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

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Abstract

Chronic Anal Fissure (CAF) is arguably the most painful anal disease with the severity of pain disproportionate to the size of the fissure (8-10mm). Its location in the posterior midline of the anus allows for easy diagnosis without need for rectal examination or instrumentation.

The treatment of CAF was excision based on the theory of crypititis causing ulceration, healing and breakdown resulting in anal stenosis. Lockhart Mummery at St. Mark's Hospital attributed the stenosis to "pecten band" in the external sphincter. So, the treatment of choice became fissurectomy and division of the pecten band. In 1951 Eisenhammer from South Africa demonstrated the role of the internal anal sphincter (IAS) in CAF. Thereafter midline internal sphincterotomy became the customary operation of CAF.

The advent of manometry in the late 60s allowed for accurate measurement of anal sphincter pressures. Nothman and Schuster demonstrated the high resting tone of the internal anal sphincter (IAS) in fissure patients and attributed the severe postcibal pain to "overshoot phenomenon". Notaras in1969 proposed lateral internal sphincterotomy to reduce the anal resting tone and healing of CAF without excising the fissure itself. This procedure has become the procedure of choice of CAF in the last 40 years.

In 1989 Khubchandani and Read reported a significant rate of anal seepage and incontinence after LIS and the stage was set for attempting "chemical sphincterotomy" with pharmaceuticals used to reduce the IAS pressure in CAF. Nitroglycerine was soon followed by Nifedipine and Diltiazem gel and later Botulinum toxin injection to cause relaxation of IAS. All these measures may help the healing of CAF initially but in most cases the result was temporary, and fissures recur after stoppage of chemicals. To this date there is no chemical agent that can compare with the result of LIS in CAF patients, irrespective of the fear of incontinence in the litigious population in the United States.

Key Words: Chronic Anal Fissure, Lateral Internal Sphincterotomy, Chemical Sphincterotomy, Fecal Incontinence

Introduction

Acute anal fissure is often a transient, self-limited painful condition which responds nicely to diet modification, warm sitz baths and topical treatments. However, a small number < 10% of them persist over 6 months and become chronic (CAF) causing severe pain after BMs and persisting from minutes to hours, subsiding gradually only to recur following the next bowel movement. Bleeding is usually fresh and minimal. Fear of bowel movements force patients to use laxatives, OTC oral and topical pain medication often with no effect.

Diagnosis of CAF is quite simple and involve gentle outward traction of the buttocks looking at a tight anal canal with posterior (>90%) or anterior (<10%) split at the dentate line. Digital examination and instrumentation are totally unnecessary and produces the severe pain.

Surgical Therapy

Recamier[1] is credited for describing this entity and managing the tight anal canal with digital dilatation. Subsequently CAF was thought to be a result of inflammation of the anal crypts causing breakdown of the anoderm at the dentate line. Following repeated cycles of healing and breakdown, the anal canal becomes contorted and tight to the examining finger. This posterior midline scarring was thought to occur mainly in the external anal sphincter (EAS) and Lockhart-Mummery[2] blamed the persist scarring to a "pecten band" in the posterior EAS. In 1951 Eisenhammer[3] correctly attributed the anal stenosis in CAF patients to a contracted internal anal sphincter (IAS) and recommended internal sphincterotomy (IS) for the treatment of chronic anal fissure. The role of IAS in CAF was fully established by further studies and publications.[4]

In the mid 1960s anal manometry helped establish the role of IAS in CAF. Nothman and Schuster[5] in their original paper in 1964 described the high resting tone of IAS in patients with CAF. During defecation the IAS does not relax as in normal patients and following the completion of BM, the sphincter pressure increases tremendously (corresponding with the severe pain patients experience) and diminishes slowly to the baseline which is still significantly higher than in normal individuals. This they called "overshoot phenomenon". A subsequent study by Abcarian et al confirmed the presence of "overshoot" in IAS.[6]

Excision of CAF continued to be the mainstay of surgery in the United States.

Samson and Stewart[7] recommended a V-Y anoplasty to cover the posterior fissurectomy wound and promote healing, however this technique never gained general popularity due to its high failure rate.

Eisenhammer in 1959 proposed lateral internal sphincterotomy (LIS) for treatment of CAF.[8] Bennett and Goligher published their results of LIS in the British Medical Journal.[9.] M.J. Notaras should be credited for describing LIS and reporting its excellent results in subsequent publiations.[10,11]

In the United States PMS continues to dominate the surgical field. However, in 1974 Ray reported the good results of LIS from Ochsner Clinic in New Orleans.[12] Abcarian reported a comparative although non-randomized study comparing 150 patients treated with midline sphincterotomy to 150 patients who underwent LIS. The latter group had less postoperative pain, faster wound healing, shorter hospital stay (inpatient surgery in 1970s) and time off work.[13] Schouten and colleagues using doppler flow measurement of anodermal microvascular perfusion, documented improved blood flow after LIS and this contributed to healing of CAF.[14,15] LIS became the procedure of choice for CAF and a report of one-year follow-up after LIS reported only 15 patients with minor flatus incontinence.[16]

All this changed when Khubchandani and Reed in 1985 published a large case series of LIS with 36% flatus and 5% fecal incontinence.[17] The University of Minnesota Group in 1990 published a retrospective case series of LIS for CAF with 30% flatus and 11.8% solid stool incontinence.[18] The stage was set for a plethora of legal actions in the litigious population in the US.

