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REVIEW

Comparison Of Non-Surgical Managements Versus Surgical Managements Of Chronic Anal Fissure

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ABSTRACT

Anal fissure is a tear of the anoderm distal to the dentate line and is very common in all age groups, with an equal incidence in males and females. Most acute anal fissures heal without surgical intervention but chronic anal fissures are usually more difficult to treat due to recurrence and complications. In addition, chronic anal fissures also have a negative impact on quality of life. Management of anal fissures consists of non-surgical and surgical where the healing rate of chronic anal fissures is higher with surgical management. However, surgery carries a risk of incontinence. This article discusses the comparison of the results of non-surgical management with surgical management of chronic anal fissures.

INTRODUCTION

Anal fissure is extremely common and is a common cause of anal pain.[1,2] The lifetime incidence of anal fissures is estimated to be about 11% and approximately 250,000 new cases are diagnosed each year in the United States.[3,4] Based on duration, anal fissures are classified as acute and chronic. Chronic anal fissure onset, exacerbation, and impact on the quality of life may be influenced by a host of psychological, physiological, and social factors. There is a high comorbidity of psychopathology in chronic anal fissure patients and the severities of depression and anxiety show a negative impact on quality of life. Stress acts as both a triggering and an exacerbating factor in chronic anal fissures. Pain and bleeding

severity have a negative impact on the overall role in daily life.[2]

Although there are many treatment options, each has drawbacks. Nonsurgical managements are likely to fail and have a higher failure rate and will only heal about 50% of chronic anal fissures. Surgical treatment of LIS can cure more than 95% of patients, but there is a risk of anal incontinence of about 5%-15%.[1,3] This article discusses a comparison of non-surgical treatments versus surgical treatments for chronic anal fissures to see which are more effective and safer.

THEORETICAL REVIEW

Anal Fissure

Anal fissure is a tear in the anoderm distal to the dentate line.[1,3] Acute anal fissures last for less than 6 months, while chronic ones last for more than 6 months. Anal fissures occur in all age groups, but are most common in the pediatric and middle-aged population. Male and female are at the same risk.[3,4] The anatomy of anal fissure can be seen in **Figure 1**.

Primary anal fissures have no clear underlying cause. This is in contrast to secondary anal fissures, which are thought to be caused by other primary conditions including constipation, chronic diarrhea, sexually transmitted infections (STIs), tuberculosis (TB), inflammatory bowel disease (IBD), human immunodeficiency virus (HIV), anal cancer, colorectal cancer, childbearing, previous anal surgery, anal sexual intercourse, dermatological conditions such as psoriasis or pruritus ani, and medications, for example, opioids or chemotherapy. Most acute anal fissures are thought to be the result of hard bowel movements, STIs, or anal injury due to penetration. A chronic anal fissure typically is a recurrence of an acute anal fissure.[3,4]

The pathophysiology of anal fissures is thought to be related to trauma either due to hard bowel movements or prolonged diarrhea. The anoderm is a very sensitive area to microtrauma and can tear with repeated trauma or increased pressure. High pressure in this area can result in delayed healing that occurs due to ischemia. A tear in the anoderm causes spasm of the internal anal sphincter (IAS), which causes pain, increased tearing, and decreased blood supply to the anoderm. In patients with anal fissures, there is evidence that the rectoanal inhibitory reflex is followed by an abnormal increased contraction. This is why patients with anal fissures have sphincter spasm and pain during defecation. Having this cycle of pain, spasm, and ischemia leads to the development of a poorly healing wound that becomes a chronic anal fissure. Most anal fissures occur in the posterior midline because this location receives less than half of perfusion compared to the rest of the anal canal. Furthermore, anodermal blood flow at the posterior midline is closely related to anal pressure which means higher pressure makes the flow lower. Ten percent to 15% occur in the anterior midline. Less than 1% of anal fissures occur off midline, which is called atypical anal fissures, and tend to be associated with other diseases.[1,3,5,6,7]

