

Conservative and Surgical Treatment of Chronic Anal Fissure: Prospective Longer Term Results

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Abstract

Introduction The aim of this prospective study was to assess the efficacy of different medical treatments and surgery in the treatment of chronic anal fissure (CAF).

Patients and Methods From January 2004 to March 2009, 311 patients with typical CAF completed the study. All patients were initially treated with 0.2% nitroglycerin ointment (GTN) or anal dilators (DIL) for 8 weeks. If no improvement was observed after 8 weeks, the patients were assigned to the other treatment or a combination of the two. Persisting symptoms after 12 weeks or recurrence were indications for either botulinum toxin injection into the internal sphincter and fissurectomy or lateral internal sphincterotomy (LIS). During the follow-up (29 ± 16 months), healing rates, symptoms, incontinence scores, and therapy adverse effects were prospectively recorded.

Results Overall healing rates were 64.6% and 94% after GTN/DIL or BTX/LIS. Healing rate after GTN or DIL after 12 weeks course were 54.5% and 61.5%, respectively. Fifty-four patients (17.4%) responded to further medical therapy. One hundred two patients (32.8%) underwent BTX or LIS. Healing rate after BTX was 83.3% and overall healing after LIS group was 98.7% with no definitive incontinence.

Conclusion In conclusion, although LIS is far more effective than medical treatments, BTX injection/fissurectomy as first line treatment may significantly increase the healing rate while avoiding any risk of incontinence.

Keywords Chronic anal fissure · Surgery · Botulinum

Introduction

The treatment of chronic anal fissure (CAF) has changed greatly during the past two decades with ongoing research on medical approaches directed at lowering the internal anal sphincter tone and avoiding the risk of fecal continence disturbance. Glycerin trinitrate (GTN), topical calcium

channel blockers and anal dilators and botulinum toxin injection alone are all known to be able to lower the IAS tone but results have been disappointing in curing CAF, often marginally better than to placebo.

In a recent meta-analysis of randomized clinical trials comparing medical treatments to placebo or surgery,¹ Nelson et al. have shown that GNT, botulinum toxin injection, and surgery have overall response rates of about 55%, 65%, and 85%, respectively, whereas the placebo healing rate is about 35% across all the studies. This evidence led Nicholls in a recent editorial to point out that surgery in the form of sphincterotomy is markedly superior to any form of chemical sphincterotomy and is the most effective treatment for fissure at present.²

Lateral internal sphincterotomy (LIS) allows prompt healing in more than 90% of the patients with a low recurrence risk of 3%. However, it may cause minor but permanent incontinence.^{3–10} According to a systematic review of randomized surgical trials,¹¹ the overall risk of

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continence disturbance after surgery is about 10% but can be as high as 35% from nonprospective uncontrolled data.

Obviously these findings augment the fear of incontinence and reluctance toward surgery for both the patient and the surgeon with the continuing call for changes to safer medical alternatives. Medical treatment seems therefore a reasonable first line therapy for most patients with CAF.

Second line use of botulinum toxin seems to heal only 50% of fissures resistant to GTN.¹² It is likely that the fibrotic nature of chronic fissures resistant to GTN is not resolved by chemical sphincterotomy alone. Fissurectomy alone is not currently used in adults, but its combination with botulinum toxin injection has been recently used with success to treat fissures resistant to medical treatment,^{13–15} with healing rates higher than 90% (not far from LIS), and with negligible risk of incontinence.

We have previously demonstrated that surgical treatment either with fissurectomy and botulinum toxin injection and LIS is safe and associated with the highest likelihood of CAF healing compared to common medical treatments. In this prospective study, we present longer term results in a larger cohort of patients with CAF assessing the efficacy of different conservative treatments (including GTN and anal dilators or a combination of the two) and surgery.

