

Fissurectomy and anoplasty in posterior normotensive chronic anal fissure

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Abstract. *Purpose:* Anal Fissure (AF) is the second most frequent proctological disease in Italy. Chronic AF (CAF) most common located at the posterior anal commissure (CAPF). CAPF are thought to be associated with hypertonic internal anal sphincter (IAS) but manometric findings showed that a normotonic IAS is present in the 20-40%. Sphincterotomy is often recommended as treatment of choice for CAF independently from IAS tone; nevertheless, this approach appears less logical for CAF with normotonic IAS, as in those cases there's a higher risk of post-operative anal incontinence. The aim of this study is to evaluate the results of fissurectomy and anoplasty with V-Y cutaneous advancement flap, as treatment for patients suffering from CAPF without hypertonic IAS. *Methods:* We enrolled 30 patients affected by CAPF without IAS hypertonia. All patients were followed up for 2 years after the surgical procedure, with evaluation of anal continence, recurrence rate and maximum resting pressure, maximum squeeze pressure, ultraslow wave activity. *Results:* All patients healed within 40 days after surgery. We didn't observe any "de novo" post-operative anal incontinence cases. We reported 2 cases of recurrences, within 18 months from surgery, all healed after conservative therapy. We didn't record statistically significant differences in pre- and post-operative manometry findings. *Conclusion:* At 2 years after the surgical procedure we achieved good results, these evidences shows that sphincter preserving procedures are more suitable for CAPF without hypertonic IAS.

Key words: proctology, anal fissure, anoplasty, sphincterectomy, fissurectomy.

Introduction

Anal Fissure (AF) is the second most frequent proctological disease in Italy(1). Post-defecation anal pain is a high intensity symptom, which can last from minutes to few hours, causing profound discomfort and worsening of the quality of life(2). This disease more frequently occurs in young people, without significant differences between genders(3). AF are classified in acute and chronic; acute AF tends to heal spontaneously or after conservative treatment, usually within 6 weeks; the AF that are refractory to medical therapy

after 6 weeks are defined as chronic AFs (CAF). From a morphologically point of view, the typical feature of CAF is the appearance of internal anal sphincter (IAS) fibres at the base of the lesion, associated with indurated edges, sentinel pile and hypertrophied anal papilla. Most common location for CAF is the posterior anal commissure (CAPF), followed by the anterior one. Usually CAPF are thought to be associated with hypertonic IAS, this characteristic seems to have an important role on the pathogenesis of this lesions; nevertheless, manometric findings showed that a normotonic IAS is present in the 20-40% of CAPF(4-7).

In the CAFs that does not heal with an appropriate medical-dietary therapy, the surgical approach become the needed treatment. Lateral Internal Sphincterotomy (LIS) is still recommended as the treatment of choice for CAF, independently from IAS tone, it leads to a reduction of the IAS tone as well as to an improvement of perianal blood supply. This is why this approach appear sensible for CAF with hypertonic IAS, but less logical for CAF with normotonic IAS, as in those cases there's a higher risk of post-operative anal incontinence occurrence(8,9).

The aim of this study is to evaluate the results of fissurectomy and anoplasty with V-Y cutaneous advancement flap, as treatment for patients suffering from CAPF without hypertonic IAS.

Material and Methods

From January 2014 to January 2018 112 patients affected by idiopathic and non-recurrent CAF, underwent fissurectomy and anoplasty with V-Y cutaneous flap advancement, of which 30 (26,7%) resulted to have CAPF with normotonic IAS. All patients were followed up for at least 2 years after the surgical procedure. The patients' outcome data were retrieved from a prospectively monitored database. None of the patients was affected by inflammatory bowel disease or underwent to previous proctology surgical procedure(10).

We conduct this study in compliance with the principles of declaration of Helsinki, the protocol for this study has been submitted to the Ethical Committee of our institution, which did not consider necessary to approve it. Written informed consent was obtained from all of the study participants.

Preoperative manometric evaluation was performed after a reasonable period of time of suspension of all medical therapy influencing IAS tone. The manometric evaluation was carried out by a manometric sensor (2.1 mm external diameter) with four circle orifices and a latex microballoon at its extremity (Marquat C87; Boissy, St-Leger, France). The machine was connected to a polygraph (Narco; Byosystem MMS 200, Houston TX) using the station pull-through method with perfusion of normal saline and the patient lying in the right lateral position. At manometric evaluation,

maximum resting pressure (MRP) and maximum squeeze pressure (MSP) were defined as the maximum pressure detected respectively, on resting and after voluntary contraction. Ultraslow wave activity (USWA) was defined as pressure's waves with frequency of less than 2/min and an amplitude greater than 25 cm H₂O(11).

