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Hemorrhoids & Fissure-in-Ano

Hemorrhoids

The prevalence of symptomatic hemorrhoids in the United States is reported to be 4.4% with a peak prevalence occurring between 45 and 65 years of age, equally in men and women. Approximately one third of these individuals seek medical attention. Treatment depends on the degree of prolapse and severity of symptoms. However, when undertaking any treatment for hemorrhoidal disease it is essential to consider hemorrhoids a part of normal anorectal anatomy important in the continence mechanism, the significance being that surgical removal may result in varying degrees of incontinence (particularly in individuals with marginal preoperative control).

Anatomy

Hemorrhoids are a normal feature of the human anorectal anatomy. These are fibrovascular cushions located in the subepithelial space of the anal canal, containing arteriovenous communications1. They are supported within the anal canal by smooth muscle (Treitz's muscle) that originates from the conjoined longitudinal muscle and passes through the internal anal sphincter to insert into the subepithelial vascular space1. As an individual strains, coughs or sneezes, these fibrovascular cushions engorge and maintain closure of the anal canal to prevent leakage of stool. These cushions account for approximately 15-20% of the anal resting pressure2. The lining of these cushions in the anal canal also supplies visceral sensory information that enables individuals to discriminate between liquid, solid and gas, further aiding in continence. In addition, during the act of defecation the fibrovascular cushions engorge with blood, cushion the anal canal lining and allow the anal canal to dilate without tearing.

There are three main fibrovascular cushions located in the left lateral, right anterior and right posterior positions of the anus, with intervening secondary complexes in some individuals. The configuration is constant and bears no relationship to the terminal branching of the superior rectal artery, contrary to what was previously thought. Internal hemorrhoids arise from the superior hemorrhoidal plexus proximal to the dentate line and are covered by insensate columnar and transitional epithelium. Blood in the superior hemorrhoidal plexus is drained through the superior rectal veins into the inferior mesenteric vein and subsequently into the portal system. External hemorrhoids arise from the inferior hemorrhoidal plexus distal to the dentate line and are covered by squamous epithelium containing nerve endings. Blood from the inferior hemorrhoidal plexus is drained in part through the middle rectal veins into the internal iliac veins, but mainly through the inferior rectal veins, into the pudendal veins (tributaries of the internal iliac veins).

Etiology, pathophysiology and symptomology

Hemorrhoids do not constitute a disease unless they become symptomatic. Hemorrhoidal disease requires the presence of pathologic changes that lead to bleeding, prolapse, pruritus, soiling, thrombosis, or a combination thereof. With repeated straining, either secondary to constipation, diarrhea and tenesmus or prolonged attempts at defecation, especially while reading on the commode, the fibrovascular cushions slide in the anal canal, engorge and the overlying mucosa becomes thin and friable with trauma to the underlying vessels leading to painless bright red (due to the arterial oxygen tension caused by the

arteriovenous communications3) bleeding on the tissue paper, on the stool or dripping into the toilet bowl. Further straining disrupts the suspensory Treitz's muscle eventually leading to prolapse and engorgement of the internal hemorrhoidal cushions associated with perianal fullnesss and discomfort. Prolapse may also occur during walking, heavy lifting and pregnancy as a result of increased intra-abdominal pressure. Although this may initially reduce spontaneously, over time this prolapse will result in persistent mucoid discharge associated with pruritus and perianal excoriation, blood staining of undergarments, as well as fecal soiling (particularly in the elderly). If the prolapse becomes irreducible because of swelling and spasm of the sphincter, the internal hemorrhoids can become strangulated, necrotic and painful and may lead to systemic illness. Because of the connection with the portal system, gangrenous hemorrhoids with superimposed infection can lead to pyelephlebitis in rare cases. Anemia due to hemorrhoidal disease is uncommon (0.5 patients/1000 000 population) 4 and is easily corrected with hemorrhoidectomy. Because communication exists between the internal and external hemorrhoidal plexuses at the dentate line, the external hemorrhoidal veins also become engorged with straining and over time chronic straining can lead to the development of combined internal and external hemorrhoids. For the most part external hemorrhoids are asymptomatic unless they become thrombosed, in which case they present as an acutely painful perianal lump, or the skin tags are so large that hygiene is impossible

Evaluation and classification

Not all complaints are truly hemorrhoids. Hemorrhoidal symptoms may be a manifestation of several different medical conditions, and therefore a careful evaluation of the patient should be conducted to determine the underlying causes of the patient's complaints. A history should include not only characterization o f bleeding, protrusion, pain and bowel habits, but also an assessment of the patient's coagulation history, and the possibility of liver disease, inflammatory bowel disease or immunosuppression. A complete examination including inspection with eversion of the anal canal by opposing traction with the thumbs, digital rectal examination, anoscopy (without and with straining) and rigid/flexible sigmoidoscopy should be performed before treatment. One must entertain the appropriate spectrum of differential diagnoses including colorectal tumors, abcess/fistula disease, anal fissures, inflammatory bowel disease (particularly Crohn's disease), rectal prolapse, hypertrophied anal papillae, perianal condylomas, other STDs and hidraadenitis supppurativa. In addition, any individual with rectal bleeding should undergo appropriate work up to exclude the possibility of proximal colorectal neoplasia. In a young individual with rectal bleeding and hemorrhoidal disease on examination with no other systemic systems and no family history, anoscopy and sigmoidoscopy are all that is warranted. However, rectal bleeding in an individual older than 50, or older than 40 with either a family history of colorectal cancer or a change in bowel habits, demands a complete colonoscopy, virtual colonoscopy or barium enema with flexible sigmoidoscopy . A positive fecal occult blood test, or iron deficiency anemia also necessitate a complete colon evaluation 5. Hemorrhoidal disease associated with symptoms of soiling or incontinence may require anorectal physiology testing and endoanal ultrasound if the patient is being considered for surgery.

Internal hemorrhoids are classified into four grades based on prolapse and clinical symptoms6. Grade I internal hemorrhoids bulge into the lumen of the anal canal and may produce painless bleeding. Grade II internal hemorrhoids prolapse with straining but reduce spontaneously. Grade III internal hemorrhoids prolapse spontaneously or with straining and require manual replacement. Finally, Grade IV internal hemorrhoids are permanently prolapsed and irreducible. Accurate classification is important for both selecting the appropriate treatment and assessing the reported efficacy of various treatments. In general less symptomatic hemorrhoids, such as those that cause only minor bleeding can be treated with simple measures such as dietary modifications and change in defecatory habits, or office procedures. More symptomatic hemorrhoids such as grade III and IV hemorrhoids are more likely to require operative intervention, as nononoperative management is ineffective 7.