Patients and Methods

Between January 2004 and March 2009, 311 consecutive patients with CAF were enrolled in the study. Diagnosis was made according to history and physical exam. CAF was defined by duration of symptoms longer than 3 months and the presence of a skin tag, a sentinel pile or fibrosis at the margins of the fissure. Exclusion criteria included atypical CAF associated with grade III/IV hemorrhoids, previous anal surgery, incontinence, inflammatory bowel disease, infection, or cancer. Patients with coexisting medical conditions requiring calcium channel blockers and oral, sublingual, or transdermal nitrates were also considered ineligible for this study. Patients with incomplete follow-up were also excluded.

During the outpatient visit, a complete explanation of the disease as well as the medical treatment options, benefits, and side effects was given to the patient.

After this, each patient was assigned to an 8-week course of medical therapy with either 0.2% GTN or DIL according to his/her preference. Patients in the GTN group were instructed to apply the ointment twice a day to the edge and just inside the anal canal (morning and evening) after a warm Sitz bath. The amount of *crème* to be applied was shown during the outpatient visit. If patients experienced

side effects, he/she was instructed to use a finger glove for application or to reduce the amount to be applied.

DIL group patients were instructed to use an anal dilators set (Dilatan, Sapi-Med, Alessandria, Italy) as follows: heating the DIL for 15 min in water, lubricating it with a preparation gel (Dilatan crema, Sapi-Med, Alessandria, Italy), introducing it fully into the anal canal, and maintaining the position for 10 min twice a day (morning and evening).

Patients were invited to repeat this procedure for 3 weeks starting with small diameter dilators (20–23 mm), followed by medium size dilators (23–27 mm), and ending with the large ones (30 mm). An illustrated brochure containing practical suggestions was given to the patients.

The primary end-point was fissure healing at last follow-up. Secondary end-points were symptomatic improvement, need for surgery, side effects and surgical complications, and patients' satisfaction.

Improvement was defined as absence of pain or bleeding. Healing was defined as complete epithelialization of the fissure base. Those patients in which no improvement in symptoms was observed after 8 weeks were crossed to the other treatment (either GTN or DIL) or switched to a combination of the two for additional 4 weeks according to his/her preference. Botulinum toxin injection in the IAS associated to fissurectomy (BTX-F) or LIS were offered to patients who did not benefit from the 12 weeks treatment course with GTN, DIL, or DIL/GTN combined, after full explanation about the risks and benefits of either procedure. Patients with nonhealed or recurrent CAF who refused surgery were offered a further medical treatment. Anorectal manometry was performed before either one of the procedures.

Either fissurectomy/Botox injection or LIS were performed in a day-surgery setting under sedation and local anesthesia in lithotomy position. Before surgery, all patients had a limited bowel preparation with one Sorbiclis (Sofar S.p.a, Milan, Italy). An Eisenhammer speculum was gently inserted, avoiding excessive sphincter dilatation. Fissurectomy was always performed by minimal excision of the fibrotic edges of the fissure and curettage of its base just back to fresh, normal, nonfibrotic tissue. If present, the sentinel pile was excised with cutting diathermy. Once fissurectomy was performed, 25 units of botulinum toxin (Botox, Allergan, Milan, Italy) were injected as follows: A volume of 1.6 ml of saline solution was mixed into a 100-unit vial of botulinum toxin and 0.4 ml aliquot (equal to 25 units) was drawn up into a 1 ml syringe with a 27 Gauge needle and equally injected into the IAS at 3 and 9 o'clock.

An open LIS was performed with patient in lithotomy position under local anesthesia and/or deep sedation when necessary. A circumanal incision of 1 cm was made just distal to the intersphincteric groove in the lateral position

with subsequent partial division of the internal anal sphincter using coagulation diathermy. The distal internal sphincter was divided under direct vision for a length up to the fissure apex. In all cases fissurectomy was performed as previously described.¹⁴

Patients in both groups were discharged home on the same day and stayed on a high residue diet and stool softener for 7 days. A nonnarcotic analgesic was also prescribed as needed and patients were advised to take regular warm Sitz baths. Patients were seen in outpatient clinic after 1 week and therefore at a 1-, 2-, 3-, and 12-month intervals. Patients were then contacted by phone. Independently of these scheduled appointments, patients were seen on request. Information about fissure healing, symptoms, complications, and adverse effects were prospectively collected. Wexner incontinence score was used to assess continence after the procedures.