Data collected on healthy subjects by our anorectal pathophysiological laboratory showed(12,13), that normal values of MRP and MSP were respectively $68,1 \pm 12,3$ mmHg and $112 \pm 36,2$ mmHg; USWA was detected in the 10% of patients. In accordance to Jones et al.(8) the range values of MRP were 45-85 mmHg, so that CAAF with hypertonic IAS were defined as those with MRP values > 85mmHg. Manometric follow up was performed at 12 and 24 months after the surgery.

All patients underwent fissurectomy and anoplasty with V-Y skin flap advancement lying in a gynecological position under spinal or general anesthesia. In order to expose the anal canal we used four Kocher pliers placed at 3,6,9 and 12 hours to avoid employing anal retractors; an Eisenhammer retractor or a speculum have been gently introduced just in case of necessity.

After injection of 5 ml of a local solution of 100mg cloridratemepivacaine and 0,025 ml L-adrenaline, the fibrotic edges were excised with a scalpel until normal non-fibrotic anodermal tissue showed sufficient bleeding. The sentinel skin tag and hypertrophied papilla at the level of dentate line were excised when present(14). The tissue at the base of the fissure was curetted until there were clean muscle fibers of the IAS. There hasn't been any use of diathermy and careful attention was payed to avoiding damages of the IAS. Standard advancement anoplasty was performed using a flap of healthy skin tissue which was mobilized and then advanced with its blood supply to fill in the defect. The flap was secured without tension to the anal canal and the skin was closed tension free in a V-Y manner with interrupted rapid absorbable suture behind the advancement flap(15).

All procedures were carried out by the same senior surgeon, who has 15 years-experience in this surgical field (GDV). Before surgery, all patients received a small volume of phosphate-saline enema. Metronidazole was administered intravenously in a dose of 500mg

1h before surgery. Subsequently, it was administered per os at the dosage of 250 mg for 7 days, three times daily.

During the first two weeks after the surgery, patients took variable doses of psyllium fibers. A laxative preparation (sennosides) was given orally to subjects who had not yet passed stools 3 days after surgery. Enema, suppositories and all rectal manipulation were avoided. Immediately after surgery, all patients received 100 mg of diclofenac intramuscularly for analgesia and were instructed to take only 100mg of nimesulide tablets as requires. The primary goal of the study was the patient's complete healing and the evaluation of incontinence and recurrence rate; the secondary goal included evaluation of MRP, MSP, USWA, symptom relief (bleeding, itching and pain). A complete healing was defined as a complete epithelialization of the advancement skin flap.

Both duration and intensity of pain post-defecation were evaluated. Pain intensity was scored with a visual analogical scale (VAS) from 0 to 10, where 0 corresponded to no pain and 10 to the worse pain conceivable. Anal incontinence was assessed preoperatively and after, 12 and, 24 months form surgery using the Pescatori grading system(16): A incontinence for flatus and mucus; B for liquid stool; C for solid stool; 1 for occasional; 2 for weekly and 3 for daily. Patients were discharged 24 hours after surgery, afterwards they were examined until they were completely healed and they were also followed up until 24 months following the surgical procedure. Independently of the scheduled appointments, patients were seen on request.

Statistical analysis

Continuous variables were expressed as a mean with standard deviation and qualitative data as absolute frequencies, MRP values were also given as median and range. Student's *t*-test with Welch correction was used to analyze the differences of pain score and pain duration at each registration point. Values of $P < 0,05$ were considered statistically significant.

Results

This study includes 6 women and 24 men. At the moment of surgical procedure, the median age of the patient was 36 years (range 19–60).

As for the clinical presentation, the patients object to study had a mean duration of symptoms of $25,2 \pm 12,3$ months; all of them presented pain, in the 66% of cases bleeding was detected and the 40% had pruritus. At anal canal examination we found that 22 patients (73,3%) presented an hypertrophied anal papilla and 18 (60%) had a skin tag. Bowel function was normal in 6 patients, 23 patients suffered from constipation and 1 from diarrhea; bowel function was assessed according to the up-dated Rome IV diagnostic criteria. Three women were nulliparous, 1 gave natural birth and all of them underwent an episiotomy and 2 patients gave birth throughout a caesarean section.

