The Evolution of the Treatment of Anal Fissure in the United States

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Abstract

Anal fissure is a common anal disease with typical severe post defection pain and minimal bleeding. Majority of fissures (95%) occur in posterior midline and the rest anteriorly. Correct diagnosis is important to avoid treating patients erroneously as having hemorrhoids. Nitroglycerine ointment (GTN) and calcium channel blockers (CCB) will results in healing in 50% of the patients but recurrences are common after discontinuing the treatment. Botulinum toxin in randomized trials, has not proven to be superior to GTN or CCB. Lateral internal sphincterotomy is the procedure of choice for chronic anal fissure and the incidence of postsurgical fecal incontinence is small.

Keywords: Anal Fissure, Internal Sphincter, Nitroglycerine; Calcium Channel Blockers, Botulinum Toxin, Lateral Internal Sphincterotomy

Introduction

Anal fissure is among the most common painful anal diseases. The pain is disproportionate to the size of the anal fissure (usually 6-8mm). This combined with bleeding during defection results to erroneous diagnosis of hemorrhoids by many patients and their physicians, ineffective treatment and prolongation of suffering.

The pain of anal fissure is caused by exaggerated contraction and spasm of the internal and sphincter after completion of defecation. This alone should alert the physician to the correct diagnosis and it is precisely why application of topical anesthetics and steroids on the anal fissure is ineffective.

Recamier in 1931 first described the anal fissure in a patient and used manual digital dilatation of the anus for its treatment. Throughout the ages, the issue of whether the anal stenosis is caused by healing and scarring of an anal ulcer or if the anal tightness predisposes to straining and anal trauma producing a fissure. With the advent of anal manometry in the 1980s it is demonstrated in asymptomatic volunteers that a subset of the population may have a high anal resting pressure and with constipation or diarrhea the stool bulk pressing against an unyielding outlet causes anal trauma producing an anal fissure.

Anal fissure predominately occurs in the midline of the anal canal at the dentate line (95% posterior and 5% anterior). This is due to the anatomic pattern of anal canal vascularization. The hemorrhoidal arteries approach the anal canal laterally, arborate and join the midline as terminal branches. This together with constriction of the small vascular branches by the spasm or contraction of the internal sphincter accentuates the relative ischemia in the midline anal canal, preventing the healing of anal fissure.

Symptoms and Signs

Anal fissure typically causes severe anal pain after defection, described as stabbing, burning or tearing sensation by the patient. The pain lasts from minutes to hours, subsiding gradually only to recur with subsequent defecation. At the worst the fear of having a bowel movement results in patients drastically reducing their food intake and resorting to laxatives.

Manometric studies have shown that the resting presence of the internal sphincter in fissure patients is much higher than normal to begin with. During the rectoanal inhibitory reflex, the relaxation is

incomplete, thus the internal sphincter is never completely relaxed. At the completion of the bowel movement the internal sphincter pressure in normal individuals return to baseline. However, in the fissure patients the sphincter pressure rises suddenly to 3-4 time the normal level and gradually diminishes to the predefecation level but never to the level seen in normal subjects.[1] This "overshoot phenomenon" is the cause of the severe pain described by fissure patients as "stabbing, tearing or cutting" pain.

The presence of a small midline ulceration results in a minute amount of bright red bleeding seen often on toilet tissue and occasionally in the toilet bowl. However, contrary to hemorrhoids, rectal bleeding is not the cardinal symptom of anal fissure.

Physical examination should be limited to gentle eversion of the anus by lateral traction of the buttocks. This will almost always reveal the midline ulceration and often a skin tag distal to it (sentinel pile in British surgical literature). Any attempt at digital or anoscopic examination in the office or emergency room will trigger the severe pain caused by defection and add to the patient's misery. When the fissure is examined under anesthesia, the base of the fissure may look pink (i.e. corrugator ani muscle) in an acute fissure (e.g. caused by travelers diarrhea or severe constipation and straining). However in chronic anal fissure, the base of the fissure reveals circular white fibers of the exposed internal sphincter. Chronic anal fissure may be associated with a sentinel pile or hypertrophied anal papilla just cephalad to it.

