CHAPTER 4

CURRENT APPROACH TO ANAL STENOSIS

Hakan DEMİR[1]
Recayi ÇAPOĞLU[2]

INTRODUCTION

Anal stenosis is the narrowing of the anoderm along with the anal mucosa. This may consist of a real anatomical stenosis or a functional stenosis due to the anal muscles. True anal stenosis is the replacement of flexible anoderm with varying degrees of fibrotic tissue. Stenosis causes a morphological change in the anal canal and consequently a deterioration in the functionality of the region(1,2). Anal stenosis may occur as a result of different pathologies causing scarring in the anoderm. Anal canal surgery is one of the leading causes of anal stenosis. In addition, trauma, inflammatory bowel disease, radiotherapy are the most common causes.

Anal stenosis is a serious complication of anorectal surgery. In 5-10% of cases, the cause of anal stenosis is excisional hemorrhoidectomy, which is generally preferred for advanced hemorrhoidal disease(3,4,5). Removal of the rectal mucosa and anoderm together with a large hemorrhoidal sac, especially from the anal canal, is a predisposing cause of stenosis (6).

In some cases of mild anal stenosis, good results can be obtained with non-surgical treatment methods including mechanical dilation, fiber supplements and laxatives (1,6,7). However, operative treatment is inevitable in cases with moderate and severe anal stenosis(8,9).

ETIOLOGY

Hemorrhoidectomy causes 90% of secondary anal stenosis (7,33). Extensive removal of the anodermal mucosa during hemorrhoidectomy can lead to scarring and chronic stenosis. The incidence of anal stenosis increases especially after Whitehead hemorrhoidectomy, which is an old method, which is not applied

[1] Dr., General Surgery Specialist Sakarya University Training and Research Hospital hakan-demir06@hotmail.com

[2] Dr., General Surgery Specialist Sakarya University Training and Research Hospital rcapoglu@gmail.com

today (4,10). Stenosis is less common in Milligan-Morgan, Ferguson and stapled hemorrhoidectomy techniques. In a study conducted on patients treated with stapler hemorrhoidectomy, anal stenosis was found in 0.8% of them due to surgery (11,33). In addition, in cases where fissurectomy is preferred for anal fissure, anal stenosis may result if lateral internal sphincterotomy is not performed. In low anterior resection, anastomotic separation can cause anal stenosis in Inflammatory bowel diseases, particularly Crohn's disease. Radiotherapy treatment for pelvic tumors (ie, uterine cancer, prostate cancer, etc.) supports the formation of anal stenosis. Besides; It can cause ischemia due to occlusion of the superior rectal artery, anal congenital diseases, acute abdomen syndromes causing intra-abdominal sepsis, anal stenosis. It has been reported that the use of ergotamine for migraine pain may cause anorectal stenosis(11,12).

PATHO-PHYSIOLOGY

In the natural anatomical structure, the diameter of the anal canal is smaller than the diameter of the anal verge. This shape can be likened to an inverted funnel. During defecation, the internal sphincter relaxes and expands into the larger diameter anoderm to allow passage of stool. Therefore, functional anal stenosis must be differentiated from organic anal stenosis. In functional stenosis, severe anal pain (ie, as in anal fissure) is present. In functional stenosis, muscle contractions are dynamic, while organic stenosis is adynamic. Thus, the anal canal gradually decreases in diameter. Gradual and irreversible fibrosis transforms the anal canal into a pathological form in which the diameter is larger than the anal verge diameter(13,14).

CLASSIFICATION

It is useful to categorize the severity of the stenosis when planning the treatment for anal stenosis. Anatomical anal stenosis can be classified according to the severity of the stenosis and the degree of stenosis in the anal canal. Milsom and Mazier defined a classification system for post-surgical anal stenosis that defines treatment options according to the severity and level of the stricture (1).

1.Classification based on the severity

Mild: Thin anal canal can be examined with finger or Ferguson retractor.

Moderate: The anal canal can hardly be inspected with a finger or a Ferguson retractor.

Severe: Anal canal cannot be examined in any way with fingers or Ferguson retractors.

2.Classification based on the level of stenosis

Low: Stenosis below the dentate-line

Middle: Stenosis at the dentate-line level

High: Stenosis above the dentate-line

DIAGNOSTIC METHODS

Anal stenosis is easy to diagnose. The patient reports painful bowel movements, often with difficult defecation. Also, the patient may have bleeding and narrow stool. Severe pain during defecation due to stool compression negatively affects the patient's life.