Differences between treatment groups were evaluated by *chi-square* test

Results

Patients’ demographics, fissure characteristics, and treatment failures are shown in Table 1. Median follow-up was 29±16 months ranging from 3 to 63 months.

Healing after 12 weeks was observed in 54.5% (103/189) of patients for the GTN only group and in 61.5% (75/122) of patients for the DIL only group without significant differences ($p=0.2$). Overall fissure healing after medical treatment with either GTN or DIL alone was observed in a total of 178 (57.2%) patients.

Recurrence rates after 12 weeks treatment were 23.3% for GTN only group and 9.3% for DIL only group, respectively ($p=0.02$), reducing the overall healing rate of single medical treatment to 47.3% (147 patients).

In particular, healing with no recurrence was observed in 79 out of 189 patients (41.8%) treated with GTN alone and in 68 out of 122 patients (55.7%) who underwent DIL only. This difference was statistically significant ($p=0.01$). In most of the patients, healing time ranged from 8 to 12 weeks after treatment course. No significant difference was noted between the two groups in terms of healing time ($p=0.4$).

One hundred thirty-three patients (42.8%) experienced nonhealing or sudden recurring disease within the first 8 weeks observation period. Of those, 46 patients (previously treated with GTN) were switched to DIL, 38 (previously treated with DIL) to GTN for additional 4 weeks. The remaining 49 patients accepted combined GTN/DIL treatment.

A total of 54 patients (17.4%) responded to this further medical therapy and overall definitive healing rate rose significantly from 47.3% to 64.6% ($p=0.001$). In particular, at the end of this additional 4 weeks treatment, GTN after DIL resulted effective in 60.5% of the treated patients (23 out 38) and DIL after GTN in 45.7% (21 out of 46; $p=0.4$). Of the 49 patients treated with combined DIL/GTN, 20 responded with healing (40.8%; $p=0.6$ vs DIL and $p=0.08$ vs GTN). During the follow-up, recurrence rates were 14.3% for DIL after GTN, 13% for GTN after DIL, and 20% for combined GTN/DIL, with no significant differences among groups.

Definitive healing was observed in 18 out of 46 patients treated with DIL after GTN (39.1%), in 20 out of 38

Table 1 Patients’ Demographics, Fissure Characteristics and Treatment Failures

	GTN	DIL	GTN/DIL	Botox/fissurectomy	LIS
Number (N)	189	122	49	30	72
Mean age (years)	49	44	47	38	45
Sex M/F	88/101	53/69	17/32	11/19	28/34
Fissure position					
Posterior	164	100	31	27	51
Anterior	20	18	13	2	9
Both/other	5	4	5	1	2
Sentinel pile N/%	117/62%	87/71%	33/67%	22/73%	51/71%
Single treatment (12 weeks) success N/(%)	103/189 (54.5%)	75/122 (61.5%)	NA	NA	NA
Recurrence	24/103 (23.3%)	7/75 (9.3%)	NA	NA	NA
After crossover healing N/%	21/46 (45.7%)	23/38 (60.5%)	20/49 (40.8%)	NA	NA
Recurrence	3/21 (14.3%)	3/23 (13%)	4/20 (20%)	NA	NA
Overall Success N/%	97/189 (51.3%)	88/122 (72.1%)	16/49 (32.6%)	25/30 (83.3%)	71/72 (98.6%)
Overall Success N/% (DIL/GTN combined included)	109/189 (57.7%)	92/122 (75.4%)	NA	NA	76/77 (98.7%)

GTN nitroglycerin ointment, DIL anal dilators, BTX botulinum, LIS lateral internal sphincterotomy, NA not applicable

patients treated with GTN after DIL (52.6%), and in 16 out of 49 patients treated with combined GTN/DIL (32.6%). DIL after GTN and combined GTN/DIL treatments were similar in terms of definitive healing but worse compared GTN after DIL treatment although differences were not significant ($p=0.07$).

