

Diamond Versus V-Y Advancement Flaps for Management of Anal Stenosis: Efficacy and Outcomes

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ABSTRACT

Background: Anal stenosis is a weighty complication after anal and rectal surgery. Moderate and severe cases mostly require surgery.

Patients and Methods: This study included 45 patients with post-hemorrhoidectomy anal stenosis; 23 patients underwent diamond flap anoplasty (group I), and 22 had V-Y flap anoplasty (group II). Patients were monitored for post-operative complications and followed up at 1, 3 and 6 months postoperatively for symptomatic improvement, pain visual analogue scale (VAS) and Wexner score for continence level.

Results: 31 patients were males and 14 were females. Age was 34.13 ± 4.32 years. 13 patients had severe anal stenosis, while 32 patients had moderate anal stenosis. Preoperative VAS score ranged between 5 and 10. There was no statistically significant difference between both groups regarding operative time and post-operative complications. Follow up at 1, 3 and 6 months showed a highly significant drop in VAS score with significant improvement of symptoms with no significant difference in both groups.

Conclusion: Diamond and V-Y flap anoplasty are easy, safe and successful options for management of moderate and severe post-hemorrhoidectomy anal stenosis with marked improvement of patient symptoms and low complication rate. Both techniques had nearly similar outcomes and choice of procedure depends on surgeon's preference.

Key words: anoplasty, diamond flap, V-Y, post-hemorrhoidectomy, anal stenosis

INTRODUCTION

Anal stenosis is a serious disabling condition. It can be anatomical or functional. In anatomical stenosis, the normal anoderm is replaced with a varying degree of restrictive non-elastic cicatrized tissue, while in functional stenosis, there is a hypertonic internal anal sphincter (1). It has been reported that aggressive hemorrhoidectomy accounts for about 90% of anal stenosis cases (2). It may be due to inflammatory process as in ulcerative colitis and Crohn's disease. Some venereal diseases, post radiotherapy, tuberculosis and chronic abuse of laxatives may be also involved (3).

Some patients may cope quite well in spite of the stenosis, while others complain of symptoms such as decreasing stool caliber, constipation, fecal

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incontinence, difficulty in evacuation, anal pain, bleeding or diarrhea (4).

The severity of postoperative anal stenosis is classified into three degrees; mild stenosis, in which there is tight anal canal which can admit a medium sized Hill–Ferguson anal retractor or lubricated index finger, moderate stenosis which can admit them only after forceful dilatation of the anus and severe stenosis in which neither the small sized Hill–Ferguson retractor nor lubricated little finger can be admitted (5). The level of anal stenosis may be low (distal to at least 0.5 cm below the dentate line), middle (0.5 cm above and 0.5 cm below the dentate line), high (proximal to 0.5 cm above the dentate line) and diffuse affecting the whole anal canal (6). Furthermore, The level of anal stenosis may be low (distal to at least 0.5 cm below the dentate line), middle (0.5 cm above and 0.5 cm below the dentate line), high (proximal to 0.5 cm above the dentate line) and diffuse affecting the whole anal canal (4).

The best treatment is prevention via adequate anorectal surgical technique (7). Conservative treatment is advised for mild cases and initially for the moderate ones. Plenty of fluids with the use of fiber supplements and stool softeners are the basis of conservative management in addition to anal dilatation which can be performed digitally or with graduated mechanical dilators (8). Lots of surgical techniques are well-known for management of moderate and severe cases of anal stenosis. The simplest procedure is partial lateral internal sphincterotomy, while classic anoplasty should be performed for more severe cases to restore the pliability of the anal canal. Many types of flaps can be performed and the selection of the appropriate surgical procedure depends on many factors a location, type, extension of stenosis and surgeon's experience (3).

Aim of the work

To evaluate the efficacy and outcomes of two different techniques of anoplasty (diamond versus V-Y advancement flaps) for management of post-hemorrhoidectomy anal stenosis.

Patients and methods

This retrospective cohort study was carried out on 45 patients with anal stenosis over a period of three and half years from May 2017 to October 2020 at Ain Shams University hospitals after approval by the Medical Ethical Committee. Written informed consent was obtained from all patients prior to surgery.