This also was an impetus to come up with pharmaceuticals to relax the IAS chemically.

Pharmaceutical (Chemical) Sphincterotomy

Since the advent of Nitroglycerine in the mid-1990s, a long list of chemicals has been tested to reduce the resting pressure of IAS and promote healing of CAF. There have been many publications with small sample size, inadequate statistical analysis and claims of success using various end points. Nelson in his landmark Cochrane review of 54 randomized trials involving 3904 patients pointed out that CAF healing in placebo controlled trials was 34% and this important fact should be kept in mind when

evaluating various publications and claims of success.[19]

Topical Nitroglycerine (NTG) is effective because there are Nitric Oxide (NO) receptors in IAS NO inhibition of neurotransmitters results in relaxation of IAS and NTG is a powerful donor of NO. Nelson reviewed 54 RCTs including 3904 patients. These include 15 RTCs comparing NTG to placebo in 1190 patients over 6-8 weeks. NTG was significantly better than placebo 19% vs 37% with incidence of headaches with NTG 24% vs 9% for placebo. To assess the optimum strength of NTG ointment Baily et al examined the dosing and interval of therapy in a multicenter trial, with those receiving 0.4% NTG having a significant decrease in their severity of pain.[20]

Calcium Channel Blockers (CCB): Ionic calcium (Ca++) contracts smooth muscle. Therefore, CCBs can be useful in treating CAF. Both Nifedipine and Diltiazem have been shown to be effective. Perotti et al [21] in a randomized trial comparing 0.3% Nifedipine vs lidocaine/hydrocortisone cream (q12h, 6 weeks) showed significantly better healing with Nifedipine (94.5% v 16.4%). Diltiazem (2% gel) has been effective in patients who failed with NTG ointment (49% healing in 8 weeks). Side effects included mood swings and drowsiness but no headaches.[22] Nelson[19] was not able to show a statistically difference in RCTs between NTG and CCBs.

Botulinum Toxin (BT) is a potent toxin capable of inhibiting neurotransmission causing muscle paralysis. The first report of its use in healing fissures was published in 1994.[23] Maria et al published the results of double-blind controlled trial (BT vs Saline) in 30 patients showing 11/15 patients in BT group had healed in 2 months compared with 2/15 in saline group.[24]

The main issue with BT injection is lack of standardization as to ideal dose (10-100 units), location of injection, under the fissure vs four quadrants or in the intersphincteric groove. Temporary incontinence to flatus is common and other side effects include but are not limited to muscle weakness, hypotension, allergic reaction and infection at injection site. The injection if effective may need to be repeated in 3-4 months. In the Nelson analysis BT and NTG had similar effectiveness in four trials. Healing after 1 year was 50% and, in the trials, BT was

inferior to surgery in healing of fissures (67% v 94%).[19]

Manual Anal Dilation originally recommended by Watts and colleagues in order to avoid surgery in 1962.[25] Very few publications followed and the risk of permanent fecal incontinence was due to circumferential injury to the IAS has resulted in virtual abandonment of anal dilation manually or with the use of anoscope or anal dilators.

Comparison of Medical vs Surgical Treatment

Nelson[19] reviewed 11 randomized controlled trials (741 patients). Healing rate with surgery was 94% vs 49% with medical treatment. Later recurrence after surgery is uncommon (97% vs 59% for medical treatment).

In order to address the different issues between surgery and medical treatment, the Canadian Colon and Rectal Surgery (CRS) Trial Group reported on 82 patients randomized between LIS (n=38) and NTG (n=44). After six weeks 34 (89.4%) of LIS had healed with no recurrence vs 13/44 (29.5%) in medical treatment with 5/23 recurrences. In 6 months 92% of LIS group were healed vs 27% of NTG group which had a relapse rate of 45%.[26]

The satisfaction rate in LIS group was 88% vs 32% in NTG group. Additionally, nine patients in NTG group had stopped the treatment due to severe headaches. After six years 51 (62%) of the patients were surveyed. The LIS group had no symptoms and no follow-up treatment. The NTG group had 41% symptomatic fissures and 59% had subsequent surgery. Most importantly fecal incontinence scores were identical between the two groups, allowing the author to conclude that LIS was desirable on long term basis, had excellent patient satisfaction and resulted in no adverse effect on fecal incontinence.

Nelson et al's meta-analysis published in 2017[27] concludes that:

a. Medical therapy for CAF is only marginally better than placebo.
b. There are no great risks with the exception of NTG induced headaches.
c. Late recurrence is common after medical therapy and quite uncommon after surgery (LIS).
d. Medical therapy should be reserved for patients with preexisting fecal incontinence or those wanting to avoid surgery

Conclusion

CAF is a common anal disease causing disabling pain in some cases. Contrary to acute anal fissure, CAF tends to be long lasting and subject to healing and recurrence. Chemical Sphincterotomy with NTG or CCBs may induce healing in 50% of the patients but disease may recur in the other 50%. It is advisable to switch NTG to CCB or vice versa after six weeks if symptoms persist.

If both fail BT may be employed with explicit patient consent as to complications and need for repeated injection. To date LIS remains the procedure of choice and the gold standard with which all new treatments need to be compared.

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