Original Article

A comparative study on the effectiveness of rectal advancement flap and seton placement surgeries in patients with anal fistula on the rate of recurrence, incontinence and infection

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Abstract

Introduction: Due to the high prevalence of anal fistulas and the recurrence of the disease following surgery, different methods have been suggested for appropriate treatment of this disease. In this study, the effects of rectal advancement flap surgery and seton placement on the recurrence rate, incontinence and wound infection were compared. **Methods:** In this interventional, prospective and quasi-experimental study, 45 patients with anal fistulas including 28 males and 17 females were studied for 2 years (2015-2017). Patients were divided into two groups and mucosal advancement flap and seton placement techniques were used for each of them. Descriptive analysis of data was performed by SPSS software. **Results:** 24 patients (54%) had seton placement surgery and 21 patients (46%) underwent rectal advancement flap surgery. Recurrence was significantly higher in patients who underwent seton placement surgery than the group that underwent rectal advancement flap surgery. Twelve patients (57%) who underwent rectal advancement flap surgery showed improvement in sphincter tone while 11 patients (45%) showed improvements with seton placement. **Conclusion:** The overall results of this study showed that rectal advancement flap surgery reduces recurrence and wound infection more significantly than seton placement in patients with anal fistula.

Keywords: Anal fistula, incontinence, rectal advancement flap, recurrence, seton placement

Introduction

Anal fistula is a common disease with a prevalence of 5.6 to 12.3 per 100,000 people.[1] Anal fistula is a chronic phase of rectal infection characterized by recurrent pus or abscesses.[2] Infection near the anus and accumulation of pus in the cryptic glands spread to the surface of the skin through the formation of a small canal behind it and cause disorder.[1] In fact, the anal fistula is a chronic abnormal relationship between the two epithelialized surfaces that usually forms between the anal canal and the surrounding skin.[2] These fistulas are divided into two simple and complex groups depending on their tract position relative to the anal sphincter. Simple fistulas include fistulas between sphincteric or low transphincteric, which can be treated with a simple tract opening, and most fistulas are of this type.[3] In contrast, treatment of complex fistulas including high transphincteric, super sphincteric, extra sphincteric and recurrent fistulas is challenging.[4] One of the problems faced by the general and colorectal surgeons following the treatment of anal fistulas, especially those involving voluntary sphincter, is the development of debilitating complications.[1] Any mistake during surgery can have serious consequences including infection and gas and stool incontinence.[5] Modern methods for the treatment of anal fistulas in the outer anterior sphincter

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include the use of a seton to cut off a muscle, drainage, fistulotomy, fistulotomy and drainage, initial restoration of sphincter and so on that none of them is selected as the treatment of choice for these fistulas.[6] The use of seton placement and mucosal advancement flap is more commonly used than other methods because of the lower risk associated with recurrence of disease and fecal and gas incontinence.[4] In the seton placement method, the seton, which is made up of indigestible material, is inserted into the tract and gradually removes the sphincter as a drain.[7] Treatment of many complex fistulas is performed by seton placement or its combination with other methods.[7] The seton is thought to prevent sphincter muscle separation by causing fibrosis and minimize fecal incontinence.[8] Despite the reported success rate of 80 to 100% of seton placement, prolonged stool incontinence can be a complication of this procedure.[8] Mucosal advancement flap is another treatment for anal fistula.[9] In cases where sphincter muscle damage is certain, the mucosal advancement flap is used. The results of several studies have reported a recurrence rate of 8 to 40% in this method.[10] In this procedure, internal fistula's pores, opening the external pores, and removing all the contaminated tissue within the fistula is a preferred method of treating anal fistula. In this way, complex fistulas can be treated without damaging the sphincter. Despite this problem and the development of this mucosal advancement flap technique, the development of fecal incontinence and postoperative recurrence are the major challenges of this procedure.[11] In previous studies, the effect of seton placement and mucosal advancement flap methods have been investigated separately. Since the rate of recurrence of anal fistula is present in both methods, this study addresses the effects of these two methods on the rate of recurrence, infection and gas and stool incontinence were evaluated comprehensively in patients living in Ahwaz and compared with the world figures. In some countries, the recurrence rates in each of these methods have been studied separately, but the comparison of the two methods has not been comprehensive. Conducting this study in Ahwaz and comparing it with global figures seems to be necessary.

