

# Anastomotic stricture following colorectal surgery

By

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## Incidences

- The incidence of an anastomotic stricture or stenosis after a colorectal anastomosis ranges from 0 to 30 percent, although only 5 % of patients become symptomatic.

## Incidences Continued

- This wide range is due at least in part to an imprecise definition of stricture. The heterogeneous surgical indications, types of surgical and anastomotic procedures, and definitions of anastomotic stricture may explain the wide range in incidence.

## Definitions

- Prospective studies have defined a stricture in terms of the inability to pass a proctoscope (12 mm diameter) or a larger rigid sigmoidoscope (19 mm diameter) through the stenosis.

## Risk factors Continued

- An anastomotic stricture may result from tissue ischemia, inflammation, radiation, anastomotic leak, or recurrent disease. The literature supporting the role of the above factors in the pathophysiology of anastomotic strictures is sparse. Both randomized trials and prospective observational studies have identified the following risk factors for stricture formation.

## Risk factors Continued



## Risk factors Continued

- A stapled colorectal anastomosis but not a stapled ileocolic anastomosis is associated with an increased risk of stricture formation compared with a hand-sewn anastomosis. A systematic review of seven randomized trials with 1042 patients with a colorectal anastomosis found a significantly higher rate of stricture formation with stapled anastomosis (8 versus 2 percent).

## Risk factors Continued

World J Surg. 2014; 38(10):2015-2024.  
DOI: 10.1007/s00268-014-2715-7



### Predictive Factors of Stenosis after Stapled Colorectal Anastomosis: Prospective Analysis of 179 Consecutive Patients

Guillermo C. Barrera, M.D.,<sup>1</sup> Miguel Angel G. Cusútilo,<sup>2</sup> Alejandro E. Barrera, M.D.,<sup>1</sup> Jaime P. Contreras, M.D.,<sup>1</sup> Carlos L. Mick, M.D.,<sup>1</sup> Daniel C. Soto, M.D.<sup>1</sup>

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## Risk factors Continued

- In a prospective observational study, the risk of developing a stenosis following a colorectal anastomosis was 2.4 times greater in men compared with women (25 versus 14 percent). This may reflect the anatomically narrow male pelvis and the associated increased technical difficulty.

## Risk factors Continued

Tech Coloproctol (2013) 17:371–375  
DOI 10.1007/s10151-012-0929-x

ORIGINAL ARTICLE

### Colorectal anastomotic stricture: Is it associated with inadequate colonic mobilization?

A. Hranovsky · G. De Silva · P. Denmyr ·  
S. Shewki · S. D. Wexner

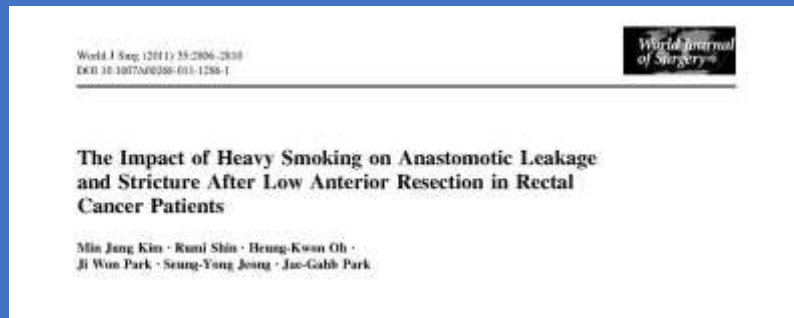
## Risk factors Continued

- The current case series found that 17 of the 19 patients (89.5 %) with anastomotic stricture had an intact splenic flexure as well as inferior mesenteric vessels. These findings represented the single most important factors related to anastomotic stricture. Tension-free anastomosis is facilitated by freeing the left colon and splenic flexure from the peritoneal attachments, and dividing the IMA and IMV.

## Risk factors Continued

- Maximal length can be obtained by dividing the IMA at its origin from the aorta, rather than below the origin of the left colic artery, together with the division of the IMV at the lower border of the pancreas.