Inclusion criteria consisted of patients with moderate and severe anal stenosis due to complications of Milligan–Morgan's open hemorrhoidectomy and the average duration of their symptoms was 1–2 years with failure of conservative management. Patients with mild anal stenosis or those with history of inflammatory bowel disease (IBD), TB, previous radiotherapy, anal malignancy and previous anoplasty were excluded from the study. Patients were divided into two groups according to the type of anoplasty; group (I) had 23 patients who underwent diamond flap anoplasty, and group (II) had 22 patients with V-Y flap anoplasty.

Data collected included age, sex, degree of anal stenosis according to Milsom and Mazier (5), preoperative symptoms and assessment of anal pain using a visual analogue scale (VAS) score on a 10-cm line representing 0 for “no pain” and 10 for “worst pain” in addition to assessment of the level of continence using Cleveland Clinic Incontinence Score (Wexner Score, WS). Operative details included the side performed either unilateral or bilateral, operative time and immediate post-operative complications. All patients were followed up at 1, 3 and 6 months postoperatively for assessment of level of symptomatic improvement on a scale of 1 to 5, where 1 is worse, 2 is the same, 3 is slight, 4 is good and 5 is excellent improvement (4) in addition to assessment of VAS score for anal pain, Wexner score and any complications.

Operative details

Because of the very much tight anal orifices, no preoperative enemas were possible, however, stool softeners were prescribed to all patients 5 days before surgery. Just prior to surgery, all patients received intravenous antibiotic (cephazoline and metronidazole) that was continued for 5 days postoperatively (6). Surgery was done under general or spinal anesthesia, and all procedures were done in the lithotomy position. After antiseptic cleaning of the area and draping, the anal verge was inspected, palpated and dilated using a medium sized Hill-Ferguson anal retractor.

For diamond flap anoplasty, incision of the scarred tissue is done leaving a diamond-shaped raw area. Then, a diamond-shaped flap is designed to cover the raw area. Adequate mobilization of the flap should be done to be tension free and preserve an adequate blood supply (9). For the V-Y flap anoplasty, after incising the scar tissue, the base of the V flap is sutured to the top of the raw area. The skin is then closed behind the V from outside pushing it inside the anal canal (10) as shown in *figs. 1 and 2*.

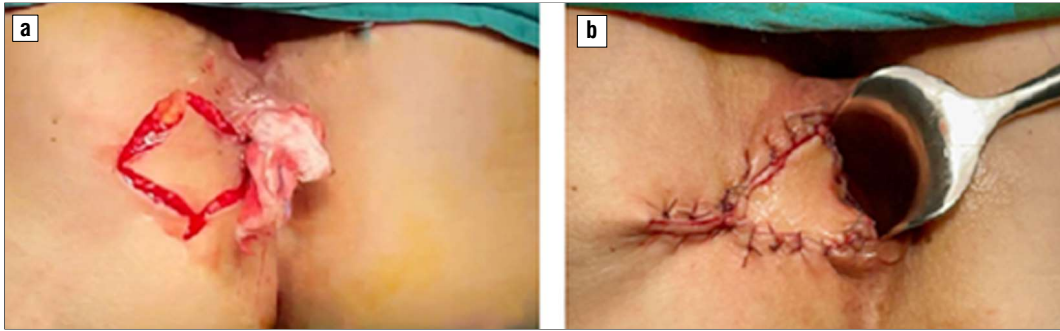


Figure 1 - Diamond flap, (a): designing of the flap, (b): advancement and suturing

