Surgical management of iatrogenic anal stenosis

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Aim
Anal stenosis is an uncommon but troublesome complication of some anorectal operations, most often seen after surgical hemorrhoidectomy. Several methods are used to control this problem, ranging from medical to various surgical procedures, depending on the severity and extent of the stenosis. This study aims to evaluate diamond-shaped flap anoplasty with partial lateral internal sphincterotomy as a treatment option of iatrogenic severe anal stenosis.
Study design
A prospective study was conducted, which was approved by the ethics committee of the faculty, and the patients were consented before being included in this study.
Place and duration of study
The study was performed at the General Surgery Department, Al-Hussein Hospital, Faculty of Medicine, Al-Azhar University, from January 2017 to December 2019.
Patients and methods
A total of 14 patients with post-surgical severe anal stenosis were included in this study. All patients were treated by diamond-shaped flap anoplasty with partial lateral internal sphincterotomy. After the procedure, every patient was evaluated in the first week, second week, first month, third month, sixth month, and the first year regarding pain, bleeding, wound infection, wound healing, and incontinence.
Results
A total of 14 patients (10 females and four males) with severe anal stenosis, with a mean age of 43.65 years, were included. Post-hemorroidectomy anal stenosis represented the main etiology in 13 (93%) patients, with post-defecation pain being the major complaint in all patients. Unilateral diamond-shaped flap anoplasty with partial lateral internal sphincterotomy was done in all patients. Post-operative pain ranged from moderate to mild over the first week, and anal spotting, which occurred in only two patients, stopped spontaneously in the first few days, and no flap loss occurred, but wound infection occurred in four (28%) patients, who were treated conservatively. Gas incontinence occurred in seven (50%) patients but improved over the first month. Complete satisfaction was achieved in 12 (86%) patients, and in the other two patients with recurrent symptoms, complete satisfaction was reached at the end of the follow-up period by having the same operation on the other side.
Conclusion
Diamond-shaped flap anoplasty with partial lateral internal sphincterotomy is a good treatment option for severe anal stenosis, being simple with low complication rate and high success rate and an easy way to perform the same operation on the other side to obtain complete patient satisfaction in failed cases with recurrent symptoms.

Keywords:
anal stenosis, anoplasty, diamond-shaped flap, hemorrhoidectomy and partial lateral internal sphincterotomy

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Introduction

Anal stenosis is diagnosed when there is a narrowing of the anal canal and subsequent loss of normal elasticity that makes its wall rigid and unable to be dilated to permit normal pain-free defecation [1].

The underlying pathology of anal stenosis results from a wide variety of either functional or anatomical causes. In functional anal stenosis, the presence of a hypertonic internal anal sphincter is the major cause of the narrowing, whereas in anatomical anal stenosis, the normal elastic anoderm replaced by an inelastic rigid fibrous tissue is the major cause of the anal canal narrowing [2].

The best way of treatment of anal stenosis is avoiding its occurrence, as the major cause is following surgical

hemorrhoidectomy, particularly when a large area of anoderm lining the anal canal is removed during the operation, but can also complicates other anorectal surgical operations [3].

The patient usually experiences painful defecation, incomplete evacuation, pellet stool, or rectal bleeding. These manifestations force the patient to rely on daily laxatives or enemas in bowel evacuation. Usually physical examination is all that is needed to confirm the diagnosis of anal stenosis, including inspection of the anal canal, perianal skin, and digital rectal examination [1].

Anatomical anal stenosis can be classified according to Milsom and Mazier [4] based on the severity of the anal canal narrowing into mild anal stenosis, when the anal canal can be examined by a well-lubricated index finger or a medium-sized Hill-Ferguson retractor; moderate anal stenosis, when forceful dilatation is required to insert either the index finger or a medium-sized Hill-Ferguson retractor; and severe anal stenosis, when neither the little finger nor a small-sized Hill-Ferguson retractor can be inserted.

In most patients with mild to moderate anal stenosis, medical management with stool softeners or fiber supplements would be a choice. However, different surgical procedures are reserved for patients with severe anal stenosis and in case of failed medical treatment [5].

The choice of the most appropriate procedure is based on the severity where lateral sphincterotomy could be sufficient for a patient with a mild and sometimes moderate degree of anal stenosis after failure of medical treatment. However, various flap anoplasty procedures should be reserved for the more severe cases to replace the cicatrized tissues [6].

