Controversies in the treatment of common anal problems

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Abstract
Treating common benign anal diseases has evolved towards more outpatient procedures with better outcome. However, minimizing post-procedure morbidities such as pain and the avoidance incontinence remain the most significant concerns. We introduce some controversies and highlight the developments in current surgical practice for the treatment of common anal problems.

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INTRODUCTION
Benign anal conditions are common and may pose troublesome physical, mental and social ailments to patients. There are numerous surgical techniques and non-surgical treatment used to treat this group of disease and most of the modalities are safe and effective. The main concern of treating anal conditions are the after-treatment undesirable pain and sphincter dysfunction which often pose a significant challenges to the attending physicians.

HEMORRHOIDS
Hemorrhoids develop from engorgement and prolapse of the submucosal anal cushion, which composed of an interlacing arterio-venous hemorrhoidal plexus, supported by connective tissue and minute muscle fibres[1]. The bulk of the anal cushion is located above the dentate line, which is devoid of sensation. The classical positions are described as the left lateral, right anterior and right posterior. The division between internal and external hemorrhoids is by their origin pedicles being proximal (overlaid by mucosa) or distal (overlaid by squamous epithelium) to the dentate line. The pressure within the anal cushion contributes to approximately 15 percent of perfect anal continence[2]. It is reported that continence disturbance co-exists in 40 percent of patients with hemorrhoids[3] and disrupting the anal cushion during hemorrhoid treatment may further worsen it.

The true prevalence of symptomatic hemorrhoids is unknown. It was reported to affect up to 10 million of North American and the European population in 1980s[4]. Predisposing factors include hereditary factors, constipation and increased intra-abdominal pressure, which include pregnancy, ascites, coughing and strenuous work. Inadequate fiber intake, prolonged sitting on the toilet and chronic straining at stool are among the risk factors. The symptoms of hemorrhoids are non-specific and the diagnosis is made by direct visualization via anoscopy or proctoscopy examinations. However, further evaluations using sigmoidoscopy or colonoscopy is useful when symptoms are not truly apparent of hemorrhoids especially in the elderly to rule out more serious conditions such as malignancy[5]. Other common symptoms of hemorrhoids include mass protrusion, pruritis ani, itching, mucus discharge and perianal pain[6]. Intermittent mass protrusion and occasional painless bleeding often do not require urgent treatment but acute symptoms of pain, bleeding and incarcerated protrusion warrant immediate action. In practice, the classification of hemorrhoids generally follows their prolapsing characteristics and they are staged into 1-IV degrees as outlined by Goligher. This classification serves as a useful guide towards choice of treatment modalities. However, comparison of treatment efficacy is largely focused on symptomatic relief and satisfaction outcome that are mostly measured using pain scores, recurrence rates and disturbance of continence after treatment.

Non-surgical treatments are indeed convenient and can avoid unnecessary complications of surgery. Unfortunately, many of these are lacking in evaluation to confirm their role in hemorrhoid treatment. High fiber intake and laxatives are employed in almost all hemorrhoid stages as an initial choice of treatment with the intention to prevent constipation and straining at defecation and reduces local...
inflammation. Similarly, antidiarrhea agents are used when diarrhea or frequent defecation exacerbate hemorrhoid symptoms. These have temporarily reduced hemorrhoids symptoms as shown by several placebo-control studies. Relief of symptoms is further enhanced with emphasis on anal hygiene. In general, the symptomatic resolution using conservative measures alone might be temporary and more patients seemed to need further surgical intervention after conservative treatment. Numerous ointments, creams and suppositories are being used as topical agents for hemorrhoids. They are mainly composed of local anesthetics, steroids and several skin irritation preparations to ameliorate symptoms of pruritus ani or pain. Their function as remitting agents is indeed very limited.