Characteristic symptoms of anal fissures include tearing pain with defecation and hematochezia. Patients may also experience an intense and painful sensation of anal spasm lasting for several hours after a bowel movement. Sometimes, there is bleeding associated with a bowel movement but usually there is not frank hemorrhage. A history of painful defecation with or without rectal bleeding that has been ongoing for several months to possibly years is usually present in patients with chronic anal fissures.[1,3]

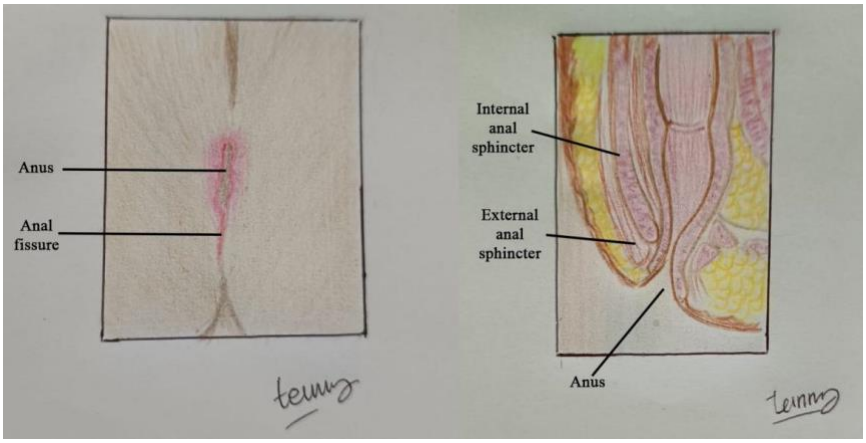

Figure 1. Anatomy of Anal Fissure

Examination is best performed in the lateral position, gently parting the buttocks to visualize the anal canal. Once an anal fissure has been diagnosed, digital examination and anoscopy should be postponed due to pain. An acute anal fissure presents as a superficial tear of the distal anoderm, usually longitudinal extending proximally, with or without bleeding, and almost always heal with medical management. In chronic anal fissures, there is a development of ulceration and raised edges with white fibers of the internal anal sphincter seen at the base of the ulcer. There often is an associated external skin tag and/or a hypertrophied anal papillae internally.1,2,3,6 Features of acute and chronic anal fissure can be seen in Figure 2.

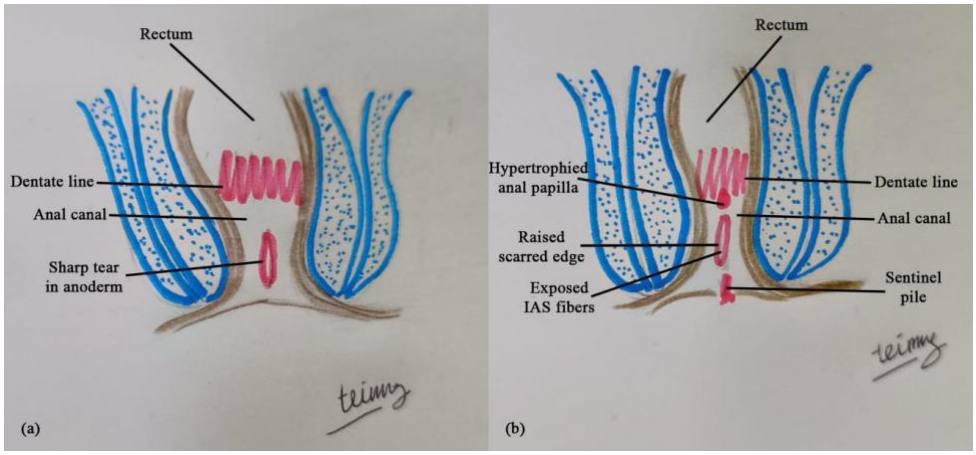

Figure 2. Schematic diagram showing features of (a) acute anal fissure, (b) chronic anal fissure

