"Core out" or "curettage" in rectal advancement flap for cryptoglandular anal fistula

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Abstract

Aim Transanal advancement flap is a recognized technique for complex fistula. Management of the tract is open to discussion. Excision of the tract by the "core out" technique is difficult and could increase the risk of sphincter damage. Curettage is easier but it could increase the risk of recurrence. The aim of the present study was to assess the effect of both techniques on sphincter function and to study the clinical results.

Method This is a retrospective analysis from a prospective database. One hundred nineteen consecutive patients with high cryptoglandular anal fistula were included. "Core out" technique was performed in 78 patients (group I) and "curettage" in 41 (group II). In both, a full-thickness rectal flap was advanced over the closed internal defect. Anorectal manometry was performed to assess sphincter function. Continence was assessed using the Wexner Scale. Recurrence was defined as the presence of an abscess or fistulization.

Results Manometric results showed a significant decrease in the maximum resting pressure after surgery in both groups. The maximum squeeze pressure was significantly reduced only in group I ($p<0.001$). No significant changes in Wexner score were observed. The overall recurrence rate was 5.88 %, five of group I (6.4 %) and two of group II (4.9 %), without statistical significance ($p=0.74$).

Conclusions The core-out technique causes a significant decrease in squeeze pressures, which reflects damage to the external anal sphincter. This could lead to incontinence in high-risk patients. Curettage is a simple technique that preserves the values of squeeze pressures without increasing recurrence rates.

Keywords Anal fistula · Rectal advancement flap · Incontinence score · Anal manometry

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Introduction

The endorectal flap advancement procedure is based on the premise that the key to healing is the closure of the high pressure side of the fistula. This technique achieves a secure closure of the internal opening and theoretically preserves the normal anatomy and function of the anal canal. However, the fact remains that the results in terms of success rates and incontinence are heterogeneous (1).

Several surgical procedures have been developed to minimize recurrences and fecal incontinence, including the

insertion of a collagen bovine sponge impregnated with gentamicin sulfate beneath an endoanal flap (2) or the fibrin glue obliteration of the fistula tract combined with flap repair (3). Many other changes in surgical technique have also been studied, such as the use of full- or partial-thickness rectal flaps, curved incisions and rhomboid flaps, the closure or non-closure of the internal opening, and the best shape and size of the flap (4–10).

However, the impact that the different ways to treat the fistula tract might have on the results of transanal flaps has not yet been studied. The "core out" technique to treat the fistula tract has been widely used. The coring procedure is rather tedious; it can be very difficult in some tracts and could increase the risk of sphincter damage. Debridement and curettage of the tract is an easier procedure and produces a satisfactory outcome as other authors have shown (10), but it could increase the risk for inadequate drainage and subsequent non-healing (9).

The aim of the present study was to assess the effect of both techniques on sphincter function using anal manometry and to study the clinical results, focusing on recurrence rate and continence.

Patients and methods

We retrospectively analysed a prospectively entered database. From January 1995 to June 2013, 139 consecutive patients were treated using the endorectal advancement flap for complex anal fistula in our institution. Fistulas were registered following Parks's classification and can be defined as complex fistulas as those with tracts cross more than 50 % of the external sphincter, presence of high secondary tracts or chronic abscess cavities, fistulas associated with Crohn's disease, and preexisting high risk factors of incontinence. If an associated abscess was detected, a drainage was performed prior to the definitive treatment. Clinical exams and endoanal ultrasounds with B&K Medical completed the preoperative study.

Patients with history of Crohn's disease, with fecal incontinence prior to surgery and mucosal advancement flaps were excluded in this retrospective analysis. Therefore, all patients included in the study had complex cryptoglandular fistulas with complete preoperative continence and full-thickness flap.

The present series comprised 119 patients, 80 men and 39 women. Their median age at the time of surgery was 50 (range 22–79) years. Eleven patients (9.2 %) had been previously operated one or more times before referral to our hospital or the establishment of Section of Coloproctology.