At the end of the study, overall medical treatment (including the crossover) success was 57.7% (109 out of 189 patients) and 75.4% (92 out of 122 patients), respectively, for patients initially treated with GTN or DIL. This difference between the two groups was statistically significant ($p=0.01$). At the end of the study, 64.6% of the patients resulted cured by medical approach alone. Overall incidence of GTN side effects was 9.7% (23 out of 236 patients), mostly mild headache (15 patients) and *pruritus ani* (eight patients). Seven patients (3.7%) discontinued therapy and were switched to DIL.

A total of 208 patients were treated with DIL (122 patients as initial treatment and 86 patients after GTN treatment) and 10.1% interrupted the DIL course because of severe discomfort. After nonhealing or recurrence, surgery was offered to 110 patients (35.4%). At the end of follow-up, eight patients refused either botulinum treatment or surgery and further medical treatment was offered with minimal beneficial effect. Of the remaining 102 patients, 30 underwent fissurectomy/Botox injection and 72 to LIS. Manometry results between these two groups are shown in Table 2. Healing was reported in 25 out of 30 (83.3%) patients after fissurectomy/Botox injection. This percentage was significantly higher compared to GTN alone course ($p=0.001$), to DIL alone treatment ($p=0.004$), or to overall combined/crossover groups ($p=0.001$). One patient (3.3%) experienced transitory flatus incontinence. Nonhealing was observed in two patients (6.7%) and recurrence in three (10%). Despite reluctance to further surgery after failed

fissurectomy/Botox by two patients, all five patients underwent LIS had complete healing. No perioperative complications were observed in this group.

All but one patient treated with LIS showed complete healing with no postoperative incontinence. Overall morbidity after LIS was 9.7%. Three patients experienced urinary retention after surgery (all males) and needed catheterization. Two patients experienced perianal ecchymosis and one perianal abscess with submucosal fistula that required surgery 7 months later. One patient experienced recurrence 10 months after surgery.

Comparing the different treatment groups, there were no significant differences in terms of healing rates between males and females, presence or absence of sentinel pile or previous GTN or/and DIL treatment.

Overall patient's satisfaction with the outcome of surgery including the LIS after BTX failures was 93.5% (72/77).

Discussion

The most recent theories on etiopathogenesis of anal fissures have focused on increased tonicity of the IAS, which induces ischemia of the anodermis mainly of the posterior commissure.^{16–22} Since the introduction of the posterior internal sphincterotomy by Eisenhammer in 1951, CAF has been managed with surgery once conservative measures failed.²³ The more safe lateral sphincterotomy popularized by Notaras in 1969 has, until recently, been the mainstay of treatment.²⁴ Despite surgery is highly efficacious and succeeds in curing CAF in more than 90% of patients (often exceeds 95% with high patient satisfaction), postoperative impairment of continence is not uncommon.^{1,17} The incidence varies between 0% and 35% for flatus incontinence, 0% and 21% for liquid, and

Table 2 Anorectal Manometry Results Between Patients

Parameters	Mean LIS \pm SD	Mean BTX/fissurectomy \pm SD	<i>P</i> value
IAS resting length	4.96 \pm 1.34	5.08 \pm 1.10	0.8117
IAS contraction length	5.25 \pm 1.02	4.90 \pm 1.57	0.4398
IAS resting pressure	69.82 \pm 20.54	65.84 \pm 22.80	0.6271
IAS contraction pressure	94.60 \pm 27.65	97.53 \pm 30.36	0.7899
HPZ resting length	2.67 \pm 0.71	2.86 \pm 1.17	0.5567
HPZ contraction length	2.35 \pm 0.79	2.61 \pm 1.08	0.4454
HPZ resting pressure	90.98 \pm 30.50	85.06 \pm 22.70	0.5974
HPZ contraction pressure	131.45 \pm 28.13	140.34 \pm 37.40	0.4552
Resting P max	159.24 \pm 42.96	141.78 \pm 53.61	0.3281
Contraction P max	226.87 \pm 59.34	250.47 \pm 52.53	0.2964
Resting anal canal asymmetry	23.73 \pm 8.55	23.77 \pm 5.64	0.9897
Contraction anal canal asymmetry	21.86 \pm 8.71	20.64 \pm 5.77	0.7017
IAS resting asymmetry	17.57 \pm 6.56	16.14 \pm 5.09	0.5626
IAS contraction asymmetry	18.53 \pm 17.45	13.74 \pm 5.46	0.4299

