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Impact of endorectal advancement flaps in fecal incontinence

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A B S T R A C T

Objective: The aim of this study was the prospective evaluation of the functional results of a series endorectal advancement flaps in the treatment of complex anal fistulas.

Material and methods: A total of 90 patients were operated on for a complex anal fistula by means of fistulectomy and endorectal advancement flap. The functional results were evaluated using the Wexner continence scale and an anorectal manometry study before and after surgery.

Results: There were 7 patients with fistula recurrence (7.7%) and the same surgical procedure was performed on 5 of them, resulting in healing in all cases. Significant reductions in maximum resting pressure (83.85 [30.96] vs 46.51 [18.67]; $P < .001$) and maximum squeeze pressure (220.97 [100.21] vs 183.06 [75.36]; $P < .001$) were seen 3 months after surgery. On the continence scale, 80% of patients had a normal continence with a value of 0 on the postoperative Wexner scale, while 20% recorded changes in continence values, most of them lower than 3 points.

Conclusions: Endorectal advancement flap is an effective surgical procedure in complex anal fistulas treatment, with a low recurrence rate. Only 20% of the patients showed changes in the continence value.

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Impacto de los colgajos transanales de avance en la continencia fecal

R E S U M E N

Objetivo: El objetivo de este estudio ha sido evaluar de forma prospectiva los resultados funcionales en una serie de colgajos de avance para tratar fistulas anales complejas.

Material y métodos: Se incluyó a 90 pacientes intervenidos por fistulas anales complejas mediante fistulectomía y colgajo transanal. Los resultados funcionales se valoraron mediante

Palabras clave:

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cuestionario de continencia anal (Wexner) y estudio manométrico anorrectal, preoperatorio y postoperatorio.

Resultados: La fístula recidivó en 7 (7,7%) casos y se repitió la misma técnica quirúrgica en 5, con curación en todos ellos. Después de 3 meses de la cirugía, se produjeron reducciones significativas en la presión máxima basal ($83,85 \pm 30,96$ frente a $46,51 \pm 18,67$; $p < 0,001$) y en la presión máxima de contracción voluntaria ($220,97 \pm 100,21$ frente a $183,06 \pm 75,36$; $p < 0,001$). Por lo que respecta al cuestionario de continencia fecal, el 80% de los pacientes mantuvo continencia normal con puntuación 0 en la escala de Wexner postoperatoria, mientras que los demás (20%) manifestaron cambios en la puntuación del cuestionario, la mayoría, menos de 3 puntos y con poca significación clínica.

Conclusiones: La reparación con colgajo de avance es una técnica efectiva para las fístulas anales complejas, con una tasa de recurrencia baja. El 20% de los pacientes modifican la valoración de su continencia en el postoperatorio..

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Introduction

Since transanal advancement flap repair was described by Noble¹ in 1902 to treat rectovaginal fistulae (RVFs), numerous modifications to this technique have been published. This technique is based on the complete or partial excision of the fistula tract and internal orifice and the creation of a flap to cover the internal defect of the fistula. Many authors have recently opted for a flap including all the muscular layer of the rectal wall in order to increase width and anastomotic area vascularisation.²⁻⁵ These complete-width covering flaps could affect postoperative continence.

However, the results published regarding continence vary greatly, with figures ranging from 8% to 35%.^{2,6-8} The objective of this study is to prospectively evaluate the impact of transanal advancement flaps in faecal continence, assessed through a continence questionnaire and anorectal manometric study.

Material and methods

Prospective study enhanced from a previously published series,⁹ where we included 90 patients surgically treated in our centre for complex anal fistulae in the period 1995-2007, who underwent transanal advancement flap repairs, which is our technique of choice for this condition. Severe sepsis, which forces set on induced drainage and complete treatment afterward, was the only criterion for not performing the transanal flap technique. In 5 patients with chronic intestinal inflammatory disease and complex anal fistulae, surgery was indicated in absence of inflammatory activity in rectal mucosa at the moment of the intervention. All patients were preoperatively studied by clinical examination and endoanal echography.

All patients received phosphosoda for colon preparation, as well as antibiotic and antithrombotic prophylaxis. Local or general anaesthesia was used. Patient position on operating

table depended on localisation of internal fistula orifice: lithotomy position in posterior fistulae and jackknife position for anterior fistulae.