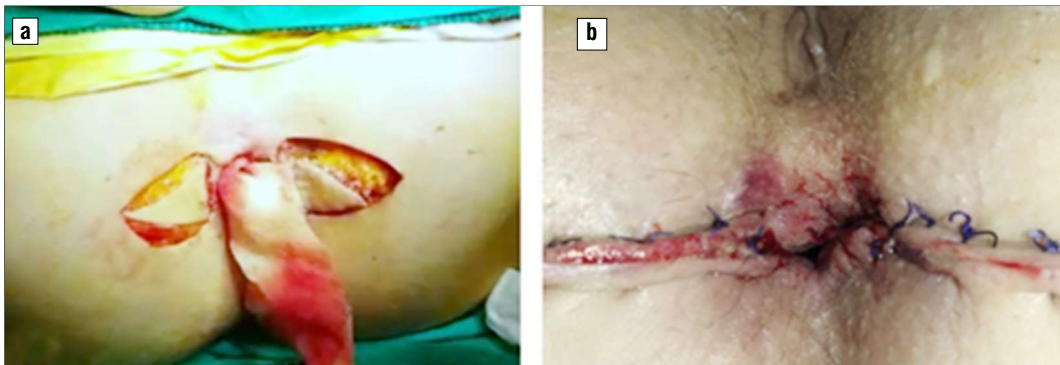


Figure 2 - V-Y flap, (a): designing of the flap, (b): advancement of the V flap and suturing

The size of the flaps was tailored according to the raw area after performing stricturotomy in all patients and the decision of performing bilateral anal flaps is considered after assessment of the anal diameter following unilateral anoplasty. After the operation, all patients were maintained on analgesics in addition to the antibiotic with dressing twice daily till healing; the first dressing was done after 24 hours to exclude ischemia of the flap. They were also advised for NPO for 24 hours followed by clear oral fluids for 48 hours then soft diet for 1 week. High-fiber diet and bulk laxatives were prescribed to all patients for the early postoperative period.

Statistical analysis

The collected data was revised, coded, tabulated and introduced to a PC using Statistical package for Social Science (SPSS 20). Data was presented and suitable analysis was done according to the type of data obtained for each parameter. Descriptive statistics included mean, standard deviation and range for parametric. Frequency and percentage were used for non-numerical data.

Analytical statistics included Friedman test for

assessment of statistical significance of the difference between more than two study variables. Chi-Square test was used for the relationship between two qualitative variables and Mann Whitney Test for statistical significance of the difference of a non-parametric variable between two study groups. P-value >0.05 represents non-significant, <0.05 for significant ones and <0.01 for highly significant results.

RESULTS

Most of the patients were males ($n=31$, 68.9%) and 14 (31.1%) were females. Their age ranged from 25 – 40 years with a mean \pm SD of 34.13 ± 4.32 . There was no statistically significant difference between patients in both groups regarding their sex or age. The main pre-operative symptoms of all patients were anal pain, constipation, difficult evacuation and narrow stool. 19 patients (54.3%) had additional symptoms of perianal itching, while 12 (34.3%) had recurrent attacks of bleeding and only 3 (8.6%) had symptoms of mild fecal incontinence (FI) as shown in *table 1*. Upon examination, 13 out of the 45 patients (28.9%) had severe anal stenosis (7 in group I and 6 in group II), while 32 patients (71.1%) had moderate anal stenosis.

Table 1 - Preoperative symptoms in both groups

Main symptoms in all patients (100%)	Additional symptoms	Group I (n= 23)	Group II (n= 22)	P-value*	Sig.
Anal pain, constipation, difficult evacuation, narrow stool	Itching	11 (57.9%)	8 (50.0%)	0.640	NS
	Bleeding	6 (31.6%)	6 (37.5%)	0.713	
	FI	1 (5.3%)	2 (12.5%)	0.446	

NS: non significant, *: Chi-square test

Assessment of anal pain revealed that all the patients had a VAS score ranging between 5 and 10 (mean \pm SD; 7.09 ± 1.77) and assessment of the continence level showed that only 3 patients had symptoms of mild fecal incontinence, while 42 patients had no symptoms incontinence with WS ranging from 0-9 (mean \pm SD; 1.02 ± 2.09).

There was no statistically significant difference between both groups regarding the operative time as it ranged from 40-70 minutes (mean \pm SD; 52.17 ± 8.90) in group I and from 40 – 65 minutes (mean \pm SD; 50.00 ± 9.26) in group II. 11 patients (24.4%) with severe anal stenosis needed performing the same shape anoplasty in the contralateral side (5 in group I and 6 in group II). All patients remained in the hospital for 2-3 days post-operatively for follow up and dressing during which, no significant immediate post-operative complications were reported apart from 2 patient in group I and 1 in group II who developed transient urine retention, which was successfully managed by Foley's catheter.