LIS lateral internal sphincterotomy, BTX botulinum, IAS internal anal sphincter, HPZ high pressure zone

0% and 5% for solid stool.^{25–28} As indicated by Nelson in a recent systematic review, the overall risk of incontinence is about 10%,^{1,11,29} mostly to flatus. In 2005, Casillas et al. conducted a review of patients who had undergone LIS, comparing a postal survey response of these patients to hospital notes.³⁰ Chart review revealed incontinence to stool and gas of 2.8% and 4.4%, respectively, whereas the postal survey of the same group of patients revealed incidences of 28.7% and 31.5%.³⁰ Consequently, surgeons may significantly underestimate the scale of postoperative continence impairment after LIS.³¹ Nonetheless, the normal weakening of the sphincters with age or other insults (anorectal surgeries, radiation, or obstetrical trauma) may influence the continence during the life. Besides endoanal ultrasound reports demonstrate extensive permanent sphincter defects after LIS even if patient remains continent.²⁷ Incontinent patients after LIS seem to have a thinner external sphincter than those who remain continent postoperatively.³²

In order to minimize this risk, several authors have tried a more limited division of internal sphincter, a tailored or controlled sphincterotomy.^{33,34}

Nonetheless, in addition to continence disturbance, general surgical complication rates range from 7% to 42% mostly related to hemorrhage, abscess, fistula, fecal impaction, and urinary retention.³⁵

In the late 1990s, alternatives to surgery were sought because of risk of incontinence, complications, costs, and recovery time. These included nitroglycerin ointment, calcium channel blockers, and botulinum toxin injection.

GTN causes sphincter relaxation by acting as a nitric oxide donor and improves anodermal perfusion.³⁶ Topical calcium channel blockers (diltiazem and nifedipine) induce IAS by decreasing cytosolic calcium concentration.

Despite early trials (including both acute and chronic fissure) of conservative treatments that showed overall healing rates and pain relief close to surgery, usually results are only marginally better than placebo or conservative therapies alone (fibers, Sitz baths, topical lidocaine) with healing rates between 36% to 68% and relapse rates as high as 35%.^{37,38} According to Nelson's meta-analysis, a marginal advantage in using GTN (55%) over placebo (35%) exists but no statistical differences were found comparing GTN to either botulinum toxin or calcium channel blockers. We used GTN ointment in addition to conservative approaches (fibers and Sitz bath) as first line treatment because of its safety, convenience, and cost. The dosage and number of applications previously reported ranges from 0.2% to 0.5% and from twice to four per day.^{39–42} The principal side effect is headache and less commonly anal pruritus.^{37,43–45} Compliance issues are observed in up to 72% of patients and about 20% of patients will discontinue therapy.^{29,42,46} Our healing rate

after GTN alone treatment was close to 42% increasing to only 51.3% after crossover to DIL and to 57.7% if DIL/GTN combined course is considered. We also observed a 23.3% recurrence rate, similar to combined GTN/DIL, but higher compared to DIL use only (9.3%, $p=0.01$), DIL after GTN (14.3%, $p=0.5$), and GTN after DIL (13%, $p=0.4$). These findings did not differ from our previous observations apart a significant lower success of DIL/GTN combined therapy.