Surgical procedure has already been described in detail.⁹ After fistulectomy, a complete-width flap was prepared to include the totality of the rectal muscular layer; the flap was advanced over the internal defect suture. Special care was taken to keep distal IAS complete and circumferential, where the flap was sutured with loose re-absorbable stitches. In 4 patients who were incontinent due to previous surgeries, the technique just described was combined with simple sphincter repair of injured external anal sphincter.

All patients were given a postoperative liquid diet with intestinal transit inhibitors for 3 days, followed by a fibre-rich diet. The average hospital stay was of 6 days (interval, 4-9).

All patients underwent a protocolised follow-up and answered a questionnaire on their symptoms related to continence (Wexner continence grading scale)¹⁰ before and after surgical intervention. Scoring in this scale ranges from 0, for normal continence, to 20, for maximum incontinence. Any Wexner >0 score has been considered as incontinence.

The anorectal manometry was performed by an independent researcher from the service of gastroenterology at the gastric motility unit of Hospital Clínico Universitario of Valencia. The data were taken with patient lying on left lateral recumbent position. A 4-channel catheter was used (Synectics Medical, External diameter, 4 mm; Synectics AB, Stockholm, Sweden) and continuous water perfusion (Arndorfer Medical Specialties, Greendale, United States) with radial distribution of orifices connected to a recording system. With the patient lying in this position, the catheter was introduced in the rectum and kept in for 10 to 15 min to proceed to withdraw it, stopping the probe every 0.5 cm to record pressure activity during at least 60 s. Both maximum pressure at rest (MPR) and maximum voluntary contraction (MVC) were measured. Laboratory reference values (same sex and age healthy volunteers) are considered normal values.¹¹

The preoperative and postoperative manometric study (3-4 months from surgery) was completed in 63 patients (70%). Due to organisation problems we do not have complete study of the other patients.

Quantitative variables are expressed as mean, standard deviation, and interval; and qualitative variables as frequencies and percentages. Comparisons between data were drawn by Student t test for paired data. A score of $P \leq .05$ was considered statistically significant.

Results

Transanal advancement flaps were performed in 90 patients with complex anal fistulae, 28 (31.1%) women and 62 (68.9%) men. Average age was 48.6 (interval, 24-78) years. Fistula classification was as follows: 59 high transsphincteric, 22 mid transsphincteric, 3 supra transsphincteric, and 6 ano-vaginal or recto-vaginal.

Cryptoglandular disease was the most frequent cause for fistulae (94.5%), and 5 cases (5.5%) were associated with chronic intestinal inflammatory disease with the characteristics described above. A simple external anal sphincter repair in 4 patients was associated with previous surgery history and incontinence symptoms. Follow-up mean has been of over 5 years (69.57 [37.7] months; interval, 10-157). Seven patients suffered fistula recurrence, with 7.7% overall relapse rate. Relapse occurred in 4 high transsphincteric, 2 mid transsphincteric, and 1 recto-vaginal fistulae. All relapsed early, presenting no fistula healing after intervention. The same surgical flap technique was repeated in 5 of these patients with complete healing results. In 2 cases left, one presented with relapse as simple sub-mucosa fistula and was surgically return to normal, whereas the 7th patient that relapsed has not agreed to being surgically treated so far.

Continence questionnaire

Results from continence are summarised in Table 1. Eighty patients (89%) presented with complete preoperative continence, whereas 10 (11%) said to suffer incontinence prior to surgery and were studied separately.

In this group of previously incontinent patients, mean assessment according to Wexner continence grading scale decreased after surgery from 5.3 (interval, 1-20) to 1.4 (interval, 0-4) and all patients improved, except 2 whose scores

remained the same. Also, a simple external anal sphincter repair was combined in 4 of the patients, and continence grading varied from 20, 8, 4 and 4 to 2, 2, 4 and 0, respectively. Surgery, therefore, improved continence in this group by 80% of the cases and half of them were given 0 in Wexner scale (Figure).

Considering completely continent patients (Wexner, 0) at preoperative stage (n=80), these experienced an increase in the mean scoring over the continence scale to 0.74 (interval, 0-13). It is important to note that 16 patients (20%) presented with changes in scoring at postoperative stage (Figure). Individualising these cases shows variations of less than 3 points in 11 patients (in relation only with gases) and in 5 (6.2%) variations were greater than 3 points, clinically evident by occasional liquid incontinence, and 2 with occasional solid incontinence.