Methods

In this interventional, prospective and quasi-experimental study, 45 patients with anal fistulas including 28 males and 17 females were studied for 2 years (2015–2017). Patients were randomly divided into two groups and mucosal advancement flap and seton placement techniques were used for each of them. The effect of different surgical methods on the rate of recurrence, infection, and gas and stool incontinence was evaluated and compared. All patients provided voluntary ethical agreement to enter the study. The proposal was reviewed and approved by the General Surgery Department of Ahvaz Jundishapur University of Medical Sciences. Frequency distribution of qualitative variables, mean and amplitude calculation for quantitative variables were performed using descriptive statistics. Inclusion criteria were absence of other diseases, including acute anal fissure, colitis, Crohn's disease, diabetes, and jaundice. Diagnosis of fistulas in all specimens was by imaging and endoscopy. Fistula healing meant complete epithelialization of the wound and recurrence of the disease was defined as the lack of healing the initial wound or recurrence of the external fistula hole. All patients had soft drinks the night before surgery, received laxative medication, and were admitted to the hospital the following morning. Patients younger than 40 years of age received only a CBC test and patients over 40 years of age received different tests depending on the need. The operation technique in rectal advancement flap was as follows: First, the patient was placed in a lithotomy position with spinal anesthesia. The internal tract path was determined by injecting dye solution (methylene blue serum and oxygenated water 200000/1) into the external tract of the fistula. At first, it was attempted to enter the appropriate probe without any resistance through the outer hole of the fistula into the tract as much as possible. Subsequently, the epinephrine solution was injected at a ratio of 1: 200000 (1 mg/200 ml solvent) to the area under the mucosa and flap. Then the V-shaped flap was removed in the mucosa and submucosa of the rectum at the site of the internal orifice. By removing the area with the hole or inner orifice, the inner hole at the muscle surface was closed using PDS 3-0 thread. Using flap advancement through the inner orifice, the external tract fistulectomy was performed to the extent of the muscles. Then the site of flap was controlled for hemostasis and bleeding and finally the site of fistulectomy was dressed. The technique of operation in the seton placement procedure was as follows: First, the patient was placed in a lithotomy position with spinal anesthesia. The internal tract path was determined by injecting dye solution (methylene blue serum and oxygenated water 200000/1) into the external tract of the fistula. Next, the drain was clamped from the tract to soft. The drain was tightened with a silk thread of 2.0. Finally, the site of flap was controlled for hemostasis and bleeding and the site of fistulectomy was dressed. Postoperative follow-up were as follows. Patients did not receive gastrointestinal nutrition for 5 days after surgery and soft drinks were used in their nutrition. Antibiotics including ampicillin, gentamicin, and metronidazole were injected intravenously. Diphenoxylate tablets were prescribed to prevent fecal excretion. After 5 days, the patients had oral cefalexin antibiotics and from this day on, the patients received a standard diet. They received milk syrup to facilitate excretion. About 10 days after surgery, the sutures were removed. Manometry was performed for all patients before and after the operation to improve or decrease sphincter tone. The following cases were recorded in the patient's visit within 1 month to 1 year after surgery. Time to recovery, recurrence, and degree of incontinence were recorded using the Jorge–Wexner table. Finally, descriptive analysis of data was performed by SPSS software.

Results

The results of the sex distribution of patients (27 male and 18 female patients) participating in this study and the frequency of each surgical procedure performed on patients are shown in Table 1. The percentages of each of these two groups were 61.4 for male and 38.6 for female patients. This table breaks down the number of patients undergoing rectal advancement

flap and seton placement surgeries for fistula. Twenty-four patients underwent seton placement and 21 patients had rectal advancement flap surgeries with 54 and 46% for each technique.

The sex distribution of patients for each of the surgical techniques in patients with anal fistula is shown in Table 2. According to the results of this table, 14 patients (51.9% male) were operated by seton placement and 13 male patients (48.1%) were operated using rectal advancement flap technique. Out of 18 female patients, 10 patients (56.2%) were operated using seton placement technique and 8 patients (43.8%) underwent rectal advancement flap surgery.

The distribution and percentage of infection in the two groups undergoing different surgeries are shown in Table 3. Based on these results, wound infection was observed in 4 patients (20.8%) that underwent the seton placement surgery. In contrast, none of the 21 patients (100% equivalent) that underwent the rectal advancement flap surgery reported infection.

The rate of recurrence and fecal incontinence in patients with anal fistulas undergoing different surgeries is shown in Table 4. 8.4% of the patients who underwent seton placement surgery had a recurrence that was significantly higher than the group undergoing rectal advancement flap surgery. None of the patients with symptoms of incontinence had any symptoms, and based on the subjective history of the patients questioned, incontinence was established.

The values of the manometric parameters of patients with anal fistula, including the amount of anal sphincter pressure at rest and squeezing in the pre- and postoperative period are shown in Table 5. As the table shows in the preoperative period, the mean MRP[1] in the seton placement surgery was 71.5 and MSP[2] was 116. The MRP in rectal advancement flap was 72.5 and the MSP in this method was 111.5. One month after surgery, the MRP and MSP in seton placement surgery were 74 and117, respectively. The MRP and MSP were740.5 and 110.5 in the rectal advancement flap method, respectively.