The aim of various techniques of anoplasty is to restore the normal function of the narrowed anal canal by dividing the stricture, and this leads to widening of the anal canal while preserving the anal continence and thus pain-free bowel evacuation [7].

The present study was conducted to evaluate diamond-shaped flap anoplasty with partial lateral internal sphincterotomy as an option for the treatment of iatrogenic severe anal stenosis and its possible complication rate.

Patients and methods

A prospective study was carried out in the General Surgery Department, Al-Hussein Hospital, Al-Azhar University, Cairo, Egypt, from January 2017 to December 2019 after acceptance of the ethical committee.

A total of 14 patients with post-surgical severe anal stenosis were included in this study. All patients were treated by diamond-shaped flap anoplasty with partial lateral internal sphincterotomy. After the procedure, every patient was evaluated in the first week, second week, first month, third month, sixth month, and the first year regarding pain, bleeding, wound infection, wound healing, and incontinence.

Inclusion criteria

Patients with post-surgical severe anal stenosis based on Milsom and Mazier classification after the failure of non-operative measures were included.

Exclusion criteria

The following were the exclusion criteria:

(1) Patients with functional stenosis as acute anal fissure.
(2) Patients with a recent history of anal stenosis who had no medical treatment trial.
(3) Patients with mild or moderate anal stenosis who expected to respond to medical treatment.
(4) Patients with inflammatory bowel disease, tuberculosis, or perianal fistula.
(5) Patients with previous radiotherapy or previous anal malignancy.
(6) Patients with previous bilateral diamond-shaped flap anoplasty.

All patients were subjected to the following:

(1) Detailed history: personal data, previous surgical history primarily anal and rectal surgery, most annoying symptoms, and past medical treatment trial of anal stenosis.
(2) Clinical examination:
    (a) Detailed general examination.
    (b) Local examination: inspection and digital rectal examination to diagnose severe anal stenosis and to rule out patients using exclusion criteria.

Method

All patients underwent the following:

(1) Preoperative bowel preparation with soft diet the day before the operation, single enema at night,

and a single third-generation cephalosporin (1 g) injection and metronidazole (500 mg) infusion 1 h before the procedure.
(2) All operations were done under spinal anesthesia and in a lithotomy position.
(3) All patients were subjected to a digital rectal examination before beginning the procedure.
(4) The procedure starts with making a 5-cm longitudinal incision in the fibrotic tissues (vertical to the dentate line) at 3 o'clock position starting from the dentate line inside the anal canal (~2–3 cm) to the apex of the flap outside the anal canal (~2–3 cm) depending on the extent of fibrosis.
(5) Partial lateral internal sphincterotomy was done to achieve adequate anal dilatation.
(6) A diamond-shaped flap was done adjacent and lateral to the incision made in the previous step and at the same level with each limb 5 cm length, avoiding making a narrow base down to the subcutaneous tissue with good mobilization of the flap to achieve adequate approximation and good suturing without tension with interrupted 3-0 vicryl suture, making sure that the flap angel covers at least 2 cm above the anal verge after ensuring good hemostasis (Fig. 1a–c).
(7) The defect lateral to the flap is sutured in the same manner.
(8) All patients were discharged the day after surgery on oral ciprofloxacin 500 mg twice daily and metronidazole 500 mg three times per day for 5 days and oral paracetamol 500 mg twice daily after meal and stool softeners for 1 week.

Follow-up

All patients were examined before discharge to detect early post-operative complications and then on the first week, second week, first month, third month, sixth month, and the first year to evaluate the following:

(1) Pain using visual analog scale (from 0 to 10).
(2) Bleeding either spontaneous or after defecation.
(3) Wound infection.
(4) Wound healing.
(5) Incontinence.
(6) Incomplete patient satisfaction.

Results

Personal data

A total of 14 patients with severe anal stenosis (10 females and four males) were included. Their ages ranged between 28 and 55 years, with a mean of 43.65 years. The etiology of post-hemorrhoidectomy anal stenosis was seen in 13 patients, and one patient was chronic anal fissure after failure of lateral sphincterotomy in whom only anoplasty was done without sphincterotomy (Table 1). The presenting symptom was pain interfering with normal defecation in all patients. Minor episodic rectal bleeding was experienced by the majority after evacuation (Table 2). Failure of medical treatment was evident in all patients.