Most acute anal fissures heal without surgical intervention, often within 10-14 days. Nonoperative therapy has straightforward goals consisting of three components. The first component is eliminating the underlying pathology responsible for the occurrence of anal fissures. The second component involves relaxing the internal anal sphincter to increase blood flow and allow healing. The third component consists of relieving symptoms from anal fissures, which are usually bleeding and pain. Chronic anal fissures are usually more difficult to treat because of recurrences and complications. It is estimated that half of chronic anal fissures will heal with nonoperative measures, such as sitz baths and psyllium

fiber supplements, with recurrence rates of 18.6%. Surgical therapy has traditionally been recommended for chronic anal fissures that have failed medical therapy, and lateral internal sphincterotomy (LIS) is the mainstay of choice.1,3,5,6

First-line therapy is aimed at minimizing anal trauma, namely with bulk-forming agents, stool softeners, a high-fiber diet, and sitz baths. As the passage of hard stool has been associated with the development of and persistence of anal fissures, ensuring adequate water and fibre intake is a mainstay of initial therapy. The goal for adults is to consume 25–30 g of fibre daily through either meals or supplements. If conservative management with dietary changes and laxatives fails, topical analgesics such as 2% lidocaine jelly, topical nitroglycerin, calcium channel blockers (CCBs) such as topical nifedipine and topical diltiazem, or a combination of topical nifedipine and lidocaine in combination with other drugs can be used. When therapy with the drugs mentioned previously fails, Botulinum toxin (Botox) injection can be added to prevent recurrence of chronic anal fissures. Studies in recent years have shown the efficacy of Botox injections in reducing pain which together with its non-permanent and minor side effects supports its role in resolution of chronic anal fissures. However, the optimal dose of Botox is not yet clarified. While many studies used approximately 20 U divided in one to four injections, there is some evidence that higher doses (30–50 U initially or for recurrent fissures) lead to improved healing rates. Other issues that need to be clarified include the ideal location of injection (into the IAS, external anal sphincter (EAS) or the intersphincteric groove), number of sites, and relationship to the fissure itself.1-4,6,8 Laser therapy is also considered a good alternative for the treatment of anal fissure because it usually reduces bleeding, pain, and discomfort.9 Passing stool in squatting position is proved beneficial in preventing constipation and other bowel related diseases which take part in anal fissure development. The greater the hip flexion achieved by squatting the straighter the rectoanal canal will be, and accordingly, less strain will be required for defecation.10,11 Surgical options for definitive management of chronic anal fissures should be reserved for cases where non-surgical treatment for more than 6-8 weeks does not produce desirable results. Surgical methods other than LIS include anal dilation, anal advancement flap (AAF), and fissurectomy. However, Lord procedure anal dilation has been mostly abandoned in recent times due to the advent of non-surgical measures, an unacceptably high risk of faecal incontinence (about 52%), as well as its overall inferiority to LIS.2,6 Treatment for anal fissures can be seen in Table 1.

Table 1. Surgical Management and Non-surgical Management of Anal Fissure1-4,6,9

Surgical Management	Non-surgical Management
LIS	Anesthetics (lidocaine)
AAF	Nitrates (nitroglycerin)
Fissurectomy	CCBs (nifedipine, diltiazem, minoxidil)
Anal dilation (Lord procedure, endoscopic, balloon)	Botox
Autologous adipose tissue transplant	Laser therapy
	Sacral nerve stimulation
	Posterior tibial nerve stimulation

AAF: anal advancement flap, CCBs: calcium channel blockers

Medical management such as topical nitroglycerin frequently causes headaches and hypotension and has a higher failure rate.1,3,4 Recurrences occur in about 50% of those initially cured. Topical CCBs are better than nitroglycerin in terms of cure rates and side effects, but have recurrence problems. Other nonsurgical management such as Botox injection carries a risk of transient anal incontinence.2 Meanwhile, healing is achieved in more than 95% of patients who undergo surgical therapy with the LIS method, and most patients experience immediate pain relief. Recurrences occur in less than 10% of patients but there is a risk of anal incontinence in the range of 5%-15%.1,3,4 Thus, it is important to find out whether non-surgical treatment or surgical treatment is more effective and safer in chronic anal fissure.