It is important to note that the pressure of non midline fissures (i.e. lateral anal wall) should alert the physician to more serious conditions such as Crohn's disease, syphilis, tuberculosis, AIDS and blood dyscrasias. These patients require further investigation including a biopsy under anesthesia.

Treatment

Medical treatment of acute anal fissure consists of diet modification to high fiber and increased oral fluid intake especially water. Warm sitz baths provide soothing but application of topical steroids or analgesics are usually ineffective. Most acute fissures run a self limited course but a small percentage (10%) may become chronic especially in patients with prior asymptomatic high internal sphincter pressure.

The surgical treatment of chronic anal fissure (CAF) consisted of anal dilation under general anesthetic. Although touted to be curative in initial reports, forceful anal dilation causes inadvertent sphincter injury and varying degrees of post treatment fecal incontinence.

Excision of anal fissure, based on the theory of ulceration, scarring and anal stenosis, was the standard treatment in the early decades of the 20th century. Even then most surgeons advocated a small incision in the thick muscular band posteriorly in the bed of the anal fissure. This was coined "the pecten band" by the renowned proctologist Lockhart-Mummery at St Marks Hospital in London. He attributed the pecten band erroneously to the scarring of the external sphincter.

Eisenhammer from South Africa was the first to describe the significance of the IS in the causation of the CAF.[2] Thus began the era of the internal sphincterotomy for the treatment of CAF. Posterior midline internal sphincterotomy become the procedure of choice in the 50's and 60's. The problem with midline sphincterotomy is that it results in a "deep cleft" which interferes with closure of the anal canal at rest. This defect is termed "the keyhole deformity" and is the main cause of postoperative anal seepage and flatus or fecal incontinence.

In 1971 Notaras[3] from St. Mark's Hospital proposed a subcutaneous "partial" lateral internal sphincterotomy (LIS) to avoid the keyhole deformity. This procedure has been curative for 98% of the patients with CAF and became the standard of care. Early studies in the US comparing the results of LIS to midline sphincterotomy confirmed the superiority of LIS and subsequent popularity of this procedure in the United States.[4] There is no real difference whether LIS is done as an open or closed technique. Should the fissure become infected resulting in a low intersphincteric fistula, the primary source at posterior midline location must be dealt with and LIS is contraindicated. In a series reported from the University of Minnesota, the incidence of incontinence following LIS was reported to be quite low and no patient needed to wear a protective pad.[5]

However things changed in 1989 when Khubchandani and Read published a large case series of LIS in which they reported incontinence to flatus in 36% and the solid stool in 5%.[6] Then in 1996 the University of Minnesota Group who had previously reported a very low incontinence rate following LIS[4] published the results of a

retrospective mail survey of their LIS patients and changed the overall incontinence rate to flatus to 30.3% and 11.8% to solid stool.[7] In a more recent study of 22 reports of LIS in non-randomized cohorts the overall incontinence rate was 14% and to solid stool at 1%.[8] Despite these results, patient satisfaction with LIS remains high due to near immediate relief of the disabling pain of the CAF.[9]

The fear of incontinence by the patient and potential litigation prompted search for "nonsurgical therapies" for CAF. The goal was to find a chemical substance which could potentially yield the high success rate of LIS without the potential postoperative disturbance of continence. The main outcome measure included: healing of fissure, non-healing or recurring fissure, anal seepage or incontinence, side effects of therapy especially headaches caused by nitroglycerine (GTN).

"Chemical Sphincterotomy"

Since the mid-1990s numerous articles have appeared in the literature comparing chemical vs surgical sphincterotomy. Many of the reports are flawed due to non-randomized selection of the patients, short or incomplete follow-up and differing end points. Nelson pointed out that CAFs may heal spontaneously in 35% of the case in response to placebo treatment. Therefore a claim of effectiveness for any medical therapy must show a significant benefit (well over 35%) to be considered credible.[10]

The first chemical used to relax the IS spasm was Glycerin Trinitate or Nitroglycerine (GTN). GTN is a nitric oxide (NO) donor which causes smooth muscle relaxation hence its use for angina. Use of GTN resulted in healing of 56% of fissures, but a third of this group had recurrence within a year. Also severe headaches caused by application of GTN resulted in 30% of the patient to discontinuing its use. Various concentrations of GTN has been tested but 0.2% dosing (x2-3 daily) offers the same healing rate as with higher concentrations but with a lower incidence of headache.[11]