This medical analysis was approved by a research ethics committee.

Surgical procedure

Standard mechanical bowel preparation alongside antibiotic and antithromboembolic prophylaxis was used. The surgery was performed using regional or general anesthesia, and the positioning of the patient depended on the location of the internal opening: lithotomy in posterior fistulas and jackknife in anterior fistulas. All operations was executed by or under the supervision of the same accredited colorectal surgeon.

Patients of Group I ("core-out" technique) From 1995 to 2009, "core-out" of fistula tract was the election technique. The primary tract was dissected from the external to the internal opening. After assessing the extent of the fistula, an incision around the skin was made and the incision was developed
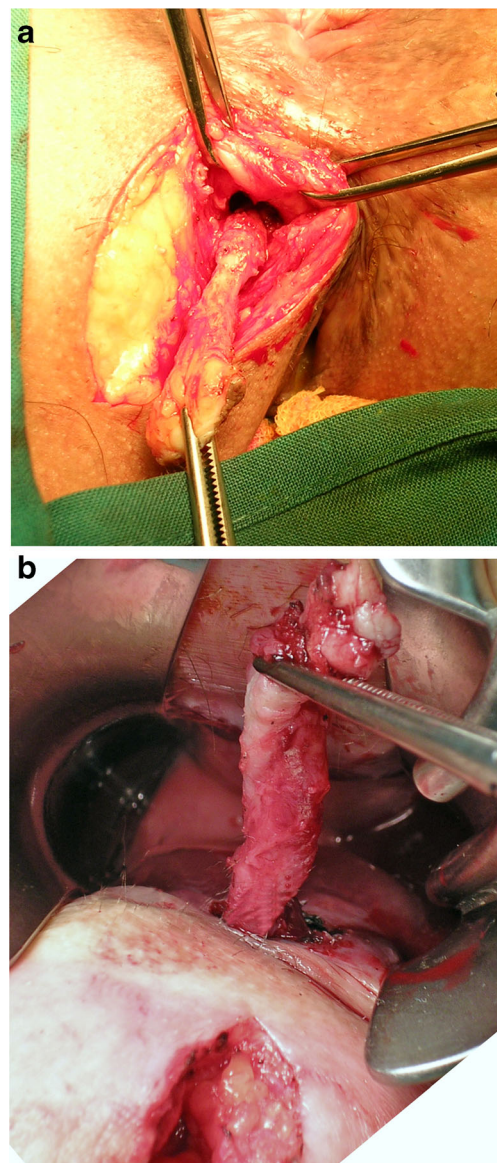

Fig. 1 "Core out" technique. **a** The fistulous tract is cored out through the external sphincter muscle. **b** Complete extirpation of the fistulous tract

sufficiently to expose the adjacent borders of the sphincter muscles. After identifying the primary internal opening, a transverse elliptical incision was made around it, covering the full thickness and deepening outwards in cone shape. The main fistulous tract was cored out through the external sphincter muscle. The crypt-bearing tissue around the internal opening of the fistula was excised along with the main tract. Thus, the complete extirpation of the fistulous tract was achieved. (Fig. 1a, b)

Patients of group II(curettage technique) Since 2010 only curettage has been executed. The tract of the fistula was treated by drainage rather than excision. Skin around the external opening was excised and the granulation tissue lining the tract was curetted with a sharp spoon, taking heed of not damaging the external sphincter. If cavity was associated, this is externally drained using a Pezzer catheter. Subsequently, the internal opening of the fistula was excised along with the cryptoglandular infective focus through the internal sphincter up to the intersphincteric space. The fistula tract in the external anal sphincter was only curettaged.

The other steps of the procedure have been described previously (11) and are the same for both groups. A full thickness of rectal wall was dissected proximally using cutting diathermy to minimize bleeding and advanced over the closed internal defect. Preservation of the integrity of the internal sphincter distal to the internal opening must be of great importance in our experience. Patients were treated with liquid diet during 4 days, followed by normal diet and bulk laxatives.