DISCUSSION

Comparison of Healing Rates

Several studies have found that surgical treatment has a significantly higher healing rate than non-surgical treatment.12-18 CM et al's study (2014) also found a higher healing rate with surgical management but it was not significant.19 Research by Vaithianathan et al (2015), Gandomkar et al (2015), and Albaidany et al (2022) showed that a higher healing rate can be seen 4 weeks after undergoing LIS.13,14,18 However, research by Aslam et al (2013) showed a higher recovery rate which could be seen 6 weeks after undergoing LIS, 2 weeks according to Motie et al's research (2016), and 1 week according to T. Acar et al's research (2020).7,16,17

Research by El-Sibai et al (2017) found a significantly higher healing rate with LIS compared to fissurectomy.20 AAF was found to provide higher healing rate compared to LIS but not significant according to Patel et al's research (2011).21 The study by Magdy et al (2012) found that complete healing rates at 3 months, 6 months, and 1 year after surgery significantly from highest to lowest were tailored LIS (TLIS) and AAF, LIS, AAF.22 Meanwhile, the study by Sahebally et al (2018) found that the rate of unhealed fissures associated with AAF was higher compared to LIS, but not statistically significant.23 Research by Maurice et al (2023) comparing LIS, Botox, and laser therapy found that healing was achieved fastest with Botox and slowest with LIS.24

In non-surgical treatment, topical diltiazem was found to provide a higher healing rate compared to topical nitroglycerin in the researches by Motie et al (2016) and T. Acar et al (2020).16,17 This is different from the research by Boland et al (2020) which states the opposite. Research by Boland et al (2020) also found that the use of Botox provides a higher healing rate compared to topical nitrates or topical diltiazem.25 Research by Khorsand et al (2008) found that there is no significant difference in healing between the group treated with low level laser therapy (LLLT) and the group treated with Botox.26 This is different from the study by Maurice et al (2023) which found that healing was achieved significantly faster with Botox compared to laser therapy.24 The study by Ahmed et al (2013) found that modified commode squatting defecation posture provides a higher healing rate than squatting and commode defecation posture.27 Comparison of healing rates can be seen in Figure 3.