Physical examination combined with visual examination of the anal canal is usually sufficient to diagnose anal stenosis.Sometimes, the anal canal is too narrow and painful to allow an adequate examination. In this case, anesthesia is required for detailed examination of the anal canal. Anesthesia relieves spasm pain that may be associated with an acute fissure. However, it does not cause an increase in lumen diameter in a patient with a true stenosis. More detailed information is obtained by measuring anal muscle tone, ano-rectal sensation and recto-anal inhibitory reflex with anal manometry. Because rectal manometry has different operating systems, there is no single accepted method. Therefore, it is difficult to compare the manometric data obtained with different methods. Anal Crohn's disease is an absolute contraindication for anoplasty(14).

CONSERVATIVE TREATMENT

For the initial care of mild to moderate stenosis, non-surgical treatment is recommended. Also, although some severe strictures respond well to conservative treatment, surgery is always necessary. In addition to adequate fluid intake, the use of fiber supplements and laxatives forms the basis of non-surgical treatment. Anal dilation is an important part of treatment. It can be done daily both digitally and in a hospital setting, with a gradual mechanical dilator. Patients are asked to do daily digital practice in the toilet. The outcome is generally good if the patient is able to continue digital expansions on a regular basis. Many patients cannot fully perform this procedure. However, if mechanical anal dilator applications do not produce results, surgery may be required. Functional anal stenosis due to anal fissure should be ruled out, especially in the patient. However, in the treatment of mild anal stenosis, long-term digital dilation therapy may be required before surgery (1,14).

SURGICAL TREATMENT

The best way to prevent anal stenosis is to reduce the incidence of anal stenosis by economical use of the anoderm and mucucutaneous area during hemorrhoid surgery(9,13). It is important to delicately resect the tissues with minimal resection and to use absorbable sutures. Khubchandani(13), in the non-surgical treatment of mild and moderate stenosis; did not find it appropriate to perform manual dilatation under anesthesia as it would increase fibrosis due to rupture in the sphincters. In Milligan-Morgan hemorrhoidectomy, anal stenosis can be prevented by maintaining adequate muco-cutaneous bridges. Or, intermittent resection of grade 3 and 4 hemorrhoid packs prevents this complication. However, the treatment of anal stenosis should be planned according to the severity, cause and localization of the disease(1,33).

Initially, moderate stenosis is treated in the same way as mild stenosis. Fiber reinforcement is initiated and dilation is performed if necessary. Also, in patients with mild narrowing, partial lateral internal sphincterotomy may be sufficient. Open sphincterotomy should be preferred. Complete release of the scarred anoderm is achieved by sphincterotomy. After resection of ectropions, it is left to secondary healing. Sphincterotomy provides relief of congestion and pain caused by the stenosis. In addition, a high fiber diet should be started immediately after surgery. Although the results are reported as positive, it is difficult to understand the degree of anal stenosis in some patients. (15,16). Various flap types have been described to replace the narrowed tissue in cases with severe anal stenosis, allowing the more flexible anoderm to advance into the anal canal. During anoplasty, the addition of a lateral internal sphincterotomy is usually required.

TYPES OF FLAPS

Each of the flap types can be applied safely. However, they have variable wound healing rates. The main purpose of anal flap application is; It is the suturing of the anoderm to both ends and bases of the stenosis after cutting the base of the stenotic area or removing a certain part of it. Therefore, it is to prevent the stenotic area from loosening and coming together again. The choice of an appropriate procedure, the degree of stenosis and location are relevant. Because stenosis; may include the anoderma, dentate line, anal canal, or all of these.

YV FLEP

On the perianal skin; Starting from the end of the transverse incision in the anoderm, a “V” shaped incision is made with the tip extending in two directions towards the anus. The incisions are prepared to be 5 to 8 cm long. While preparing

the flap, attention should be paid to its nutrition. The apex of the obtained V advancement flap is sutured to the area of the stenosis. Absorbable and non-absorbable sutures should be used in combination (12,17,18,19). This technique is simple and very useful for anal fissure-associated stenosis. However, if the stenosis is circularly involving more than 25% of the anal canal, another anaplastic technique should be applied(14).

VY FLEP

This procedure is similar to HV anoplasty. The base of the triangular V flap is shifted towards the stenosis area. In addition, extensive mobilization should be performed to maintain flap viability. The remaining open part of the V incision in the outer part of the perineum is closed in a mutual "Y" shape (20).

DIAMOND FLAP

Depending on the condition of anal stenosis, one or both sides flaps can be created. A diamond-shaped flap perpendicular to the anus is prepared. The apex of the diamond-shaped flap is sutured to the dentate line and internal sphincter, covering the intra-anal part of the opened stricture(5,17,21). During the preparation of the flap, attention should be paid to tissue blood supply .