The most known oral pharmaceutical agent used to treat hemorrhoids is Daflon™, which consists of mainly micronized dionis and hesperidin. This is a venotropic compound used in various venous disorders. A dose of 500 mg taken two to three times daily rapidly diminishes variable degree of hemorrhoid symptoms such as pain, bleeding and swelling within 10 d of treatment. In addition, an extended dosage study used by Goedebeke using Daflon 1000 mg bid for two months has resulted in 60 percent symptoms severity reduction as compared to 30 percent of the placebo group without much side effects. Nevertheless, rapid symptomatic relief alone might not be satisfying and it is still unclear concerning the ability of this oral pharmaceutical agent in preventing hemorrhoids surgery. Daflon™ is however not readily available in the United States and the use of any pharmaceutical agents for hemorrhoid treatment has yet to achieve wide acceptance among North American physicians.

Asymptomatic external hemorrhoids do not require surgical intervention but these are prone to thrombosis. The treatment for thrombosed external hemorrhoids is rather straightforward. The main aim is to rapidly eliminate pain by means of general conservative measures, clot evacuation or surgical excisions. The choice of treatment depends largely on the severity of pain. It will be wise to embark on surgical procedures at the peak of the pain which is within 24 to 72 h of its initiation. This is because the procedures themselves might be more painful. When the pain is somewhat tolerable, conservative measures is useful because most pain decreases with time. However, surgical excision is more effective with lower relapse rate and longer remission intervals than conservative measures. On the other hand, the treatment for symptomatic internal hemorrhoids had undergone numerous revolutionary modalities. Multiple ablative techniques have been used and these are mainly aimed at fixing of the anal cushion and disrupting the hemorrhoid circulation by means of local office procedures or surgical excision (hemorrhoidectomy). Among the office procedures are injection sclerotherapy, rubber band ligation, diathermy, cryotherapy and infrared photocoagulation. Most of these are simple to perform and capable of producing satisfying short and long-term improvement. Furthermore, repeated attempts can be done until satisfying results achieved. The overall success rates measured by symptomatic improvement and avoidance of further intervention were 80 percent to 90 percent. Controversies remain with regard to the best procedure that produce the least complications of pain, bleeding and incontinence. These complications are mainly technical and frequently used as gauge for patients’ satisfaction between treatment modalities. Rubber band ligation seemed to have better long term efficacy in terms of lower recurrence and complication rates than other modalities in treating second and third degree hemorrhoids. These complications can be substantial and may affect overall treatment success. There were many comparison studies between two modalities and the results did not show clear advantage of any procedure over another. Initial results from the use of rubber band ligation for second and third degree hemorrhoids has shown better long term efficacy especially in reducing prolapse but complications such as pain and bleeding remained the same. However, in a meta-analysis, Johanson et al found that the curative rate was almost similar for all methods of treatment after 12 mo follow-up. The rubber band ligation had the best result at preventing recurrence but complication of post treatment pain was the least after infrared coagulation treatment. Gupta also demonstrated similar result in a randomized study comparing rubber band ligation and infrared coagulation treatments. Combining two modalities has also produced good therapeutic result. Chew et al combined injection sclerotherapy with rubber band ligation and achieved 90 percent cure or improvement. The complication rate was 3.1 percent with an overall recurrence rate of 16 percent. Only 7.7 percent of these patients required hemorrhoidectomy. In summary, these studies have shown that most of the office treatments are safe and effective for low grade hemorrhoids but the best among all is yet to be confirmed. Correcting technical issues has lowered the complications rates making office treatment for first to third degree hemorrhoids tolerable and satisfying.

