

Advancement flap plasty for the closure of anal and recto-vaginal fistulas in Crohn's disease

F. Penninckx, A. D'Hoore, L. Filez

Department of Abdominal Surgery, University Hospital Leuven, Belgium.

Abstract

The management of anal fistulas in patients with IBD continues to be extremely challenging and, indeed, somewhat frustrating. Despite a global closure rate of about 75%, all patients should be informed about the risk of infection, early failure, eventual temporary defunctioning stoma and the possibility of late recurrence (about 15%). Closure of a RVF in Crohn's disease should not be considered an easy undertaking, especially in patients with several Crohn localisations. The technique can be adapted to the local situation. Construction of a temporary stoma is not mandatory. However, stoma construction seems to be beneficial when extensive perianal or recto-vaginal dissection including eventual tissue interposition is required.

Advancement flaps are an attractive surgical alternative for the management of all anal transsphincteric fistulas, also in Crohn's disease, because sphincter architecture and function are well preserved. Improved medical treatment and the changed approach from conservative to reparative surgery may well have resulted in a decreased need or at least in a delay of the need for a proctectomy. Although the surgical principles of advancement flap techniques are sound, these techniques have not been used for many decades. Skills needed, problematic approach, suboptimal quality of local tissues have contributed to its selective use and to the absence of prospective randomised studies. (*Acta gastroenterol. belg.*, 2001, 64, 223-226).

Introduction

The aim of surgical management of fistula-in-ano is the eradication of the process with preservation of anal continence. Surgical techniques can be categorised either as procedures that divide the tissue encircled by the fistula tract or those that attempt to close the fistula without sphincter division. The lay-open procedures, including the cutting seton technique, have a low recurrence rate but result in anal incontinence (4-66%; reviewed by Garcia-Aguilar *et al.*), certainly when applied to high transsphincteric fistula tracts or to the ventrally located anovaginal, rectovaginal fistula. Incontinence is related to damage to the sphincter(s) and/or to anatomical deformation of the anal canal (gutter or key-hole deformity). The push to avoid disturbed continence made that fistula occluding techniques are also performed for lower variants of transsphincteric fistulas. It is evident that in potentially diarrhoeic diseases such as Crohn's disease all possible efforts should be made to avoid disordered anal continence. However, procedures that attempt to occlude the fistula tract without division of the sphincters have a significant rate of recurrence (13-56%; reviewed in Garcia-Aguilar *et al.*).

In order to avoid sphincter division several techniques can be applied. Rerouting techniques, i.e. transforming transsphincteric into intersphincteric fistula tracts, may be successful but divide the internal anal sphincter. Simple fistulectomy, i.e. core out of a transsphincteric tract with primary suture closure of the internal opening, closure of the sphincter defect and drainage of the perianal wound seems to favour recurrence because of the juxtaposition of mucosal and muscular suture lines. Curettage, desinfection and obliteration of a simple sphincter tract with fibrin glue together with simple closure of the internal opening proved effective in some patient series. However, its precise role remains to be validated by wider experience. Flap advancement procedures have been introduced in order to avoid incontinence after fistulotomy for transsphincteric fistula tracts and in order to overcome the problem of early recurrence associated with simple fistulectomy and closure.

Indications and timing of advancement flap surgery. Who and when to flap?

Treatment of anal fistulas in Crohn's disease is influenced by many factors and is to be considered a serious, eventually protracted and long lasting undertaking. There is no imperative or absolute indication for surgical closure of a fistula. Only disturbingly symptomatic fistulas require surgical treatment, i.e. closure. Indeed, a loose draining seton may be well tolerated and eventually remain in place for many years. Lay-open techniques or even the use of cutting setons can not be considered procedures of choice in patients with transsphincteric fistula and actually or potentially decreased sphincter function (e.g. fertile or multiparous women) or diarrhoeic disease (e.g. Crohn's) because of the risk of incontinence. Certainly in these patients — and may be in all — a transsphincteric fistula tract should be excised and closed with a minimum trauma to both internal and external sphincters and with minimal deformation of the anal epithelial lining. Indeed, repeat sepsis and sphincter cutting procedures may ultimately result in proctectomy because of functional and anatomical destruction. Ano- or rectovaginal fistulas have been

Corresponding author: Penninckx F. Department of Abdominal Surgery, University Hospital Gasthuisberg, Herestraat 49, 3000 Leuven, Belgium.

associated with a 30-50% ultimate risk of a stoma or a proctectomy. This risk may be delayed (reduced ?) by timely drainage of sepsis in order to avoid secondary tracks, maintenance therapy to control the disease and fistula closure by an advancement flap technique when indicated.

