

**SMOKING AFFECTS THE OUTCOME OF TRANSANAL
MUCOSAL ADVANCEMENT FLAP REPAIR OF
TRANSSPHINCTERIC FISTULAS**

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ABSTRACT

Aim of the present study was to identify variables affecting the outcome of transanal advancement flap repair (TAFR) for perianal fistulas of cryptoglandular origin. A consecutive series of 105 patients (m:f = 65:40), with a median age of 44 (range, 19–72) yrs. were included in the present study. These subjects were recruited from the colorectal departments of two university medical centers. Several variables were assessed. The results were analyzed by multiple logistic regression. Median follow-up was 14 months. No differences were observed between both centers. TAFR was successful in 72 patients (69 percent). None of the variables, evaluated in the present study, affected the outcome of the procedure, except for smoking habits of the patient. In smoking patients the observed healing rate was 59 percent, whereas a healing rate of 79 percent was found in patients who did not smoke. This difference was statistically significant ($p=0.037$). Moreover, a significant correlation was observed between the number of cigarettes smoked per day and the healing rate ($p=0.003$). Cigarette smoking affects the outcome of TAFR in patients with a cryptoglandular perianal fistula

INTRODUCTION

In the early 1980's transanal advancement flap repair (TAFR) was introduced for the treatment of transsphincteric perianal fistulas. It has been stated that this procedure is the treatment of choice because it enables the healing of almost all transsphincteric fistulas without sphincter damage and consequent continence disturbances. Initially, the reported healing rates varied between 84 and 100 percent¹⁻⁴ (table 1.8).

Recently, however, less favorable results have been reported^{5,6}. It is still unclear which factors affect the outcome of TAFR. According to some authors the results are less favorable in patients who had undergone prior attempts at repair^{5,6}. Sonoda and coworkers have shown that other factors, such as Crohn's disease, older age, prior seton drainage and the duration of symptoms are also associated with failure¹⁰. Until now, these data have not been confirmed by others. Moreover, the impact of lifestyle factors, such as smoking habits and alcohol consumption, has never been evaluated. Aim of the present study was to assess the healing rate after TAFR and to identify factors affecting outcome.

PATIENTS AND METHODS

Between 1995 and 2000, a consecutive series of 105 patients with a perianal fistula of cryptoglandular origin underwent transanal advancement flap repair. In all cases the fistula passed through the upper and middle third of the external anal sphincter. The patients were recruited from the colorectal departments of two university hospitals (Erasmus Medical Center, Rotterdam: n=66, Leiden University Medical Center, Leiden: n=39). Baseline patient characteristics did not differ between the two clinics. The present series comprised 65 women and 40 men. Their median age at the time of repair was 44 (range, 19 - 72) years. Sixty-two patients (59 percent) had previously undergone one or more attempts at repair before referral to one of the two university hospitals.

inclusion and exclusion

Patients with a perianal fistula passing through the upper or middle third of the external anal sphincter were included in this study. Patients with a superficial transsphincteric fistula, passing through the lower third of the external anal

sphincter, underwent a lay-open procedure and were not included. Patients with a rectovaginal fistula and those with a fistula due to Crohn's disease were also excluded from the present series.

surgical technique

The patients referred to the Erasmus Medical Center underwent complete mechanical bowel preparation (polyethylene glycol). In the Leiden University Medical Center a single phosphate enema was instilled on the day of the operation. After induction of general endotracheal anesthesia metronidazole (500 mg) together with cefuroxime (1500 mg) was administered intravenously. The surgical technique is described in detail in chapter 3. The patients who underwent a TAFR at the Erasmus Medical Center in Rotterdam were immobilized for 5 days. During this time period metronidazole and cefuroxime were administered intravenously three times daily. The patients who underwent a TAFR at the Leiden University Medical Center were immobilized for a minimum of 24 hours and did not receive additional antibiotics. After release from the hospital, all patients were instructed to take frequent sitz-baths and to refrain from activities that could harm the flap (e.g. riding a bicycle). Endo-anal examination or proctoscopy was not performed for a minimum of six weeks after the operation. All subjects visited the outpatient clinic until all external wounds had healed. If no recurrent internal or external opening was observed 6 months later, the fistula was classified as healed.