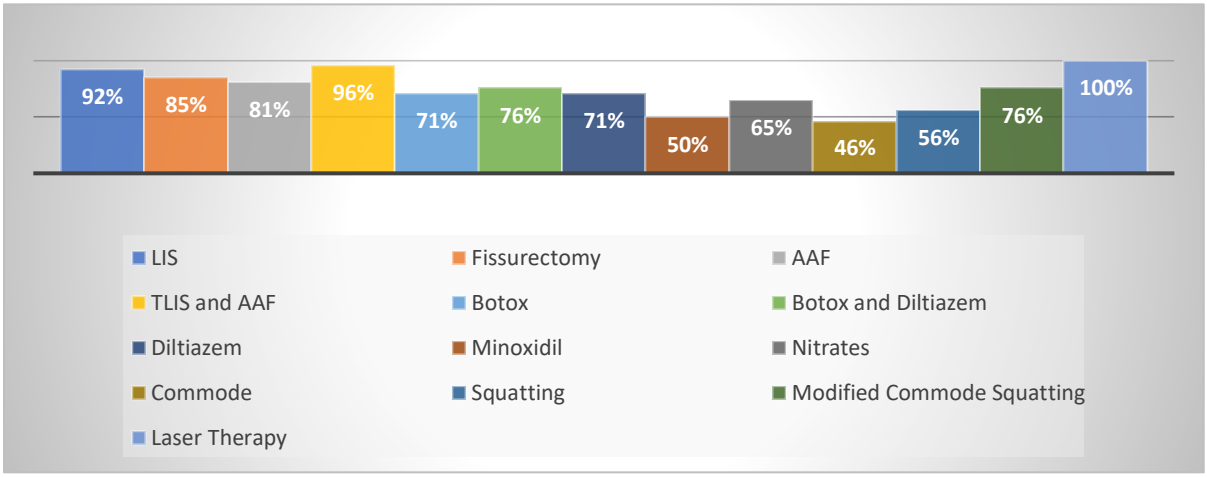

Figure 3. Comparison of Healing Rates

The recurrence rate was found to be lower in surgical treatment compared to nonsurgical treatment.13,15,16,25 Research by Motie et al (2016) found recurrences occurred in 11 of 63 patients who used nitroglycerin, 6 of 65 patients who used diltiazem, and no recurrences were found in those who underwent LIS.16 Research by Boland et al (2020) found recurrence rates from highest to lowest were Botox, nitrates, LIS.25 Recurrence rate was higher in fissurectomy compared to LIS according to the study by Shaikh et al (2012), but it was not significant.28 Meanwhile, research by Bara et al (2021) found the opposite.29 Research by Magdy et al (2012) found that recurrence rates after 1 year from highest to lowest were AAF, LIS, TLIS and AAF, and it was significant.22 Research by Maurice et al (2023) found significant recurrence rates from highest to lowest were Botox, laser therapy, LIS.24 There is an interesting finding by Gandomkar et al (2015), namely there is no significant difference between surgical management and nonsurgical management in terms of healing or relapse rates in patients with chronic anal fissures ≤12 months.15 Comparison of recurrence rates can be seen in Figure 4.

Comparison of Pain Relief Rate

The rate of pain relief was found to be significantly higher with surgical treatment than with non-surgical treatment in the studies.14-18 The study by CM et al (2014) also found a higher rate of pain relief with surgical treatment but it was not significant.19 There is a different finding by Maurice et al (2023) showing that pain relief rates at 1 day, 7 days, and 2 weeks post therapy significantly from highest to lowest were Botox, laser therapy, LIS.24 The recurrence rate was higher in those undergoing fissurectomy compared to those undergoing LIS according to the study of Shaikh et al (2012).28 Meanwhile, research by Bara et al (2021) found the opposite.29 Research by Magdy et al (2012) found that recurrence rates after 1 year from highest to lowest were AAF, LIS, TLIS and AAF, and it was significant.22

In non-surgical treatment, there was no significant difference in the level of pain relief between the use of topical nitroglycerin and topical diltiazem according to the study by Motie et al (2016).16 However, the study by T. Acar et al (2020) found that topical nitroglycerin provided significantly higher pain relief than topical diltiazem.17 According to the results of a study by Gandomkar et al (2015), there was no significant difference between

surgical management and non-surgical management in terms of the rate of pain relief in patients with chronic anal fissures ≤12 months.15 Research by Khorsand et al (2008) found that there was no significant difference in pain relief between the group treated with LLLT and the group treated with Botox.26 The study by Ahmed et al (2013) found that modified commode squatting defecation posture provides a higher pain relief rate than squatting and commode defecation posture.27 Comparison of pain relief rates can be seen in Figure 5.

Comparison of Side Effects

Significantly higher rates of incontinence in surgical treatment than non-surgical treatment were found in several studies.13,15,24 A different finding by Boland et al's research (2020) showed Botox provided a higher overall incontinence rate compared to LIS, but permanent incontinence only occurred in LIS.25 According to a study by T. Acar et al (2020), 1.2% of the group undergoing LIS had gas incontinence and improved at 4-6 months after surgery.