Healing fissure and relief of symptoms

We achieved complete wound healing, in all patients, in 40 days. Intensity and duration of post-defecation pain was significantly reduced with respect to the pre-operative values starting from the first defecation ($p < 0,01$)Table1. None of the patients complained about pain, bleeding or itching 40 days after surgery. Analgesics consumption decreased significantly after first defecation.

Incontinence

We recorded 2 cases of pre-operative anal incontinence (6,7%), 1 case were type A1 and 1 was type A2 according to Pescatori grading system. In these patients, anal incontinence resulted not modified after surgery,

Table1. Intensity of pain evaluated by VAS and duration of pain expressed in minutes after defecation

	Intensity of pain	Duration of pain
Preoperative	8,5(1,3)	165(40,3)
1st defecation	4,2(1,5)*	100(35,1)*
3rd defecation	4,1(1,1)	60,5(20,8)
5th defecation	3,0(0,6)	30,2(12,3)
7th defecation	2,2(0,7)	10,4(5,1)
9th defecation	0,8(0,3)	5,1(2,8)
10th defecation	0,2(0,4)	2,8(0,7)

Values are expressed as mean and (SD). Student's *t* test with Welch correction was used to compare the difference between each point. Significance. 1st defecation vs preoperative * $P < 0,01$ * $P < 0,01$

nor the manometric findings. We didn't observe any "de novo" anal incontinence case after 12 and 24 months after surgery.

Recurrences

We reported only 2 cases of recurrences (6,7%), all of them occurred within 14 to 18 months from surgery. In both cases the recurrent lesion is not localised at the site of the previous one; both patients underwent a medical treatment consisting in implementation of fibres in the diet, employ of local products containing nifedipine or lidocaine and anal dilators. Both patients responded to the conservative treatment with a complete healing.

Manometry findings

Pre-operative MRP values have been found to be $65,3\pm 15,1$ mmHg (range, 50-82 mmHg), whereas, MSP ones resulted to be 112 ± 22 mmHg; USWA detection rate was 4 of 30 (13%). We didn't record statistically significant differences among pre-operative values of MRP, MSP and USWA at 12 and, 24 months, post-surgery ones Table 2.

Complications and follow up

There were no cases of urinary retention, anal stenosis or keyhole deformity. No necrosis of the transposed flap was observed. The only complications recorded post-operatively were of slight entity and in no case required further surgery; in particular, 2 infections were detected in the donor site and a partial break down of the flap occurred in one case.

Discussion

The results of our study show that fissurectomy and anoplasty, as a treatment for CAPF without hypertonic

IAS, allows a fast resolution of clinical symptoms as well as a fast healing of the wound. We recorded a low rate of recurrence (6,7%); we didn't observe any "de novo" case of post-operative anal incontinence and patients pre-operatively suffering from it didn't experienced any changing. Moreover, post-operative, at 12 and, 24 months post-surgery MRP, MSP and USWA values were similar to the preoperative ones.

LIS has been recommended as treatment of choice for CAPF, which are refractory to pharmacological therapy. This surgical procedure is characterized by a low rate of post-operative complications and by a high rate of healing, above 95% and, it allows an immediate improvement of pain (17,18). Furthermore, LIS is associated with significantly high incidence of post-operative anal incontinence, which has a strong impact on the quality of life of patients and it can be more disabling than CAF itself (19,20); as a matter of fact, patients tend to bear better the recurrence than the faecal incontinence (21). Nowadays is well known that anal incontinence can occur many years after a sphincter damage, the normal weakening of the sphincter fibres with the age or other insult can influence continence alteration during lifetime (22). Chowcat et al. (23) reported that patients with low sphincter pressure showed a further reduction with aging.

According to a systematic review of randomized surgical trials, the overall risk of continence disturbance after LIS is 10%, but can reach values as high as 35% from non-prospective uncontrolled data (24). Variation of these values could be due to operative technique, length of follow up or different criteria used to define anal incontinence. A low rate of anal incontinence incidence has been reported by Pescatori et al. (25), who performed a tailored sphincterotomy in patients affected by CAF with normotonic IAS and a standard one in patients affected by CAF with hypertonic IAS.

