



Management of internal opening of high anal fistula

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Abstract

The management of high anal fistula presents a difficult surgical challenge. The objectives in treating anal fistula are to eradicate sepsis and the fistulous tract while preserving continence. A simple laying open achieves the first two objectives but leads to disruption of the anal sphincter mechanism if the fistulous tract traverses the sphincter muscle. To overcome the problem of incontinence, an alternative approach is required. The purpose of this study is to assess the outcome and complications of management of anal fistula with modified anal skin house advancement flap technique regarding healing and anal continence. Our study is a case series study which includes 31 patients who presented at Kasr Al Ainy colorectal outpatient clinic with anal fistulae, whose etiology are suspected to be due to cryptoglandular origin of infection, assessed clinically and radiologically. House advancement flap was done to cover internal opening in twenty-three patients after core fistulectomy was done for the tract; recurrence was occurred in two patients (8.7%). While modified seton was done at the expected site of internal opening in eight patients after core fistulectomy was done for the tract; recurrence was occurred in three patients (37.5%). Skin house advancement flap is a promising external sphincter sparing technique for treatment of anal fistula. It showed good results with different types of fistulae with no impairment of the continence state of the patients or major morbidity.

Keywords: Anal fistula, Skin house advancement flap, Modified Seton, Internal opening.

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1. Introduction

The ideal surgical treatment for anal fistula should eradicate sepsis and promote healing of the tract, whilst preserving the sphincters and the mechanism of continence. For the simple and most distal fistulae, conventional surgical treatment such as lay-open of the fistula tract as a complete transection of the tissue between the fistula tract and anoderm is very effective with a success rate of up to 100% [1]. Although reported incontinence rates following fistula surgery is very variable and is influenced by many factors, incontinence rate after laying open of inter-sphincteric and distal fistulae seems to be under 10% [2]. However, the risk of potential damage to the anal sphincters and subsequent poor functional outcome remains in a large proportion of patients with high fistulae when the tract crosses more than 30%-50% of the external sphincter, and with recurrent or

complex fistulae with multiple extensions or separate tracts. Women with anterior fistula or previous obstetric injury as well as patients with pre-existing incontinence or specific risks such as previous local irradiation or co-existing Crohn's disease are also at significant risk of incontinence and poor outcome [3]. In these circumstances, an endorectal advancement flap which avoids the division of the sphincter complex is considered a safer alternative. However, the reported success rate is widely variable, ranging from 24% to 100%. Further, functional outcome assessments, in terms of post-operative incontinence rates, have been described as high as 35% [4]. MRI has demonstrated high accuracy in detection of fistula and its related pathologies. Several studies have confirmed its high sensitivity and specificity in classification of fistula primary tract as well as other substantial information.

This includes abscess formation, the presence or absence of secondary tracts, accurate localization of internal opening and detection of horseshoe fistulas. These studies reported sensitivity and specificity ranging from 80 to 100% with the lowest sensitivity related to detection of secondary tracts and superficial fistula and lowest specificity related to detection of internal opening, which still were well above digital rectal exam and endorectal ultrasonography in most of these studies [5]. MRI is now considered the gold standard and should be considered as the modality of choice in preoperative evaluation of perianal fistulas and their related complications [6].

2. Patients and methods

This is a prospective case series of patients presenting with anal fistula at Al-kasr Al-Ainy hospital, faculty of medicine, Cairo University during period from May 2019 to October 2021. Patients presenting with anal fistula whose etiology are suspected to be due to cryptoglandular origin of infection, either transsphincteric type, suprasphincteric type, or intersphincteric type were included in the study. Patients who refuse to participate in the study and patients with inflammatory bowel disease were excluded from the study. All patients were subjected to full history taking: regarding onset of symptoms, duration, previous anal surgeries, history of trauma, history of perianal abscess drainage, history of obstetric trauma (episiotomy, breech delivery), comorbidities, bowel habits, previous medications, extraintestinal manifestations for IBD and baseline continence. Anal incontinence was defined as the involuntary passage of stool (liquid or solid) or flatus and it was assessed using Cleveland Clinic fecal incontinence score as shown in table 1. A score of 0 is perfect continence, 20 is complete incontinence. (0-5 is considered mild, 6-15 is considered moderate, and 16-20 is considered severe).