Treatment

I. Conservative management (dietary and lifestyle modification)

Dietary management consisting of adequate fluid and fiber intake to relieve constipation and eliminate straining at defectaion is the primary noninvasive treatment for all symptomatic hemorrhoids5. Fiber supplements such as psyllium work in concert with water to add moisture to the stool and subsequently decreases constipation. Diarrhea may also be controlled with psyllium to

add bulk to the liquid stool thereby increasing the consistency and decreasing the frequency of bowel movements. A recent meta-analysis confirmed that fibre is effective In treating symptomatic hemorrhoids associated with lesser prolapse and bleeding (Grades I and II)8, however, conservative management alone is ineffective for hemorrhoids with significant prolapse (Grades III and IV)7 which are more likely to require surgical intervention. Stool softeners may be added if necessary. Sitz baths are useful for relieving anal pain and maintaining anal hygiene9,10. Exercise should be recommended. Simply instructing patients to avoid reading on the commode will frequently resolve symptoms.

Over the counter topical agents and suppositories containing local anesthetics, corticosteroids, astringent, antiseptics and protectants are available and may alleviate symptoms of pruritus and discomfort. However, long-term use of these agents should be discouraged, particularly corticosteroid preparations which can permanently damage or cause ulceration of the perianal skin. No randomized controlled trials are available to support their widespread use. In one prospective series, nitroglycerin ointment relieved pain due to thrombosed hemorrhoids, presumably by decreasing anal tone11.

Oral venotonics, such as flavanoids, have been used as dietary supplements in the treatment of symptomatic hemorrhoids in Europe and the Far East. The mechanism of action of these drugs remains unclear, but they may improve venous tone, reduce hyperpermeability, and have anti-inflammatory effects. However, a recent meta-analysis concluded that limitations in methodological quality and potential publication bias raise doubts about the benefits of these agents in treating hemorrhoids12. Flavanoids have not been approved for use in America by the Food and Drug Administartion.

II. Nonoperative management (office procedures) + Minor operative procedures

Excisional hemorrhoidectomy (EH) provides excellent long-term cure of symptoms, but at the expense of pain, complications and time off work. For decades alternatives have been sought to achieve minimally invasive treatment options. Because anoderm is viscerally innervated , it is not sensitive to touch, pain and temperature, making it easily amenable to office procedures. The goal of office procedures, just like EH, is to ablate the vessels involved and fix the sliding hemorrhoidal tissue back onto the muscle wall of the anal canal in order to improve symptoms of bleeding and prolapse. Office procedures are recommended for most patients with refractory Grades I, II or III hemorrhoids. Options include sclerotherapy, infrared coagulation, bipolar coagulation, direct-current electrotherapy, monopolar coagulation, cryotherapy and Doppler-guided artery ligation. Only 5-10% of patients require surgery.

a. Rubber Band Ligation

The most common office procedure used for the treatment of symptomatic internal hemorrhoids is rubber band ligation. Through a side viewing anoscope, an atraumatic clamp (modified Allis forcep) is used to retract the tissue at the apex of the hemorrhoidal complex (2 cm proximal to the dentate line)into a ligator (Barron or McGivney), and a single or double elastic band is fired from the drum. The introduction o f suction bands have allowed this procedure to be performed by a single operator13. This is a relatively painless procedure, as long as the rings are properly positioned above the dentate line. The banded tissue infarcts and sloughs over the next 7-10 days, forming a small ulcer, resulting in reduction of the prolapsed hemorrhoidal tissue as well as fixation of the residual hemorrhoid in the upper anal canal. In our practice we prefer single ligations at intervals of 4-6 weeks to reduce discomfort and vaso-vagal symptoms and allow the ulcer to heal. However, prospective studies have shown no increase in post ligation pain or complications with multiple banding 14,15, so many surgeons apply up to 3 bands at each visit. In attempt to reduce the discomfort of multiple banding, injection of local anesthetic into the banded hemorrhoids has been tried, but without success16. More recently, local anesthesia of the upper anal canal has been described to produce full relaxation and maximal mucosal redundancy of the anal canal, thus providing an excellent exposure and allowing accurate, multiple rubber band ligation without causing significant pain during or after the procedure17. However, these are only preliminary results.

Rubber band ligation (RBL) is commonly used for Grades I, II, and III hemorrhoids internal hemorrhoids. Some authors recommend it for Grade IV hemorrhoids after reduction of the incarcerated prolapse18, but no long-term data is available. RBL

was found to be the most effective of the office procedures in a meta-analysis of 18 prospective, randomized trials. RBL was associated with a lower recurrence rate but more overall pain than sclerotherapy or infrared coagulation19. A recent meta-analysis20 comparing RBL to EH confirmed long-term cure was better with EH, particularly for Grade III hemorrhoids, although pain , complications and time off work were significantly greater than with RBL. The author's recommended that RBL be adopted as the treatment of choice for Grade II hemorrhoids with similar results but without the side effects of EH, while EH could be reserved for Grade III hemorrhoids or recurrent hemorrhoids after RBL.

Banding techniques appear to achieve complete relief of symptoms in 65-85% of patients. The recurrence rate may be as high as 68% at four or five years of follow-up, but symptoms usually respond to repeat ligation; only 5-10% of such patients require EH21. Complications include pain, bleeding, thrombosis and perineal sepsis. A dull persistent ache is common for the first 24-48 hours following banding. If significant pain is experienced immediately following the banding, then the rubber band can be removed with a beaver blade, although this is difficult endeavor. If the patient develops pain later on, it is generally treated with sitz baths, analgesics and avoidance of constipation. Bleeding generally occurs immediately after banding or 7- 10 days later when the band falls off. Though rare, this may require operative intervention with suture ligation to control persistent hemorrhage. Banding is contraindicated in patients who are anticoagulated. Occasionally, banding can result in thrombosis of internal and external hemorrhoids resulting in significant pain. Rarely banding can lead to lifethreatning perianal sepsis. Therefore, patients complaining of significant pain, fever and dysuria should be administered broad spectrum antibiotics and should undergo prompt examination under anesthesia. Because of the potential risk of perianal sepsis, some authors recommend avoiding hemorrhoidal banding in immunocompromised individuals.

