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Original article

Benign anastomotic strictures after oncologic rectal cancer surgery. Results of treatment with hydrostatic dilation

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ABSTRACT

Introduction: Benign anastomotic strictures after rectal cancer surgery are common and their treatment can vary from conservative measures to surgical resection.
Patients and methods: Between March 2001 and August 2008, 422 patients with rectal cancer underwent anterior resection and 83.8% were treated with primary anastomosis. Anastomotic stricture has been defined as the inability to pass a colonoscope. Hydrostatic balloon dilation was performed. Results of success and failure dilation were assessed.
Results: Twenty-six patients (7.34%) with anastomotic stricture were treated; 16 men and 10 women, with a median age of 66 years (57–74). A total of 26 anterior resections were performed, as well as 10 end-to-end anastomosis, 10 side-to-end, 4 j-pouch and 2 pouch coloplasties. The median stricture height was 10 cm (4–12). Thirteen patients had preoperative radiotherapy (50%), and 9 patients had an ileostomy (34.7%). The median time of diagnosis was 6 months (3–10). The diagnosis was made by: rectal digital examination in 19.2%, colonoscopy 23.1% and clinical symptoms in 57.7%. The median number of dilation sessions required was 2 (1–4). The median of follow-up was 39 months (23 to 49). Results were successful 88.5% and unsuccessful in 11.5%. Morbidity was 3.8% (one perforation after dilation). There was no mortality.
Conclusions: Benign anastomotic strictures after rectal cancer surgery are frequent (7.05%), develop symptoms (52.9%) and can be successfully treated by hydrostatic dilation in more than 88% patients.

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Estenosis anastomóticas benignas en la cirugía radical del cáncer de recto. Resultados del tratamiento con dilatación hidrostática

Palabras clave:
Cáncer de recto
Estenosis anastomótica
Dilatación endoscópica

RESUMEN

Introducción: Las estenosis anastomóticas tras cirugía de cáncer de recto son frecuentes y precisan tratamientos desde medidas conservadoras hasta cirugía de resección.
Pacientes y método: De marzo de 2001 a agosto de 2008 se intervinieron 422 carcinomas de recto, en el 83,8% se realizó anastomosis. Se definió la estenosis como la incapacidad de pasar el colonoscopio. Se realizó tratamiento mediante dilatación hidrostática. Se analizaron las diferencias entre los tratamientos con y sin éxito.
Resultados: Serie de 26 pacientes con estenosis de anastomosis (7,34%). Dieciséis varones y 10 mujeres, con una mediana de 66 años (57–74). Las intervenciones fueron 26 resecciones anteriores: 10 anastomosis término-terminales, 10 laterotерminales, 4 reservorios en J y 2 coloplastias. La mediana de altura de la estenosis fue de 10 cm (4–12). Trece pacientes recibieron radioterapia (RT) preoperatoria (50%). Nueve pacientes portaban ileostomía (34,7%). La mediana de diagnóstico fue 6 meses (3–10). El diagnóstico se realizó: por tacto rectal en 19,2%, por colonoscopia 23,1% y por clínica en 57,7%. Se realizaron una mediana de 2 (1–4) sesiones de dilatación. La mediana de seguimiento fue de 39 meses (23 a 49). El resultado fue bueno en el 88,5% y fracasó en 11,5%. La morbilidad fue del 3,8% (una perforación tras la dilatación). No existió mortalidad.
Conclusiones: Las estenosis anastomóticas tras cirugía de cáncer de recto son frecuentes (7,05%), suelen originar clínica (52,9%) y pueden tratarse con éxito mediante dilatación en más del 88% de los pacientes.

Introduction

Between 3%–30% of the patients that undergo colorectal surgery may suffer a benign anastomotic stenosis.[1-3] This great variability depends largely on diagnostic criteria used. However, currently most authors define anastomotic stenosis as the impossibility to pass a 12 mm diameter colonoscope.[4] During the treatment of rectal cancer, carrying out complex and high risk anastomosis, together with frequent preoperative radiotherapy, make anastomotic stenosis a frequent cause of functional complications and quality of life alteration, although it is not sufficiently considered.[5]

Although most anastomotic stenoses dilate spontaneously, there are 3 situations that require mandatory treatment: severe or persistent symptoms (difficulty to evacuate or signs of intestinal obstruction), patients with protective stomas before their closure and when it is impossible to pass a colonoscope during colorectal cancer[6] follow-up.

We present our results with hydrostatic dilation of anastomotic stenosis after rectal cancer surgery in a cohort of patients followed prospectively.