HOUSE FLAP

A transverse incision is made through the perianal skin from the dentate line to the end of the stenosis. The long part of the incision comes perpendicular to the base of the house-shaped flap. Proximal and distal transverse incisions are perfectly centered on the longitudinal incision. Next, the flap base is designed as a proximal oriented house(5,22,23).

U FLAP

These techniques are preferred in the treatment of anal stenosis with mucosal ectropion. A U-shaped incision is made in the perianal skin, with the ends of the U close to each other. Mobilization and suturing of the flap is the same as for diamond flap anoplasty. The area where the flap was dissected is left open.

ROTATOR S FLAP

The S rotator flap is used in the treatment of Bowen's and Paget's disease, in which a large amount of perianal skin must be removed and new skin returned to the area(21,24). In the jack-knife position, after scar tissue is excised, a full-thickness S-shaped flap is made on the perianal skin, approximately 8-10 cm from the dentate line. The flap is then rotated and sutured to normal mucosa.

CONCLUSION

There are many flap options for the surgical treatment of anal stenosis. However, there are not enough prospective and comparative studies showing the superiority of these flap shapes over each other. Among flap techniques, V-Y and diamond advancement flaps are the preferred techniques with very good results (17,25,26). The House advancement flap was preferred because it provides a wide skin flap, especially in circular severe stenosis(27,28). In the limited number of comparative studies in the literature, it is not clear what the ideal dimensions of the anal canal should be after the flap. Good results have been obtained in patients treated with diamond flaps with an anal canal calibration of 25-26 mm(29). In a prospective randomized study by Farid et al.(30), although the house advancement flap has a longer operation time than the V-Y and rhomboid flaps; reported that it provides less complications and better clinical recovery rate. An ideal surgical technique; It should be easy to apply and well tolerated by the patient. In addition, it is aimed to have a good level of continence and comfort. However, there is no ideal treatment method with effective results for the patient(31,32). Therefore, the degree of disease and the level of anal stenosis should be considered in the selection of the appropriate surgical technique. The most appropriate flap shape for the patient should be considered. At the same time, the method with which the surgeon is experienced increases the success rate.

REFERANCES

1. Milsom JW, Mazier WP. Classification and management of postsurgical anal stenosis. Surg Gynecol Obstet 1986;163:60-64.
2. Parnaud E. Leiomyotomy with anoplasty in the treatment of anal canal fissures and benign stenosis. Am J Proctol. 1971;**22**:326–330.
3. Boccasanta P, Capretti PG, Venturi M, Randomised controlled trial between stapled circumferential mucosectomy and conventional circular hemorrhoidectomy in advanced hemorrhoids with external mucosal prolapse. Am J Surg. 2001;**182**:64–68. DOI: 10.1016/s0002-9610(01)00654-7
4. Wolff BG, Culp CE. The Whitehead hemorrhoidectomy. An unjustly maligned procedure. Dis Colon Rectum. 1988;**31**:587–590. DOI: 10.1007/BF02556790
5.Leventoglu S, Mentes B, Balci B. New Techniques in Hemorrhoidal Disease but the Same Old Problem: Anal Stenosis. Medicina (Kaunas). 2022 Mar 1;58(3):362. doi: 10.3390/medicina58030362.
6.Altomare D.F. , Picciariello A., Pecorella G., The Italian Haemorrhoid Survey group Surgical management of haemorrhoids: An Italian survey of over 32 000 patients over 17 years. *Colorectal Dis.* 2018;20:1117–1124. doi: 10.1111/codi.14339.
7. Brisinda G. How to treat haemorrhoids. Prevention is best; haemorrhoidectomy needs skilled operators. BMJ. 2000;321:582-583. DOI: 10.1136/bmj.321.7261.582
8. Kmiot W.A. Anal stenosis. In: Mazier W., Levien D., Luchtefeld M., Senagore A., editors. *Surgery of the Colon, Rectum and Anus.* 1st ed. WB Saunders; Philadelphia, PA, USA: 1995. pp. 340–344.
9. Macdonald A., Smith A., McNeill AD, Finlay IG Anüsün manuel dilatasyonu. *Br. J. Surg.* 1992; 79 :1381–1382. doi: 10.1002/bjs.1800791248.
10. Brisinda G, Brandara F, Cadeddu F. Hemorrhoids and hemorrhoidectomies. Gastroenterology.

