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Endoscopic dilation of colonic postoperative strictures*

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Summary. After the use of surgical staplers had become widespread, the number of colonic postoperative stenoses was observed to have increased. Nevertheless, the clinical relevance of this observation is minimal since only 2–5% of the patients complain of chronic constipation or obstruction symptoms. In such cases medical therapy is somewhat troublesome, and surgical treatment always implies a major operation. Endoscopic dilation has proved to be a reliable, simple, and safe therapeutic alternative. Forty-two patients with evidence of stenosis of either colocolic or colorectal anastomosis underwent mechanical or pneumatic dilation in our unit: 19 patients with a temporary diverting stoma were dilated before the colostomy was removed; in the remaining 23 cases, treatment was given according to the patients' symptoms or because it was not possible to pass the anastomosis with an endoscope. The overall failure rate was 2.4%, and no morbidity or mortality was found. When the percentages of patients successfully treated in one session alone were compared (76.9% versus 51.8%), balloon dilation was found to be more effective than bougienage. In our opinion, endoscopic dilation represents the mainstay of treatment of colonic anastomotic strictures, with surgery being reserved for the rare failures, when recurrence of cancer should be suspected.

Key words: Colonic anastomosis – Surgical staplers – Dilation therapy

In recent years, an increasing number of postoperative colonic strictures has been reported [4]. Meanwhile, surgical staplers have been used widely in gastrointestinal (GI) surgery. A relationship between these two phenomena has been suggested by some authors [7, 9].

On the other hand, the clinical relevance of colonic strictures is minimal; only a few stenoses on the left side may be responsible for obstruction symptoms. In these instances, conservative management based upon the administration of bulk-forming laxatives, stool softners and enemas can be of some advantage, but the quality of life of these patients remains poor, and surgical treatment (resection of the anastomosis) always means a major procedure.

Endoscopic dilation of benign colonic stenosis in the symptomatic patient has recently gained wide acceptance because of its excellent cost/benefit ratio and patients' compliance [1, 4, 12, 17, 18].

In the last 6 years, a total of 42 patients have undergone endoscopic treatment in our unit. The technique and results are reported.

Patients and methods

Ten colocolonic and 32 colorectal stenotic anastomoses were endoscopically dilated in 42 patients (25 men and 17 women); the mean age was 67 years (range 54–75). Nineteen patients (45.2%) had a diverting stoma; in these cases the barium enema or endoscopic study performed before removal of the colostomy had shown an anastomotic narrowing.

Of the 23 patients without a colostomy, 17 (40.5%) were symptomatic, constipation being the major complaint at presentation, and this was often accompanied by narrow stools. Four patients (9.5%) had true obstruction symptoms. Two asymptomatic patients (4.8%) underwent dilation since the stenosis did not allow an endoscopic examination of the proximal colon. Before starting the procedure, 5–10 mg diazepam were given IV.

Table 1. Colonic anastomotic stenosis: endoscopic treatment (1982–1988)

Mechanical (1982–1986)		29 patients (69%)[a]
Eder-Puestow	(10)	
Celestin	(19)	
Pneumatic (1987–1988)		13 patients (31%)[b]
Rigiflex	(13)	