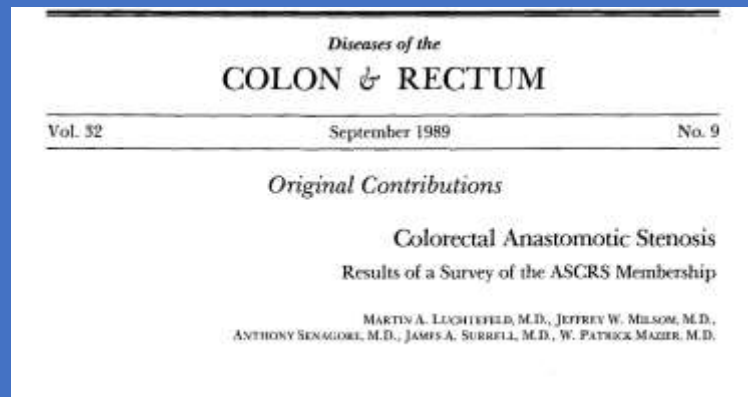
## Risk factors Continued



## Risk factors Continued

- Between January 2005 and December 2008, 215 patients underwent low anterior resection for rectal cancers at Seoul National University Hospital.
- A history of heavy smoking (more than 40 pack-years) is an independently significant risk factor for anastomotic complications after low anterior resection in rectal cancer patients.

## Risk factors Continued



## Risk factors Continued

- Anastomotic stenosis in 123 patients were identified by a mail survey of the ASCRS (110) membership. The great majority of the stenosis were in the sigmoid colon or rectum (93 of 123), and two thirds of these were stapled anastomoses.



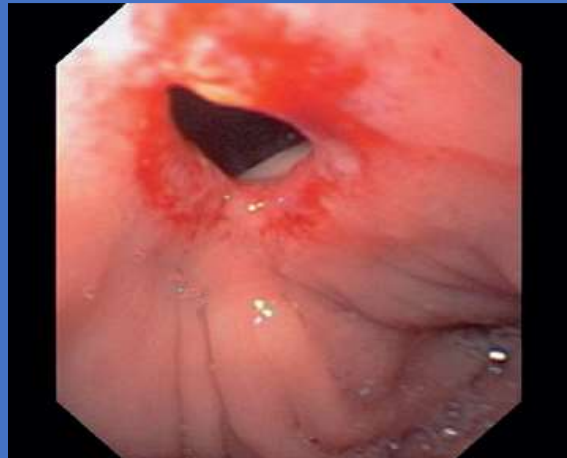
## Risk factors Continued

- Several clinical factors were noted to have the most frequent association with anastomotic stenosis; Preoperatively, obesity (23%) and abscess (10%) were the most common factors. Intraoperatively, "incomplete doughnuts" (10%) were seen most frequently. Postoperatively, anastomotic leaks (12%) and pelvic infections (10%) were frequent.

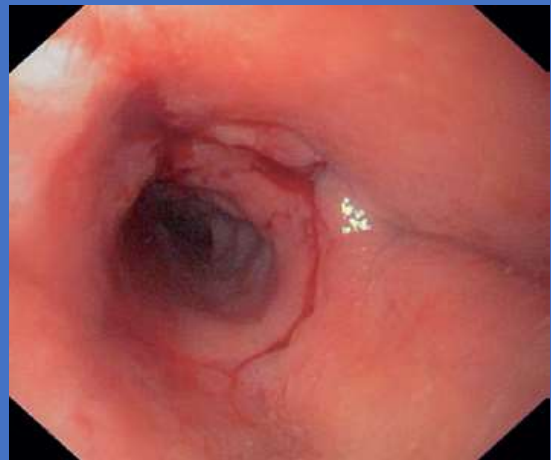
## Risk factors Continued

- Most stenosis (70%) were detected within six months following surgery.
- Many stenosis responded to dilatation (53%) and non-operative management (11%), but over one quarter of the patients in this series required major surgery.