In our series, the incidence of side effects associated with GTN application was lower (9.7%) than the commonly reported incidence of 20–30% (but up to 72%).⁴⁷ Almost 4% of the patients discontinued the therapy and were switched to DIL. GTN therapy was discontinued because of headache (four patients) and *pruritus ani* (three patients). As previously observed, we believe that our low incidence of side effects and good compliance to treatment program are the result of number of applications (twice a day) and the accuracy of given instructions.

The rationale for the use of DIL is the finding that they induce muscle relaxation with consequent reduction in sphincter hypertonia. Moreover blood flow is improved in the IAS thus favoring fissure healing. When the DIL is heated, the relaxing effect is enhanced.⁴⁵ Short-term healing rates are reported as high as 95% when used in combination with GTN,^{46–49} with about 10% reduction after 2 years follow-up. Recently, Schiano et al. reported healing rates of 75% with DIL only and 93.7% with combined GTN/DIL treatment.⁴⁵ In our experience, the DIL-only treatment was associated with a 55.7% healing rate, significantly superior to GTN use only (41.8%). The significantly lower recurrence rate after DIL alone (9.3% vs 23.3%) may explain this result. It seems that DIL use allows a durable healing and the reduced recurrence rates observed when DIL is implemented may suggest this observation. This observation is confirmed by the observed success rates at the end of the study: 57.7% for initially treated with GTN vs 75.4% for initially treated with DIL. It may be argued that patients initially treated with dilatation experienced less pain as expression of less severe disease at the time of diagnosis thus more likely to agree for such treatment and with more chances to heal. As a matter of fact, patients who decided for DIL instead of GTN treatment presented a lower visual analogue scale score at presentation despite differences were not statistically significant.

When DIL group was switched to GTN because of nonhealing, the success rate increased to 52.6% higher, but not significantly, than the success rate of 39.1% observed when GTN course was followed by DIL. We explain this difference with a shorter healing time observed with GTN compared to DIL course that needs few weeks applications of different size dilators. A 4-week DIL course may not be sufficient to significantly increase the healing rate after

GTN thus reducing the likelihood of surgery. On the other hand, differently from our previous observation, patients treated with combined DIL/GTN showed a low definitive healing rate of 32.6% with a 20% recurrence rate. This result is far from the 93.5% healing rate, reported by Schiano et al. Our longer follow-up may temper this difference. In our experience DIL use is safe, healing rate are slightly better to GTN treatment, but compliance is lower. Overall 10.1% of the patients (vs 2.9% of GTN) interrupted the DIL course because of severe discomfort preferring “less invasive” approaches. Of those, 17 patients (81%) were patients from DIL/GTN combined group. The reluctance in using DIL after GTN failure (either as crossover or in combination) as well as the reduced compliance may explain the low healing rate observed in this group.

In the recent years, injection of botulinum toxin A into the internal sphincter has emerged as an alternative to surgery in the treatment of CAF. By a temporary chemical sphincterotomy, it allows fissure healing in approximately 50% of resistant CAF when used alone and as much as 93% in the short and medium term when combined to fissurectomy.^{34,50} It reduces maximum resting pressure by a similar proportion to that of GTN (25–30%),⁴⁶ but muscle paralysis occurs within hours after injection and the effect remains over a 2–3 months period of time.^{25,51} Botulinum injection is a simple procedure, easy to learn, and can be also done in the outpatient clinic without the need for sedation or local anesthesia. A single botulinum injection is well tolerated, with minor side effects thus eliminating noncompliance issues.

The most common side effect is transient incontinence to flatus (up to 10%) or feces (up to 5%),⁴⁸ which may persist until the toxin’s effect have worn off by neuronal degeneration.⁵² To date there is only one case of long-term fecal incontinence after botulinum injection.⁵³

Recurrence are common, but may be easily retreated with a good rate of healing even if up to 20% of patients will need LIS.^{29,49,54}