2004 Sep;127(3):1017-8. doi: 10.1053/j.gastro.2004.07.047.
11. Ravo B, Amato A, Bianco V. Complications after stapled hemorrhoidectomy: can they be prevented? Tech Coloproctol. 2002;**6**:83–88. DOI: 10.1007/s101510200018
12.Sayfan J. Ergotamine-induced anorectal strictures: report of five cases. Dis Colon Rectum. 2002;**45**:271–272. DOI: 10.1007/s10350-004-6160-x
Abstract
13. Khubchandani IT. Anal stenosis. Surg Clin North Am. 1994;**74**:1353–1360. DOI: 10.1016/s0039-6109(16)46486-8
14. Liberman H, Thorson AG. How I do it. Anal stenosis. Am J Surg. 2000;**179**:325–329. DOI: 10.1016/s0002-9610(00)00344-5
15. Turell R. Postoperative anal stenosis. Surg Gynecol Obstet. 1950;**90**:231–233, illust.
16. Sileri P, Stolfi VM, Franceschilli L. Reinterventions for specific technique-related complications of stapled haemorrhoidopexy (SH): a critical appraisal. J Gastrointest Surg. 2008;**12**:1866–1872; discussion 1872-1873. doi: 10.1007/s11605-008-0670-0.
17. Angelchik PD, Harms BA, Starling JR. Repair of anal stricture and mucosal ectropion with Y-V or pedicle flap anoplasty. Am J Surg. 1993;**166**:55–59. DOI: 10.1016/s0002-9610(05)80583-5
18. Aitola PT, Hiltunen KM, Matikainen MJ. Y-V anoplasty combined with internal sphincterotomy for stenosis of the anal canal. Eur J Surg. 1997;**163**:839–842
19. Ramanujam P, Venkatesh KS, Cohen M. Y-V anoplasty for severe anal stenosis. Contemp Surg. 1988;**33**:62–68.
20. Alver O, Ersoy YE, Aydemir I. Use of "house" advancement flap in anorectal diseases. World J Surg. 2008;**32**:2281–2286. DOI: 10.1007/s00268-008-9699-1
21. Pearl RK, Hooks VH , Abcarian H. Island flap anoplasty for the treatment of anal stricture and mucosal ectropion. Dis Colon Rectum. 1990;**33**:581–583. DOI: 10.1007/BF02052210
22. Christensen MA, Pitsch RM Jr, Cali RL. "House" advancement pedicle flap for anal stenosis. Dis Colon Rectum. 1992;**35**:201–203. DOI: 10.1007/BF02050680
23. Owen HA, Edwards DP, Khosraviani K. The house advancement anoplasty for treatment of anal disorders. J R Army Med Corps. 2006;**152**:87–88. DOI: 10.1136/jramc-152-02-02
24. Ferguson JA. Repair of Whitehead deformity of the anus. Surg Gynecol Obstet. 1959;**108**:115–116.
25. Maria G, Brisinda G, Civello IM. Anoplasty for the treatment of anal stenosis. Am J Surg 1998;175:158-160. DOI: 10.1016/S0002-9610(97)00266-3
26. Caplin DA, Kodner IJ. Repair of anal stricture and mucosal ectropion by simple flap procedures. Dis Colon Rectum 1986;29:92-94. DOI: 10.1007/BF02555384
27. Sentovich SM, Falk PM, Christensen MA. Operative results of House advancement anoplasty. Br J Surg 1996;83:1242-1244.
28. Christensen MA, Pitsch RM Jr, Cali RL. House advancement pedicle flap for anal stenosis. Dis. Colon Rectum 1992;35:201-203. DOI: 10.1007/BF02050680
29. Gülen M, Leventoğlu S, Ege B. Surgical Treatment of Anal Stenosis with Diamond Flap Anoplasty Performed in a Calibrated Fashion. Dis Colon Rectum 2016;59:230-235. DOI: 10.1097/DCR.0000000000000530
30. Farid M, Youssef M, El Nakeeb A. Comparative study of the house advancement flap, rhomboid flap, and y-v anoplasty in treatment of anal stenosis: a prospective randomized study. Dis Colon Rectum 2010;53:790-797. DOI: 10.1007/DCR.0b013e3181d3205a
31. Altuntaş YE, Öncel M. Anal Stenoz. İçinde: Menteş B, Bulut T, Alabaz O, Leventoğlu S. Anorektal bolgenin selim hastalıkları.1.Baskı, Ankara; 2011:145-164.
32.Brisinda G, Vanella S, Cadeddu F. Surgical treatment of anal stenosis. World J Gastroenterol. 2009 Apr 28;15(16):1921-8. doi: 10.3748/wjg.15.1921.