data collection and analysis

Various variables, regarding patient characteristics, fistula type, surgical aspects and lifestyle factors were evaluated. The data regarding patient characteristics (age, gender and body mass index) as well as the data regarding lifestyle factors, such as smoking and drinking habits, were prospectively collected from medical histories

taken at the time of admission. The number of cigarettes or cigars smoked per day and the number of alcoholic drinks consumed per week, were noted. Data regarding prior attempts at repair and the use of a seton for preoperative drainage were collected retrospectively from clinical records. All other aspects, such as bowel preparation, the use of antibiotics, the presence of horseshoe-extensions, the location of the internal opening and postoperative drainage of the external wound were noted before, during and after the procedure. The variables, evaluated during this study, are listed in table 5.1. Except for the aforementioned differences in protocol, both centers were comparable on all the collected variables. Healing rates were compared between groups using the Fisher's exact test or the χ -square test. Multiple logistic regression was used to evaluate factors which were statistically significant in univariate analysis. Other tests used are indicated in the text. A p-value less than 0.05 was considered to be statistically significant.

RESULTS

The median duration of follow-up was 14 months. After transanal advancement flap repair, fistula healing was observed in 72 patients (69 percent). No differences were noted between the series from Leiden and Rotterdam. The healing rate was not affected by age and gender of the patients, nor by the number of prior attempts or the preoperative use of a seton for drainage. Fistula characteristics such as the location of the internal opening, presence of supralevator extensions and the presence of horseshoe-extensions did not influence the outcome. External wound drainage after the procedure was not advantageous (table 5.1).

<i>Factor</i>	<i>N</i>	<i>Healing rate (%)</i> <i>[95% C.I.]</i>	<i>p-Value</i>
Age:			
< 45	54	61 [47 - 74]	
≥ 45	51	77 [63 - 87]	0,10 (0,14)
Gender:			
Male	65	65 [52 - 76]	
Female	40	65 [48 - 79]	0,29 (0,20)
Prior attempts:			
0	43	74 [59 - 86]	
≥1	62	64 [51 - 76]	0,50 (0,23)
Seton drainage:			
Yes	41	76 [60 - 88]	
No	64	64 [51 - 76]	0,28 (0,13)
Horseshoe extension:			
Yes	32	59 [41 - 76]	
No	73	73 [61 - 82]	0,25 (0,26)
Supralevator extension:			
Yes	18	67 [41 - 87]	
No	87	69 [58 - 78]	0,5 (0,97)
Location internal opening:			
Posteriorly	72	68 [56 - 79]	
Anteriorly	21	71 [48 - 89]	
Laterally	12	67 [35 - 90]	0,9 (0,64)
Postoperative drainage:			
Yes	50	72 [58 - 84]	
No	55	65 [51 - 78]	0,53 (0,58)
Body mass index:			
< 25 kg/ m ²	55	73 [59 - 84]	
≥ 25 kg/m ²	50	64 [49 - 77]	0,40 (0,21)
Smoking:			
Yes	57	60 [46 - 72]	
No	48	79 [65 - 90]	0,037 (-)
Drinking:			
Yes	48	71 [56 - 83]	
No	54	65 [51 - 77]	0,5 (0,17)

Table 5.1; Univariate analysis of different factors. Figures in [] indicate 95 % confidence interval. Figures in () indicate statistical correction for smoking.

Comparing both centers, the treatment protocols were found to be different regarding preoperative bowel preparation, duration of post-operative immobilization and the use of antibiotics. Similar healing rates were observed despite these differences. Body mass index and drinking habits did not affect the outcome after TAFR. In the present study, the outcome was only affected by cigarette smoking. In smoking patients the observed healing rate was 59 percent versus 79 percent in patients who did not smoke ($p=0.037$). Among the patients who smoked ($n=57$), the fistula healed in 34 cases (60 percent). In these subjects, the mean number of

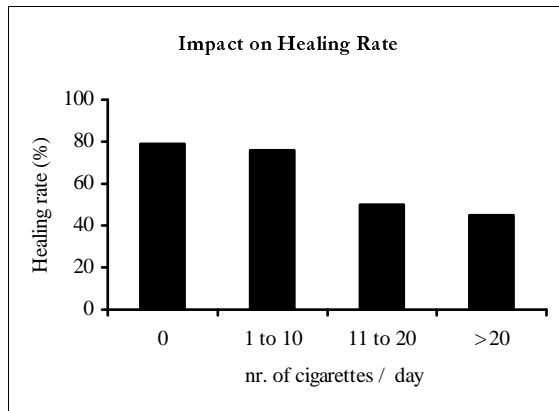


Figure 5.1; Impact of the nr. of cigarettes smoked per day on healing rate. ($P_{trend} = 0.003$)

cigarettes smoked per day was significantly lower than that observed in patients in whom the fistula persisted after TAFR ($p= 0.012$, Mann-Whitney). The healing rate was significantly lower in those who smoked 10 or more cigarettes per day. ($P_{TREND}= 0.003$) (Figure 5.1).