LIS for CAPF without hypertonic IAS expose the patients to a higher risk of anal incontinence by

Tabella 2. MRP and MSP value assessed preoperatively and 12 and 24 months after surgery. Statistical significance: MRP pre-operative vs 12 months post operative $p=0,44$; MRP pre-operative vs 24 months post operative $p=1$; MSP pre-operative vs 12 months post operative $p=1$; MSP pre-operative vs 24 months post operative $p=0,62$

	Pre-operative	12 months after surgery	24 months after surgery
MRP (mmHg)	112±22	110±20	115±25
MSP (mmHg)	65,3±15	68±12	63±19

reducing the IAS tone. A series of 177 patients underwent LIS(26), showed that 6 weeks after the procedure MRP values diminished from $106\pm 21,5$ mmHg to $80,9\pm 10,4$ mmHg ($P<0,001$). The MRP values defined as normal in healthy patients have an upper limit at 90 mmHg, so that, patients with pre-operative MRP <90 mmHg had a 3,2% of soiling; whereas, patients with pre-operative MRP values >90 mmHg had 0,7% of soiling(27).

In various series and guidelines LIS is not the first line therapy for CAF without hypertonic IAS; Marti et al. (28) in Germany reported fissurectomy as the treatment of choice for all CAF regardless to the IAS tone; Higuera(29) in France, said that there are controversies about the employ of LIS, while fissurectomy and anoplasty is preferred. In Italy, Altomare et al. (30) support anoplasty for patients affected by CAF with hypertonic IAS; in Spain, Alonso-Cohelo et al. (31) recommended fissurectomy in patients with CAF but no sign of IAS hypertone. In UK Holzgang and Jane (32) reported that LIS is suitable for CAF and high pressure of the IAS; ACPGBI guidelines (33) recommend the use of advancement flap in patients affected by CAF with normal or low IAS pressure. In Egypt Emile (34) treats patients with manometry normal or low MRP with fissurectomy and cutaneous V-Y flap anoplasty.

As the clinical examination doesn't allow the correct identification of patients affected by CAF with normotonic IAS, it is sensible to perform an anorectal manometry. Surgeons' ability to distinguish between normotonic or hypertonic IAS is poor. Jones et al.(8) reported in their study that the clinical assessment of the sphincter tone alone, managed to identify 14 of the 15 patients with manometry proven high MRP, with a specificity of 93%; whereas, it allowed the identification of only 4 of the 25 patients with manometry proven low or normal MRP, with a sensitivity of 16%; moreover the clinical assessment of sphincter tone has been shown to have a positive predictive value of 40% and a negative one of 80%. In one of our research, anorectal digital exploration in patients affected by CAPF agreed with manometry evaluation in those patients with manometry proven very high MRP (>100 mm Hg), but managed to diagnose only 2 of the 16 patients with manometry proven normal MRP (data not shown). So that in order to reduce the risk

of faecal incontinence in patients affected by CAPF without hypertonic IAS, it is mandatory to perform anorectal manometry(35).

Fissurectomy is the most common surgical procedure used in order to preserve structural and functional integrity of the IAS(36,37). The employ of a flap to cover up for the naked area after fissurectomy(38,39), is designed to relocate in this area healthy and fresh blood supplied tissue, perfused by different arterial district. Another possible advantage of using a flap might be represented by the enlarging effect on the cutaneous circumference of the anal canal, which reduces the risk of splitting.

Several surgical techniques for the use of flaps have been described, we number among them the employ of skin or mucous flaps, skin ones are most frequently hired. Various type of skin flaps are known, such as sliding skin grafts, house advancement flap, V-Y advancement anoplasty, island advancement flap and rotation flap(40-42). All results obtained with different flaps are overwhelming and the outcome is found to be better than the fissurectomy alone or associated with pharmacological sphincterotomy(43-48).

Even if fissurectomy associated with anoplasty has been found to have very good results, we must consider the post-operative complications related to the flaps' surgical performing, infection and dehiscence are the most commonly observed, with an incidence rate of 5-10%; however, they didn't often require a further surgical approach in our experience these latter have been of slight entity and didn't require any further surgery.

Conclusion

Our study shows that fissurectomy with anoplasty with V-Y cutaneous advancement flap is a feasible and safe procedure for the treatment of CAPF without hypertonic IAS. This latter procedure has been found to lead to a fast resolution of symptoms, it is burdened by a low rate of recurrences and it doesn't cause any anal continence alteration. Nevertheless, further randomised trials are necessary to better define the role of this surgical approach by comparing this latter procedure to others most commonly employed.

Conflicts of interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

Consent section: Informed written consent was obtained from all individuals participants included in this study.

Ethics approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The Ethical Committee of our institution did not consider necessary to approve this research.

Availability of data: The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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