b. Sclerotherapy

Sclerotherapy is reserved for Grade I and II hemorrhoids. It involves a submucosal injection of a sclerosant (1-2 ml of 5% phenol in almond oil, 5% quinine urea, or 5% sodium morrhuate) at the apex of the hemorrhoidal complex through an anoscope using a 25 or 30 gauge needle. This causes thrombosis of the vessels, sclerosis of the connective tissue, with shrinkage and fixation of the overlying mucosa thereby decreasing bleeding and prolapse. Sclerotherapy can be used in patients on anticoagulation. Sclerotherapy can result in a dull ache lasting 24-48 hours but complications are infrequent and usually related to incorrect placement of the sclerosant. Rarely, a patient may develop mucosal ulceration and necrosis, local infection and abcess formation, prostatitis, erectile dysfunction or portal pyaemia. Though it is cheap, easy to perform and slightly less painful than hemorrhoidal banding19 it is less widely used than banding because of a higher failure rate. However, it has been used in combination with RBL with good results 22,23. Repetitive sclerotherapy should be used with caution because of the potential of scarring and stricture formation.

Takano et al. 24described the use of a new sclerosing agent OC-18 (containing aluminum potassium sulfate) for the treatment of Grade III and IV internal hemorrhoids and found it to be as effective as EH at 28 days. However recurrence was still significantly higher compared to EH. Furthermore this technique required either local or spinal anesthesia in order to inject the solution in four areas of each hemorrhoidal complex. Recently, a case study 25 evaluated the use of foam sclrotherapy by flexible endoscopy for Grade II-IV hemorrhoids. Bleeding and prolapsed were resolved with at most 2 sessions, while pain resolved after 1 session, with no complications. However, no comparative studies and long-term data are available.

a. Infrared photocoagulation

The infrared photocoagulator (IRC) produces infrared light which penetrates the tissue and converts to heat, promoting coagulation of vessels and fixation of hemorrhoidal tissue. The amount of tissue destruction depends on the intensity and duration of the application. It is recommended that the infrared probe be applied for 1.5 seconds to the apex of each internal hemorrhoid, and be repeated three times on each hemorrhoid. Infrared coagulation does not cause tissue necrosis because of the small amount of heat delivered, and is therefore only useful in the treatment of Grade I and possibly small Grade II hemorrhoids, without significant prolapse. Infrared coagulation seldom causes pain or other complications. In a meta-analysis of randomized controlled trials, infrared coagulation was found to be significantly less painful than RBL, but required more sessions to relieve symptoms, had a higher recurrence rate and is more expensive than RBL 19.

b. Electrocoagulation

Like IRC, electrocoagulation techniques all rely on coagulation and fixation of hemorrhoidal tissue at the level of the anorectal ring. Electrocoagulation has proven useful in the treatment of Grades I-II hemorrhoids, while some authors find it useful for Grade III hemorrhoids as well26.

Bipolar (Bicap) coagulation is electrocautery in which heat does not penetrate as deeply as with monopolar coagulation. Cautery is applied in one second pulses at the apex of the hemorrhoid, until the underlying tissue coagulates. Its effect is similar to that of IRC, but unlike IRC, the depth of injury does not increase with multiple applications at the same site, which is sometimes necessary with higher grade hemorrrhoids27. It does not eliminate prolapsing tissue, and up to 20% of patients require excisional hemorrhoidectomy.

Direct-current electrotherapy (Ultroid) is similarly applied through a probe placed via an anoscope onto the mucosa at the apex of the hemorrhoid. The current is set to the maximal tolerable level and continued for 10 minutes with multiple treatments required to the same site in up to 30% of patients with higher degree hemorrhoids. Bipolar coagulation compared to direct–current coagulation has the advantage that treatment application lasts only several seconds compared with eight to ten minutes per application for direct current. Because of the limited effect in higher degree hemorrhoids and lengthy treatment times, direct-current coagulation has never become popular. But both bipolar and direct-current coagulation are associated with a minor complication rate of 10% (pain, bleeding, fissure, or sphincter spasm) and recurrence rates between 25 and 35%26,28 .

Monopolar coagulation, using either the ball-tip or the spatula-tip, is the coagulation method of choice for some authors29 , as an alternative to rubber band ligation. Bipolar coagulation was compared to monopolar coagulation in a randomized trial of 81 patients. Monopolar coagulation was associated with more pain, but higher success rates and a lower incidence of complications30. The key to success is to coagulate the tops of the hemorrhoids until they are charred, so the mucosa will ulcerate and fix to the anorectal ring.

c. Cryotherapy

Cryotherapy uses cold coagulation (nitrous oxide or liquid nitrogen) to destroy the hemorrhoidal cushions. However, this procedure results in profuse discharge associated with a foul smell, irritation and pain due to necrosis, and the healing time is very long. In addition, if it is not properly performed, destruction of the anal sphincter can cause anal stenosis and incontinence. For these reasons, cryotherapy is no longer recommended for the treatment of internal hemorrhoids.

d. Doppler guided hemorrhoidal artery ligation (DGHAL)

DGHAL was introduced in 1995 by Morinaga, a Japanese surgeon. This technique uses a specially designed proctoscope (Moricorn) housing a Doppler transducer that can identify hemorrhoidal arteries and permits their ligation with six to ten figure of eight sutures above the dentate line in the insensate region. The insertion of a ring of sutures, which bunches up the mucosa, results in pulling up the prolapse while interrupting its blood supply. HAL was designed as a minimally invasive alternative to EH for prolapsing hemorrhoids that do not respond to or are not amenable to office procedures. However, DGHAL has little value for Grade IV hemorrhoids where the main problem is mucosal prolapse (not bleeding); even with appropriate technique the prolapsed mucosa remains in place along with symptoms. DGHAL is performed as an outpatient procedure under local (with sedation), spinal or general anesthesia. The success rate has been reported to be greater than 90% for grade III hemorrhoids31-35, with a minimal rate of complications (mild discomfort, tenesmus, limited rectal bleeding, thrombosis). There is no anal wound to heal. There is no risk of incontinence or stricture. The failure rate is about 10% (nearly 70% for grade IV hemorrhoids). In a small randomized study, DGHAL showed much less anal pain, shorter hospital stay and earlier return to work compared to hemorrhoidectomy, and long-term recurrence rates at 1 year follow-up were similar in both 36. DGHAL appears to be an effective, simple, minimally invasive alternative to hemorrhoidectomy for prolapsing (but reducible) hemorrhoids that fail to respond to office procedures. However, more comparative studies and longer follow up data are needed .

e. Anal stretch/dilation

Popularized by Lord in 1968, and still employed in Europe, the anal stretch procedure is based on the belief that hemorrhoids are

due to a narrowing of the anal canal caused by a fibrous deposit (“pecten band”) that results in abnormal straining and subsequent venous congestion leading to hemorrhoids. This procedure is performed under intravenous sedation or general anesthesia, and the anal canal is stretched until four fingers can be inserted. Patients then use an anal dilator intermittently over the next six months. However, endosonography has shown sphincter injury associated with anal dilation 37 and several clinical series have reported high rates of associated incontinence, especially long-term38 . In addition, when compared to surgical hemorrhoidectomy, anal dilation has a higher failure rate, with some patients requiring hemorrhoidectomy 39. Most authorities today advocate abandoning this approach.