An advancement flap procedure is most successful and should be performed only in patients with quiescent disease, eventually after intense medical treatment and surgical resection of more proximal disease if indicated. Thus, first of all sepsis (abscesses) should be drained. Secondary tracks should be laid open and a loose seton should be inserted in the primary fistula tract for at least 6 weeks. Meanwhile, concomitant intestinal and extraintestinal disease must be taken care of, i.e. assessment of its extent and installation of adequate medical therapy. It is not evident what drugs would be most appropriate in order to simultaneously treat the anal location of the disease, nor whether a general, local or combined administration route is to be preferred. Metronidazole with or without azathioprine (or 6-mercaptopurine) seems to be most effective.

After some time (months), the loose seton in the primary track may be removed on the condition that all sepsis has disappeared. Relevant data on the "definitive" closure rate of anal Crohn fistulas after removal of a seton are absent. This most probably indicates the failure of this type of undertaking and the fact that expectations have to be set at a low level. It remains to be seen whether new drugs (incl. anti-TNF) will be more efficacious in the short- and long-term. In any way, in case of rectitis the grade of local inflammation has to be reduced until macroscopically minimal or absent at proctoscopy before any local reparative surgical procedure can be performed with an optimal chance of successful healing and fistula closure. If surgical resection would be indicated for intestinal disease, it is appropriate to take that "opportunity" for temporary faecal diversion.

Preoperative informed consent is essential with review of the complex nature of the problem, the therapeutic alternatives, and the risks of postoperative dehiscence or infection with recurrence eventually requiring a secondary temporary stoma construction. Abnormally high expectations have to be adjusted. Indeed, transsphincteric fistula surgery in Crohn's disease is to be considered a challenge both for the patient and the surgeon and should be undertaken preferentially by experienced experts only in patients with disturbingly symptomatic fistulas.

What is advancement flap surgery ?

Advancement flap procedures have to be regarded as improved versions of fistulectomy with simple closure. They aim to overcome the risk of early recurrence after simple fistulectomy by avoiding the juxtaposition of mucosal and muscular sutures. Thus, after core out fistulectomy and closure of the muscular defect, a brought-

based flap of mucosa with underlying submucosa and/or muscle layer is mobilised in order to completely cover the exposed muscle and the fistula opening. The edge of the flap is fixed at some distance from the original fistula opening. Essential technical aspects are : absence of local sepsis, adequate quality of local tissue, adequate bowel preparation, adequate blood supply to the flap, suturing the flap without tension (tension becomes a problem when a wider defect of more than 2.5 cm has to be covered).

The fistula is excised, proceeding from the external opening up to the sphincter level. The internal opening is excised transanally. The transsphincteric part is sparingly excised or curetted. The excised tissues are given for pathology.

Rectal, vaginal, anocutaneous flaps can be constructed. The type of flap, as well as its shape and thickness, can be adapted to local circumstances, i.e. the location of the fistula and the quality of the tissues. A rectal advancement flap (RAF) is preferred whenever easily feasible because the flap is created on the high pressure anorectal side of the fistula. A cephalad-based rectal flap, advanced distally, is most frequently used. Its shape can be tongue, semilunar or even circumferential as a sleeve (after resection of a limited zone of anorectal stenosis). When the internal fistula opening is high, a lateral-based flap is more practicable. The dissection plane, determining the flap thickness and its blood supply, is in the submucosal space or in the rectal musculature (no significant difference ; Athanasiadis *et al.*, 1995).

The hole in the sphincters is closed with sutures and the flap is fixed to the internal sphincter, in case of a cephalad-based RAF, some 5 mm below the level of the internal orifice with transanally placed separate stitches. The perianal or vaginal wound is left open for drainage and healing by secondary intention.