[a] 18 (62.1%) patients with a stoma
[b] 1 (7.7%) patient with a stoma

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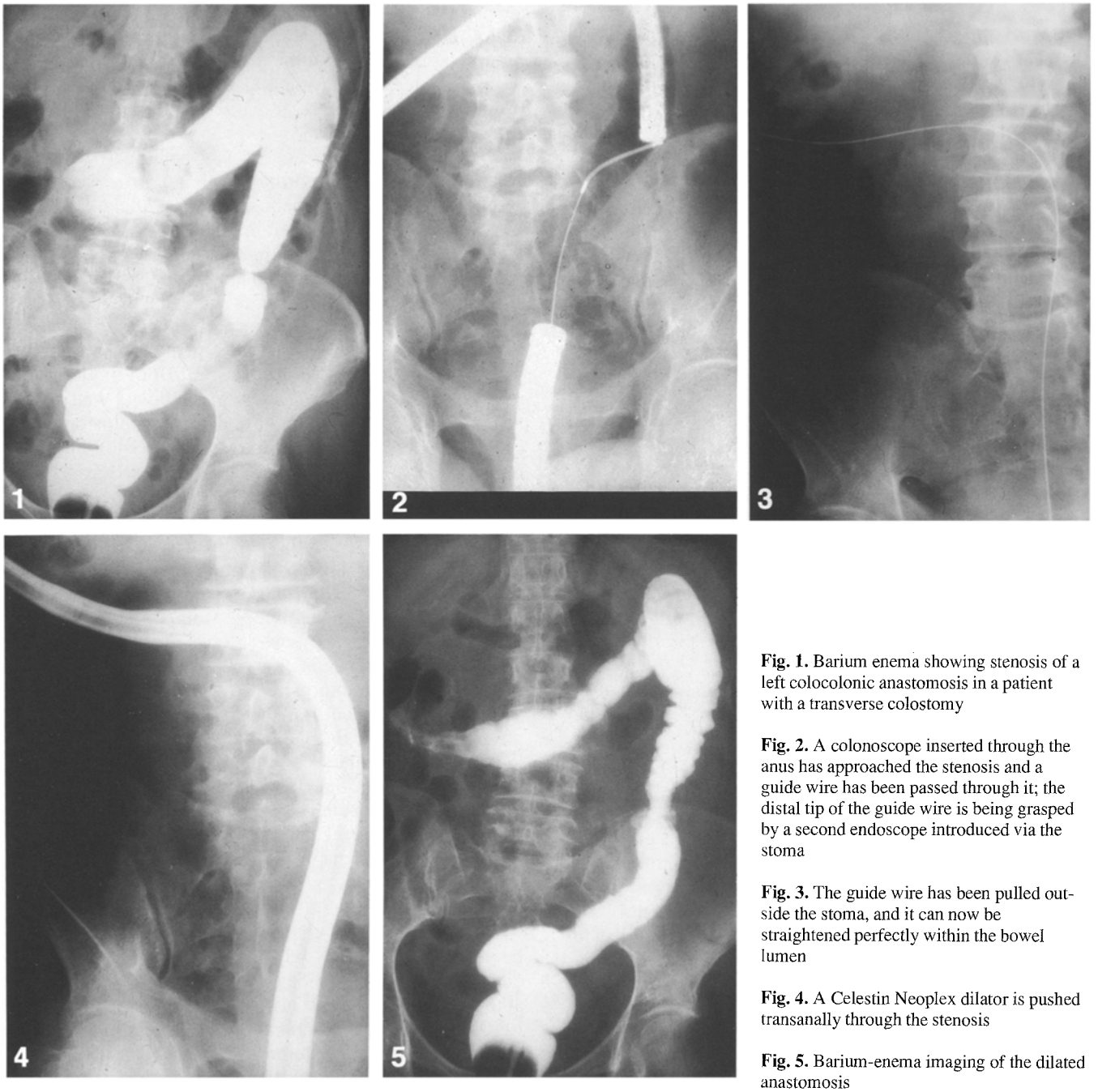

Fig. 1. Barium enema showing stenosis of a left colocolonic anastomosis in a patient with a transverse colostomy

Fig. 2. A colonoscope inserted through the anus has approached the stenosis and a guide wire has been passed through it; the distal tip of the guide wire is being grasped by a second endoscope introduced via the stoma

Fig. 3. The guide wire has been pulled outside the stoma, and it can now be straightened perfectly within the bowel lumen

Fig. 4. A Celestin Neoplex dilator is pushed transanally through the stenosis

Fig. 5. Barium-enema imaging of the dilated anastomosis

Mechanical and pneumatic dilators were used at two different time periods (Table 1). During the first period (1982–1986), 29 patients (69%) underwent mechanical dilation by means of either Eder-Puestow olives (10 cases or 23.8%) or Celestin dilators (19 cases 45.2%). Of these, 18 (62.1%) had a colostomy. The last 13 patients (1987–1988) were all treated by means of Rigiflex achalasia balloon dilators (OD = 20–40 mm; Microvasive, Milford, Mass.) using our own technique. In this last group, only 1 patient (7.7%) had a colostomy.

The endoscopic dilation technique is based upon the insertion of a guide wire through the stenosis under direct visual inspection. The guide wire allows the dilator to progress correctly through the stricture (i.e., according to an axis which should be parallel to the longitudinal axis of the colon). In the patients with a stoma, the distal end of the guide wire can be grasped by means of a second colonoscope and drawn outside (Figs. 1, 2). By tightening the two extremities of the guide wire, it is possible to straighten it perfectly (Fig. 3).