The best way to minimize and/or eliminate headaches is to apply the GTN on the anal area in recumbent position. An immediate rush or heat is felt in the head caused by vasodilatation of cerebral vessels which subsides just as quickly. The patient then can get up and resume normal activity. Application of GTN in the anal canal is unnecessary and causes undue pain as its

mode of action is through absorption from the skin (such as nitropaste for treatment of angina pectoris). Application of GTN in a hurry and in sitting or standing potion increases the incidence of headaches (6% v 56%) and may result in premature discontinuation of treatment.[11]

Calcium ions play an important role in smooth muscle contraction. Calcium channel blockers (CCB) such as Nifedipine and diltiazem have been used as calcium channel antagonists in CAF pain. Both Nifedipine 0.3% ointment and diltiazem 2% gel are equally effective in healing CAF but recurrences are relatively common (up to 30%), after discontinuation of treatment, presumably due to recturn of high resting pressure in the internal anal sphincter, CCB have the same rate of healing CAF as GTN but without the problem of headaches caused by the latter. It is also desirable to switch medications after a 6 week course of therapy if the CAF fails to heal.[12] It is also important to reexamine the patient carefully to exclude presence of subcutaneous abscess-fistula at the bed of the CAF. Purulent drainage from the fissure requires examination under anesthesia, drainage of the abscess and primary fistulotomy at the midline position.

Botulinum toxin is a potent chemical which inhibits neurotransmission. It has been used for decades in the medial treatment of achalasia. Maria et al[13] reported a prospective double blind randomized trial of Botox® vs placebo in 30 patients with CAF. After 2 months 11/15 in the Botox group had healed vs 2/15 in the control group (p=0.003). Transient flatus incontinence is to be expected. The treatment, if effective, may have to be repeated in 3-4 months due to the tachyphylaxis of botulinum toxin. Other reported side effects caused by erroneous injection of botulinum toxin in the external sphincter which may lead to varying degrees of fecal incontinence.

The main problem with all published reports of "chemical sphincterotomy" are short follow-up (regarding persistence or recurrence after healing) and no pre and postoperative measurements of anorectal sphincter pressures (regarding incontinence). One of the best articles dealing with these issues is a report of a study by the Canadian Colorectal Surgical Trial Group.[14] Eighty-two patients were randomized to LIS or topical GTN (o.2% bid). The outcomes were assessed at 6 weeks and 6 months. The study concluded that LIS was curative in 98% of the group while topical GTN

resulted in healing in 60% of the patients and the fissure recurred in half of those, who needed subsequent LIS. Also 30% of the patients in the GTN group ultimately discontinued the treatment due to severe headaches. Quality of life studies revealed no evidence of early postoperative incontinence. Additionally patients in the GTN group responded that facing similar choices, they would opt for LIS while the reverse was not the case.[14]

In an exhaustive analysis of 19 studies comprising of 3083 patients Nelson concluded that:

- Anal stretch was associated with high rate of recurrence.
- Anal stretch in CAF had a higher risk of fecal incontinence than formal surgery.
- There is no difference between the complication rates of open vs closed LIS.
- None of the "chemical sphincterotomies" provide permanent healing of fissures and they are statistically marginally better than placebo.

Conclusion:

Anal fissure is a very common anal disease with typical severe pain after bowel movements and scant bright red rectal bleeding. Fissures are often misdiagnosed as hemorrhoids, even though it can be easily visualized by simple eversion of the anal canal looking for the midline ulceration. Fissure occurring on the lateral anal wall must raise suspicion for systemic disease and warrant appropriate investigation and even a biopsy.

Acute fissure responds to dietary modification and warm sitz baths. Topical steroid and local anesthetic ointments offer no added benefit. Chronic anal fissure can be identified by the presence of exposed white fibers of the internal sphincter at its base. Topical GTN (0.2% bid) or CCB 0.3% Nifedipine or 2% diltiazem gel 2-3 days daily may result in healing CAFs in 50% of the cases, with subsequent recurrence in half. Botulinum toxin injection in IS has demonstrated no clear and long acting benefit over GTN and CCB. Lateral Internal Sphincterotomy remains the procedure of choice for persistent CAF.

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