Hydrostatic Balloon Dilatation of Benign Colonic Anastomotic Strictures

Karukurichi S. Venkatesh, M.D., P. S. Ramanujam, M.D., Shirley McGee, R.N.

From the Endoscopy and Surgical Departments, Mesa Lutheran Hospital, Mesa, Arizona

From 1985 to 1990, 25 patients with benign colorectal anastomotic strictures were treated. The majority of the patients presented with decreasing stool caliber and abdominal cramps. Most of the strictures were secondary to anastomosis utilizing the EEA® stapling device (United States Surgical Corp., Norwalk, CT) for malignant neoplasm. Under IV sedation, strictures were dilated endoscopically with the TTS® balloon (Microvasive). No complications were encountered in this series. Hydrostatic balloon dilatation is a safe and effective modality for treatment of anastomotic strictures. [Key words: Anastomosis; Balloon dilatation; Stricture]

Venkatesh KS, Ramanujam PS, McGee S. Hydrostatic balloon dilatation of benign colonic anastomotic strictures. Dis Colon Rectum 1992;35:789–791.

Most colorectal strictures are iatrogenic in origin. Anastomotic strictures following use of the EEA® stapling device (United States Surgical Corp., Norwalk, CT) seem to occur in approximately 10 percent of patients.[1] As more sphincter-saving procedures are being performed with the use of staplers, treatment of anastomotic strictures becomes important.

Hydrostatic transluminal balloon dilatation is a relatively new and easy treatment for benign colorectal strictures. Balloon dilatation involves application of direct radial force to the strictured area. Some authors believe that application of radial force appears to be safer and more effective than the axial force exerted by standard bougie dilators.[2] Uncommonly, diverticular stricture can present as a shorter stenotic segment amenable to balloon dilatation. Patients with diverticular strictures were not included in this study.

Twenty-five patients with benign colonic strictures were treated with endoscopic transluminal hydrostatic balloon dilatation between January 1985 and December 1990. The majority of the strictures were secondary to stapled low anterior anastomosis.

MATERIALS AND METHODS

Nineteen patients (76 percent) were between 65 and 80 years of age. Fourteen of the 20 patients in this study were women. The majority of the patients have associated medical conditions (Table 1).

Among the 25 patients, the most common presenting symptoms were thinning of bowel movement and associated abdominal cramps. Feeling of incomplete evacuation was experienced in 16 patients (64 percent). Blood streaking the bowel movement was observed in 13 patients (52 percent).

The rectum was the most common site of anastomotic strictures (Table 2). The level of stricture in the rectum ranged from 4 cm to 12 cm from the anal verge. Eight patients had strictures between 4 cm and 6 cm from the anal verge. Twelve patients had strictures between 6 cm and 10 cm, and two patients at 12 cm, from the anal verge. Twenty-three of 25 patients with anastomotic stricture underwent surgical resection for malignant neoplasm. The majority of the strictures were less than 8 mm in diameter. Four patients had strictures less than 5 mm in diameter. All the strictures were very short, measuring less than 1 cm in length.

Only symptomatic strictures without any evidence of tumor recurrence were selected for hydrostatic balloon dilatation. Informed consent was obtained from all patients undergoing balloon dilatation for possible abdominal exploration, in case of complications. All patients underwent mechanical bowel preparation. They were placed on clear liquids the day before and given either GoLYTELY® (Braintree Laboratories, Braintree, MA) solution or magnesium citrate followed by bisacodyl tablets or enemas. All patients were given broad-spectrum intravenous antibiotics an hour before the procedure. Oral antibiotics were not used in this series of patients.

The procedure was performed under intravenous sedation. Dilatation was carried out through the flexible scope (preferably videoendoscopy) using the TTS® balloon (Microvasive). The deflated balloon was advanced through the stricture under direct vision. It is important to center the balloon at the stricture site. Strictures were dilated stepwise beginning with a 15-mm balloon and ending with

Address reprint requests to Dr. Venkatesh: 546 North Vineyard, Mesa, Arizona 85201.

Table 1.
Associated Medical Conditions

Medical Condition	Percentage
Atherosclerotic heart condition	61
Cerebral vascular accident	11
Myocardial infarction	11
Diabetes	17

Table 2.
Level of Stricture

Level	Number of Patients	Percentage
Rectum	22	88
Transverse colon	2	8
Ileocolic	1	4

an 18-mm balloon. The balloon was inflated to 45 cm of water pressure and held in place 45 to 60 seconds at a time in increments to efface the stricture indentation. Once the stricture was dilated, advancement of the flexible scope through the stricture could be made with ease. A small amount of brisk bleeding and mucosal lacerations are not uncommon.

All patients were watched in the recovery room for one hour before being discharged. They were observed for abdominal pain, sustained vasovagal reactions, and profuse rectal bleeding. The patients were given a liquid diet for 24 hours before advancing the diet.

Twenty-one patients (84 percent) needed two dilatations at four-week intervals. These patients were followed to assess the size of the anastomosis at three months and one year postdilatation and every year thereafter. Twenty-three patients have been followed so far with yearly endoscopic evaluation to assess the size of the anastomosis. Two patients were lost to follow-up. Ten patients have been followed for over three years, and seven patients have been followed for over two years. None of the 23 patients have restrictured the dilated anastomosis. Patients were advised to return for an examination of the anastomosis site if they experienced decreased size in stool caliber, blood in stool, and increased stool frequency.