Rectal flap construction requires adequate exposure and access. This might not be obtainable in patients with a scared sphincter complex or a rigid anal canal. In those circumstances, an ano-cutaneous flap ("house flap") is more appropriate, if the internal fistula opening is located in the lower part of the anus ; in case of an ano- or recto-vaginal fistula, a vaginal advancement flap (VAF) is preferable ; in patients with a recurrent anal fistula at a high rectal level where closure by an advancement flap is not possible, total fistula excision using a posterior "transsphincteric" approach followed by primary anorectal and pelvic floor reconstruction (Mason technique) can be considered (recurrence rate 2/14 ; Christiansen *et al.*, 1995).

A perineal approach with fistulotomy, followed by primary levator plasty and overlapping sphincter reconstruction, has to be limited to patients with ano- or recto-vaginal fistula in combination with well-documented sphincter destruction and faecal incontinence.

Thus, the type of repair is determined by the nature and the extent of local disease. These procedures can be performed under loco-regional or general anaesthesia.

Table 1. — Primary and global healing after rectal advancement flap for fistula in Crohn and non-Crohn's disease

	Crohn's disease		Non-Crohn's disease	
	primary healing	global healing	primary healing	global healing
anorectal fistula	79%	85%	87%	88%
rectovaginal fistula	53% *°	70% **	87%	90%

* p < .0001 vs. non-Crohn ; ° p < .004 vs. anorectal Crohn fistula ; ** p < .006 vs. non-Crohn (deduced from HULL T.L. in : Perspectives in Colon and Rectal Surgery, 1999, 11 : 41-56).

Preoperative bowel preparation is essential and antibiotics have to be given at the time of surgery and continued postoperatively, together with deep venous thrombosis prophylaxis.

Temporary defunctioning stoma or no stoma ?

This important aspect of management remains controversial and strict guidelines have not been established. Indeed, stoma construction could not be identified as an independent factor predicting healing after Crohn fistula closure. In patients with simple fistula tracts, quiet Crohn's disease especially at the anorectal level, and normal defaecation frequency (e.g. up to 3 per day) fistula surgery, including flap advancement procedures are usually not combined with a temporary diverting stoma. Indeed, this appears to be too drastic in those ideal circumstances. Nevertheless, it seems very logic to recommend that defaecation be delayed for up to one week after advancement flap procedures by the use of low residual diet or medical colostomy with antidiarrhoeal medication.

However, in case of complex fistulae, hence more complicated surgical repair eventually to be performed on suboptimal tissue quality with a high risk of early recurrence due to postoperative dehiscence or infection, a temporary stoma has an undeniable benefit both to the surgeon and the patient. The consequences of wound dehiscence and infection are so important that not raising a stoma might expose these patients to unnecessary risks and disillusion. The "benefit" of a stoma can be compared with the situation in low rectal anastomosis, i.e. a stoma probably limits the clinical impact of infectious complications. Although all "parties" involved might be willing to avoid stoma construction, we would like to emphasize that all stomas could be closed in our patient series, and that the attempt to repair a RVF never resulted in the need for proctectomy or a definitive defunctioning stoma.

Finally, in some patients it may be useful to construct a diverting stoma prior to complex fistula surgery in order to exclude the anorectum and to facilitate control of active anorectal Crohn's disease. The location of the diverting stoma will depend on the extent and activity of intestinal Crohn's disease. Thus, a temporary diverting colostomy can be constructed in patients with minimal colon involvement. An ileostomy may be preferable, eventually associated with segmental resection if in-

dicated, in case of active colon involvement or in the presence of chronic colitis associated with increased risk of leakage after stoma closure.

Flap results

Advancement flap surgery is not new. It was introduced in 1902, but became more popular and widespread in recent years although mainly performed and reported by expert centres. Randomised trials comparing advancement flaps with other procedures have not been performed.

The results, including primary and global healing, after rectal advancement flap for idiopathic or Crohn's, anorectal or anovaginal fistulas are summarised in table 1. The data presented are a compilation of reports in the literature and it must be admitted that some studies have included very limited numbers of patients or followed them for a relatively short term.