Follow-up

The data for patients recruited into the study were prospectively collected into database. Demographic characteristics (age, sex, smoking, ASA), previous anorectal operation, type and origin of the fistula (anatomy, horseshoe extensión, supralevator cavity), and surgical outcome (postoperative stay, complications, recurrence, and incontinence) were recorded.

Clinical results were obtained from direct interview and exploration at a minimum follow-up of 12 months. Healing of the fistula was defined as complete wound healing and closure of all external openings in combination with absence of symptoms. Recurrence was defined as the presence of an abscess arising in the area or evidence of fistulization.

All patients were questioned about incontinence symptoms according Wexner Continence Grading Scale (WCGS) (12) before and 3 months after operation. The score can vary from 0: perfect continence to 20: complete incontinence. Continence was considered unaffected when there was no change in continence score and deteriorated when the score decreased after surgery. An increase of one to three points was considered as minor, and of four points or more as a major decrease in continence.

The functional outcome of fistula surgery has been also quantified by anal manometry, preoperatively and 3 months after surgery. The anorectal manometry was conducted by an independent researcher of Digestive Motility Unit of Clinic Hospital of Valencia, and we completed the full study in 93 patients (78.1 %). It was performed using a low compliance water perfusion system (Arndorfer Medical specialties, Greendale, WI, USA) with a four-lumen catheter (Synectics Medical, external diameter, 4 mm; Synectics AB, Stockholm, Sweden), having radially arranged ports in cross section. With the patient in the left lateral position and the hips flexed to 90°, the catheter (lubricated lightly with water-soluble gel) was inserted into the rectum, so that the manometric holes were situated 6 cm from the anal verge. After a 60-s delay, the catheter was withdrawn from the rectum in 0.5-cm steps, remaining for at least 1 min at each station to ensure that the pressure there had reached a plateau, then asking the patient to squeeze maximally. Maximum anal resting pressure (MRP) and maximum squeeze pressure (MSP), obtained as the maximal voluntary anal contraction related to basal rectal pressure. Reference values of our laboratory (healthy volunteers matched by age and sex) were used as normal values.

Statistical analysis

Statistical analysis was performed using SPSS version 22.0 for Mac (SPSS, Chicago, IL, USA). Variables are presented as percentage or as mean±SD and range for all numerical variables. Categorical variables were analyzed using the chi-square Pearson. Continuous measures were analyzed using the Mann-Whitney U test for independent variables and the Wilcoxon test for associated variables. $P<0.05$ was considered statistically significant. The cumulative probability of recurrence was analyzed by the Kaplan-Meier method and compared using the log-rank test.

Results

A total of 139 patients underwent endorectal advancement flap repair for anal fistula at this center. Patients with history of Crohn's disease ($n=4$), fecal incontinence prior to surgery ($n=10$), and mucosal advancement flaps ($n=6$) were excluded from the analysis. Finally, 119 patients with complex cryptoglandular anal fistulas were qualified for inclusion into this study (Fig. 2). Seventy-eight patients were treated with "core out" (group I) and 41 with curettage (group II).

Demographic and clinical characteristics are shown in Table 1. No statistically significant differences between the two groups were found. Fistula type, previous drainage, previous fistula surgery, horseshoe extension, or supralevator cavity were evenly distributed (minimum $p=0.12$) (Table 1).

Recurrence

All patients were followed for a minimum of 1 year, and the overall median follow-up period was 23 months. *Fistula recurrence* occurred in seven patients: five (6.4 %) of group I and two (4.9 %) of group II, giving an overall recurrence rate of 5.9 %, without statistical differences between the two groups ($p=0.74$). All recurrences were detected during the first 6 months after operation. The cumulative incidence of recurrent fistula is shown in Fig. 3, with no differences between the 2 groups (log-rank test $p=0.716$). Five patients in whom the procedure failed underwent new surgery using the same technique and healed. Two patients recurred with a low intersphincteric fistula, which could be handled with fistulotomy.