Operative data

The mean operative duration of the procedure was 65 min and ranged from 50 to 90 min.

Post-operative complications

Post-operative pain assessed by visual analog scale over the first 10 days is shown in Fig. 2. Regarding post-

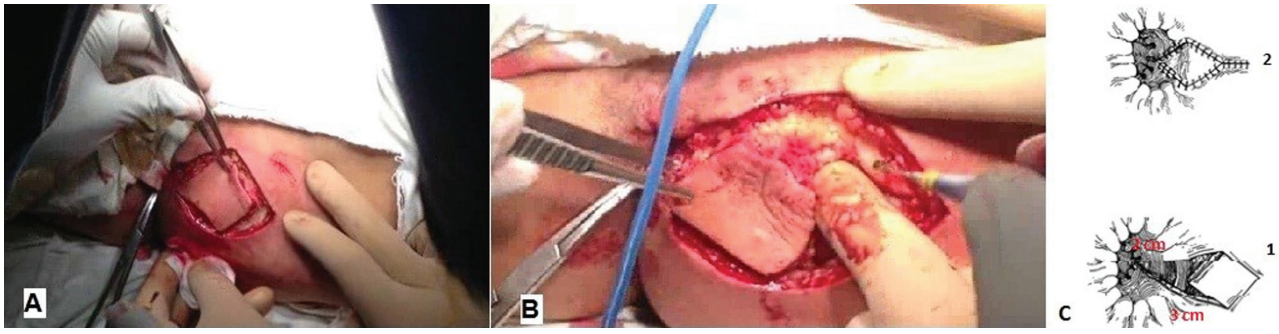
Table 1 Etiology of anal stenosis

Etiology	*n* (%)
After hemorrhoidectomy	13 (93)
Chronic anal fissure	1 (7)

Table 2 Presenting symptom

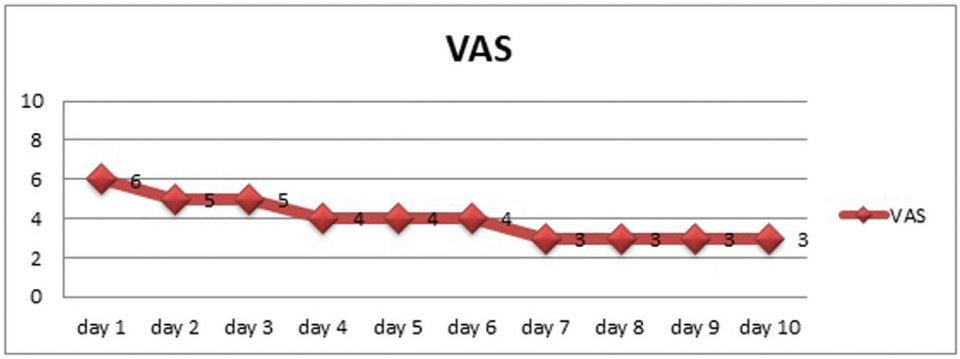
Presenting symptom	*n* (%)
Pain	14 (100)
Rectal bleeding	12 (86)

Figure 1



(a–c) Making diamond-shaped flap.

Figure 2



VAS over the first 10 days. VAS, visual analog scale.

Figure 3

Wound healing achieved by 22 days.

operative bleeding, two patients experienced spotting after defecation that stopped spontaneously over the first few days. None of the patients developed complete flap loss, but there were four patients who showed early signs of post-operative wound infection, which settled conservatively, of whom two patients were well-controlled diabetic.

The mean duration of complete healing was 22 days, ranged between 18 and 30 days (Fig. 3). Regarding post-operative incontinence, seven patients developed gas incontinence, which disappeared over the first month. Complete patient satisfaction was reached in 10 patients by the third month and another two patients by the sixth month. The last two patients, where there is incomplete satisfaction (recurrent symptoms) by the end of the sixth month, had the same operation on the other side, and by the end of the follow-up period, complete patient satisfaction was achieved (Table 3).