III. Surgical treatment

Surgical hemorrhoidectomy is the most effective treatment for hemorrhoids overall and for Grade III in particular19, with rare recurrences. However, nonoperative techniques are preferred when feasible in the first instance because surgery is associated with more pain, postoperative disability and complications. Indications for surgical hemorrhoidectomy include failure of office procedures, patient inability to tolerate office procedures, large external hemorrhoids or combined internal/external hemorrhoids with significant prolapse and concomitant conditions (such as fissure or fistula) that require surgery. About 5-10% of patients, usually those with garde III or IV hemorrhoids, need surgical hemorrhoidectomy. Over time, several different techniques have been described.

a. Excisional hemorrhoidectomy

Excisional hemorrhoidectomy can be performed with either open or closed techniques. In the Milligan- Morgan (open) hemorrhoidectomy , used mostly in Great Britain, the internal and external components of each hemorrhoid are excised and the skin is left open in a three leaf clover pattern that heals secondarily for four to eight weeks. In the Ferguson(closed) hemorrhoidectomy, the hemorrhoid component is excised and the wounds are closed primarily. Four randomized trials have compared open versus closed hemorrhoidectomy40-43. Both techniques are safe and effective. The majority of trials showed no difference in postoperative pain, analgesic use, hospital stay and complications, whereas complete wound healing showed mixed results with a suggestion that closed hemorrhoidectomy promotes faster wound healing. As opposed to the United Kingdom, more members of the American Society of Colon and Rectal Surgeons report using a closed rather than open technique44.

Postoperative pain remains the major obstacle to patients seeking surgical management of their hemorrhoids. Narcotics are generally needed to control pain, and most patients do not return to work for 2-4 weeks after surgery45-48. Randomized trials have shown no difference in pain scores between the use of diathermy or scissors for EH49-51. Early reports suggested that laser hemorrhoidectomy was associated with less postoperative pain; however, a randomized trial of the Nd:YAG laser versus cold scalpel did not show any difference in postoperative pain or analgesic use52-54 . Furthermore, laser hemorrhoidectomy was associated with higher costs and impaired wound healing. Newer instruments have come into vogue for performing hemorrhoidectomy such as the Harmonic Scalpel ®or LigaSureTM. Four randomized controlled trials evaluated the ultrasonically activated, Harmonic Scalpel ® and showed conflicting results with respect to postoperative pain55-58 . Two small randomized trials suggested a possible minor advantage with bipolar diathermy (LigaSureTM), but pain scores did not differ significantly 59-60. The additional costs of these instruments and the lack of superior results preclude their recommendation for routine use.

Many different attempts at reducing pain have included limiting the incision, suturing only the vascular pedicle without an incision, using a concomitant lateral internal sphincterotomy, administering metranidazole, injecting local anesthetics, using anal sphincter relaxants including nitroglycerin, using anxiolytics and using parasympathomimetics (to avoid urinary retention)61-70. However, each of these strategies has had limited or mixed results and therefore cannot be recommended for routine use. However, postoperative analgesics as well as laxatives are necessary to reduce pain during the first postoperative motion.

The complications of hemorrhoidectomy include urinary retention (2-36%), bleeding (0.03%-6%), infection (0.5-5.5%), anal stenosis(0-6%) usually as a result of inadequate mucosal bridges and incontinence (2-12%)21. Sphincter defects associated with incontinence have been documented by endoanal ultrasound and anal manometry in up to 12% of patients after

hemorrhoidectomy71-74, probably due to excessive retraction and dilation of the anal canal.

Other hemorrhoidectomy techniques described in the literature include the Whitehead hemorrhoidectomy and the Parks hemorrhoidectomy. The Whitehead hemorrhoidectomy, involves circumferential excision of the hemorrhoidal complexes beginning at the dentate line and proceeding proximally in a similar manner to a Delorme procedure for rectal prolapse. This procedure has been by in large abandoned in the United States due to the high complication rates, including stricture, loss of anal sensation and development of mucosal ectropion. Parks described a submucosal hemorrhoidectomy that reconstructed the anal canal and therefore was expected to preserve better sensory continence and reduce postoperative pain. This technique is not frequently used, because it does not offer a solution to the external hemorrhoidal component.

Emergency excisional hemorrhoidectomy for strangulated, gangrenous hemorrhoids can be performed safely 75. As discussed earlier, a randomized trial comparing excisional hemorrhoidectomy to RBL with incision for acute strangulated hemorrhoids, showed that both techniques can be performed safely, although early recovery is slightly improved after RBL and incision 18.

There is no scientific data comparing treatment options for external hemorrhoidal thrombosis. Clinical experience has led to the recommendation that individuals who present with symptoms for less than 48-72 hours are best treated by local excision, whereas those patients whose symptoms have been present for more than 72 hours can be treated conservatively (avoidance of constipation, analgesia, sitz baths). Incision and clot evacuation should be avoided5. Perianal skin tags can be excised if symptomatic.

Lateral internal sphincterotomy during conventional hemorrhoidectomy was assumed to reduce the postoperative pain, even when there was no evidence of anal fissure. Currently, there is no evidence that patients without concomitant anal fissure will benefit from this procedure. In fact, studies have suggested that this procedure does not reduce pain and may have deleterious effects on continence 76.

b. Stapled hemorrhoidectomy

Stapled hemorrhoidectomy, also known as circular stapled hemorrhoidectomy [CSH], procedure for prolapsed hemorrhoids [PPH] and stapled anopexy, has been developed as a minimally invasive, less painful alternative to excisional hemorrhoidectomy. This procedure, like RBL, essentially removes redundant anal musosa at the top of the hemorrhoids. However, it resects much larger redundant rectal mucosa than RBL and should be performed in Grade II and III which do not respond to RBL and Grade IV hemorrhoids that are reducible under anesthesia. It is Longo who popularized the technique using a specially designed circular stapler (Ethicon Endo-Surgery) which performs a circumferential resection of mucosa and submucosa above the hemorrhoids and then staples closed the defect. The goal is to resuspend the prolapsing hemorrhoidal tissue back into the anal canal, as well as to interrupt the arterial inflow that traverses the excised segment. So, in fact this procedure is a stapled hemorrhoidopexy rather than hemorrhoidectomy since the hemorrhoids are not removed, but rather returned to their anatomic position.