Manometric and clinical results

Manometric results are shown in Fig. 4. Resting pressure (MRP) decreased significantly in both groups after surgery. In group I, there was a significant decrease from 87.3±27.4 to 47±20.1 mmHg ($p<0.001$) and in group II from 92.8±34.2 to 44.3±20.6 after operation ($p<0.001$).

Maximum squeeze pressure (MSP) decreased significantly in group I from 240.3±99 to 189.9±78.9 mmHg after surgery (p<0.001), but in group II, it did not differ significantly between preoperative and postoperative values (217.3±74.8 to 203.8±77.6 mmHg) ($p=0.1$).
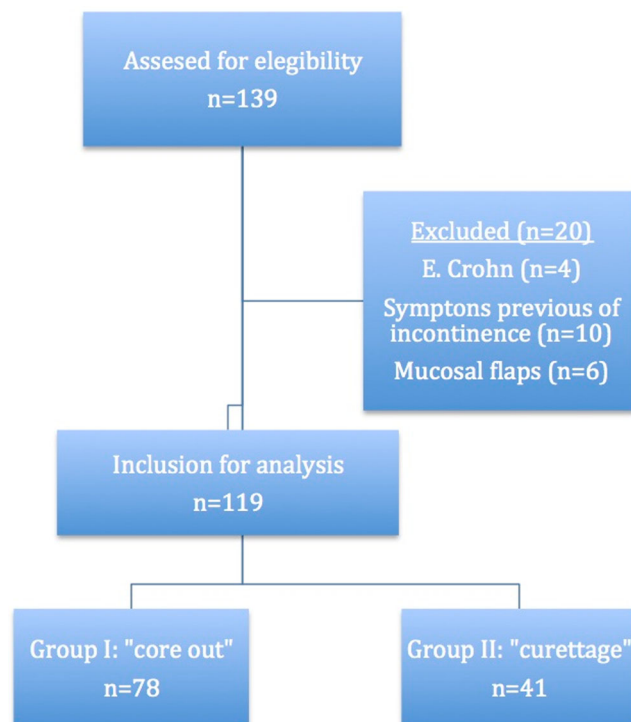
Wexner questionnaire data are summarized in Fig. 5. All patients had a Wexner score of 0 at preoperative assessment. At postoperative assessment, a Wexner score of 0 was identified in 76.5 % of all scored patients, 59 patients of group I (75.6 %) and 32 of group II (78 %) ($p=0.3$). The proportion of patients with a postoperative minor increase of the Wexner score was 19.2 % in group I and 22.0 % in group II, while 4 (5.1 %) patients of group I and none of group II had a major increase of the Wexner score postoperatively.

In particular, in the four patients with a major increase of the Wexner score, the preoperative MSP was significantly lower than the other patients in group I (139±29.3 vs 248.2 ±98.3, $p=0.02$), maybe defining a group of patients at high-risk for incontinence.

Discussion

The outcome of patients with complex fistulas and the actual value of the procedure are determined by two factors: anal continence and recurrence. The technique of rectal advancement flap has the practical advantages of curing and preserving the normal anatomy and function of the anal canal. Good results using this technique have been reported in the literature, but there is a wide range of success rates and heterogeneous results, both in relation to continence or recurrence rates (1, 10, 13–18).