Hemorrhoidectomy is currently the ultimate treatment for advanced or severe hemorrhoids. It has been the standard and eventual treatment for decades before the introduction of stapled hemorrhoidopexy in 1997. There are numerous techniques of hemorrhoidectomy but the two most popularly used are the Milligan-Morgan open procedure and the Ferguson closed procedures. The Milligan-Morgan procedure involves excision of the hemorrhoids with the overlying mucocutaneous tissue. The excision will need to preserve adequate skin bridges in between excised hemorrhoids to prevent stricture. After achievement of hemostasis, the wound is left opened with a classical clover appearance for secondary healing. In the Ferguson procedure, the wound is sutured together for healing by primary intention using absorbable materials. Both these techniques had achieved up to 90 percent cure for third and fourth degree hemorrhoids with few wound complications. These operations are associated with significant post operative pain and the exact etiology is still unknown. It is thought to be due to anal sphincter spasm and concurrent bacterial infection. The use of local anesthetic injection or peripheral nerve block has shown to benefit patients in terms of immediate pain control. These can be combined with oral analgesics and antibiotics such as Metronidazole to alleviate pain. In addition, a con-

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comitant lateral internal sphincterotomy was also shown to reduce pain without causing more incontinence\textsuperscript{[30]}. However, routine usage of perioperative antibiotics and lateral internal sphincterotomy to diminish postoperative pain are controversial.

Another commonly encountered problem of hemorrhoidectomy is bleeding. There are several modifications of the classical technique have been tried to overcome it. This involved using diathermy, laser, Ligasure\textsuperscript{TM} and Harmonic scalpel\textsuperscript{TM} during hemorrhoid excision. Other complications of hemorrhoidectomy include temporary urinary retention and wound infection, which are usually treated by conservative measures. In 1997, Longo introduced the treatment of prolapse hemorrhoid by means of a stapled mucosectomy. It is indeed the only method that does not require the hemorrhoids to be excised and the term ‘stapled hemorrhoidopexy’ was hence used\textsuperscript{[30]}. It is otherwise known as the procedure for prolapse hemorrhoids (PPH) and involves excision of rectal mucosa just proximal to the dentate line and fixing the two cut end together using a circular staple device. This results in disruption of hemorrhoidal circulation and produces healing. Stapled hemorrhoidopexy have more peri-operative advantages and seems to fair equal if not better to hemorrhoidectomy in terms of patients’ tolerability. However, its effectiveness as an ultimate treatment for prolapse hemorrhoids awaits further evaluations. Comparison with standard excision hemorrhoidectomies in several randomized trials has shown that stapled hemorrhoidopexy produced shorter hospital stay and better tolerated especially during the immediate post-operative period. It also has the advantage of providing earlier return to normal daily activity for patients\textsuperscript{[35-40]}. This may be largely due to the much reduced pain resulted from the procedure. The major short and long-term complications of stapled hemorrhoidopexy were also rare and comparable to the conventional hemorrhoidectomies. Apart from pain, the complications observed include temporary incontinence disturbance. The theoretical anal sphincter trauma or injury caused by instrumenting of this technique did not seem to be real as shown by studies that assessed anal sphincter function and anal manometry at follow up\textsuperscript{[33,34,39]}. Relapse of symptoms occurred in less than 5 percent of cases with an average of 90 percent patients satisfaction can be achieved. This however, did not differ from the hemorrhoidectomy procedures. Most relapse cases in those trials were successfully salvaged using local office treatments or hemorrhoidectomies. In a most recent study by Gravie \textit{et al}, stapled hemorrhoidopexy had produced good long-term outcome of 85 percent cure after 2 years with comparable morbidity to the conventional hemorrhoidectomy\textsuperscript{[41]}. This result was shown to be reproducible by any level of operators.

In summary, patients’ comfort and avoidance of complications are the prime issues in treating symptomatic hemorrhoids. For optimal outcome, careful symptomatic assessment in determining the degree of disease severity is an important step for the physician to decide which modality suits their patients best.

## ANORECTAL ABSCESS

Anorectal abscess is a common condition caused by infection of the anal glands situated in the crypt of the anorectal junction. The spread of the infection into the intersphincteric space resulted in collection of pus into surrounding perianal spaces. It commonly affects young men with the common symptoms include perianal pain, fever, tender lump around the anus and sometimes produces discharge and incontinence\textsuperscript{[32,40]}. In practice, the Park’s classification of anorectal abscess into perianal, intersphincteric, ischio-rectal and supralever is widely used. Perianal and intersphincteric abscesses occurred more commonly then the deeper ischiorectal and supralever abscesses\textsuperscript{[42-44]}. Apart from the cryptoglandular origin; causes of anorectal abscesses include Crohn’s disease, tuberculosis, malignancies and trauma. Patients who are diabetic and immunosuppressed are also prone to ano-rectal abscesses.