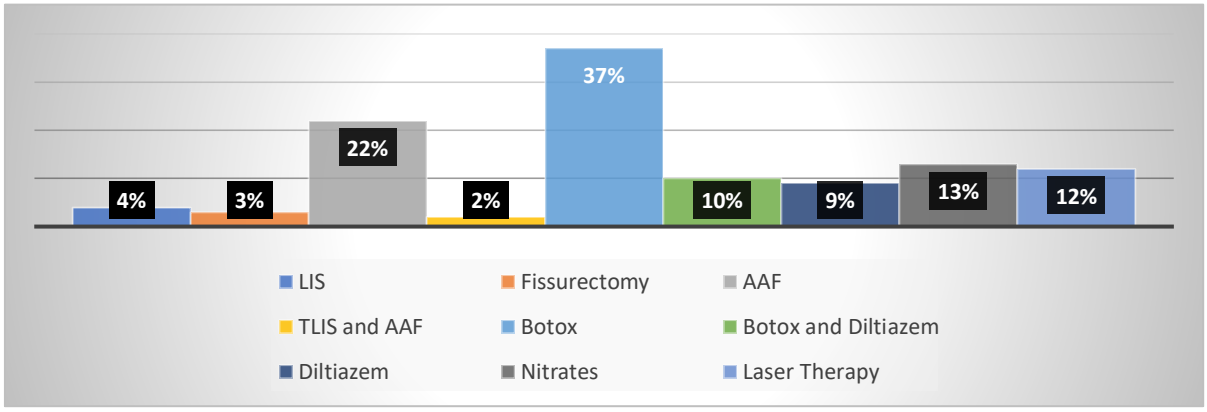

Figure 4. Comparison of Recurrence Rates

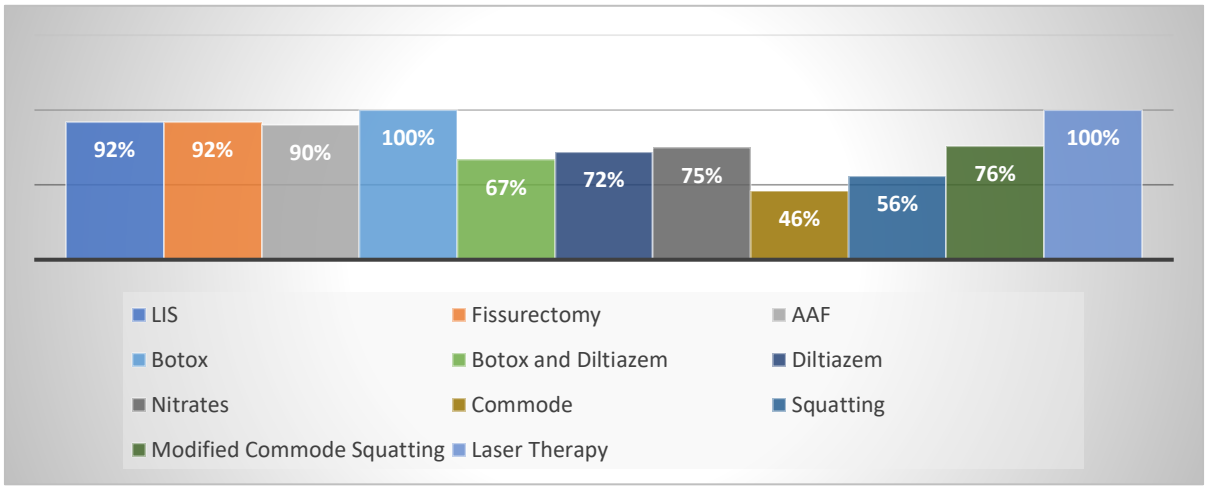

Figure 5. Comparison of Pain Relief Rates

However, of those undergoing LIS, 0.8% had persistent fluid incontinence, and 0.8% had perianal abscess.[17] The study by Vaithianathan et al (2015) did not find incontinence but 2 out of 45 people who underwent LIS had anal submucosal

abscess.[14] In the study by Motie et al (2016), 2 out of 62 people who underwent LIS had gas incontinence early after surgery which had relieved until the fourth week.[16] Boland et al's study (2020) found that in LIS, permanent incontinence was seen at a rate of 2.3% and bleeding was seen at a rate of 4.6%.[25] A study by Albaidany et al (2022) found incontinence occuring in 1 out of 30 people who underwent LIS.[18] Research by Aslam et al (2013) found that 6.6% of those undergoing LIS had incontinence due to flatus and feces.[12] El-Sibai et al (2017) and Bara et al (2021) found significantly lower complication rates in those undergoing LIS compared to those undergoing fissurectomy.[20,29] Research by Shaikh et al (2012) found that rates of urinary retention and flatus incontinence were significantly higher in fissurectomy compared to LIS, but rates of fecal incontinence were higher in fissurectomy than LIS (significance was not measured).[28] The urinary retention was only transient and improved with sitz bath.[20,28] The study by Patel et al (2011) found a higher rate of postsurgical complications in LIS compared to AAF, but it was not significant.[21] Magdy et al's study (2012) found incontinence rates from highest to lowest were LIS, TLIS and AAF, AAF, and it was significant.[22] Research by Sahebally et al (2018) found that AAF was associated with a statistically significantly lower rate of incontinence compared to LIS. The rate of wound complications was higher in AAF compared to LIS, but not statistically significant.[23] The study by Mirani et al (2021) found rates of anal infection and incontinence were significantly higher in LIS compared to AAF.[30]