2.1. Examination

The patient was asked to lie in left lateral position with flexed right hip and knee joints to expose the perineal region. The perianal skin was inspected for scars of previous operations, external opening of the fistula (site, number of openings, and exuberant granulation over the opening), associated piles or anal fissure. To localize the internal opening of the fistula, follow the fistulous track from internal to external opening, assess the anal canal sphincters involvement by the track, and if there is side branch for the fistula. Also, we asked the patient to squeeze and to release the anal sphincters to assess the integrity of anal sphincters. Magnetic resonance imaging (MRI) rectum and anal canal was done for all patients to assess internal opening, demonstrate site of sepsis, to determine the relationship of the fistula tract to the sphincter mechanism, and reveal other secondary tracts or collection. MRI examinations were performed on ACHIEVA 1.5T imaging system using a phased array body coil at the Radiology department. The patient was examined in a supine position. Preliminary scout localizers in axial and coronal planes were done. The standard anal fistula protocol was set: Sagittal T2, Axial oblique T1, T2, T2 SPAIR, Coronal oblique T2, T2 SPAIR. The axial images were plotted perpendicular to long axis of the anal canal in the sagittal plane. The coronal images were plotted parallel to the longitudinal axis of the anal canal with slice thickness was 3mm with no gap. Routine pre-operative

investigations (CBC, bleeding profile, liver and Kidney functions) were carried out for all patients.

2.2. Surgical technique

The operations were performed under general or spinal anesthesia. A single dose of antibiotics was given on induction of anesthesia. The patient was placed in prone jackknife position or lithotomy position according to surgeon preference. After proper sterilization, anoscope was introduced to explore the anal canal and exclude any other pathology. Then, identifying the internal and external opening was carried out. Injection of hydrogen peroxide 10% from the external opening was done to confirm localization of internal opening of anal fistula.

2.2.1. Modified Seton technique

When there was no identifiable internal opening intraoperatively; a core fistulectomy was performed with excision of external opening, main tract and secondary tracts if present. Prolene suture was applied over expected site of internal opening from inside anal canal including mucosa and submucosa. Cutting of prolene suture was done after 4 to 6 weeks with fistulotomy of the remaining tract.

2.2.2. Skin advancement flap technique

When there was identifiable internal opening intraoperatively; a core fistulectomy was performed with excision of external, internal openings and main tract, excision of another tract if present. House flap incision was made in the perianal skin. The flap was mobilized then advanced to cover the internal opening and sutured to the anal mucosa proximal to the internal opening using vicryl. The skin was sutured using absorbable sutures as shown in figures 1 & 2.

2.3. Postoperatively

Postoperative care consisted of regular baths, dressings, and antibiotics for 5 days. Most patients were discharged from the hospital within 24 hours

2.4. Follow up

All the patients were followed up weekly in our outpatient clinic for six months. During the follow up visits, the patients were asked about discharge, pain and continence state. Also, they were examined for the fistulous opening. Healing of the fistula was defined as complete closure of all openings, absence of discharge. Recurrence was defined as reopening of the fistula, the development of a new fistula originating from the site of primary repair, or persistent drainage from the fistulous opening.

2.5. Ethical committee approval

The thesis was ethically approved by the ethical committee of the general surgery department, Cairo University on September 2019. Patients were recruited in the study after obtaining their informed consent and explaining the risks and benefits of the studied techniques.

2.6. Statistical methods

Data were coded and entered using the statistical package for the Social Sciences (SPSS) version 26 (IBM Corp., Armonk, NY, USA). Data was summarized using frequency (count) and relative frequency (percentage).

For comparing categorical data, Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. P-values less than 0.05 were considered as statistically significant.