Fig. 2 Study flow chart

Table 1 Demographic and clinical characteristics

	Group I Core-out (n=78)	Group II Curettage (n=41)	P value
Sex, Male, n (%)	54 (69.2 %)	26 (63.4 %)	0.51
Age (mean±SD), years	48.6±12.4	52±12.2	0.53
Smoking, n (%)	36 (46.2 %)	19 (46.3 %)	0.88
ASA grade, n (%)			
1	35 (44.9 %)	16 (39 %)	0.34
2	37 (47.4 %)	24 (58.5 %)	
3	6 (7.7 %)	1 (2.4 %)	
Previous abscess			
No	17 (21.8 %)	4 (9.8 %)	0.24
1	34 (43.6 %)	22 (53.7 %)	
>1	27 (34.6 %)	15 (36.6 %)	
Previous fistula surgery	10 (12.8 %)	1 (3.1 %)	0.12
Anatomy of the fistula			
Medium transsphincteric	22 (28.2 %)	10 (24.4 %)	0.89
High transspincteric	52 (66.7 %)	29 (70.7 %)	
Suprasphincteric	4 (5.1 %)	2 (4.9 %)	
Horseshoe extension	22 (28.2 %)	7 (17.1 %)	0.18
Supralevator cavity	9 (11.5 %)	6 (14.6 %)	0.63

The wide variability of results between different institutions and surgeons is a fact and suggests that technical factors might play a significant role in the outcome of an advancement flap. Several RCT (randomized controlled trials) have failed to show improved outcomes with surgical variations, and there are only a few recognized factors that might increase the risk of failure, such as smoking or concomitant obliteration of the tract with injection of fibrin glue or plugs (2, 3, 19). Some authors have suggested that a full-thickness flap is better than just a mucosal flap, and reported an improvement of recurrence rates without higher incontinence rates when a full mobilization of the rectal wall is performed (4). Likewise, a prospective randomized study (5) concluded that partial thickness is better than mucosal advancement flaps. The modifications of the flap are not the object of this study, but like Lewis (10), we believe that full-thickness flaps of the rectal wall increases the strength and vascularity of the suture sites and provides a thicker cover for the deep end of the fistulous tract. We always design a flap about half a circumference of the anorectal canal, and it is mobilized to cover without tension the closed end of the track. It also seems important to be careful to keep the distal internal sphincter intact, therefore preventing a keyhole deformity of the anal margin that can lead to mucus or stool leakage.

Regarding the fistulous tract, it is common for many surgeons to manage it by "coring out" the tract (8, 9, 16, 20, 21), from the external to the internal opening. The coring procedure is time-consuming, and it would be very difficult in horseshoe tracts. Furthermore, when the tract is cored out through the external sphincter muscle, it may be damaged. Debridement and curettage of the tract is a much easier procedure and some authors have shown satisfactory outcomes (10, 14, 18), but it could increase the risk of inadequate

drainage and recurrence (9). However, the comparison of consequences and results of "core-out" or curettage of the fistulous tract have never been analyzed.

Manometry has been performed in few studies on endorectal advancement flaps (6, 9, 22–24). Our results revealed a significant decrease in resting pressure after the advancement flap in both groups. Resting anal pressure mainly reflects the function of the internal anal sphincter, and its decrease indicates involvement of the internal sphincter in the full-thickness flap. Some of the other manometric studies show similar results (6, 9), and this reduction was only present when the flap included the anorectal muscle layer (25). Maximum squeeze pressure is a measure of the external anal sphincter function, and some investigators have found it to decrease after advancement flaps (6, 24). The anal dilation during surgery has been postulated as a possible cause (26). In our experience, MSP showed a significant decrease only in
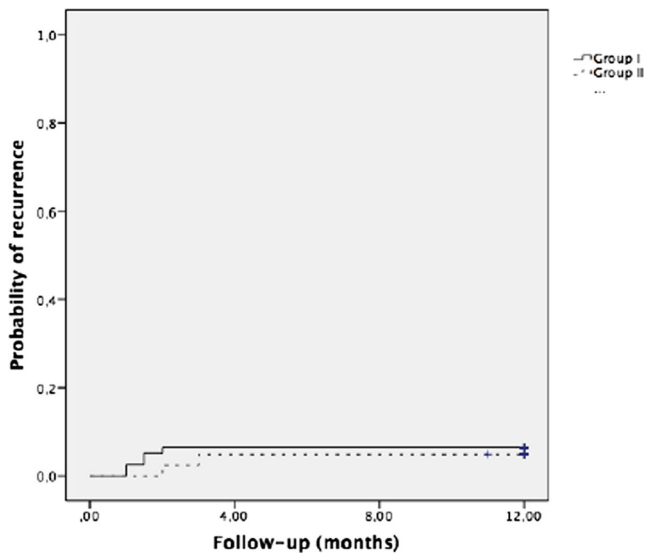