Table 1: Sex distribution of patients and Frequency of each surgical procedure performed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	M	27	61.4	61.4	61.4
	F	18	38.6	38.6	100.0
	Total	44	100.0	100.0	
Valid	Seton	24	54	54.5	54.5
	Advanced	21	46	45.5	100.0
	Total	44	100.0	100.0	

Table 2: Sex distributions of patients with a anal fistula for each surgical procedure

			Group		Total
			Seton	Advanced	
sex	M	Count	14	13	27
		% within sex	51.9%	48.1%	100.0%
		% within group	58.3%	65.0%	61.4%
	F	Count	10	8	18
		% within sex	58.8%	43.8%	100.0%
		% within group	41.7%	35.0%	38.6%
Total		Count	24	20	44
		% within sex	54.5%	45.5%	100.0%
		% within group	100.0%	100.0%	100.0%

Table 3: Distribution of infection in two groups under different surgery methods

			Group		Total
			Seton	Advanced	
infection	Negative	Count	19	21	39
		% within sex	48.7%	51.3%	100.0%
		% within group	79.2%	100.0%	88.6%
	Positive	Count	5	0	5
		% within sex	100.0%	0.0%	100.0%
		% within group	20.8%	0.0%	11.4%
Total		Count	24	20	44
		% within sex	54.5%		100.0%
		% within group	100.0%	100.0%	100.0%

Discussion

Due to the high prevalence of anal fistula disease and its disabling complications following treatment and recurrence of the disease, different methods of treatment have been studied to achieve a method with least damage to the external sphincter. Two widely used anal fistula surgeries are seton placement and rectal advancement flap methods. In this study, the effects of these methods are compared in patients with anal fistula. The study reports that the rectal advancement flap treatment significantly reduced recurrence rate, incontinence, and wound infection compared to seton placement. According to the results of this study, the rate of postoperative recurrence of anal fistula in rectal advancement flap was less than other methods.[12,13] In Ghahremani *et al.* (2012), the rectal advancement flap method was selected as a suitable method for the operation of patients with anal fistula.[14] The low recurrence rate in the rectal advancement flap method can be due to closing the internal hole and external hole drainage,[12] which were also considered in the present study. Recurrence of the disease in both seton placement and rectal advancement flap methods can be due to the surgeon's inadequate experience and failure to diagnose internal fistula hole, horseshoe fistula, nicotine use by the patient, and a history of chronic constipation.[14,15] Moreover, among the reasons for the increased recurrence of anal fistula in the seton placement were the type of seton material, lack of sufficient drainage from the internal fistula hole, and the discharge from the external fistula hole.[15] In contrast to the observed results, in the study of Ege *et al.* (2014), the rate of recurrence of anal fistula disease in seton placement technique was lower than that of rectal advancement

1 mean resting pressure
2 mean squeezing pressure

Table 4: Rate of recurrence and fecal incontinence in patients

Number of patients with fecal incontinence (%)	Number of patients with recurrence (%)	Total	
Zero (zero percent)	2 (8.3%)	24	Operated with seton placement
Zero (zero percent)	1 (4.76%)	21	Operated with rectal advancement flap

Table 5: Manometric parameters in anal fistula patients under different surgeries (A: Seton, B: Advance flap)

Mean	Maximum	At least	*n*		
71.5	95	48	24	MRP[1]A	Before surgery
72.5	99	46	21	MRPB	
116	170	62	24	MSP[2]A	
111.5	168	55	21	MSPB	
74	100	48	24	MRPA	After surgery
74.5	103	46	21	MRPB	
117	170	64	24	MSPA	
110.5	164	57	21	MSPB	

[1]MRP: mean resting pressure. [2]MSP: mean squeezing pressure

flap, which could be due to the difference in the type of seton material.[16] In addition, in contrast to the results of the present study, van der Hagen *et al.* (2011) reported that the rate of anal fistula recurrence in rectal advancement flap method was higher than the seton placement technique. The cause of postoperative pain after rectal advancement flap, which led to patient spasms, decreased perfusion, and necrosis of the flap tissue increased the recurrence rate.[17] Despite the higher rate of recurrence, the rate of wound infection and fecal incontinence in the rectal advancement flap was lower than that of the seton placement technique.[17] Postoperative anal fistula incontinence is one of the major surgical complications in this study. Fecal incontinence in this study was less in patients treated with rectal advancement flap surgery than the ones with seton placement, which is consistent with the former studies.[14,16,17] The lower incontinence rate in the rectal advancement flap surgery may probably be attributed to the size of the external sphincter muscle, while in seton placement, the sphincter muscle segmentation and cutting had a negative effect on the external sphincter function.[17] The rate of wound infection in patients undergoing rectal advancement flap surgery was significantly lower than in patients undergoing seton placement, which is consistent with the results of previous studies.[10,17] The type of material used in different researches for seton placement can lead to different results in terms of wound infection in this method of anal fistula surgery.[16]

Conclusion

The overall result of this study showed that rectal advancement flap surgery reduces recurrence and wound infection significantly compared to seton placement in patients with anal fistulas.

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Conflicts of interest

There are no conflicts of interest.

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