3. Results and Discussion

Middle age patients (range age 40 – 60 years old) forming 61.3% of the studied group. Male gender patients forming 74.2% of the studied group as shown in Table 2. Twelve patients (38.7%) have high transsphincteric fistula. Six patients (19.4%) have suprasphincteric fistula. Six patients (19.4%) have low transsphincteric fistula. Seven patients (22.6%) have intersphincteric fistula. Thirteen patients (41.9%) had fistula associated with abscess collection or multiple tracts. High anal fistula was presented in nineteen patients with recurrence in four patients (21%) while low anal fistula was presented in twelve patients with recurrence in one patient (8.3%). Twenty-one patients (67.7%) did previous anal operations (fistulectomy, abscess drainage, fissurectomy, hemorrhoidectomy) while ten patients (32.3%) didn't have any history of previous anal operation. Ten patients (32.3%) did previous perianal fistulectomy. Eleven patients (35.5%) did previous surgical drainage of perianal abscess. Four patients had history of previous fistulectomy and abscess drainage as shown in Table 3. In house flap advancement group, eleven patients presented with high anal fistula with recurrence in one patient while twelve patients presented with low anal fistula with recurrence in one patient. In modified seton group, all eight patients presented with high anal fistula with recurrence in three cases. Assessment of internal opening of perianal fistula was done clinically compared to MRI results, confirmation was done intraoperative. Twenty-one patients (67.7%) had identified internal opening clinically while MRI identified it in sixteen patients (51.6%). Ten patients (32.3%) had non-identified internal opening clinically while MRI did not identify internal opening in fifteen patients. There was identifiable internal opening intraoperatively in twenty-three patients (74.2%), fistulectomy was done then house advancement flap from perianal skin was applied to cover internal opening. There was no identifiable internal opening intraoperatively in eight patients (25.8%), fistulectomy was done for the tract and modified Seton technique was done by applying proline suture over expected site of internal opening. Cutting of proline suture was done after 4 to 6 weeks with fistulotomy of the remaining tract. Two patients presented with felling out Seton spontaneously without need for further surgical intervention. Recurrence of perianal fistula was occurred in five patients (16.1%). All recurrent patients (23.8%) had history of prior anal operations. Three of them had history of previous fistulectomy while the others had history of drainage of perianal abscess (Table 4). The objectives in treating anal fistula are to eradicate sepsis and the fistulous tract while preserving continence. A simple laying open achieves the first two objectives but leads to disruption of the anal sphincter mechanism if the fistulous tract traverses the sphincter muscle. To overcome the problem of incontinence, an alternative approach is required. Although advances in surgery and technology have led to development of various surgical techniques. The results in terms of success rate and recurrence are quite disappointing.

The failure rate is approximately 30 - 60 % for established surgical procedures such as the endorectal advancement flap and injection of biological glues. The initial enthusiasm for even newer techniques, such as anal fistula plug and ligation of the intersphincteric fistula tract (LIFT) have decreased at the long- term follow-up, with a recurrence rate of about 70 - 80 % and 30 - 60 %, respectively [7]. Anal fistula recurrence is a common and potentially devastating outcome after anal fistula surgery. It can lead to significant morbidity, multiple operations, increased risk of local fibrosis and scarring and an increased risk continence disturbance. Fistula recurrence can adversely affect the surgeon-patient relationship as well as patients' quality of life, particularly as recurrence can result in higher health care costs, prolonged wound healing and higher risk of anal stenosis. The reported rate of recurrence after anal fistula surgery is between 3 and 57%, with varying rates among different procedures [8]. Multiple factors can affect the development and outcomes of patients with anal fistula, involving patient-related risk factors (eg. Patient gender, age, smoking, alcohol, diabetes mellitus or obesity), surgery-related risk factors (eg. surgical procedure or intraoperative adopted technique) and fistula-related risk factors (type of fistula, number of fistula tracts and height or location of internal opening) [9]. Our study included 31 patients with male predominance 3:1 ratio with percentage 74.3% which is close to gender distribution in our region as in El-said et al., study [10]. Also close to demographic distribution in western region as in Cintron et al., study [11]. Recurrence is defined as reopening of the fistula, the development of a new fistula originating from the site of primary repair, or persistent drainage from the fistulous opening. In our study proper identification and excision of the whole fistula tract with its branches was done at first then dealing with internal opening either by advancement flap technique or modified seton technique, which have reflected in recurrence rate 16.1%. Zubing Mei and colleagues performed a meta-analysis to summarize and assess the credibility of evidence of potential risk factors for anal fistula recurrence after surgery [12]. They found moderate-quality (Class II) evidence for a significant association between recurrence and prior anal surgery. Other patient-related factors in that meta-analysis demonstrated that age, smoking and obesity all had no significant associations with recurrence. In our study group, all recurrent patients (23.8%) had history of prior anal operations. Three of them had history of previous fistulectomy while the others had history of drainage of perianal abscess. Zubing Mei and colleagues found four fistula-related factors were determined to be significantly associated with recurrence: high transsphincteric tract, undetected internal opening, horse-shoe extensions and multiple tracts [12]. Although recurrence was found in 37.5% of patients with non-identified internal opening intraoperative compared to 8.7% of patients with identified internal opening, there was no statistically significant difference (p value= 0.093) between recurrence and identification of internal opening. The concept of total sphincter preservation using rectal advancement flaps was developed by Noble in 1902 that used a full-thickness rectal wall flap in the repair of rectovaginal fistula. Following its success, this technique was also used to treat simple and complex anal fistula.