Table 3 Post-operative complication

Post-operative complication	*n* (%)	Treated by
Bleeding	2 (14)	Stopped spontaneously
Complete flap loss	0	
Wound infection	4 (28)	Conservative
Gas incontinence	7 (50)	Improved over the 1st month
Incomplete satisfaction (recurrent symptoms)	2 (14)	Another flap on the other side

Discussion

Although anal stenosis is not a common complication after anorectal procedures, it should receive great attention as the prevention is the best way of management. The rate of post-hemorrhoidectomy anal stenosis has been reported to be from 1.2 to 10% in different papers [8].

Anal stenosis may complicate any condition where there is scarring of the anoderm. The etiology of anal stenosis includes anorectal surgeries, trauma, radiation therapy, venereal disease, inflammatory bowel disease, and tuberculosis. However, 90% of anal stenosis occurs after surgical hemorrhoidectomy, where a large area of anoderm was removed [9].

Patients with anal stenosis usually complain of anal pain, incomplete evacuation, straining during defecation, constipation, and narrow stool caliber. Therefore, most patients will become dependent on laxatives and enemas [10].

Non-surgical management is usually suitable for mild to moderate anal stenosis, which by definition most often does not require invasive intervention. Medical management includes high-fiber diet, laxatives, and self-digital dilatation [7].

When there is severe anal stenosis or if conservative management fails, anoplasty is indicated. The

principle of anoplasty technique consists of increasing anal caliber and removal of cicatrized tissues by using different methods of advancement flap procedures [8].

Flap anoplasty procedures are also used as a treatment option of resistant chronic anal fissures. These procedures involve preparing a local flap to cover the defect after fissurectomy, and hence there is no disruption of the internal anal sphincter. These procedures are particularly useful in patients with normal anal pressure, especially those occurring after obstetric trauma [11].

In a previous study involving 77 cases of anoplasty divided into two groups according to the performance of an additional lateral internal sphincterotomy, it was observed that incontinence complicated some cases with internal sphincterotomy, whereas unhealed wounds complicated some cases in the other group. However, they concluded that at the end of the follow-up period, there was no statistically significant difference in post-operative incontinence between the two groups [12].

As indicated by Nelson in a recent systematic review of randomized surgical trials, the overall risk of incontinence (transient or permanent) after sphincterotomy is about 10%, mostly to flatus. However, it is a common belief that the risk of permanent incontinence is about 1% [13].

The benefit of partial lateral internal sphincterotomy with anoplasty is that it gives more space for dilatation, decreases post-operative discomfort, and reduces failure rate [14].

The ideal procedure should fulfill the criteria of being simple and should restore anal function, with no or minimal early and late post-operative morbidity. Many procedures have been described for treatment of anal stenosis, and despite the reported good results (60–100% healing rate) of these procedures, many complications have been reported like anal mucosal ectropion, seepage of mucus or liquid stools, pruritus, flap retraction, ischemic necrosis especially at the corners of the flaps, donor site infection, incontinence, and restenosis [15].The Y-V and diamond island flaps are now the preferred techniques, with comparable results. Aitola *et al.* [16] published a study in which 10 patients underwent Y-V anoplasty combined with internal sphincterotomy. The patients had a healing rate of 90% after 1 year of follow-up.

Maria *et al.* [8] conducted a prospective study which compared Y-V anoplasty with diamond flap anoplasty in a median follow-up of 2 years. Complete resolution was reported for diamond flap anoplasty (100%), whereas the healing rate for Y-V anoplasty was 90%.

Regarding this study, it is consistent with the literature studies that evaluated this operation in showing that the principal etiology of anal stenosis is post-hemorrhoidectomy (93%), and the most annoying symptom is defecation pain (100%), and unilateral diamond-shaped flap anoplasty with partial lateral internal sphincterotomy succeeded in providing pain-free defecation and complete patient satisfaction in 86% of patients, and its failure rate (14%) with recurrent symptoms can be corrected by operating the other side in the same manner. Post-operative complications are easily controlled conservatively, provided that the most critical issue is correctly managed, that is, the flap preparation on a wide base and avoiding suturing over tension.

The limitation of this study was the small sample size and inability of doing manometry preoperatively owing to stenosis and during follow-up owing to unavailability.

Conclusion

Diamond-shaped flap anoplasty with partial lateral sphincterotomy is a good treatment option for severe anal stenosis, being simple with low complication rate and high success rate and an easy way to perform the same operation on the other side in patients with restenosis to obtain complete patient satisfaction.

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Conflicts of interest
There are no conflicts of interest.

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