There is no consensus on dose, site, or number of injections.⁵⁵ However, a dosage between 20 and 25 units and anterior injection seems more effective and causes no additional side effects.^{16,17,44,48,56,57} Despite healing rates as high as 90% for acute and chronic fissures shown by early trials, the enthusiasm was tempered by the disappointing results on CAF. Lindsey et al., in a prospective study of 40 patients with GTN-resistant fissures treated with 20 units of botulinum, reported a healing rate of only 43%.¹² Similarly, Minguez et al.⁵⁸ did not show healing rates as high as surgery after botulinum injection with a 42 months follow-up, while Arroyo and Montes observed 1-year recurrence rates after botulinum injection approaching, respectively, 50% and 40%.^{59,60} Higher healing rates are

observed if botulinum is given early before the chronic fibrosis of the fissure is established.⁴⁶ Since botulinum injection treats only the internal sphincter spasm, Lindsey et al. have proposed to add fissurectomy to chemical sphincterotomy reporting a healing rate of 93% for medically resistant CAF.²⁵

Fissurectomy enhances healing removing the fibrotic fissure edges, unhealthy granulation tissue at the base, and the sentinel pile when present.^{25,61} Fissurectomy alone creates in essence an acute fissure with fresh wound edges, but does not address the underlying IAS spasm at the base of CAF pathogenesis. Few authors suggested that higher rates of fissure healing could be achieved if fissurectomy is combined with conservative pharmacological sphincterotomy.³¹

We adopted this novel sphincter-sparing procedure as second line treatment after failure of GTN and/or DIL course. We observed a long-term healing rate of 83.3%, significantly higher than all other medical approaches. Along with Lindsey et al., we believe that fissure healing is significantly higher with fissurectomy–botulinum toxin injection compared to medical treatment alone because with this treatment we are able to address both elements of chronic fissure, chronic fibrosis, and internal sphincter spasm. We observed a single case of transitory low grade incontinence (Wexner incontinence score=2). The main drawback of this approach is the need of an operating theater and the costs. Although five patients of this group experienced fissure recurrence or nonhealing with all requiring subsequent LIS at certain point, fissurectomy and botulinum injection reduces significantly the need of LIS. The paucity of minor side effects associated to the good healing rates indicate that botulinum injection/fissurectomy may be used as first line approach for selected CAF even without previous medical treatment. Our study confirms that medical treatment alone for chronic, well-established fissures might be inappropriate, merely delaying definitive fissure healing.¹⁴ We believe that BTX/fissurectomy should be offered as first line treatment for patients with typical CAF even without previous medical/conservative treatments. Patients at high risk for anal incontinence, young female patients, and patients with previous anal surgery can also be treated with BTX/fissurectomy. Botulinum toxin injection associated to a gentle fissurectomy seems to be very safe, reducing greatly the likelihood of surgery and abolishing the risk of incontinence. The main drawback of BTX/fissurectomy is the need of surgery and the costs. However, we believe that with the prompt and excellent healing rates (close to LIS), the absence of severe side effects or complications might justify the costs.

Failure of BTX/fissurectomy or recurrence indicates the need of LIS.

Our study confirms that LIS represents the most effective approach to CAF with minor morbidity and minimal recurrence rate. Although transitory postoperative inconti-

nence can be observed in up to one third of patients, in our experience we did not incur in any. Nonetheless, we did not observe any permanent incontinence.

Our general complication rate after LIS was approximately 10% within the range reported from the literature.³⁵

Although the proximal extent of the LIS continues to be a topic of debate, in our experience, by “tailoring” the amount of sphincter to be divided to the length of the fissure, the risk of incontinence is minimized as well as the fissure healing achieved.

The proximal extent of LIS up to the apex of fissure, although associated with a delayed healing and increased recurrences,^{16,35,61} minimizes the risk of continence disturbance. Proximal extent of LIS is particularly important in female patients because of the shorter length of the internal sphincter and vaginal deliveries that have been found to be a significant risk factor of incontinence after LIS.³⁰

In conclusion, although LIS is far more effective than medical treatments, BTX injection/fissurectomy as first line treatment may significantly increase the healing rate compared to standard conservative treatment. Moreover, this approach as first line treatment allows a faster healing time compared to medical treatments while avoiding any risk of incontinence if compared to LIS.

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