In the first period, Celestin Neoplex probes were generally preferred because the technique is simpler, safer, and faster (Figs. 4, 5). In patients without a colostomy, when only a small amount of guide wire could be inserted past the stenosis, Eder-Puestow metallic olives had to be used. These dilators were progressively forced through the stricture, starting with the smaller sizes (31–33 F) and moving up, when possible, to the maximum width available (60 F). More recently, colonic perendoscopic balloon dilators (Rigiflex TTS; OD = 4–18 mm; Microvasive, Milford, Mass.) have been used at first to dilate the very narrow strictures, so that a colonoscope can be passed through the stenosis and the guide wire well-positioned (Fig. 6). These pneumatic dilators fit the biopsy channel of the colonoscope. In this way, it is possible to perform the preliminary dilation under direct visual control.

As far as the technique of pneumatic dilation is concerned, an achalasia balloon is inserted onto the guide wire and blindly slid up to the level of the stenosis. Correct positioning of these pneumatic dilators can

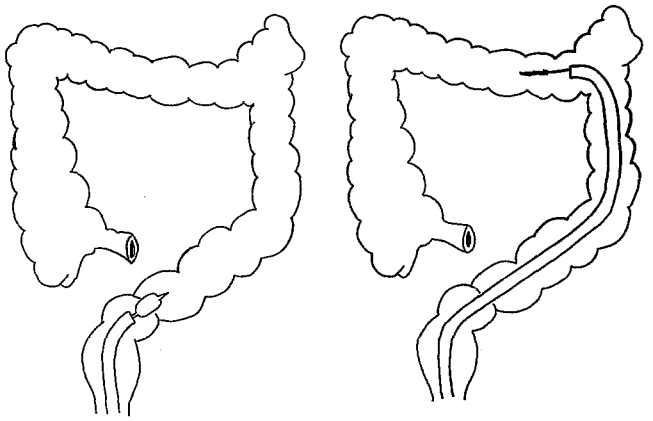

Fig. 6. A Rigiflex TTS balloon dilator (Microvasive, Milford, Mass.) can be useful to predilate a stenotic anastomosis (*left*); afterwards, the stricture can be passed by the endoscope to position the guide wire at least past the splenic flexure (*right*)

be radiologically assessed only in a low colorectal anastomosis. More proximal anastomoses (Fig. 7) require simultaneous endoscopic inspection to verify the level reached by the dilator (Figs. 8, 9) since it is not possible otherwise to identify the precise site of the stenosis.

The maximum inflation pressure varies according to the size of the balloon, ranging from 20 (40 mm OD) to 40 PSI (20 mm OD). The procedure (20 min mean time when pneumatic dilators are used) is completed by a Gastrografin enema to document the patency of the anastomosis and the absence of leaks; moreover, multiple biopsies are performed to rule out recurrence of cancer. Subsequent endoscopic examinations are scheduled according to the follow-up program of patient's primary disease, unless symptoms persist or recur.

Results

The success of endoscopic dilation was evaluated on the basis of both the disappearance of symptoms and anastomotic patency (to be passed at least by the colonoscope) at follow-up examinations (Table 2). Of the 29 patients in the first group (mechanical dilation), definitive treatment in one session alone was achieved in 15 patients (51.7%), while 13 patients (44.8%) required further dilation because of recurrent obstruction symptoms. The total number of dilation procedures performed in the latter 13 patients was 41 (mean 3.15; range 2–4). Only one patient (3.5%) required a surgical operation following four unsuccessful endoscopic attempts over 6 months. In this last case pathology showed otherwise unremarkable scar tissue.

In the second group (pneumatic dilation), 10 patients (76.9%) out of 13 required no further dilation following the first session; in the remaining 3 cases (23.1%) a total number of 8 dilation sessions (mean 2.6; range 2–3) were necessary to obtain definitive treatment. No failures were observed.

Discussion

Postoperative colonic anastomotic stenoses are caused by a cicatricial retraction at the level of the suture line, and they should be differentiated from the strictures that can follow anastomotic recurrence of large-bowel cancer. Cicatricial stenoses are more often diagnosed at endoscopic and/or radiologic follow-up examinations within the first 6 months after the operation. Only a few patients (2–5%) with evidence of anastomotic narrowing will consult a physician because of constipation or intermittent bowel obstruction.