The preservation of the anal cushions may in fact contribute to the low rate of incontinence after this operation. No external wounds are created and the stapling device cuts well above the dentate line, therefore postoperative pain is minimal and usually absent. In contrast to conventional hemorrhoidectomy, however, skin tags and enlarged external hemorrhoids are not removed using the stapled technique. Though complications are rare, several serious complications have been reported after stapled hemorrhoidopexy, including rectal perforation, retroperitoneal sepsis, anovaginal fistula and pelvic sepsis, which are likely due to excision of full-thickness rectal wall rather than muscosa and submucosa only. Smooth muscle fibers have been detected in a variable percentage of stapled hemorrhoidopexy specimens, although such fibers have also been detected following conventional hemorrhoidectomy. Of potentially more functional consequence, fragmentation of the internal sphincter was noted in 14 % of patients who underwent stapled hemorrhoidectomy using a standard 37-mm anal dilator. The main complication of the procedure is bleeding from the staple line, which can be easily over sewn. With the second generation 33-mm hemorrhoidal circular stapler and a closed height of .75 mm, bleeding has been markedly decreased. 21

A single trial compared stapled hemorrhoidopexy to RBL and found more pain with stapling, but improved relief of symptoms 77. A meta-analysis performed by Nisar et al 78 in 2004 demonstrated that patients undergoing stapled hemorrhoidopexy have improved peri-operative outcomes, particularly with respect to pain and return to normal activities compared to the conventional techniques. A more recent Cochrane systematic review 79 of stapled hemorrhoidopexy concluded that the procedure was as safe as conventional hemorrhoidectomy with very few complications reported. However, stapled hemorrhoidopexy is associated with a higher long-term risk of hemorrhoid recurrence and the symptom of prolapse. It is also likely to be associated with a higher likelihood of long-term symptom recurrence and the need for additional operations compared to conventional excisional hemrroid surgeries. The authors concluded that if hemorrhoid recurrence and prolapse are the most important clinical outcomes, then conventional excisional surgery remains the “gold standard” in the surgical treatment of internal hemorrhoids.

IV. Special situations

a. Hemorrhoids in Pregnancy. Hemorrhoidal symptoms commonly occur and intensify during pregnancy (particularly during the last trimester) and delivery. Constipation should be avoided during pregnancy. Mild laxatives should be given during the last three months of pregnancy and postpartum period particularly for patients with constipation problems. Hemorrhoids that intensify during delivery tend to resolve. Hemorrhoidectomy is indicated during pregnancy only if acute prolapse and thrombosis occur. It should be performed under local anesthesia in the left lateral position. An operation is indicated in the immediate postpartum period if prolapse and thrombosis occur during delivery, or symptomatic hemorrhoids that were present prior to pregnancy and aggravated during pregnancy persist after delivery.

b. Hemorrhoids, Varices and Portal Hypertension. Portoystemic communications exist in the anorectal canal- the superior hemorrhoidal veins, which drain the upper anal canal and rectum into the portal circulation, are decompressed via the middle and inferior hemorrhoidal veins of the systemic circulation in patients with portal hypertension. Anorectal varices develop commonly in portal hypertension, but unlike esophageal varices they rarely bleed. In the rare case of symptomatic, bleeding anorectal varices, suture ligation in 3-4 columns running from the as high in the rectum as possible to just outside the anus will usually stop the bleeding. Other treatments include stapled hemorrhoidopexy, portal decompression via a transhepatic potosystemic shunt (TIPS) ligation of the inferior mesenteric vein, and potosystemic shunts.

The majority of painless rectal bleeding , even in cirrhotics, is due to internal hemorrhoids. Massive bleeding from prolapsed hemorrhoids in such patients, though rare, can be lifethreatning. This commonly occurs during treatment for encephalopathy which results in severe diarrhea. Suture ligation is necessary to stop the bleeding. Hemorrhoidectomy is reserved for the rare situation in which suture ligation fails to control the bleeding. It is also important to correct any coagulopathy and control the diarrhea.

c. Hemorrhoids in inflammatory bowel disease. Most anal problems in IBD result from diarrhea. Hemorrhoids can be treated operatively, or nonoperatively in patients with ulcerative colitis. However, patients with anorectal Crohn’s disease or Crohn’s proctitis have a substantial risk of local complications that can be severe enough to require proctectomy. If necessary hemorrhoidectomy can be performed in the Crohn’s patient with quiescent ileal or colonic disease.

d. Hemorrhoids in the immunocompromised. Correction of any coagulopathy and administration of antibiotics is the mainstay therapy for hemorrhoidal disease in these patients. Operative treatment can result in poor wound healing and abcess formation, and is therefore used as a last resort to relieve pain and sepsis in this population.

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Fissure-in-Ano

An anal fissure is a linear ulcer in the squamous lining of the anal canal extending from the dentate line to the anal verge. Patients typically complain of severe sharp pain during and after defecation, lasting minutes to hours. Bright red blood is commonly seen but scant, mostly on the toilet tissue or streaking the stool surface. Fissures are most commonly found in the posterior midline but can be seen in the anterior midline in up to 13% of women and 8% of men, or in both locations in up to 3% of patients1. An acute fissure appears as a simple tear in the anoderm that usually heals spontaneously within 6-8 weeks. A chronic fissure persists much longer and tends not to heal without intervention. Chronic fissures are marked by secondary changes such as a sentinel pile, a hypertrophied anal papilla, fibrous induration of the fissure edges, and finally fibrosis of the base of the ulcer (internal anal sphincter) which can result in a spastic, contracted internal sphincter. A precipitating cause should be sought, typically constipation or diarrhea, and corrected otherwise the fissure will likely fail to heal or recur. Secondary causes may be due to trauma post anal surgery or childbirth in women. Atypical fissures such as those occurring in the lateral positions, multiple, painless or nonhealing fissures should prompt an evaluation for other diseases such as IBD, HIV/AIDS, syphilis, tuberculosis, leukemia, sarcoid or anal SCC which must be excluded.