Somewhat unexpectedly, the success rate after anorectal fistula closure is comparable in the presence or absence of Crohn's disease ; this is most probably related to patient selection and appropriate preoperative medical treatment of Crohn patients. In contrast, ano- or rectovaginal fistulas in Crohn's disease prove to be much more challenging than their "idiopathic" comparators or than anorectal Crohn fistulas. All authors agree that changes in anal continence are very rare after advancement flap surgery ; prospective manometric data have shown unchanged resting and squeeze pressures (Lewis *et al.*).

As mentioned, the surgical approach in Crohn's disease is adapted to the severity of anorectal inflammatory disease and its sequelae. The results of different types of advancement flap procedures can best be illustrated in Crohn's rectovaginal fistula (RVF) and are summarised in table 2. All types of repair (rectal, vaginal, anocutaneous advancement flap, or perineo-proctotomy with fistula closure) seem to be equally effective.

Factors affecting healing and late results

Early failure after flap advancement is related to infection beneath the flap (eventually infection of an haematoma) or ischemia at the tip of the flap.

Recurrence has been associated with the presence of colonic disease but not small bowel or rectal disease ;

Table 2. — Healing rate after different types of surgical repair for rectovaginal fistula in Crohn's disease

Type of primary repair	Overall healing rate in % (N healed / Total N)
Vaginal flap	77 (24/31)
Rectal flap	71 (91/129)
Anocutaneous flap	90 (9/10)
Perineoproctectomy*	71 (17/24)

* i.e. fistulotomy, sphincter repair with closure of fistula and levatorplasty (deduced from Penninckx *et al.*, 2000).

it was not associated with the absence or presence of a defunctioning stoma (Makowiec). In our series, univariate analysis identified the number of Crohn localisations, presence of extraintestinal disease and prior Crohn rectitis to be related with problematic healing after a surgical repair. A positive relation was found between extraintestinal disease and the number of repairs needed to ultimately obtain healing, whereas the relation with previous right hemicolectomy was negative. Multivariate analysis revealed the number of Crohn localisations as the only factor predicting problematic healing. A defunctioning stoma was not related to the healing rate and had its intrinsic morbidity with supplementary hospitalisation.

Results of long-term follow-up are very scarce. After a median follow-up of 40 months (range 8-87), we observed a late recurrent RVF in 4 of our patients (12%) 8 months to 4 years after previous closure. Others have reported late recurrence rates of 20% after perineoproctectomy or anocutaneous flap (Bandy, Hesterberg) and up to 33% after RAF (Markowiec). We observed late recurrences only after VAF procedures. This does not correspond with the absence of recurrence after VAF with a follow up of 55 months reported by others (Sher). The influence of postoperative maintenance therapy on late outcome has not been reported.

A decreased risk of proctectomy ?

Till not so long ago, the presence of anal fistulae, especially a symptomatic RVF, significantly increased the risk for an abdominoperineal rectum excision to be performed (Radcliffe *et al.* ; Heyen). The proctectomy rate was 53 and 34% in two series of 80 and 35 female patients (Scott 1988 ; Heyen 1995). Although there are no exact recent published data, the risk for proctectomy seems to be decreased due to improved medical therapy and the changed attitude from conservative to reparative fistula surgery. Several centres reported successful outcome after repair of RVF in Crohn's disease avoiding, at least temporarily, a defini-

tive stoma. In our consecutive experience with 36 patients presenting a RVF since 1993, we had to perform a proctectomy in only 2 of them (6%) ; moreover, the main indication was not the RVF, but proctitis with incontinence. Others reported a 29% incidence in 48 patients (Cleveland 1997).