Small and simple perianal and intersphincteric abscesses are usually cured by adequate drainage, which is done through a skin incision or transrectally. Clinical examination under anesthesia frequently provides accurate assessment. For the more obscured abscesses, radiological guidance such as CT scan may help in delineating severity.

A perianal elliptical radial incision over fluctuant area of the abscess and breaking of all locules are sufficient to eliminate infection. The incision is preferred to be as close possible to the anus so that any concomitant fistula can easily be treated later. Specimen for culture and sensitivity is not necessary because antibiotic is not needed for treatment. The use of antibiotics is only for extensive cellulitis, necrotizing lesions or in immunocompromised patients or those with valvular heart disease or implants. However, culture result differentiating gut from skin flora is rather sensitive in determining the presence of fistula\textsuperscript{[42-47]} although this is no better than the surgeons’ careful search\textsuperscript{[48]}. All necrotic tissues are minimally debrided with care not to injure the anal sphincters and often drains are used to facilitate drainage. The wound is left open for secondary healing along with adequate analgesia and sitz bath. Reported complication and abscess recurrence were low at 3 and 0.6 percent respectively\textsuperscript{[46]} and the reasons for recurrence were mainly inadequate drainage or missing a concomitant fistula\textsuperscript{[49]}. The treatment of anorectal abscess is more complex when it is deep, large, multiple or associated with a fistula. These may occur due to the abundant adipose tissue filling the supralever and ischiorectal spaces. In addition, a horseshoe abscess may develop from deep post anal space abscess connecting to the ischiorectal spaces. In these abscesses, the main concern is the presence of concomitant fistulas. The reported incidence is 35-65 percent\textsuperscript{[43,40]}.

Beside draining and debridement, the treatment of the abscesses requires meticulous search of the internal openings and determining the amount of anal sphincters involvement along the fistulous tracks. This can be difficult in the setting of active acute inflammation. Preoperative endoanl ultrasonography and magnetic resonance imaging may facilitate in delineating the complexity of these.
In most instances, the detection of an internal opening is achieved by passage of pus seen at proctoscopy and gentle massaging of surrounding abscess swelling. Once identified, the decision to drain percutaneously or transrectally is much based on the type of abscess that one deals with. This is to avoid the development of high trans-sphincteric or extraspshincteric fistulas, which may develop from drainage of supravelator and ischiorectal abscesses. The drainage of supravelator abscesses need special attention to its aetiology. It may be associated with both pelvic inflammatory process or trans-sphincteric spread of cryptoglandular origin. Drainage through the rectum is preferable when they originated from interspshincteric spread. This is to avoid forming a suprasphincteric fistula which is much more difficult to treat in later dates. Another important consideration is to perform fistulotomy or fistulectomy during abscess drainage or to do staged procedures. Excessive sphincterotomy produces incontinence due to inability to judge precisely the amount sphincter involved. In one prospective study, Schouten et al compared patients who underwent concomitant fistulotomy from those who had a staged drainage with secondary fistulotomy. They found that immediate fistulotomy at drainage is associated with 40 percent continence disturbance which tend to worsen overtime. They then recommended for abscesses to be drain adequately first and fistulotomy is reserved for a second stage procedure. In contrast, others have demonstrated that concomitant fistulotomy is safe and effective in eliminating fistula and prevent recurrence. Persistent symptomatic fistula occurred in 25 percent of patients who did not undergo primary fistulotomy and incontinence were similar whether or not a primary fistulotomy is performed. However, in acute setting of abscess, the use of staged procedure using drainage seton will potentially minimize anal sphincter injury with fistulotomy or fistulectomy.