Follow up of the patients at 1, 3 and 6 months after surgery showed a highly significant drop in VAS score for anal pain and a highly significant improvement of their symptoms over time as shown in *table 2* and *figs. 3* and *4* with no significant difference between patients in both groups regarding their post-operative outcomes at 1,3 and 6 months as shown in *table 3*. Post-operative Wexner score revealed improvement of the continence level of the 3 patients who had pre-operative mild fecal incontinence (WS 4 Vs 9). Among the remaining 42 patients, only 2 patients in group I

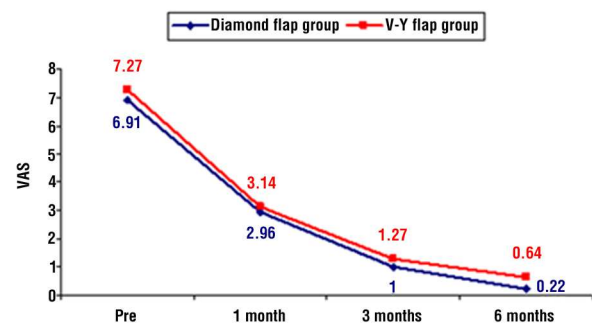


Figure 3 - Pre- and post-operative VAS score for anal pain

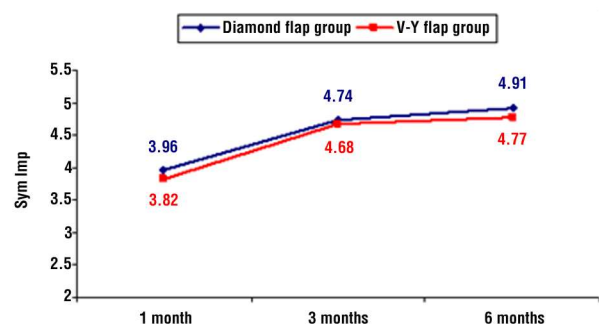


Figure 4 - Post-operative symptomatic improvement

Table 2 - Post-operative follow up of the patients

	Pre-operative Mean \pm SD	1 month Mean \pm SD	3 months Mean \pm SD	6 months Mean \pm SD	P-value*	Sig.
Group I (n=23)						
VAS score	6.91 ± 1.81	2.96 ± 1.19^a	$1.00 \pm 1.13^{a,b}$	$0.22 \pm 0.52^{a,b,c}$	0.000	HS
Symptom imp.	–	3.96 ± 0.71	4.74 ± 0.54^a	$4.91 \pm 0.29^{a,b,c}$	0.000	HS
Group II (n=22)						
VAS score	7.27 ± 1.75	3.14 ± 1.25^a	$1.27 \pm 1.52^{a,b}$	$0.64 \pm 1.50^{a,b,c}$	0.000	HS
Symptom imp.	–	3.82 ± 0.66	4.68 ± 0.57^a	4.77 ± 0.69^b	0.000	HS

S: significant, HS: highly significant, *: Friedman test, a: difference from preoperative, b: difference from one month and c: difference from 3 months

and 3 patients in group II developed mild occasional incontinence to flatus and liquid stool postoperatively (WS 3 to 4). Regarding post-operative wound complications, there was no statistical difference between both

Table 3 - Comparison between groups regarding post-operative outcomes

		Group I Range (Mean \pm SD)	Group II Range (Mean \pm SD)	P-value*	Sig.
1 Month	VAS	2 – 5 (2.96 \pm 1.19)	2 – 5 (3.14 \pm 1.25)	0.617	NS
	Symptom imp.	3 – 5 (3.96 \pm 0.71)	3 – 5 (3.82 \pm 0.66)	0.506	
3 Month	VAS	0 – 3 (1.00 \pm 1.13)	0 – 5 (1.27 \pm 1.52)	0.688	
	Symptom imp.	3 – 5 (4.74 \pm 0.54)	3 – 5 (4.68 \pm 0.57)	0.682	
6 Month	VAS	0 – 2 (0.22 \pm 0.52)	0 – 7 (0.64 \pm 1.50)	0.171	
	Symptom imp.	4 – 5 (4.91 \pm 0.29)	2 – 5 (4.77 \pm 0.69)	0.574	

NS: non significant, *: Mann-Whitney test

groups regarding the complication rate. At one month follow up, 4 patients developed wound dehiscence and 2 patients had delayed wound healing in group I, while in group II, 5 patients had wound dehiscence and another 3 patients had delayed wound healing. All these complications were completely resolved at 3 months follow up apart from one patient in group II who developed a picture suggestive of restenosis at 3 months that eventually resulted in recurrence of anal stenosis by the 6th month giving a healing rate of 100% in group I and 95.5% in group II.

