphincters are under-stretched. Furthermore the decrease in pressure may be so temporary that it does not allow fissure healing and increases the chances of early recurrence. All these factors have contributed to changes that have evolved over the years for management of patients with anal fissure.

This is why lateral internal sphincterotomy is increasingly being recommended as surgical treatment of choice because of increased success rate with minimal complications and manual anal dilatation is being discouraged because of low success rate and high complication rates [6-8-59-74]. In present study, fissure healing was present in approximately 28 patients (93%), patients (table 8) with recurrence only in one patient in lateral internal sphincterotomy group (Table 9). There is fissure healing in 18 (60%) patients (Table 8) and recurrence in 7 (23%) patients (Table 9) in manual anal dilatation group. These results are comparable to many studies [6-8-59-60-77]. All these studies reinforce the results of present study. Many other national and international studies have shown more than 90% healing rates and the same time achieved very low recurrence rates in patients of anal fissure treated by lateral internal sphincterotomy [65-66-74-76-77-83-84]. On the other hand, many authors have presented low healing rate and at the same time increased complication rate when manual anal dilatation was used as surgical treatment for patients of anal fissure as compared to lateral internal sphincterotomy [6, 8, 28, 59, 60, 77, 84]. Nearly all above mentioned authors used similar technique of lateral internal sphincterotomy and manual anal dilatation as was used in present study. Majority of them used general or spinal anaesthesia, although some have used local anaesthesia which is comparable to present study. Nearly all of them have used similar peri-operative measures. In one study at Abbottabad, author achieved 100% healing rate in anal fissure by manual anal dilation 62. It is not supported by other studies. It seems impossible to achieve 100% healing rates and 0% complication rates at same time. This also looks doubtful if pathophysiology of de-

velopment of anal fissure is studied in detail because the main factor is decreased blood supply and increased tone of the anal sphincter [19,20]. Recurrence rate for lateral internal sphincterotomy group ranged from 1.3–13.1% in some international studies [73-82]. This difference may be related to the aggressive or conservative approach of the surgeons.

In another study from Turkey, healing rate in lateral internal sphincterotomy was 82% which is due to conservative approach during surgery to prevent incontinence [4]. In present study, there was complete pain relief in 29 (96%) cases in lateral internal sphincterotomy group (table 5). In manual anal dilatation group, there was complete pain relief in 17 (56%) and partial pain relief in 12 (40%) patients which is supported by other studies [8-9]. So it seems that, both procedures are good for pain relief but pain did not completely go off in 12 patients in manual anal dilatation. One author had achieved 100% pain relief rate in manual anal dilatation group, but this was not a comparative study and no other studies are available over the world in support of this study [62]. However, pain relief was quick in L.I.S group as compared to manual anal dilatation group in present study. Effective pain controlled in both groups may be related to temporary loss of muscle tone. In lateral internal sphincterotomy, the tone of internal sphincter is decreased while in M.A.D, tone of both internal & external sphincter is decreased. In present study, no faecal incontinence was present in lateral internal sphincterotomy group. This is certainly due to the fact that no damage to EAS is done and voluntary control over the passage of faeces is not lost.