**PERIANAL FISTULA**

Perianal fistula and ano-rectal abscess are merely two components of a disease encountered at a different time. Typical symptoms of their co-existence are recurrent perianal pain with chronic purulent discharge. Common etiological factors denote similar therapeutic approach and the presence of one component will merit the search for the other for a complete cure. The Park's classification of perianal fistula into intersphincteric, transspshincteric, supraspshincteric and extraspshincteric described the anatomical tract route in relation to the anal sphincter complex, which is useful for therapeutic guidance. Division into simple and complex fistulas entails risk of sphincter dysfunction upon treatment. The main goal of treating perianal fistulae is to eradicate sepsis and eliminate epithelialized tracks without causing incontinence. Patients' satisfaction after fistula treatment is largely related to recurrence and the effect on continence.

For the low and simple fistulas, effective treatment is by cutting open the fistulous track (fistulotomy) for secondary healing to take place. It is easy to perform but meticulous assessment must be emphasized on the amount of external sphincter involvement especially in multiparous women. Excising the entire fistula track (fistulectomy) when minimal anal sphincter is involved is also safe but has to be performed with precision. The overall rate of recurrence by these procedures is low at around 4 percent. Despite this, the reported incontinence rate was up to 45 percent. This mainly occurred after fistulotomy, which also gave a longer healing time due to the larger tissue excision. Risks factors for incontinence include anal deformities from previous surgery, prior diarrhea and internal sphincterotomy.

The treatment for complex and high fistulas involving multiple tracks and abscesses needs more diligent strategy. Traditionally, if more than half of the sphincters are involved a staged procedure with cutting setons is used. However, identification of tracks in complex fistulas requires a combination of careful clinical and perhaps radiological assessments prior to intervention. Hydrogen peroxide enhanced endorectal ultrasound and magnetic resonance imaging may aid in delineating the tracks and abscesses. These examinations will also allow assessment of anal sphincter anatomy and tone prior to surgery and exclude fistulas from Crohn's disease, perianal tuberculosis and malignancy. Guided blunt probing of the tracks will enable drainage seton insertions for abscess and identification of external anal sphincter for later interventions. When the sepsis is eliminated, a cutting seton which is changed or tightened in the office at certain follow-up intervals can be applied. The cutting seton will cut through the muscle producing immediate fibrosing effect that prevent sphincter retraction. Using this method, the healing rate is high and recurrence of fistulas occurred at only 4-6 percent of cases. However, cutting setons are associated with 19 to 63 percent of incontinence and causes pain and discomfort. The reason for incontinence is multifactor. While it appears obvious that excessive cutting of the external anal sphincter might be the main reason for incontinence, preserving the internal component of the sphincters may be advantages. A technique introduced by Zbar et al had shown that by excluding the internal anal sphincter using a modified cutting seton technique gave better continence result by virtue of better post-operative anal pressure measurements. The technique combined a short mucosal flap (not incorporating the IAS musculature) to close the internal opening, and IAS repair and a re-routing of seton (for EAS cutting) through the interspshincteric space. In essence, identification of patients who are prone to develop incontinence after a cutting seton may help. This includes those who had multiple abscess drainage or previous fistula repairs and patients with chronic disease or infection. Avoiding excessive sphincter cut in these patients would certainly be wise. An alternative to overcome cutting seton morbidities is to use a two stage seton fistulotomy. This involved the insertion of a loose seton for abscess drainage followed by a scheduled secondary fistulotomy. The seton could be left for long period of time until sepsis settles or satisfactory healing achieved especially in complicated cases like Crohn's disease.