Etiology and Pathogenesis

It is generally accepted that the initiating factor in the development of a fissure is trauma to the anal canal, usually due to the passage of a large, hard stool. However, a history of constipation is not always obtained, and in fact, some patients describe repeated episodes of diarrhea prior to the onset of symptoms. The elliptical arrangement of the external sphincter in the posterior midline may offer less support to the posterior aspect of the anal canal during defecation, contributing to the formation of a midline fissure during the passage of a large, hard stool. Perpetuating factors include persistently hard or liquid stool, which continuously aggravate the anal canal. Increased resting pressures within the internal anal sphincter (IAS) in patients with fissures2-10, has been described as another perpetuating factor. It has been demonstrated that patients with anal fissures have an abnormal “overshoot“ contraction of their IAS following expected reflex relaxation due to rectal distension2. Whether increased resting pressures within the IAS are the cause or the effect of development of an anal fissure remains unclear. In addition, a number of studies have shown that the posterior commisure is perfused more poorly than the rest of the anal canal11, a factor which is postulated to play a role in the pathogenesis of fissure-in-ano. It is believed that the increased IAS tone in patients with a fissure results in decreased blood flow and pathogenetically relevant ischemia in the posterior midline which prevents the fissure from healing. Sphincterotomy has been shown to decrease pressure of the IAS and improve anodermal blood flow at the posterior midline, resulting in fissure healing12.

An understanding of the physiology of the IAS sheds some light on the pathophysiology of anal fissures as related to increased IAS tone and response to non-surgical treatment. The basal tone of the IAS is dependent on intracellular calcium. Therefore contraction of the smooth muscle cells within the IAS is mediated by influx of calcium through calcium channels, but it is also affected by neurohormonal stimulation of α1- adrenoreceptors at the smooth muscle cells. Activation of α2-adrenoreceptors in the myenteric inhibitory neurons most likely presynaptically inhibits non-adrenergic, non-cholinergic (NANC) relaxation. Relaxation of these cells is mediated through directly decreasing intracellular calcium concentration as well as increasing cGMP

and cAMP. Potassium influx hyperpolarizes the cell membrane and decreases calcium entry. Activation of β2- adrenoreceptors increases cAMP, returning intracellular calcium to the sarcoplasmic reticulum. In addition, there are inhibitory neurotransmitters that mediate NANC relaxation, including nitric oxide (NO) and vasoactive intestinal peptide (VIP). NO is the major neurotransmitter mediating NANC relaxation of the IAS by increasing cGMP. VIP, like β2- adrenoreceptors increases cAMP13,14. L-arginine, a precursor of nitric oxide, has been found to relax IAS smooth muscle perhaps by increasing substrate for nitric oxide synthase (NOS), the enzyme involved in NO synthesis15. A preliminary study has shown reduced NOS in the IAS of patients with anal fissures compared to controls16. The reduced production of NO provides a possible explanation for the high IAS pressures seen in most fissure patients and also why pressures return to pre-treatment values in patients whose fissures have healed with non-surgical methods17.

Treatment

I. Conservative management

The aim of treatment of an acute fissure is to break the cycle of a hard stool (or loose stool), pain and reflex spasm. This can be accomplished by the ingestion of adequate fluid and fiber to create a large but soft bulky stool, warm sitz baths or local application of heat to relieve sphincter spasm and if necessary stool softeners such as docusate. Up to 50% of patients diagnosed with acute fissures will heal with these measures1. However, fiber should be continued for life to prevent recurrence, as up to 25% of fissures will recur if therapy is stopped18. The goal for adults is to consume 25-30g of fiber daily either through meals or supplements. Topical anesthetics are equivalent to placebo and may cause perianal dermatistis19. Anti-inflammatory (hydrocortisone) suppositories have no advantage over fiber and sitz baths19 and insertion can be painful.

II. Nonsurgical therapy

The goal in the treatment of nonhealing anal fissures is to relieve the abnormally high IAS pressures. The gold standard for treatment has been a lateral internal sphincterotomy (LIS) to produce a permanent reduction in IAS pressures. However, due to increasing concerns of long-term impaired continence as a consequence of such an intervention, physicians have turned to “chemical sphincterotomy”. Chemical agents have been used to create a reversible reduction in sphincter pressure until the fissure has healed. A Cochrane review of non-surgical therapy for anal fissure20, has concluded that medical therapy for non-healing fissures may be applied with a chance of cure that is marginally but significantly better than placebo, but far less effective than surgery and recurrences are higher. Nonetheless, the risk of using such therapies is not great, without apparent long term adverse effect and the therapy can be repeated. These therapies might therefore be used in individuals wanting to avoid surgical therapy, with surgery being reserved for treatment failures. That said, these medications are only effective while in use, explaining the higher risk of recurrence compared to operative management.

a. Topical Nitrates

Nitrates are metabolized by smooth muscle cells to release NO. NO is the principle non-adrenergic, noncholinergic neurotransmitter in the IAS, and its release results in IAS relaxation. Studies have shown that topical nitroglycerin effectively reduces mean resting IAS pressure21-23 transiently for 90 minutes, and significantly increases anodermal blood flow24. Topical nitroglycerin ointment 0.2% administered 2-3 times daily for 4-8 weeks is currently the first line treatment in many centers for non-healing fissures. This treatment significantly reduces pain on defecation after 2 weeks, even in patients who don’t heal28. Higher dosing does not improve outcome25-27. Repeated applications may be necessary. The principle side-effect is headache in 27% of patients, often affecting compliance in those patients, and hypotension in 6%. The overall healing rate in the Cochrane meta-analysis is 48.6% compared to 37% with placebo, but late recurrence of fissure is common, in the range of 50% of those initially cured. There is no advantage to either botox or calcium channel blockers when compared to nitroglycerin20. Second-line Botox and calcium channel blockers can be used in patients who fail to heal with nitroglycerin or who cannot tolerate its side effects with healing rates near 50-77% in small studies29,30,36.