Several studies have reported cure rates of between 90 and 100 percent for idiopathic anal fistula. Kodner and colleagues reported a ten-year experience including 107 patients, with an overall initial success rate of 84%, rising to 94% with revision surgery in nine initial failures [13]. Finan achieved healing in 10 of 11 patients with infralevator transsphincteric fistula, with preservation of sphincter muscle function and anoderm sensation [14]. Mucosal advancement flaps are often technically challenging and are complicated by bleeding and the development of ectropion. As an alternative, Del Pino and colleagues described island-flap anoplasty and reported failure in one of eight non-inflammatory bowel disease patients and two of three Crohn's disease patients [15]. Jun and Choi described anocutaneous advancement flap but include part of the internal sphincter in the flap [16]. Robertson and Mangione adopted the cutaneous advancement flap in association with suture closure of the internal opening and drainage of the external opening [17]. They report good results (uneventful healing occurred in 11 of 14 patients in an average of 6.5 weeks), but when looking at their patient population, i.e., "low internal openings with transsphincteric fistulas," it would be expected that good results might have been obtained with a simple fistulotomy. Amin and colleagues described core fistulectomy, curettage of any cavity, closure of the defect in the internal anal sphincter, and V-Y advancement buttock flap to cover the internal opening, leaving the site of the external opening for drainage while preserving both internal and external sphincters. 15 of 18 (83%) patients experienced healing of their fistula [18]. The few reported cutaneous flap series have mostly involved the treatment of uncomplicated, low transsphincteric fistulae rather than the less common higher anal fistula, but have shown good healing rates 80 – 95% and low incidence of recurrence [19]. We describe that house flap technique in treatment of anal fistula with internal opening, with external sphincter preservation and without the risk of ectropion.

That technique is simple, heals rapidly with minimal scarring. This procedure is most suitable for high transphincteric and suprasphincteric anal fistula in which internal openings at the dentate line. On the other hand, fistula with an internal opening that is large or high in the anal canal can sometimes be difficult to treat with this procedure. Because the flap is advanced from the anal skin, there is no raising of a proximal defect in the rectal mucosa or submucosa nor in the muscle layer, and so dead space is avoided (in which blood or serum may collect and be prone to infection and damage the repair). The space is external and allowed to drain. The flap is mobile and may be advanced without tension, in contrast with rectal mucosal flaps, which may be under tension at the anal mucosa suture line. In our study, house advancement flap was done in 23 patients; recurrence was occurred in two patients (8.7%). This technique involves external sphincter preservation and maintains continence in all patients. This rate of cure is comparable with other series using different techniques. There are no specific anatomic or demographic characteristics associated with recurrent patients. Recurrence may be explained in those cases due to missed tracts, presence of deep anal abscess. Modified seton was done in eight patients; recurrence was occurred in three patients (37.5%). Although this technique maintains continence in all patients, there is higher rate of recurrence comparable to house advancement flap technique. This can be explained by localization of internal opening in house advancement flap group. Although there were no fistulas with inflammatory bowel disease in our study group, these fistulas could be treated successfully by this procedure in selected patients. Limitations of our study include: small sample size, short follow up duration for 6 months. Also, high location of internal opening of anal fistula was limited the use of skin advancement flap technique. Importance of our study is that it is simple, applicable with low cost and appropriate to patients with different types of fistulae with good healing rate and minimal complications.

Table 1: Cleveland clinic fecal incontinence score.

Type of incontinence	Never	Rarely (<1/month)	Sometimes (≥1/month but <1/week)	Usually (≥1/week but <1/day)	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Wears pad	0	1	2	3	4
Life style alteration	0	1	2	3	4

Table 2: Descriptive statistics of demographic data collected on the studied patients.

		Count	%
Sex	Female	8	25.8%
	Male	23	74.2%
Age	adult <40	9	29%
	middle age 40-60	19	61.3%
	old age>60	3	9.7%

Table 3: History of previous anal operation of the studied group.

		Count	%
Previous fistulectomy	History of fistulectomy	10	32.3%
	None	21	67.7%
Previous abscess drainage	History of abscess drainage surgically	11	35.5%
	None	20	64.5%
Previous other anal operation	History of anal operation	3	9.7%
	None	28	90.3%

Table 4: Type of fistula, assessment of internal opening and recurrence of studied group.