The reported incidence of this pathology varies between 1.2 and 50% according to the criteria used by the authors to diagnose a "stenosis" [2, 7]: slight or marked radiologic reduction of anastomotic caliber as compared to the adjacent colonic segments; inability to pass the endoscope through the anastomosis; symptoms of colonic obstruction. Anyway, most authors agree that the incidence of colonic postoperative stenoses has increased in recent years [2, 4, 5, 10]; this has been attributed to the widespread use of surgical staplers [7, 9]. Both the long-term persistence of metal staples within the bowel wall and the less frequent use of a temporary diverting colostomy have been suggested as possible causes of anastomotic strictures. Nonetheless, prospective randomized trials have failed to show any significant difference in either short- and long-term complications between hand-sewn and stapled anastomosis [3, 6, 11]. Moreover, early inflammatory reaction at the anastomotic site seems to be somewhat more evident after hand-sewn sutures [8], possibly because of the higher likelihood of impairment of the microcirculation caused by the stitches [16]. It has recently been shown that fecal diversion is associated with a higher incidence of anastomotic narrowing [20]; therefore, it should be concluded that the passage of stools exerts a physiological role in maintaining colonic patency at the level of the anastomosis.

In our opinion, the large number of stenoses observed in the last years is better related to the increased number of anastomoses performed in colorectal surgery following the introduction of mechanical staplers and to more extensive follow-up studies on the patients after the operation. In our experience most of the stenoses occurred in patients in whom an anastomotic complication could at least clinically be suspected. In a few patients without past clinical evidence of a leak or dehiscence, following dilation we were able to demonstrate the orifice of a small fistulous tract. Radiation therapy and inflammatory bowel disease are less common causes of anastomotic narrowing.

We therefore suggest that true cicatricial colonic stenoses are produced exclusively by exaggerated perianastomotic inflammation as a result of leaks, even when minimal.

Treatment of anastomotic stenosis should be considered only when the patients are symptomatic, with repeated need of bulk-forming laxatives, stool softners and enemas. Moreover, asymptomatic strictures that cannot be passed by a colonoscope should be treated as well in order to allow endoscopic inspection of the more proximal bowel. Another indication is represented by patients who have a diverting colostomy, in whom an anastomotic stenosis is identified prior to stoma closure.

Since surgical treatment always involves a major operation, in 1982 we moved to a more conservative approach to colonic cicatricial stenoses [14]. In the first few years of our experience, the majority of our patients had a