b. Calcium Channel Blockers

Calcium channel blockers prevent influx of calcium into smooth muscle cells, decreasing intracellular calcium and preventing muscle contraction. Calcium channel blockers therefore promote fissure healing by reducing resting IAS pressure31-35. Oral

agents appear to have poorer healing rates and higher rates of side effects than their topical counterparts31. Until recently, most studies showed that topical calcium channel blockers (diltiazem 2%, nifedipine 0.3%) achieve fissure healing to a similar degree reported with topical nitrates20, but without side effects. However, the reported adverse effects during topical diltiazem treatment may be more common than previously thought36. In a recent 2 year follow-up of patients treated with topical diltiazem, 21% reported side-effects (perianal itching, mild headaches, nausea and flushing), although they rarely led to reduced compliance. In addition, for the first time, this study looked at recurrence rate over a long-term period. Disappointingly 59% of patients required further treatment, no better than recurrence rates with nitroglycerin treatment.
Unlike topical nitroglycerin, neither diltiazem nor nifedipine has undergone comparative studies with placebo. However, topical nifedipine has been compared to lidocaine and hydrocortisone with significantly better healing rates (95% vs 35%)39,40. Until recently, there have been no studies comparing topical calcium channel blockers to surgical sphincterotomy. A randomized study by Katsinelos et al38 in 2006 showed that topical 0.5% nifedipine t.i.d for 8 weeks could achieve complete healing in 96.7% of patients, not significantly different from the group treated with LIS. Although the dosage was more than double that of previous studies, there was no increase in adverse effects. However, recurrence remained a problem compared to LIS. This group has hypothesized that the high healing rate of nifedipine may be attributed not only to the reduction of the anal canal pressure but also to the anti-inflammatory action of nifedipine as well as its anti-oxidant, anti-ulcer effects.

c. Neurotoxins

Neurotoxins are metalloproteinases that enter peripheral nerves and inhibit release of neurotransmitters, thereby causing muscle relaxation. Botulinum toxin (BT) is an exotoxin produced by the bacterium Clostridium botulinum. When injected into skeletal muscle to treat hypertonia or cosmetic disorders, BT binds to the presynaptic nerve terminal at the neuromuscular junction preventing release of acetylcholine and resulting in temporary paralysis of the injected muscle. Botulinum toxin is unlikely to be preventing acetylcholine release at the IAS neuromuscular junction, as acetylcholine causes relaxation in this tissue, and a rise, not a fall in anal tone would be expected. In the IAS it is believed that botulinum toxin acts on the postganglionic sympathetic nerves to reduce noradrenaline release41 thereby blocking sympathetic output and producing sphincter relaxation that occurs in a few hours and lasts for approximately 2-3 months allowing fissure healing. Relapse is due to reinnervation which occurs through “sprouting” of nerve endings.

Reported data is difficult to interpret because of varied injection techniques with doses varying from 10 to 100 units, injection sites located at various locations around the anal canal in either the EAS or the IAS, varying number of injections, as well as varying follow-up protocols. The optimum dose and method of injection have not been determined, though 20-25 units is usually applied on either side of the fissure directly into the internal sphincter. For patients with a posterior fissure, injection of BT anteriorly results in earlier healing probably due to the scar of the fissure limiting diffusion of the toxin48. For those authors who recommend injection of BT into the EAS, the mechanism of action must be diffusion of the toxin into the IAS, as the fundamental pathogenesis in chronic anal fissure formation is an elevated IAS pressure.

BT temporarily decreases mean anal canal resting pressures42,43 for 2-3 months44, healing 60-80% of fissures at a rate higher than placebo45 and lidocaine46. The dose of BT injected appears to be critical to successful healing of fissures 44,47,48 with higher doses producing better healing rates without an increase in adverse effects. The most common side effect is temporary incontinence to flatus in up to 10% of patients 44,45,48 and to stool in approximately 5% of patients52. Although patients return to full activity sooner, BT remains inferior to surgery in curing fissures 49,50 , with longer time to healing49 and recurrences of healed fissure exceeding 40-50% after 1 year50,51. However, failures and recurrences can be retreated with a reasonable rate of healing48,52. Still approximately one quarter of patients fail BT therapy and go on to surgery49. In combined analyses BT was found to be no better or worse than topical nitrates20, but BT is effective in healing 50-70% of patients with fissures resistant to topical nitrates53,29 and may be more effective in refractory fissures if combined with topical nitrates54,55.

Gonyautoxin, a phycotoxin produced by shellfish, has also been used in anal fissure management. In a recent report56, 23 patients were injected with 100 units in the IAS every 4 days. Total remission was achieved in all patients within 7-14 days. No relapses were observed during the 10 month follow-up. No side-effects were noted. All patients showed immediate sphincter relaxation detected by digital exam and confirmed after 4 minutes by manometry, with immediate pain relief. However, a

randomized controlled trial has yet to be conducted

d. Other Pharmacologic Agents

1. L-arginine, a precursor of NO, appears to promote fissure healing in 60% of patients when applied topically57 by reducing anal tone15. However, this effect appears to be independent of NO59, which perhaps explains the absence of significant headaches with its use. No effect on resting anal pressures was observed with oral preparations58.

2. Adrenergic antagonists, particularly alpha-1 adrenoreceptor blockers, are effective smooth muscle relaxants that have been shown to reduce resting anal pressures in opossums60 as well as in patients with anal fissures and healthy controls61. However alpha-1 adrenoreceptors are currently not advocated in the treatment of anal fissures due to the lack of efficacy shown in a placebo-controlled trial where indoramin, an alpha-1 adrenoreceptor administered orally succeeded in healing only 1 in 23 patients despite a 30% reduction in MARP after 6 weeks of treatment, with a large number of side effects leading 50% of patients to withdraw62.

3. Cholinergic agonists, such as bethanechol, are inhibitory to the IAS causing relaxation of the IAS. A 24% reduction in MARP has been documented in healthy volunteers using 0.1% topical bethanecol63. A subsequent nonrandomized study reported fissure healing in 60% of patients without side effects, results equivalent to diltiazem35. However a randomized controlled trial and long term follow-up are lacking.

4. Phosphodiesterase Inhibitors inhibit the breakdown of intracellular cyclic guanylate monophosphate (cGMP), thereby producing smooth muscle relaxation. Topical sildenafil (Viagra), a phosphodiesterase-5 inhibitor) used in erectile dysfunction, has been reported to reduce anal tone by an average of 18% in less than 3 minutes in patients with chronic anal fissures64. These findings have been confirmed in in-vitro studies65,66. However, there are no published studies on its effect on fissure healing.