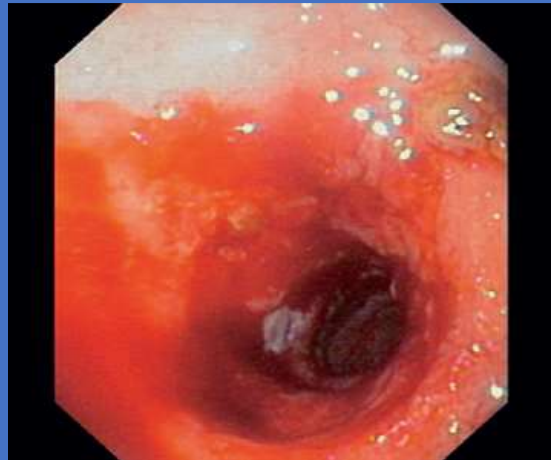
Anastomotic stenosis in upper rectum, covered with blood after bougienage.



Anastomotic stenosis in middle rectum, light bleeding, considered normal, at the stenosis ends following balloon dilation.



Anastomotic stenosis in middle rectum, moderate bleeding immediately after dilation. The patient comes every two to three years for balloon dilation and is without complaints.



Discrete laceration of the stenosis ends after balloon dilation of a rectosigmoidostomy, within normal range.





Short concentric stenosis; a Stenosis after rectal resection with stapler, not passable, prior to treatment. b After the first laser incision with APC, c The concentric stenosis is opened after two sessions of APC laser incision. A few staples can be seen on the ends.

## Management

- A clinically significant stricture typically presents with signs of a partial or complete bowel obstruction.
- The incidence of symptomatic strictures ranges from 4 to 10 percent.
- Most patients with an anastomotic stricture do not require an intervention.

## Management Continued

- Despite the unclear pathophysiology of anastomotic stricture, multiple techniques have been used for its management, including staplers and cutting devices, steroid injections, the combined use of electrocautery and photoablation, manual or instrumental dilatation using a balloon, bougie, or pneumatic dilator, and surgical resection and re-anastomosis.

## Management Continued

- Management of an anastomotic stricture depends upon its etiology and anatomic location.

## Management Continued

- Malignant strictures — When the initial resection is performed for malignancy, it is imperative to rule out local recurrence. The evaluation includes laboratory tests (CEA), radiographic imaging (CT scan, MRI, endoscopic ultrasound, or PET scan), and endoscopic biopsy of the stricture.

## Management Continued

- Malignant recurrence is reported to be rare in early strictures (up to six months) but the risk of local malignant recurrence increases with time [44]. In the absence of distant metastatic disease, surgical resection of a malignant anastomotic stricture should be performed, with restoration of gastrointestinal continuity if technically feasible. In the presence of distant metastatic disease or unresectable locoregional disease, proximal fecal diversion may be warranted for palliation.

## Management Continued

- Benign strictures — Benign low colorectal, coloanal, and ileoanal strictures are usually effectively treated with repeated dilatation using an examining finger or rubber dilators. Higher colorectal, colocolic, or ileocolic strictures may be managed endoscopically. Endoscopic balloon dilatation is successful in 88 to 100 percent of benign cases.

## Management Continued

- Endoscopic alternatives employing the use of self-expanding metallic stents or endoscopic transanal resection of strictures are effective in treating high grade anastomotic strictures. In refractory cases, surgical revision may be required and, occasionally, permanent fecal diversion is warranted.

## Management Continued

- The role of endoscopy is primarily diagnostic, evaluating the nature of the stricture by examining mucosal appearances (still inflamed? residual tumor?).
- Though radiology is often superior for determining the length of stenosis, endoscopically one can often already determine whether a stenosis is concentric (usually following anastomosis), a postoperative angulation of the bowel, or a longer narrowing.

## Management Continued

- Appropriateness of endoscopic therapy;

suitable stenosis: short, “ring-like” stricture, concentric,

unsuitable stenosis: long (>5 cm), eccentric, sharply angulated.



## Management Continued

- Principles of endoscopic therapy
  1. Bougienage: entails a risk of eccentric and undesirable expansile force over longer bowel segments.

## Management Continued

2. Balloon dilation: placed either over a guidewire using radiographic control (limitations in the right colon) or through the endoscope using a balloon which is advanced through the working channel and placed under direct visualization (TTS = through the scope balloon dilation).

## Management Continued

- Balloon dilation has the advantage of direct visualization through the balloon (filled with a mixture of contrast agent and water) into the stenosis during the procedure; expansile force of dilation is evenly distributed radially.
- Discrete lacerations involving slight or moderate bleeding on the stenosis ends immediately following dilation are considered normal.