Patients and methods

During the period from March 2001 to August 2008, 422 patients with a diagnosis of rectal carcinoma underwent surgery at the Colorectal Surgery Section of the Hospital Donostia (tumours located up to 15 cm from the anal margin with rigid rectoscopy). Anastomosis was performed in 354 cases (83.8%). All the patients with a diagnosis of anastomotic stenosis were evaluated prospectively by means of clinical examination, opaque enemas and/or colonoscopy. Anastomotic stenosis was defined as the impossibility to pass a 12 mm diameter colonoscope.[4] We ruled out local recurrence prior to treatment (by means of biopsies taken at the site of anastomosis) in all patients. We used hydrostatic dilation by means of colonoscopy (with sedation in cases with low stenosis). The technique

Figure 1 – Controlled pressure pistol.

Figure 2 – Hydrostatic dilation catheter (Microvasive™, Boston Scientific, USA).

consisted in the insertion of a balloon catheter of 20 mm in diameter (Microvasive™, Boston Scientific, USA) ([Figure 1] and [Figure 2]) maintaining a pressure of 6 atm for 3 min. After deflating, we assessed the results (by passing a finger or a colonoscope) and, if necessary we repeated one or 2 more cycles of insufflation in the same session. We carried out endoscopic or digital control 2-3 weeks later, and, if necessary repeated the dilation session. We considered we had obtained a cure when the colonoscope would pass the structure and there was an absence of clinical symptoms of obstruction. All the patients were controlled by colonoscopy at 3 and 12 months, in addition to the standard controls for their original neoplastic disease.

The basal characteristics of the patients were analysed: age, sex, presence or not of clinical symptoms, height and type of anastomosis, time of diagnosis, presence of derivative ostomy, use of radiotherapy and postoperative complications. Furthermore, during follow-up we registered the number

Table – Univariate analysis of risk factors associated with failure of dilation of anastomotic stenosis after rectal cancer surgery

Variable	Success	Failure	Significance
Age median, range	67 (45–82)	58 (54–73)	P=.495[a]
Sex (%)			
Male	13 (50%)	3 (11.5%)	P=.262[b]
Female	10 (38.5%)	0 (0%)	
Obesity			
Yes	10 (38.5%)	0 (0%)	P=.262[b]
No	13 (50%)	3 (11.5%)	
Clinical			
Yes	12 (46.2%)	3 (11.5%)	P=.238[b]
No	11 (42.3%)	0 (0%)	
Ileostomy			
Yes	7 (27%)	2 (7.7%)	P=.268[b]
No	16 (61.5%)	1 (3.8%)	
Anostomotic leak			
Yes	5 (19.2%)	2 (7.7%)	P=1[b]
No	18 (69.3%)	1 (3.8%)	
Radiotherapy			
Yes	11 (42.3%)	2 (7.7%)	P=.792[b]
No	12 (46.2%)	1 (3.8%)	
Height of anastomosis, cm (median and range)	10 (3–13)	6 (3–13)	P=.653[a]
Mesorectal exeresis			
TME	11 (42.3%)	2 (7.7%)	P=.500[b]
PME	12 (46.2%)	1 (3.8%)	
Type of anastomosis			
T-T	9 (34.7%)	1 (3.8%)	P=.580[b]
L-T	14 (53.8%)	2 (7.7%)	
Delay in dilation, nths (median and range)	6 (2–36)	5 (2–5)	P=.778[a]
# of dilation sessions (median and range)	2 (1–8)	4 (2–5)	P=.136[a]

PME indicates partial mesorectal exeresis; TME, total mesorectal exeresis.
[a]Mann-Whitney.
[b]Fisher Exact.

of dilation sessions, intervals between these, appearance of complications and results of dilation.

The data was analysed with the SPSS v15.0 (SPSS, Chicago, Illinois, USA) statistical programme. The quantitative variables are expressed as median and interquartile range (IR) and the qualitative data as frequencies and percentages. The successful and not successful groups were compared after dilation using the Fisher and Mann-Witney tests. A value of $P>.05$ was considered significant.

Results

During the study period, 354 colorectal and coloanal anastomoses were performed (83.8%) in 422 patients diagnosed with rectal carcinoma. In 26 (7.34%) patients anastomotic stenosis was diagnosed. Thirteen patients had a tumour in the upper third of the rectum, 8 in the middle third and 5 in the lower third. In 13 cases (50%), a total mesorectal exeresis (TME) and partial mesorectal exeresis (PME) were performed, with at least 5 cm of mesorectal margin in the rest. The median height of the anastomosis was 10 cm (4-12). The patients had undergone termino-terminal colorectal anastomosis in 8 cases, laterоterminal colorectal anastomosis in 12 cases, coloanal reservoirs in J in 4 cases and Fazio type coloplasties in 2 cases. In 23 (88.5%) patients the anastomosis was performed with double clipping, and in the remainder (11.5%) with manual suture. The median interval to diagnosis was 6 months (3-10 months). Diagnosis was suspected based on clinical history in 15 cases (57.7%): 6 patients with pseudo-diarrhoea and 9 with difficulty to evacuate. In 5 patients (19.2%), the diagnosis was made by rectal palpation (in absence of clinical signs) and by colonoscopy in the other 6 (23.1%). The median follow-up after dilation was 39 months (23-49 months). The results were considered good in 23 patients (88.5%) and failure in 3 (11.5%), who required surgical re-intervention (one patient due to perforation after dilation). A colorectal re-anastomosis was performed in the 3 patients with failures, and 2 Hartmann interventions, respectively. Morbidity was 3.8% and there was no mortality. The univariate comparative analysis of the groups with and without success after dilation (Table) did not reveal any predictive factor of failure of treatment by hydrostatic dilation, although the low number of failures (3) could explain these results. No multivariate analysis was performed.