In M.A.D group, there was faecal incontinence in 8 (26.6%) and 5 (16.6%) patients at three and six weeks but they gradually recovered and no faecal incontinence was present at 12 weeks in manual anal dilatation group also. This can be explained with the fact that initial trauma to external sphincter decreased its tone and voluntary control, but healing took place as time passed. Similarly voluntary control over the passage of faeces also improved along with the help of other perianal and pelvic floor muscles. Flatus incontinence was only transient in LIS group. At 12 weeks post operatively 8 patients (26.6%) in manual anal dilatation group had flatus incontinence with significant p value ($p \leq .002$) between two groups. In one Pakistani study, faecal and flatus incontinence was reported to be found in 59.6% in manual anal dilatation and only 6.6% cases in lateral internal sphincterotomy group [8]. A study from Israel, where manometric pressure was measured before and after surgery, also proved that lateral internal sphincterotomy does not cause any incontinence [13]. Other study also proved this [18]. Adnan Giral and friends also found no significant incontinence in lateral internal sphincterotomy groups [4]. In another study, 8% flatus and 8% faecal incontinence was reported in manual anal dilatation group. In one study in Lahore, flatus incontinence was reported in 13.2% cases with no faecal incontinence in lateral internal sphincterotomy and some international studies also favour this [46-58-67-69-74]. But in manual anal dilatation group, some sort of faecal or flatus incontinence was present with evidence of damage to external sphincter [28-61-63-64-73]. Results of present study regarding incontinence are supported by other studies [5-7-66-77]. Flatus incontinence is most probably due to loss of complete air tight closure of anal orifice as a result of defect in internal sphincter where it is cut in lateral internal sphincterotomy. As it is a clean cut, it heals slowly and tight control is gradually achieved. Hence flatus incontinence is transient, it does not require any treatment. In present study, this transient flatus incontinence has been noted. In manual anal dilatation, damage to both internal and external sphincter is present. The tearing of internal and external sphincter is irregular and can result in permanent loss of air tight closure of anal orifice. As there are other mechanisms and muscles are present to maintain continence in access to external anal

sphincter, flatus incontinence and leakage of mucus secretions may be present in absence of faecal incontinence. In present study, soiling of clothes was present in only one (3.3%) patient in lateral internal sphincterotomy group and 13 (43.3%) patients in manual anal dilatation group at 12 weeks post operatively. So soiling is negligible in lateral internal sphincterotomy group. Some other studies also have similar results regarding faecal soiling in LIS group [66-71-74-77]. Increased soiling of clothes is documented in MAD group in many studies [9,84]. This can also be explained as loss of tight closure of anal orifice will allow liquids like mucus to pass through it. This loss of tight closure is also more pronounced in manual anal dilatation group. In one study, there was 22% soiling and 35.1% grade I incontinence in lateral internal sphincterotomy group [72]. This may be related to the increased length of cut made in internal anal sphincter. Less complication rate in present study is related to more conservative approach (cutting of internal sphincter only up to upper limit of fissure). As cutting up to upper margin of anal fissure sufficiently decreased the tone of internal sphincter so no further cutting was needed. Similar technique was applied in Turkey to get nearly similar results with negligible complications [4]. In present study, fissure location was mostly posterior midline (90% cases). In another study, fissure was present in posterior midline in 98% cases [9]. This is comparable to the traditional text book teachings about the location of the anal fissure. In present study, anal tags were removed in both groups and in one patient L.I.S was combined with haemorrhoidectomy. Another local study also denotes that other rectal procedures can be combined with L.I.S provided the cases are carefully selected and this will give added benefit to the patient without increasing morbidity [37]. Removal of anal tag in lateral internal sphincterotomy and manual anal dilatation did not cause any damage or added complication in present study. There were no complications related to anaesthesia during present study in both groups. This can be explained by the facts that both procedures can be completed in very short time if surgeon is experienced and familiar with the technique of surgery. The experience and education standard of anaesthetist and helping staff in operation theatre also counted for successful and uneventful recovery from anaesthesia. Finally the results of present study showed the higher success rate in lateral internal sphincterotomy group than manual anal dilatation group in treatment of anal fissure. The complications and recurrence rates were very low (negligible) in L.I.S group as compared to M.A.D group. Results were applicable to both male and female gender.

CONCLUSION AND RECOMMENDATIONS

Lateral internal sphincterotomy is very effective and safe procedure as compared to M.A.D as surgical treatment in cases of anal fissure. L.I.S has many benefits. It has excellent success rate regarding healing of fissure and pain relief. Furthermore it has very low complication rate and repeated surgery is avoided because of very low recurrence rate. This also reduces the cost of treatment in long term. M.A.D has low success rate with high complication rates and many patients have to undergo repeated dilatations. It can be recommended that patients of anal fissure who do not respond to conservative methods of treatment should undergo L.I.S. This is best for patients in terms of cost and recovery from diseases.

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— This article does not have any appendix. —