Fig. 3 Cumulative overall recurrence rate of perianal fistulas after flap according to surgical technique. Group I, "core out"; group II, curettage. *P*=0.713 (log rank test)
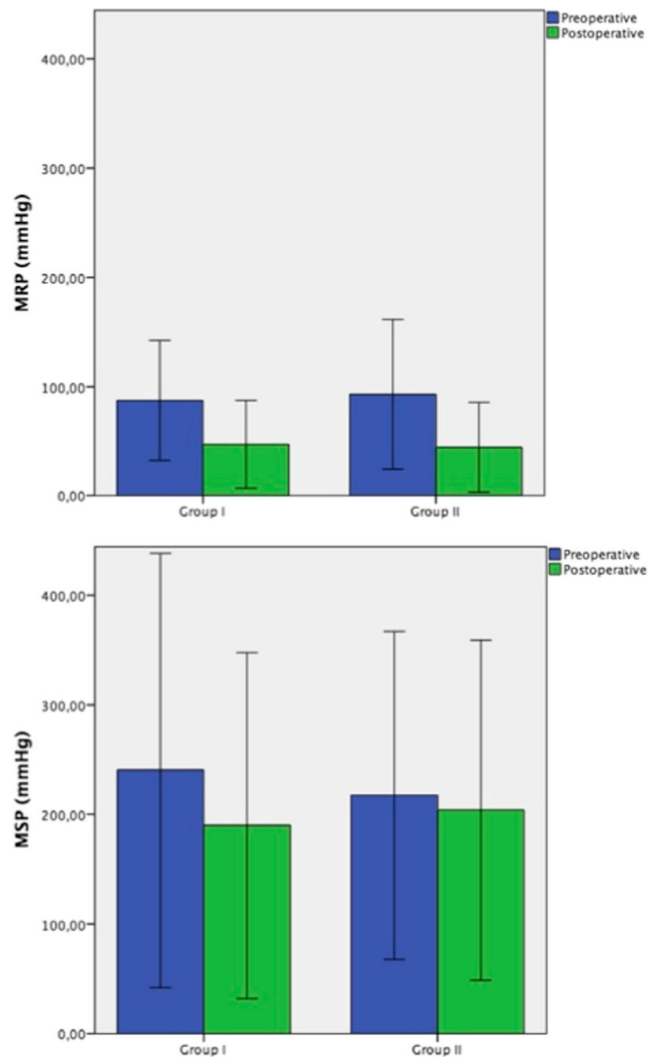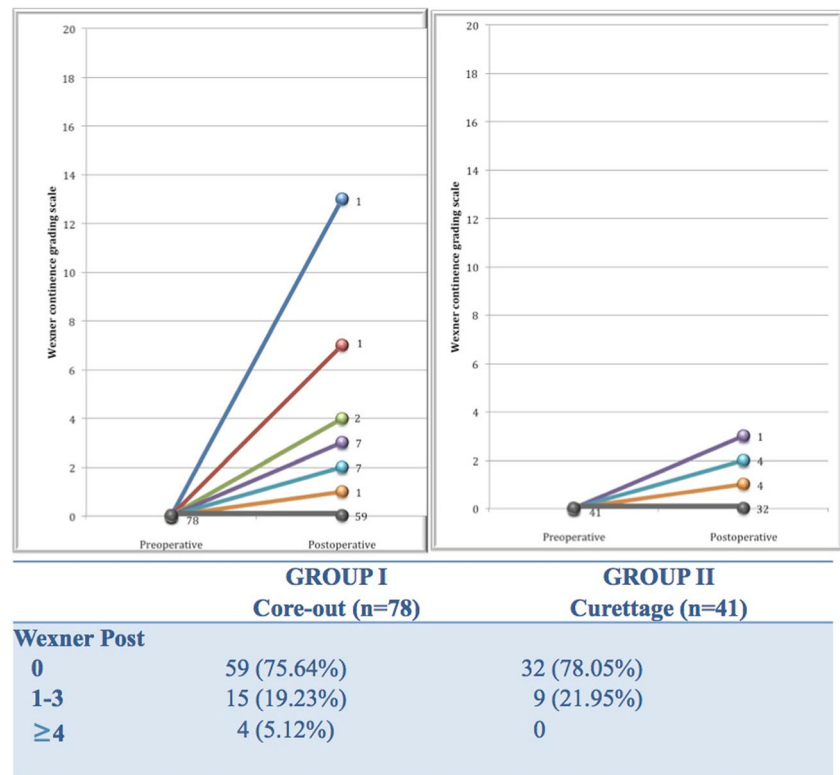