DISCUSSION

Based on the high success rates in the early 1980's¹⁻⁴, transanal advancement flap repair (TAFR) was advocated as the treatment of choice for transsphincteric fistulas passing through the upper or middle third of the external anal sphincter. Several studies, performed in recent years, have revealed considerably higher recurrence

rates, up to 41 percent⁶⁻¹⁰. Recently, several authors have attempted to identify factors affecting the outcome after transanal advancement flap repair in patients with a perianal fistula of cryptoglandular origin^{9,10}. A previous study, conducted at our own institution revealed a less favorable outcome in patients who had undergone two or more previous attempts at repair⁵. In 44 patients, who underwent a flap repair, we found that the healing rate was 87 percent in patients who had undergone no, or only one previous attempt at repair. This healing rate dropped to 50 percent in patients who had undergone 2 or more prior attempts at repair. A similar finding was observed by Ozuner and coworkers⁶. According to others, however, the number of prior attempts at repair does not affect the outcome⁸⁻¹⁰. In the present study we were also not able to identify previous surgical attempts as a negative predictor of outcome. There is no good explanation for this striking difference between our previous study and the present one. Therefore it is still not clear whether the number of prior attempts at repair affects the outcome or not. Mizrahi et al.⁹ evaluated other variables such as the injection of fibrin glue during flap repair and the construction of a diverting stoma. Their study revealed that these two factors were not predictive of failure⁹. Sonoda et al.¹⁰ also attempted to identify other factors affecting the outcome of transanal advancement flap repair in a heterogeneous group of patients including women with a rectovaginal fistula and patients with a perianal fistula due to Crohn's disease. They found that advanced age, large body surface area, prior abscess drainage, previous seton placement and short fistula duration (<3 months) are associated with a better outcome¹⁰. In addition, they were not able to identify factors that were associated with poor outcome. Based on these two studies, it is still not possible to identify one or more factors that are predictive of failure.

The present study was also aimed at identifying variables affecting the outcome after transanal advancement flap repair for cryptoglandular perianal fistula. A relatively

large number of patients was included. All women with a rectovaginal fistula and all patients with a perianal fistula due to Crohn's disease were excluded from the present series. This resulted in a very homogenous group of patients with a cryptoglandular fistula. Eleven variables were assessed and the results were analyzed by multiple logistic regression. None of these 11 variables, except for smoking, were predictive of failure. This is the first report indicating that smoking adversely affects the outcome of transanal advancement flap repair for transsphincteric fistulas. A similar impact of smoking has been described in other types of operations. It has been reported that smoking patients encounter more wound complications after intra-abdominal, plastic, and breast surgery¹¹. Tobacco smoke is a complex aerosol of particulate matter, volatile acids and gases. The overall cellular effect of these inhaled or absorbed by-products is to produce an environment of relative tissue hypoxia and delayed wound healing mediated by vasoconstriction, abnormal cellular function and thrombogenesis¹¹. Therefore, it seems likely that impaired wound healing is a major contributing factor in the breakdown of the advancement flap in our patients who smoked. Another factor might be reduced blood flow in the flap due to cigarette smoking. It has been shown that the blood flow in normal rectal mucosa decreases temporarily following the smoking of a cigarette. Recently, Emmanuel and Kamm performed laser Doppler flowmetry of the rectal mucosa in six healthy volunteers¹². They observed that the blood flow dropped significantly with 15 percent shortly after smoking a cigarette. Further studies are mandatory in order to elucidate the long-term effect of cigarette smoking on the blood flow of normal rectal mucosa as well as on the blood flow of advancement flaps. Furthermore, it may be worthwhile to assess whether or not cessation of smoking before flap repair can reduce the failure rate.

CONCLUSION

Transanal advancement flap repair for perianal fistula of cryptoglandular origin has an overall healing rate of 69 percent. The only factor that significantly influenced outcome was the smoking behavior of the patient. This factor was associated with a high failure risk for this procedure.

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