Anorectal manometry

Manometric changes are shown in Table 2. A significant decrease is found in baseline maximum pressure (BMP) after surgery (83.85 [30.96] vs 46.51 [18.67] mm Hg; $P < .001$), as well as a decrease in maximum voluntary contraction (MVC) (220.97 [100.21] vs 183.06 [75.36] mm Hg; $P < .001$). Correlation studies show that postoperative MVC decreases more in patients with incontinence after surgery (147.8 [48] mm Hg) than in continent patients (184.7 [76] mm Hg) ($P < .07$).

In the previously incontinent group, manometric decreases that were not significant were found after surgery, whereas in the 4 patients with sphincter repair an improvement in BMP was observed (35.75 [15.7] vs 40.6 [17.7] mm Hg) with small variation in MVC (143.5 [62.2] vs 144.6 [75.2] mm Hg).

Discussion

Continence is the factor that most significantly relates to satisfaction after anal fistula surgical treatment. Recurrence and rectal advancement flap technique join the advantage of preserving the external sphincter with that of achieving a safe closure of the internal fistula orifice.

The best way to assess anal function is by validated questionnaires on faecal continence. Unfortunately, many authors just mention "slight degrees of incontinence" when referring to gas and faecal incontinence, with no more precise definition than such. Furthermore, some articles make no reference to continence or do not include

Table 1 – Assessment of continence in continent patients and previously incontinent patients (n=90)

	Preoperative	Postoperative	Postscore >0, %
Continent (n=80)	0	0.74	20 (n=16)
Incontinent (n=10)	5.3	1.4	
Values correspond to mean score in continence scale.			

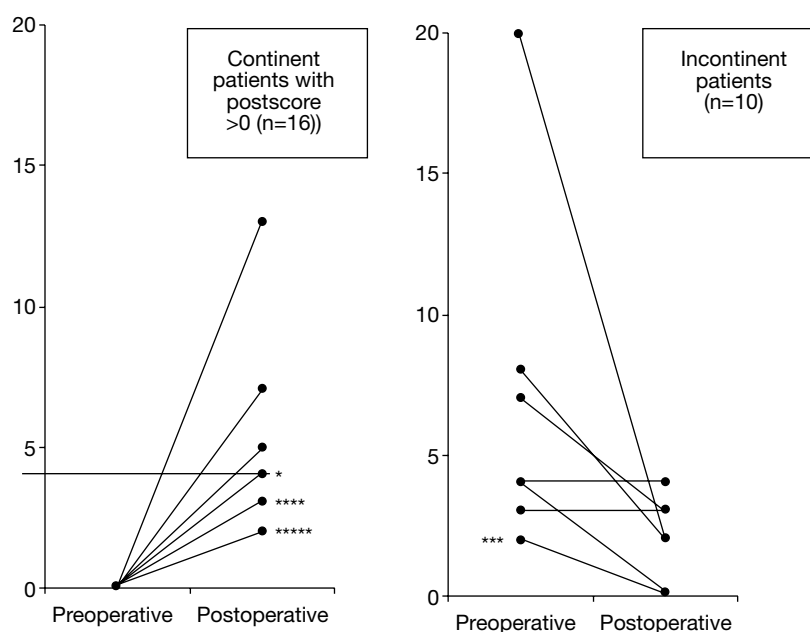


Figure – Results from continence questionnaire in patients previously incontinent (n=10) and in continent patients with changes in postoperative continence (n=16).

Table 2 – Anal manometry results			
	Preoperative	Postoperative	P
Complete series (n=63)			
BMP	83.85 (30.96)	46.51 (18.67)	<.001
MVC	220.97 (100.21)	183.06 (75.36)	<.001
Incontinent patients			
BMP	64.56 (38.6)	44.7 (17.6)	NS
MVC	209 (77.1)	196.1 (67.1)	NS
Sphincter repair			
BMP	35.75 (15.7)	40.6 (17.7)	
MVC	143.5 (62.3)	144.6 (75.2)	
BMP indicates baseline maximum pressure; MVC, maximum voluntary contraction; NS, not statistically significant. Data present mean (standard deviation).			

a grading system to assess it.¹²⁻¹⁴ Joy et al¹⁵ were objective in this sense, by making a marked difference between incontinence assessed in a habitual clinical revision and that provided by a detailed questionnaire. Because of all this, it clearly seems that to assess the real impact of a certain technique on functional results it is essential to use faecal continence questionnaires. Additionally, inclusion or not in the series of patients previously incontinent may modify incontinence rates, which makes it essential to assess them separately.