Fig. 4 Evaluation of anal manometric pressures before and after surgery. *MRP* maximum resting pressure, *MSP* maximum squeeze pressure. Group I, "core out"; group II, curettage

Fig. 5 Analysis of Wexner continence score in relation to surgical technique

	GROUP I Core-out (n=78)	GROUP II Curettage (n=41)
Wexner Post		
0	59 (75.64%)	32 (78.05%)
1-3	15 (19.23%)	9 (21.95%)
≥4	4 (5.12%)	0

the "core-out" group, whereas no changes were found in the curettage group, which could be explained by sphincter damage when the tract is tunneled from the sphincters.

Avoidance of fecal incontinence is one of the objectives of the different surgical techniques, and the endorectal advancement flap has been associated with a wide inter-study variability between 0 and 35 %, (4, 6, 8, 10, 13, 15, 20). Particularly noteworthy is the frequent omission of specific information in many studies, and as Soltani noted in a review of the literature, systematic evaluation and questioning of patients after transanal advancement flaps might reveal a much higher incidence of fecal incontinence (1). In our study, some symptoms of incontinence were found in 23.5 % of all patients, similar to other reports (4, 17). We report minor symptoms with a slight decrease in continence in 20 %; major disturbances (WCGS score >4) were found only in the "core out" group. Furthermore, we found that patients with major decrease in continence had significantly lower squeeze pressure before surgery than the other patients, despite scoring 0 in the Wexner score. It is possible that the "core-out" was the precipitating factor for incontinence in high-risk patients.

The reported success rates within an average follow-up of 28.9 months show a wide inter-study variability from 36 to 98.5 % (1) with large differences in recurrence rates from 2 to 43 %. We have obtained a mean recurrence rate of 5.8 %. The curettage group did not show worse recurrence rates, and there was no difference between the two treatment groups. Concerning the time point of recurrence, it has been reported

that it normally occurs within the first year after surgery (4, 27). In this study, all recurrences were detected during the first 6 months after surgery. Therefore, we also believe that extending the length of follow-up beyond 1 year is not necessary.

To the knowledge of the authors, this is the first study that compares core-out and curettage of the fistulous tract in rectal advancement flap for anal fistula. Although the study is retrospective, data were collected prospectively and the two groups resulted to have similar preoperative characteristics. Moreover, the fact that the same surgeon performed all the procedures, guarantees the uniformity of the surgical technique. Finally, the anal pressure measured by manometry, associated with the evaluation of the continence with a widely validated score system, allowed to assess the functional results of the two surgical techniques.

Conclusions

From the analysis of the data, it can be concluded that the core-out technique causes a significant decrease in squeeze pressures that reflects damage to the external anal sphincter. This can lead to incontinence in high-risk patients. Curettage is a simple technique that does not change the values of MSP, and presents the same recurrence rates.

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