In non-surgical treatment, a study by Vaithianathan et al (2015) found 2 out of 45 people using topical diltiazem had flushing and headache.[14] Research by Motie et al (2016) found no side effects in those using topical diltiazem, and found 17 out of 63 people using topical nitroglycerin had headaches that disappeared in 3 people.[16] A study by T. Acar et al (2020) found that 5.3% of the group using nitroglycerin ointment had headache, and in the group using diltiazem ointment, 1.3% had nausea and 1.3% had arrhythmia.[17] The study by Boland et al (2020) found that the rate of overall incontinence was 1.9% for using nitrates, 0% for minoxidil and diltiazem. Intolerance was only seen in those using nitrates at a rate of 9.7%. Headache rates from highest to lowest are nitrates, minoxidil, diltiazem. Botox has a higher rate of ecchymosis/hematoma than LIS.[25] Meanwhile, a study by CM et al (2014) found no side effects in either surgical or non-surgical management.[19] A summary of the side effects comparison of surgical management and non-surgical management can be seen in **Table 2**.

GAP IN LITERATURE

In this review, the number of literatures investigating laser therapy is very small. There is literature investigating the combination of Botox and diltiazem but only one, and so are minoxidil, combination of TLIS and AAF, and comparison of defecation postures. Also only about half of the literatures reviewed that discuss about the recurrence rate of each therapy in chronic anal fissures.

CONCLUSION

Surgical management provides significantly higher healing and pain relief rates and lower recurrence rates in chronic anal fissures compared to most nonsurgical management. However, for chronic anal fissures ≤12 months, there was no significant difference between surgical management and non-surgical management. The primary choice for surgical management is LIS because it provides higher healing and pain relief

rates and a lower incidence of anal incontinence compared to other surgical methods. Persistent fluid incontinence is only found in LIS, but is rare. The incidence of anal incontinence in LIS is 10.06% and usually resolves within 4 weeks. LIS also has other side effects such as perianal abscess, bleeding, and ecchymosis but they are very rare. Urinary retention can occur but only temporarily and usually improves with sitz bath. AAF provides the lowest incontinence rate, hence can be considered as a surgical method for chronic anal fissure patients that avoid incontinence risk.

Non-surgical management includes a high fiber diet, laxatives, sitz baths and topical medications. The main choice of topical drug is diltiazem because it provides healing and pain relief rates equivalent to nitroglycerin and significantly lower side effects and recurrence rates than nitroglycerin. Side effects of diltiazem such as flushing, headache, nausea and arrhythmias are rare. Meanwhile, Botox provides a significantly higher healing rate than nitrates and diltiazem, but the recurrence rate is the highest compared to other treatment options. Botox can also cause incontinence but only temporarily. Laser therapy gives the highest healing and pain relief rates, hence can be considered as the first choice of therapy. Passing stools in modified commode squatting position also helps improving pain and healing.

So, in this review laser therapy was found to be the first choice of therapy for chronic anal fissures because it provides 100% healing and pain relief rates. However, there could be a bias due to the little number of literatures investigating about it and the total sample is only 63. LIS can also be the main choice of therapy for chronic anal fissures because it has the highest healing and pain relief rates and the lowest recurrence rate compared to most of other treatment options. The most common side effect is anal incontinence but is rare and resolves within 4 weeks. Although permanent incontinence may occur, it is rare. Patients are also advised to maintain smooth bowel movements and defecate in modified commode squatting position, Medical management can be added in the form of topical diltiazem as the first choice to reduce pain and accelerate healing. Botox injections can be used as an alternative to surgical management and in combination with topical drugs. AAF can be an alternative surgical method. TLIS combined with AAF seems to give promising results but needs further research.

CONFLICT OF INTEREST

There is no conflict of interest in this research.

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