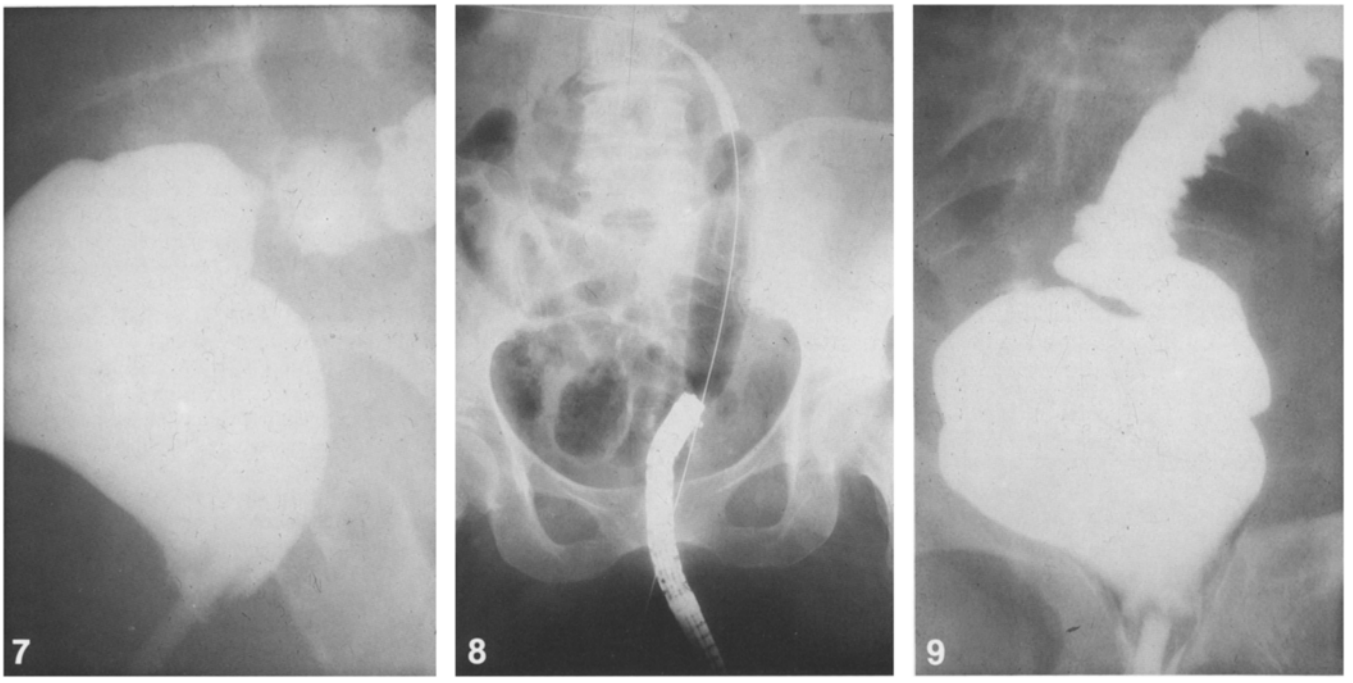

Fig. 7. Barium enema showing stenosis of a colorectal anastomosis at the 13 cm level

Fig. 8. An achalasia balloon dilator (Microvasive, Milford, Mass.) has been slid onto a guide wire through the stenosis. During balloon inflation, correct positioning of the dilator must be checked by inserting a colonoscope up to the level of the anastomosis

Fig. 9. The anastomosis has been dilated. Only by using pneumatic balloons is it possible to dilate the bowel up to its normal caliber

colostomy; this allowed for an even safer and simpler technique, since the correct positioning of the guide wire could be accomplished by passing another endoscope via the stoma. In those years we were exclusively utilizing mechanical dilators. Adequate enlargement of the stenosis was reached at the first session in 51.8% of patients, while 44.7% of cases required 2–4 dilations. Only 1 patient underwent surgical operation following 4 unsuccessful treatments within 6 months. Even if no cancer cells were seen at surgery, we believe that when it is not possible to maintain adequate patency of anastomosis despite multiple dilation sessions, recurrent carcinoma should always be suspected.

From these first cases we learned that, if present, a colostomy should be closed following the first or second dilation to maintain the physiological passage of feces through the anastomosis. Because of better sliding on the guide wire, the less traumatic effect of Neoplex compared to the stainless steel olives and better patient compliance (fewer introductions), we prefer the Celestin dilators.

In the past years a significative increase in the use of hydrostatic balloons to dilate GI tract stenoses has been observed [10]. In 1987 we started to use Rigiflex achalasia balloon (OD = 30–40 mm) to dilate colonic stenoses. More recently, Rigiflex rectosigmoidal balloons (Microvasive, Milford, Mass.) (OD = 20–40 mm) have been specifically designed for this purpose. On the other hand, the small Rigiflex TTS perendoscopic balloons (OD = 4–18 mm) can only be useful for predilating the stricture, when adequate progression of the guide wire through the stenosis cannot be achieved. In fact, following "pre-dilation", it is possible to pass the anastomosis with the endoscope and to position the guide wire correctly.

By using balloon dilators, 76.9% of patients were successfully treated in one session alone, and no failures were seen. The better results obtained by means of balloon dilators (Table 2) are justified by the larger dilation diameter (40 mm versus 18–20 mm maximum for Eder-Puestow olives or Celestin and Savary bougies). One should bear in mind that only by using pneumatic balloons is it possible to dilate the colon up to its normal diameter. Unlike in esophageal stenosis, the endoscopist should not be afraid of achieving such a degree of dilation. In fact, the overabundant scar tissue, which always surrounds the stenosis, guards against the risk of perforation. Compared to olives or bougies, the use of balloon dilators can be somewhat

Table 2. Colonic anastomotic stenosis: endoscopic treatment (1982–1988)

	Immediate[a] success (%)	Repeated[a] treatment (%)	Failure (%)[a]
Mechanical dilation	15 (51.8)	13 (44.7)	1 (3.5)
Pneumatic dilation	10 (76.9)	3 (23.1)	–
Total	25 (59.5)	16 (38.1)	1 (2.4)

[a] There were no deaths or morbidity

more difficult in the treatment of proximal stenoses; in such circumstances, the endoscope should also be introduced and advanced to visualize the correct positioning of the balloon through the stenosis, whose level cannot be easily identified during fluoroscopy.

In conclusion, endoscopic dilation of colonic postoperative stenoses represents a simple, rapid, and effective method with virtually no complications or mortality; moreover, only mild sedation is necessary. Other endoscopic techniques are also available now (LASER, electroresection) [1, 4, 12, 13, 15, 19] and they fit the different anatomical conditions as well as the endoscopist's personal preference.

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