Although transanal flap technique has always been proposed as a model for continence preserving surgery and although literature gives a low incontinence rate,^{6,8} some authors^{2,4,7} found alterations in as much as 35% of the patients. We believe, also, that complete-width covering flaps over rectal wall, including the rectal muscular layer, cause more transrectal movement, as well as movement from a section of the smooth muscle, with possible repercussions over continence. A comparative study, however, between mucous flaps and complete-width flaps⁴ did not provide significant differences in postoperative incontinence rates, whereas it did show a significant improvement in relapse rates, of 5% with complete-width rectal wall flaps and 35.3% with mucous flaps. Technically, we carry out complete-width mucous-muscular flaps, of about half the circumference of the anal canal and with oblique lateral incisions that help us move the flap and allow us to advance it without tension. In addition to this, special care is taken to keep the distal internal anal sphincter whole and rounded to prevent anal canal deformation (keyhole) that could be detrimental for functional results.

When assessing faecal continence, we have considered as incontinence any score different from 0 along the Wexner scale, and we have summarised a change in postoperative continence scoring in 16 (20%) patients. In 11 the changes were of less than 3 points and they manifested clinically with alteration in continence of gases. We believe these changes are due to complete-wall flaps with involvement of muscular rectal layer and also related to a reduction in BMP confirmed by manometry. In addition to this, 6.2% of the patients presented with problems in controlling liquids (3 cases) and/or occasional faeces discharge (2 cases), and incontinence scale variation in these was higher than

3 points. Incontinence in these patients was related to larger reductions in MVC by manometry.

When analysing manometric results, we observe that other authors, although in short series, have already described the reduction in BMP after transanal advancement flaps.^{2,5,16} As for our longer series of 63 patients, we also observed a significant decrease in BMP which is attributable, no doubt, as it has already been stated, to using the rectal muscular layer when setting the flap. In addition, changes in MVC have been seen in many series^{2,5} and the only explanation for it is the use of anal retractors in surgery, as no other split is the external sphincter is to be expected during the intervention. Our results also corroborate these data and we have confirmed a significant decrease in MVC. In addition to this, these values are further reduced in incontinent patients than in those keeping a 0 postoperative Wexner score, although not significantly so. Based on these data, we believe that anal retractors by themselves do not justify these changes and that fistulectomy could occasionally injure EAS, leading to detrimental functional results.

A very important point is assessing patients previously incontinent, as we have modified surgical attitude in some cases. In 4 out of 10 patients with incontinence symptoms, the anal echography revealed sphincter lesions caused by previous surgeries, and, after placing the flap and through the fistulectomy wound, we carried out an EAS simple repair with Maxon 2/0. In 3 of these patients continence improvement was evident and in one case Wexner scoring did not change. Manometric results ratify this improvement as well. In general, this 10-patient group improved continence by 80%, and in those with no sphincter repair improvement could be attributed to the fact that fistula symptoms stopped. Although cases are reduced, we believe that it is possible to have sphincter repair together with fistula surgery, an interesting hypothesis given the number of patients with previous multiple surgeries and continence problems before definite intervention of their complex fistula condition.

As for relapse, recurrence rate in our patient group was of 7.7%. Regarding advancement flap technique, recent studies have shown recurrence rates of 7% to 40.4%.^{6-8,12,17} As such, results observed in our series can compare to the best results from other series in the literature where advancement flaps have been used.

Despite our long follow-up, all our relapses have been of early occurrence, clinically recognised by no healing of fistula. We completely agree with Ortiz et al¹⁸ in that there is no need for long-term follow-ups.

Finally, one advantage this technique has is that it can be carried out again if relapse occurs, with good results regarding success rate and no repercussions regarding continence.¹⁹ We were able to prove this right in our study with the same technique in 5 out of 7 relapses, achieving final healing of fistula in all of them.

Conclusions

We consider transanal advancement flap to be an effective method to treat complex anal fistulae. Recurrence and

incontinence risk is low, but it cannot be neglected that 20% of the patients modify their postoperative continence assessment.