Another option of treating perianal fistulas is using
the advancement flap procedures. This involves elevating flaps composed of rectal mucosa, submucosa and internal sphincter to cover the internal opening without tension. Associated sepsis is initially eradicated and this procedure will require a good bowel preparation to achieve better healing. It is mainly performed when fistulotomy is either dangerous or difficult such in high trans-sphincteric and suprasphincteric fistulas, the anterior fistulas and fistulas associated with Crohn’s disease. In addition, advancement flap procedures are particularly useful in patients who had failed previous treatment. The effective healing rate is between 60-82 percent. It is expectedly associated with low continence disturbance of less than 10 percent but the recurrence rate varies from 8 to 40 percent. Recurrence and failure are especially observed among patients with Crohn’s disease or those who had multiple prior fistula procedures.

Another method in treating perianal fistula is the use of fibrin glue, which obliterates fistula opening and tracks. This method avoids the extensive dissection of other techniques especially in complex fistulas. The reported success rates for these complex fistulas were moderate and vary from 14 to 60 percent. Its use is potentially good in short tract and low-lying fistulas and theoretical continence disturbance from fibrin glue use in these should not be real although reports regarding it are not available. For highlocated internal openings and more proximal fistula, fibrin glue application may be performed using endoscopic assistance.

PERIANAL CROHN’S DISEASE

In Crohn’s disease prevalence of perianal lesions is about 6 to 29.6 percent and it is associated with more colonic and than ileal diseases. Severe perianal disease with typical features of multiple non-midline fissures and fistula lesions is rather easy to recognize but it is often difficult to diagnose perianal Crohn’s from fistulas of cryptoglandular origin with confidence without active intestinal disease. Furthermore, the yield of histological granuloma for definitive diagnosis is only at 20 to 40 percent of biopsies. It is therefore challenging to decide on anti-cytokine therapy or surgical treatment without confirmatory diagnosis. In addition, even when the diagnosis is obvious, healing of perianal lesions from medical treatment is very unpredictable resulting in recurrent attacks and intractable disease. Infliximab, which is an anti tumor necrosis factor antibody, provides a 60-70 percent response rate in fistulizing Crohn’s disease patients who were refractory to immunosuppressant therapy and the best response was achieved among the patients with perianal disease. It has thus prevent a significant proportion of patients from surgery because excessive radical surgery to treat perianal Crohn’s disease may worsen the existing condition. Traditionally, proctectomy and ileostomy is used to treat severe perianal Crohn’s disease. Current efforts are now focused on interventions that will alleviate symptoms and avoid proctectomy. More sphincter sparing and conservative measures such as long duration setons were used effectively. Fistulotomy is reserved for superficial fistulas and endorectal advancement flap surgery may be appropriate for more complex fistulas after sepsis eradication in patients with permissible rectal disease, competent sphincters and absence of strictures.

ANAL FISSURE

Comprehensive systematic reviews with regards to the treatment of anal fissure are readily available and this chapter is indeed containing a brief overall management summary. Anal fissure is a break in the squamous epithel of the anal canal. Its true etiology is not completely understood but hypertonic internal anal sphincter is a common finding and this is thought to cause ischaemia and ulceration. However, cases of anal fissure with normal or even lower resting anal pressure is not uncommon. Ninety percent of fissures are found in the midline over the posterior part of the anal canal and it is prevalent in young individuals of the third and fourth decade. Associated anal conditions include Crohn’s disease, hemorrhoids and perianal fistula. Typical symptoms of anal fissures are excruciating pain at defecation, which sometimes followed by post defecation bleeding and pruritis ani.