DISCUSSION

Many procedures have been described for management of anal stenosis as Y–V, V–Y, diamond, house, U-shaped, C-shaped advancement flaps and rotational S-flap (11). The principle of anoplasty consists of increasing the dimension of the anal outlet by internal sphincterotomy and removal of cutaneous scarring and maintaining correction by proximal advancement of skin flaps or distal advancement of mucosa (4).

No single procedure fits all, and the choice of the operation depends both on the surgeon's experience and on the severity of stenosis (7). Despite the reported good results of these procedures (60–100% healing rate), many complications have been reported like anal mucosal ectropion, seepage of mucus or liquid stools, pruritus, suture dehiscence, flap retraction, ischemic necrosis especially at the corners of the flaps, infection, incontinence, and recurrence. The best technique has to be simple with no morbidity and restoring the anal function giving the best long-term results (3).

In our study, we preferred to study and compare the outcomes of two different techniques of anoplasty which are diamond and V-Y flap anoplasty as we hypothesized that they both have good long-term results and low complications, beside that they may be performed bilaterally in patients with severe anal stenosis.

All cases of anal stenosis in our study were complications of Milligan–Morgan's open hemorrhoidectomy which is going well with the literature as the commonest cause of anal stenosis. Its rate has been reported from 1.2 - 10% after overzealous hemorrhoidectomy (9). Excision of large areas of rectal mucosa sacrificing the muco-cutaneous bridges during hemorrhoidectomy leads to massive scarring ending in chronic stricture (10). Patients with other causes of anal stenosis as IBD, TB, previous radiotherapy or anal malignancy were not included in the study to exclude the possibility of recurrence as a pathological result of these original diseases.

In our study, both techniques resulted in significant improvement of the preoperative symptoms as evidenced by marked drop of the VAS score for anal pain and a significant increase of the symptom improvement score of the patients with their follow up at 1, 3 and 6 months after surgery with over all healing rate of 97.8%. This was in agreement with Milsom and Mazier (5) who advocated V-Y anoplasty for management of severe low anal stenosis over a five-year period and documented excellent results with 90% healing rate after the operation. Sheikh and his colleagues (12) also documented successful results of V-Y flap anoplasty for management of severe cases of anal stenosis in a series of 5 patients.

100% healing rate was documented in study of Caplin et al in which 23 patients with anal stricture and mucosal ectropion were operated using diamond flap anoplasty (13). The same healing rate (100%) was also documented in many studies using diamond flap for management of anal stenosis (9,14).

Comparing both techniques in our study showed that they were similarly successful in management of the condition with no significant difference between both techniques regarding operative time and post-operative outcomes. Prospective trials were not performed quietly enough in the literature, so it is difficult to compare the results of the various anoplastic techniques. However, in the comparative

prospective randomized study by Farid et al (15), the house advancement flap resulted in longer operative time but was associated with fewer complications and better clinical improvement, patient satisfaction, and quality of life compared to Y-V and diamond flaps for the treatment of anal stenosis. In another comparative study of 10 patients who underwent different flap surgery for anal stenosis (V-Y, house, diamond and dufourmental), they were nearly similar in their outcome with no preference of single technique (16).

Few patients in our study developed minimal post-operative complications at one month follow up as wound dehiscence and delayed wound healing mostly related to wound infection. They were managed conservatively and completely resolved by the 3rd month apart from one patient who developed restenosis. This was in accordance with many studies that reported occurrence of minimal post-operative symptoms that were treated conservatively and did not need any further surgical interventions (1,4,5).

CONCLUSION

Diamond and V-Y flap anoplasty are easy, safe and successful options for management of moderate and severe post-hemorrhoidectomy anal stenosis with marked improvement of patient symptoms and low complication rate. Both techniques had nearly similar outcomes and choice of procedure depends on surgeon's preference.

Conflict of interest

The authors declare no conflict of interest.

Ethical approval

Institutional ethical approval was obtained prior to the study.

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