References

- ATHANASIADIS S., NAFE M., KOHLER A. Transanaler rektaler Verschiebelappen (rectal advancement flap) versus Mukosaflap mit Internusnaht im Management komplizierter Fisteln des Anorektums. *Langenbecks Arch. Chir.*, 1995, **380** : 31-36.
- CHRISTIANSEN J., RONHOLT C. Treatment of recurrent high anal fistula by total excision and primary sphincter reconstruction. *Int. J. Colorectal Dis.*, 1995, **10** : 207-209.
- GARCIA-AGUILAR J., BELMONTE C., WONG W.D., GOLDBERG S.M., MADOFF R.D. Anal fistula surgery : factors associated with recurrence and incontinence. *Dis. Colon Rectum*, 1996, **39** : 723-729.
- GARCIA-AGUILAR J., WONG K.S., ROTHENBERGER D.A. Management of recurrent anal fistula. *Seminars in Colon & Rectal Surgery*, 1998, **9** : 183-191.
- GRAF W., PAHLMAN L., EJERBLAD S. Functional results after seton treatment of high transsphincteric anal fistulas. *Eur. J. Surg.*, 1995, **161** : 289-291.
- HEYEN F., WINSLET M.C., ANDREWS H., ALEXANDER-WILLIAMS J., KEIGHLEY M.R.B. Vaginal fistulas in Crohn's disease. *Dis. Colon Rectum*, 1989, **32** : 379-383.
- HULL T.L. Rectal advancement flaps for high fistulas in Crohn's disease and other conditions. *Perspectives in Colon and Rectal Surgery*, 1999, **11** : 41-56.
- HULL T.L., FAZIO V.W. Surgical approaches to low anovaginal fistula in Crohn's disease. *Am. J. Surg.*, 1997, **173** : 95-98.
- JONES I.T., FAZIO V.W., JAGELMAN D.G. The use of transanal rectal advancement flaps in the management of fistulas involving the anorectum. *Dis. Colon Rectum*, 1987, **30** : 919-923.
- KOSCINSKI T., MARTI M.C. Lambeaux muqueux dans le traitement des fistules anales. *Helv. Chir. Acta*, 1992, **58** : 877-881.
- LEWIS W.G., FINAN P.J., HOLDSWORTH P.J., SAGAR P.M., STEPHENSON B.M. Clinical results and manometric studies after rectal flap advancement for infra-levator trans-sphincteric fistula-in-ano. *Int. J. Colorectal Disease*, 1995, **10** : 189-192.
- MAKOWIEC F., JEHLE E.C., BECKER H.D., STARLINGER M. Clinical course after transanal advancement flap repair of perianal fistula in patients with Crohn's disease. *Br. J. Surg.*, 1995, **82** : 603-606.
- MAKOWIEC F., JEHLE E.C., STARLINGER M. Clinical course of perianal fistulas in Crohn's disease. *Gut*, 1995, **37** : 696-701.
- MARCHESA P., HULL T.L., FAZIO V.W. Advancement sleeve flaps for treatment of severe perianal Crohn's disease. *Br. J. Surg.*, 1998, **85** : 1695-1698.
- MILLER G.V., FINAN P.J. Flap advancement and core fistulectomy for complex rectal fistula. *Br. J. Surg.*, 1997, **85** : 108-110.
- PENNINCKX F., MONEGHINI D., D'HOORE A., WYNDAELE J., COREMANS G., RUTGEERTS P. Success and failure after repair of rectovaginal fistula in Crohn's disease : analysis of prognostic factors. *Colorectal Dis.* : submitted, 2000.
- RADCLIFFE A.G., RITCHIE J.K., HAWLEY P.R., LENNARD-JONES J.E., NORTHOVER J.M.A. Anovaginal and rectovaginal fistulas in Crohn's disease. *Dis. Colon Rectum*, 1988, **31** : 94-99.
- RICART E., PANACCIONE R., LOFTUS E.V., TREMAINE W.J., SANDBORN W.J. Successful management of Crohn's disease of the ileoanal pouch with infliximab. *Gastroenterology*, 1999, **117** : 429-432.
- SCOTT N.A., NAIR A., HUGHES L.E. Anovaginal and rectovaginal fistula in patients with Crohn's disease. *Br. J. Surg.*, 1992, **79** : 1379-1380.
- SHER M.E., BAUER J.J., GELERT I. Surgical repair of the rectovaginal fistulas in patients with Crohn's disease : transvaginal approach. *Dis. Colon Rectum*, 1991, **34** : 641-648.