## Management Continued

3. Electro-incision using high frequency current: either using argon plasma coagulation or electrical needle knives. The use of papillotomy devices with pure cutting current has also been reported for benign strictures, but we avoid their use. We prefer incision with an argon beamer, in two sessions if necessary. This method is particularly suitable for short anastomotic “ring” stenosis.

## Management Continued

4. There is little confirmed evidence and only a few small and retrospective case series on the occasional use of corticosteroid injection in such stenosis to prevent restenosis.

## Management Continued

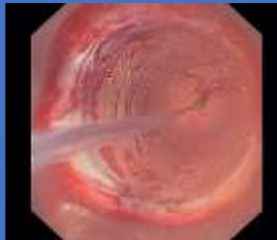


Crohn disease.

Inflammation and stenosis at ileoascendostomy .

Advancement of a TTS balloon through the stenosis, inflation of the balloon in the stenosis.

## Management Continued



Stenosis at anastomosis following sigmoid resection due to diverticulitis.

Stenosis not passable.

Advancement of the TTS balloon, inflated balloon in the stenosis.

## Management Continued



Final image after balloon dilation, now sufficiently opened and passable. A few staples are visible at the edge.

Stenosis and inflammation of ileo-colonic anastomosis in Crohn disease, "Laying out" the guidewire.

After balloon dilation the stenosis is dilated and has bloody lacerations.

## Management Continued

- Endoscopic dilatation is more successful and carries a lower complication rate in patients who were operated upon for benign rather than malignant disease.

## Management Continued

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### ORIGINAL ARTICLE

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#### Efficacy and Safety of Endoscopic Balloon Dilatation of Benign Anastomotic Strictures After Oncologic Anterior Rectal Resection

*Report on 24 Cases*

*Sergio Eduardo Alonso Araujo, MD and Adriana Purnado Costa, MD*

## Management Continued

- TTS balloon dilation of anastomotic stricture after oncologic low anterior resection was easily and safely performed and provided long-term clinical success. Therefore, it might be considered the first treatment option for new cases and also for recurrence management.

## Management Continued

### CLINICAL STUDY

#### **Safe and Effective Treatment of Colorectal Anastomotic Stricture Using a Well-defined Balloon Dilation Protocol**

Pyeong Hwa Kim, BS, Ho-Young Song, MD, PhD, Jung-Hoon Park, RT,  
Jin Hyoung Kim, MD, Han Kyu Na, BS, and Ye Jin Lee, BS

## Management Continued

- In conclusion, results show that fluoroscopically guided balloon dilation is safe and clinically effective and is superior to previously described dilation techniques in the treatment of colorectal anastomotic stricture.

## Management Continued



## Management Continued

- The application of sphincteromes seems suitable for colorectal anastomotic strictures, which was easily performed, and yielded an effective result. The present outcome was also satisfactory. However, the risk and the long-term results of this method could not be assessed because of limited experiences.

## Management Continued





## Management Continued

**Table 1** Details of patients with benign anastomotic stricture treated by self-expandable metal stents (SEMS).

Case number	Age	Sex	Distance from anal verge (cm)	Stoma prior to SEMS	Length of stricture (cm)	Type of stent	Length (cm)
1	69	F	10	Yes	2.5	Uncovered	9
2	81	M	10	No	2.2	Covered	8
3	52	M	15	No	3.2	Covered	8
4	77	M	10	No	3	Covered	10.1
5	73	F	7	No	4	Covered	8
6	75	M	7	Yes	2	Covered	10.1
7	73	M	8	Yes	3	Covered	8
8	77	F	8	No	3	Covered	8
9	80	M	4	No	2.5	Covered	8
10	73	M	7	No	3	Covered	8