RESULTS

Successful dilatation was accomplished in 24 patients (96 percent). The symptoms of small-caliber stools and abdominal cramps subsided in all patients with successful dilatation. In one patient, stool frequency increased considerably, with partial anal incontinence, immediately after dilatation. These symptoms improved gradually over a six-month period. In one patient, dilatation was not possible. This patient underwent resection with satisfactory results. There were no immediate or late complications in this series. None of the patients reported significant postdilatation rectal bleeding requiring either cauterization or suture ligature. The incidence of fever and significant abdominal pain was nil. There was no immediate or late perforation. There were no anesthetic complications in this series.

DISCUSSION

There are very few published reports of nonsurgical management of colorectal anastomotic strictures.[1,3–8] Hydrostatic endoscopic balloon dilatation seems to be a safe and useful method.[3,5,9–11] Hydrostatic balloon dilatation of anastomotic strictures offers several advantages over the standard bougie method. The force applied by the inflating balloon is purely radial and therefore is less likely to cause perforation. The standard bougienage technique seems to apply more longitudinal tearing force, which could be potentially harmful.

Dilatation of the anastomotic stenosis using various nonsurgical methods has been described. Mazier[12] described gradual dilatation using a Foley catheter with increasing volumes of water. Treatment of anastomotic strictures with digital dilatation has been reported. However, the strictures encountered in this series were too tight for digital dilatation. Some authors have used transanal radial incision with success.[13,14]

In our series, there are two patients with anastomotic strictures following handsewn anastomosis. The increased incidence of stenosis following stapled anastomosis as shown in animal models appears to be related to the mucosal healing by a combination of both primary and secondary intention leading to increased scar formation. Others have implicated ischemia as an important factor leading to stenosis in stapled anastomosis.[15]

There were no complications encountered in this series of 25 patients. One patient had temporary increased stool frequency and incontinence.

This is probably related to the undoing of the "bottleneck" effect. The failure rate is very minimal, as seen in this series and others.[1,3,5] The incidence of anastomotic strictures in relation to

cartridge size is very difficult to determine. In this series, 21 of the 25 patients had their colorectal anastomoses performed by surgeons other than the authors. This has made it difficult to assess the exact size of the cartridge used and the technique applied.

Even though hydrostatic balloon dilatation is a safe procedure, the endoscopist should prepare the patient for possible surgery, including a colostomy if perforation were to happen. Mechanical bowel preparation and preoperative antibiotic therapy are mandatory.

SUMMARY AND CONCLUSION

Twenty-five patients were treated with hydrostatic balloon dilatation for severe symptomatic anastomotic strictures. The majority of the patients needed two dilatations at four-week intervals. In 24 patients (96 percent), the presenting symptoms resolved after successful balloon dilatation. There were no perforations. The failure rate was 4 percent.

In selected patients with anastomotic strictures, hydrostatic balloon dilatation done under proper guidelines is easy, safe, and successful, with minimal complications.

REFERENCES

1. Kissin MW, Cox AG, Wilkins RA, Kark AE. The fate of the EEA stapled anastomosis: a clinicoradiological study of 38 patients. Ann R Coll Surg Engl 1985; 67:20–2.
2. Graham DY, Smith JL. Balloon dilatation of benign and malignant esophageal strictures: blind retrograde balloon dilatation. Gastrointest Endosc 1985; 31:171–4.
3. Fregonese D, DiFalco G, DiToma F. Balloon dilatation of anastomotic intestinal stenoses: long term results. Endoscopy 1990;22:249–53.
4. Kozarek RA. Hydrostatic balloon dilatation of gastrointestinal stenoses: a nation survey. Gastrointest Endosc 1986;32:15.
5. Whitworth PW, Richardson RL, Larson GM. Balloon dilatation of anastomotic strictures. Arch Surg 1988; 123:759–62.
6. Manten HD, Zara J, Raskin JB, Goldberg R, Radhammer DE. Balloon dilatation of rectosigmoid strictures: transendoscopic approach. Gastrointest Endosc 1986;32:162–4.
7. Frency F. Balloon dilatation of post anastomotic colonic strictures (abstr). Gastrointest Endosc 1986; 32:170.
8. Luchtefeld MA, Milsom JW, Senagore A, Surrell JA, Mazier WP. Colorectal anastomotic stenosis: results of a survey of the ASCRS membership. Dis Colon Rectum 1989;32:733–6.
9. Stark E, Paolucci V, Herzer M, *et al.* Esophageal stenosis: treatment with balloon catheters. Radiology 1984;153:637.
10. Dawson SL, Mueller PR, Ferrucci JT, *et al.* Severe esophageal strictures: indications for balloon catheter dilatation. Radiology 1984;159:631.
11. Fregonese D, DiFalco G, DiToma F, *et al.* Balloon dilatation of esophageal strictures. Chest 1986; 89(Suppl):6–539.
12. Mazier WP. A technique for the management of low colonic anastomotic stricture. Dis Colon Rectum 1973;16:113–6.
13. Öhman U, Svenberg T. EEA stapler for mid-rectum carcinoma: review of recent literature and own initial experience. Dis Colon Rectum 1983;26:775–84.
14. Accordi F, Sogno O, Carniato S, *et al.* Endoscopic treatment of stenosis following stapler anastomosis. Dis Colon Rectum 1987;30:647–9.
15. Akiyama H, Miyazono H, Tsurumaru M, *et al.* Use of the stomach as an esophageal substitute. Ann Surg 1978;188:606.