The division of acute and chronic anal fissure is mainly by the length of symptoms existence. Persistent symptoms of 6 wk or more preclude chronic fissures. In addition, an acute anal fissure has sharp margins with signs of acute inflammation and pink granulation tissue overlies the base while the chronic fissures have raised margins and lack of granulation. Often, horizontal fibers of the internal anal sphincter, which is sometimes hypertrophied, can be seen at the base of a chronic anal fissure. The diagnosis of anal fissure requires direct examination of the anal canal usually performed under anesthesia. Anal manometry and continence score are the commonly used tools to accurately assess treatment outcome since the reduction of anal resting and squeeze pressures correlate well with symptoms improvement and healing. Disturbance of continence is indeed the main complication found in every treatment modality. Most acute fissures will resolve after conservative measures of regular fiber diet modification, stool softener and topical and oral analgesia. This will also cure 10% of chronic fissures but the remaining chronic fissures will require further interventions. The use of topical pharmaceutical agents (chemical internal sphincterotomy) is largely aimed at reducing anal sphincter hypertonia which will then reduces ischaemia and hence promote fissure healing. Topical glyceryl trinitrate (GTN) has a symptomatic and healing effect on chronic anal fissures by causing transient relaxation of anal sphincter through exogenous nitrous oxide provision. Healing is usually observed after a period of 8 wk applications. Studies that attempted to determine the optimal dosage for GTN has been eluded by the high improvement rates shown in the placebo arms due to sampling that might include patients with acute fissures. In a study by Thornton et al, rapid reduction in mean anal resting pressure by 20 percent after first application was achieved. For the patients that were compliant, 73 percent of them achieved symptoms relief with 64 percent fissures healed after 8 wk treatment. The clinical improvement was
also found to correlate positively with high pre-treatment maximum anal resting pressure in the mid anal canal and lower fissure score. The main side effect of topical GTN is headaches that occurred in 20-30 percent of treatment and this was independent of the dosage used despite producing 46-50 percent healing\[95,96\]. In another study, calcium antagonist diltiazem produced significant pain and bleeding reduction in an additional 48 percent of patients who had either failed GTN treatment or those who could not comply to GTN due to severe headaches with lesser headache\[96\].

Botulinum toxin injected around the fissure and the anal sphincters is another substance used in treating chronic anal fissure. It is also believed that the mechanism involved is related local production of nitrous oxide resulting in sphincter relaxation even though the exact mechanism is still obscured. In one double-blind placebo controlled trial of patients who had failed GTN topical treatment, Maria et al demonstrated that injection of 20 U of botulinum toxin produced symptoms relief and healing of 86 and 53 percent respectively at one month follow-up as compared to 13 and 27 percent in the placebo group\[97,98\].

Furthermore, the healing rate improved after 2 mo follow up and repeat injection can be performed to avoid surgery. It was also not associated with severe local or systemic complication except for transient incontinence, which tends to recover expectantly\[99,100\]. However, after longer follow up period, it was reported that more than half of patients who received botulinum toxin injection for chronic fissures required lateral internal sphincterotomy due recurrence\[99,101\].

Currently, the best available treatment for chronic anal fissure is lateral internal sphincterotomy (LIS). It is done by dividing the distal one third of the internal sphincter fibers without extending beyond the dentate line. The sphincter is divided over the lateral aspect to ease healing and management after surgery. Comparison with topical chemical use had repeatedly shown LIS is a better modality with persistent healing rates of 90 percent and provides more rapid symptoms improvement\[100,101\]. It also produces high patients satisfaction and better quality of life\[102\]. The reported continence disturbance after LIS is between 10-30 percent and severe incontinence to solid stool occurred in 1 to 3 percent of treated patients\[100-103\]. Recently, efforts are being made to avoid incontinence using a tailored\[104\] or controlled\[105\] techniques. These involve precise graduated division of the sphincter tailored to the fissure length rather than the dentate line as the reference points. These techniques had claimed fewer incontinence and stenosis complications. Covering an anal fissure with a skin flap by means of a V-Y flap or a rotational flap is another surgical modality available for chronic anal fissure. This is probably the best method for recurrent fissures after surgical treatment or traumatic sphincters or patients with weak sphincters (low pressure fissures) such that occur in multiparous women or previously irradiated patients. The technique provides the advantage of avoiding further sphincter injury. Unfortunately, reported series comprised small number of patients and it is rather difficult to make conclusions with regards to its effectiveness\[106-108\]. These techniques seemed to be easy to perform and maybe considered as an alternative methods in treating chronic anal fissures.

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