## Management Continued

Efficacy and safety of EC for severe anastomotic strictures

Obara et al

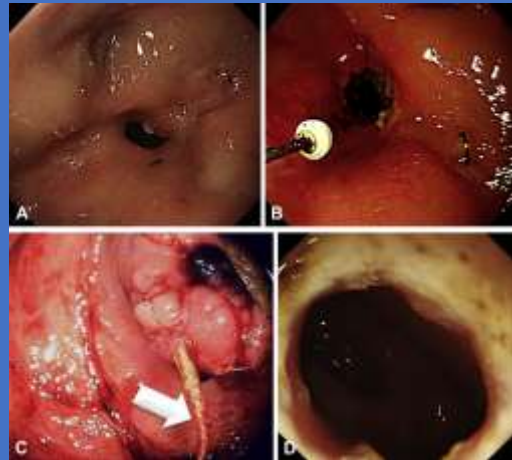
Efficacy and safety of endoscopic radial incision and cutting for benign severe anastomotic stricture after surgery for lower rectal cancer (with video) 

Shoichi Obara, MD,<sup>1</sup> Hiroaki Ikematsu, MD, PhD,<sup>1</sup> Tomoyuki Odagaki, MD,<sup>2</sup> Yasuhiko Sano, MD,<sup>3</sup> Torumasa Yano, MD,<sup>4</sup> Akihito Kohayashi, MD, PhD,<sup>5</sup> Masaki Ito, MD, PhD,<sup>6</sup> Norio Saito, MD, PhD,<sup>7</sup> Kazuhiro Kaseko, MD, PhD<sup>8</sup>

Kashima, Japan

## Management Continued

Details of the RIC method; A, A postoperative anastomotic stricture is visible in the lower rectum, B, The blade of an insulated-tip knife is inserted into the stricture area, C, The stricture area is incised radially with the insulated-tip knife, and the scar tissue is excised in an arc from the incision along the lumen, D, After the RIC procedure, the endoscope can pass through the stricture.



## Management Continued

- In conclusion, dilatation by RIC is feasible, effective, and safe for the treatment of severe anastomotic strictures in the lower rectum after ISR or LAR. RIC could be used to treat cases of refractory anastomotic strictures that do not respond satisfactorily to existing treatment methods by dilatation.

## Management Continued

### Usefulness of Flexible Colonoscopic Microwave Coagulation Therapy for a Colorectal Anastomotic Stricture

Kunio Takeuchi, M.D.,\*† Yastushi Tsuzuki, M.D.,\* Tetsu Ando, M.D.,\*  
Masao Sekihara, M.D.,\*† Takashi Hara, M.D., Ph.D.,\*† Takayuki Kori, M.D.,\*  
Hiroki Nakajima, M.D.,\* Takayuki Asao, M.D., Ph.D.,‡  
Hiroyuki Kuwano, M.D., Ph.D., F.A.C.S.‡

*From the \*Department of Surgery, Tone Chuo Hospital, and †Department of Surgery I, Gunma University School of Medicine, Gunma, Japan*

## Management Continued

- Flexible colonoscopic, microwave coagulation therapy under flexible colonoscopic visualization is a useful, simple, effective, and safe method for the treatment of benign, colorectal anastomotic strictures.

## Management Continued

**Diseases of the  
Colon & Rectum**

**Case  
Reports**

### The Strictured Anastomosis: Successful Treatment by Corticosteroid Injections—Report of Three Cases and Review of the Literature

Paul A. Lucha, Jr., D.O., James E. Pücsar, M.D., Michael J. Francis, M.D.  
*Department of General Surgery, Naval Medical Center, Portsmouth, Virginia*

## Management Continued

- Intra-stricture injection of a long-acting corticosteroid preparation offers a safe and effective means for managing severe symptomatic anastomotic strictures.
- Its use should be considered in those who have failed more conservative means before attempts at more aggressive surgical intervention.

## Management Continued

### Results of Reoperations in Colorectal Anastomotic Strictures

Rodolfo D. Schlegel, M.D., Nidal Dehni, M.D., Rolland Parc, M.D.,  
Scott Caplin, F.R.C.S., Emmanuel Tiret, M.D.

*From the Department of Digestive Surgery, Hôpital Saint-Antoine AP-HP, University of Paris VI (Pierre et Marie Curie), Paris, France*

## Management Continued

- A retrospective study of 27 patients with colorectal anastomotic strictures refractory to endoscopic management underwent surgical revision with either a colorectal or coloanal anastomosis without a mortality and no evidence of restenosis in any patient at a median follow-up of 28 months.

**THANK YOU**