5. Potassium channel openers are known to relax smooth muscle and have been postulated to reduce anal tone. A double-blind randomized trial compared the efficacy of topical minoxidil, a potassium channel opener, with topical lidocaine and a combination of the two67. There was no significant difference in healing rates or pain relief between all 3 groups at 6 weeks, however patients healed faster with the combination of treatments compared to the single treatments. Comparative studies are required and the safety of these topical potassium channel openers must be confirmed as a number of case studies report anal ulcers associated with the use of the oral potassium channel opener nicorandil in angina patients68-70.

6. Angiotensin-converting enzyme inhibitors (ACE-I). The renin-angiotensin system (RAS) is found in vascular smooth muscle and has been shown to be present within the IAS71. Renin converts angiotensinogen to angiotensin I, which is then converted to angiotensin II by angiotensin-converting enzyme (ACE) resulting in contraction of smooth muscle cells. ACE-I prevent the production of angiotensin II resulting in relaxation of smooth muscle. Recently, 0.28% topical captopril, an ACE-I, was shown to reduce MARP in 50% of volunteers by up to 44% at 20 minutes72,73. Further studies are needed to demonstrate its use in the treatment of anal fissures.

7. Hyperbaric oxygen therapy provides a significant increase in tissue oxygenation in hypoperfused wounds, enhancing fibroblast replication, collagen synthesis and neovascularization and thereby promoting wound healing. It was hypothesized that recalcitrant chronic anal fissures would heal with hyperbaric oxygen therapy. In a small non-randomized study74, 5 of 8 patients with fissures refractory to topical nitrates healed with 15 treatments of hyperbaric oxygen given over 3 weeks. 2 patients failed to heal and one relapsed after 3 months. This treatment is costly with respect to time and resources, but may be of benefit in recalcitrant fissures that are not amenable to or have failed surgery.

III. Surgical therapy

A. Lateral internal sphincterotomy (LIS)

LIS is currently the surgical treatment of choice for management of anal fissures refractory to non-surgical therapy and may be offered without a trial of pharmacologic treatment after failure of conservative therapy75. The initially advocated posterior midline sphincterotomy through the fissure bed 82often resulted in a “keyhole deformity” complicated by incontinence to gas and/or stool or fecal soiling. LIS is superior to fissurectomy and posterior midline sphincterotomy with respect to healing rates, pain relief and incontinence85,86. The procedure involves division of the internal anal sphincter laterally76, 81 from its distal most end up to the dentate line, or for a distance equal to that of the fissure77, an approach that cuts less muscle in attempt to diminish the risk of impaired continence. The sphincter can be divided in an open (through a radial or circumferential incision) or closed (through a stab wound) fashion with similar results78,79, 80. Wound healing is twice as fast with primary closure of the wound as compared with healing by secondary intention87. The fissure itself does not require surgical therapy (fissurectomy), but very large sentinel piles or prolapsing, hypertrophied anal papillae might be removed for cosmetic or cleansing purposes84. The procedure may be done with the patient under local, regional or general anesthesia, and can be combined with other anorectal procedures 85such as hemorrhoidectomy.

LIS is usually successful with overall healing rates of 90-100%88. Complications such as ecchymosis and hemorrhage, perianal abcess, fistula-in –ano and prolapsed hemorrhoids are rare. However, rates of continence impairment vary widely throughout the literature ranging from 0% to 50%88, but incontinence sufficient to cause any measurable impairment in quality of life is uncommon, in the range of 3%89,90. In addition, a recent study reported that rates of incontinence following LIS are similar to those in patients undergoing topical therapy91, although incontinence after topical therapy is usually transient. Recurrence rates are low (the majority in the range of 1-3%88) and generally attributed to inadequate sphincterotomy that can be confirmed by endo-anal ultrasound92. In such cases, a second lateral internal sphincterotomy could be performed on the opposite side5,83, but outcome data is limited.

Not all patients with fissures have the classic hypertonic internal sphincter. Some patients are normo- or even hypotonic93. Therefore, careful patient selection and absence of preoperative continence problems on history are necessary prior to performing surgery. Caution should be exercised before performing internal sphincterotomy in patients with diarrhea, irritable bowel syndrome, diabetes, and in the elderly or postpartum women, particularly if they have undergone an episiotomy or suffered a tear during labor, as well as patients who have undergone previous sphincter surgery83. Preoperative anal manometry and endoanal ultrasound should be performed in those patients at high risk of previous sphincter damage, particularly in those patients with recurrent fissures after LIS and in women who have undergone an episiotomy or suffered a tear during labor94.

B. Anal advancement flaps

Early studies comparing advancement flaps to LIS showed comparable healing rates95and were especially successful in those patients without sphincter hypertonia96. However further prospective, randomized studies with long-term follow-up are needed. Currently advancement flaps are recommended for chronic anal fissures in patients with normal or hypotonic anal sphincters such as those who develop fissures postpartum or have had previous sphincter injury97.

C. Anal dilation

Anal dilation for the treatment of anal fissure is currently obsolete. Anal stretch (manual or pneumatic) carries a higher risk of fissure persistence or recurrence than internal sphincterotomy and also a significantly higher risk of impaired continence than sphincterotomy98 due to uncontrolled sphincter disruption. Use of medical therapy in conjunction with dilation does not improve outcome. In a recent small randomized trial, he combination of cryothermal dilators with topical NTG proved to be effective, safe and with statistically better rates of healing, recurrence, and reduction in anal tone than dilation or NTG alone, without impaired continence101. Confirmation of these results in larger randomized trials are necessary.

IV. Special situations

A. Crohn's disease- Crohn's fissures are frequently multiple and off the midline, and are sometimes asymptomatic. Traditionally, anorectal surgery has been avoided in patients with Crohn's disease because of fears regarding postoperative incontinence, exacerbated by preexisting diarrhea that may result in proctectomy. For this reason, treatment should be focused on controlling the diarrhea. There are no data to support the use of topical sphincter relaxants or BT in the treatment of fissures in Crohn's disease. If the fissure persists despite conservative measures, examination under anesthesia and limited sphincterotomy should be performed. In 2 small retrospective reviews, surgery has been reported to result in uncomplicated wound healing in > 80% of cases99,100.

B. HIV/AIDS- It is essential to differentiate between typical fissures in HIV-positive patients which may be treated as usual and HIV- associated anal ulcers which are broad based and deep, occur anywhere within the anal canal and are associated with a low rather than high sphincter tone. STD's must be excluded and treated if present. Typically antiretroviral treatment combined with conservative measures is effective. There is no data available about the risk of postoperative incontinence or the use of topical sphincter relaxants or BT as treatment options.

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