REFERENCES

1. Noble GH. New operation for complete laceration of the perineum designed for the purpose of eliminating danger of infection from the rectum. *Trans Am Gynecol Soc.* 1902;27:357-63.
2. Koehler A, Risse-Schaaf A, Athanasiadis S. Treatment for horseshoe fistulas-in-ano with primary closure of the internal fistula opening: a clinical and manometric study. *Dis Colon Rectum.* 2004;47:1874-82.
3. Lewis P, Bartolo DCC. Treatment of trans-sphincteric fistulae by full thickness anorectal advancement flaps. *Br J Surg.* 1990;77:1187-9.
4. Dubsky PC, Stift A, Friedl J, Teleky B, Herbst F. Endorectal advancement flaps in the treatment of high anal fistula of cryptoglandular origin: full-thickness vs. mucosal-rectum flaps. *Dis Colon Rectum.* 2008;51:852-7.
5. Pérez F, Arroyo A, Serrano P, Sánchez A, Candela F, Pérez MT, et al. Randomized clinical and manometric study of advancement flap versus fistulotomy with sphincter reconstruction in the management of complex fistula-in-ano. *Am J Surg.* 2006;192:34-40.
6. Marzo J, Ortiz H. Continencia y recidivas en una serie prospectiva de 101 pacientes intervenidos mediante fistulectomía y colgajo de avance endorrectal. *Cir Esp.* 2000;68:450-2.
7. Schouten WR, Zimmerman DDE, Briel JW. Transanal advancement flap repair of transsphincteric fistulas. *Dis Colon Rectum.* 1999;42:1419-23.
8. Mizrahi N, Wexner SD, Zmora O, Da Silva G, Efron J, Weiss EG, et al. Endorectal advancement flap: are there predictors of failure?. *Dis Colon Rectum.* 2002;45:1616-21.
9. Uribe N, Millán M, Minguez M, Ballester C, Asencio F, Sanchiz V, et al. Clinical and manometric results of endorectal advancement flaps for complex anal fistula. *Int J Colorectal Dis.* 2007;22:259-64.
10. Jorge JMN, Wexner SD. Etiology and management of fecal incontinence. *Dis Colon Rectum.* 1992;35:482-7.
11. Minguez M, Tomás-Ridocci M, Moreno E, Mora F, Benages A. Manometría anorrectal. Técnica, valores normales y utilidad clínica. In: Lledó S, Roig JV, Tomás M, Minguez M, editors. *Avances en coloproctología.* Barcelona: Jims; 1990.
12. Sonoda T, Hull T, Piedmonte MR, Fazio VW. Outcomes of primary repair of anorectal and rectovaginal fistulas using the endorectal advancement flap. *Dis Colon Rectum.* 2002;45:1622-8.
13. Ozuner G, Hull TL, Cartmill J, Fazio VW. Long-term analysis of the use of transanal rectal advancement flaps for complicated anorectal/vaginal fistulas. *Dis Colon Rectum.* 1996;39:10-4.
14. Kodner IJ, Mazor A, Shemesh EI, Fry RD, Fleshman JW, Birnbaum EH. Endorectal advancement flap repair of rectovaginal and other complicated anorectal fistulas. *Surgery.* 1993;114:682-90.
15. Joy H, Williams JG. The outcome of surgery for complex anal fistulas. *Colorectal Dis.* 2002;4:254-61.
16. Gustafsson UM, Graf W. Excision of anal fistula with closure of the internal opening: functional and manometric results. *Dis Colon Rectum.* 2002;45:1672-8.

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17. Miller GV, Finan PJ. Flap advancement and core fistulectomy for complex rectal fistula. *Br J Surg.* 1988;85:240-2.
 18. Ortiz H, Marzo J, de Miguel M, Ciga MA, Oteiza F, Armendariz P. Length of follow-up after fistulotomy and fistulectomy associated with endorectal advancement flap repair for fistula in ano. *Br J Surg.* 2008;95:484-7.
 19. Mitalas LE, Gosselink MP, Zimmerman DDE, Schouten WR. Repeat transanal advancement flap repair: impact on the overall healing rate of high transphincteric fistulas and on fecal continence. *Dis Colon Rectum.* 2007;50: 1508-11.