		Count	%
Type of fistula	High transphincteric	12	38.7%
	Suprasphincteric	6	19.4%
	low transphincteric	6	19.4%
	Intersphincteric	7	22.6%
Assessment of internal opening:			
Clinical assessment of internal opening	Identified	21	67.7%
	Non-identified	10	32.3%
MRI assessment of internal opening	Identified	16	51.6%
	Non-identified	15	48.4%
Intraoperative assessment	identified internal opening intraoperatively	23	74.2%
	Non-identified internal opening intraoperatively	8	25.8%
Recurrence of perianal fistula		5	16.1%

There was significant relation between and clinical assessment of internal opening that most of patients in recurrence group had non identified internal opening (Table 5).

Table 5: Relation of recurrence with identification of internal opening.

		Relation with recurrence				P value
		Recurrence		No recurrence		
		Count	%	Count	%	
Clinical assessment of internal opening	Identified	1	4.8%	20	95.2%	0.027
	Nonidentified	4	40.0%	6	60.0%	
MRI assessment of internal opening	Identified	1	6.3%	15	93.8%	0.172
	Nonidentified	4	26.7%	11	73.3%	
Intraoperative assessment	Identified internal opening intraoperatively	2	8.7%	21	91.3%	0.093
	Nonidentified internal opening intraoperatively	3	37.5%	5	62.5%	
Surgery type	Flap	2	8.7%	21	91.3%	0.093
	Seton	3	37.5%	5	62.5%	

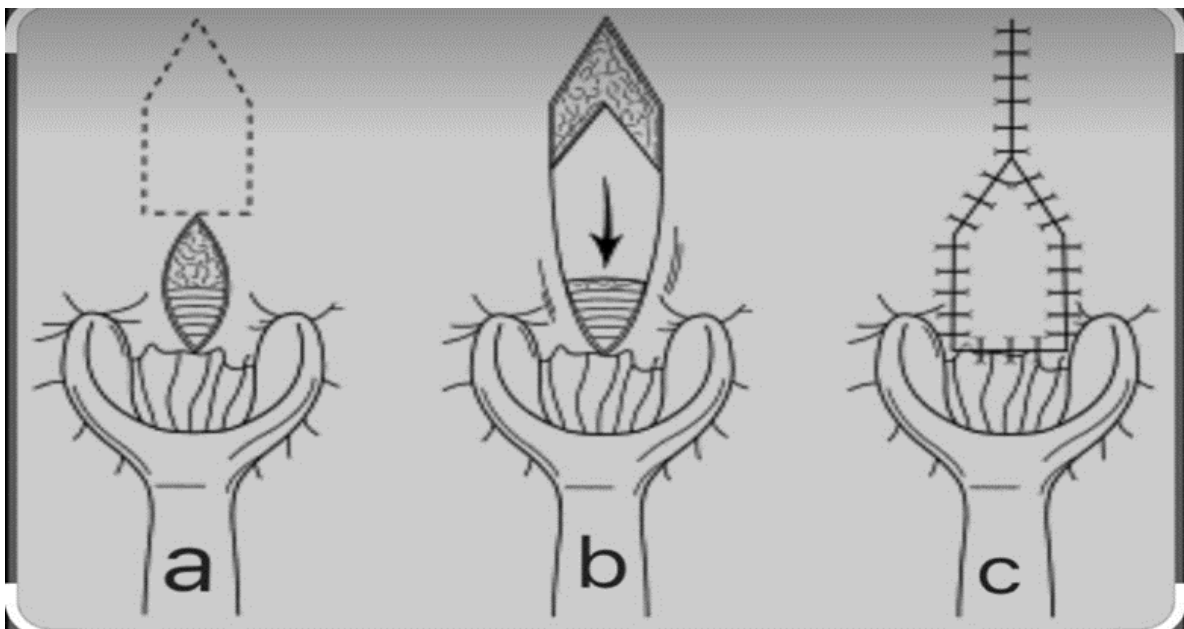


Figure 1: Diagram of skin house advancement flap. a) The dotted line outlines the flap to be raised; b) House flap is elevated and drawn up into the anal canal; c) The flap approximated to the anal mucosa.



Figure 2: Anal skin advancement flap after coverage of internal opening.

4. Conclusions

Skin house advancement flap is a promising external sphincter sparing technique for treatment of anal fistula. It showed good results with different types of fistulae with no impairment of the continence state of the patients or major morbidity. Localization of internal opening at dentate line or lower site shows reliable outcomes with skin house advancement flap. We recommend more studies for assessment of the technique with longer follow up duration and large number of patients.

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