Discussion

The exact prevalence of anastomotic stenosis after rectal cancer surgery is difficult to determine. The variability of its definition, the fact that in most cases there is spontaneous resolution, the variability of follow-up methods, the poor correlation between degree of stenosis and clinical appearance, as also the frequent digital dilation in external consulting rooms, could explain these difficulties. Smith et al[7] and Luchtefeld et al[8] published, during the 1980s, the first ASCRS surveys on the prevalence of colorectal anastomotic stenosis (between 3% and 30%), emphasising its double valuation: anatomical and functional, as also the good response to non-surgical treatments. Furthermore, several risk factors associated with stenosis were found, some preoperative ones (obesity, sepsis and radiotherapy), some intraoperative (incomplete doughnuts) and some postoperative (dehiscences, pelvic infections and radiotherapy).

Most cases were diagnosed between the 3rd and 6th month after surgery,[1,8,9] similar to what we saw with our patients, which could be related to the evolution of the fibrotic process, caused possibly by ischaemia, local infection or postradiotherapy changes.[10] In studies with early endoscopies after surgery, very low rates of stenosis have been found, 0–3%.[11] However, the variability in diagnostic criteria may make this difference greater. Solt et al, of 44 patients with postoperative stenosis, found a mean delay of over 9 months.[12] There is no clear correlation between clinical findings and degree of stenosis. In fact, 47.5% of our patients were diagnosed while asymptomatic, as was seen with the ASCRS survey with 43% asymptomatic cases in 123 patients[8] or in the case of the series seen by Pietropaolo et al[13] 40.5% out of 42 patients. These results were different compared to those seen by the Saint-Etienne group with 22% asymptomatic cases out of 27 patients,[14] and very different from what has recently been published by Araujo et al[9] with 100% asymptomatic cases in 24 patients.

Although the majority of anastomotic stenosis after colorectal surgery resolve spontaneously (due to progressive dilation by faecal bolus) they may require treatments that go from dilation to reoperation. Severe or persistent clinical symptoms, patients with a protective stoma before its closure and the fact that it is impossible to pass the colonoscope during colorectal cancer follow-up are the 3 situations in which some type of treatment is mandatory.[6]

From the time it was first described in the decade of the 1980s, pneumatic/hydrostatic dilation with a balloon has become the most frequently used treatment.[15] Recently, a systematic review showed that dilation was the most used method, especially in short lesions.[2] Contrary to the pressure applied by *bougies*, dilation applies radial force, decreasing the risk of perforation and, in most series, it has replaced the use of *bougies*. The balloon can only expand to a fixed diameter, maintaining low compliance; this prevents perforations, since the balloon breaks if over-inflated.[16] Furthermore, the combination of dilation with endoscopy allows visual control of the procedure and improves its safety. Only one study has compared different dilation systems, and this found that fewer sessions were necessary when using a hydrostatic balloon than when using a pneumatic balloon.[17] Our group used a hydrostatic dilation balloon, with endoscopic control, as also did the largest series.[9,18]

Our success rate was high, 88%, greater than the Suchan series, that reported 59% of good results in rectal cancer and established aetiology as the most important factor related to failure, versus 88% in benign conditions. A review of the literature shows a success rate between 59%-100%, with a mix of different conditions, anastomotic techniques and colorectal locations.[9] As in our cases, several dilation sessions are usually necessary (median 2.5) and a lengthening of these does not seem to improve results. Other long series have

shown homogeneous results with a median of 2.9 or 2.5.[9,18] Of our 3 failures, in 2 we did not achieve the right dilation from the first session; this means that the number of sessions is not correlated with the percentage of success.[9]

The most frequent complication is re-stenosis, which in our series with a long follow-up period of more than 36 months, was the case with one patient (3.8%), and it was successfully resolved with a new dilation session. The relapse rate is variable, from 0 to 87.5%.[9] Suchan et al presented 15% of relapses only in patients with rectal cancer.[18] However, few studies provide these numbers, with very irregular follow-ups, varied technique and, therefore, it is difficult to extract conclusions. Severe complications, such as haemorrhage and perforation, are rare. In our series 1 patient (3.8%) suffered a perforation and required Hartmann type emergency surgery. Similar results to those of the long Suchan et al series of 6%.[18] A recent survey on complications due to dilation has been carried out in the main centres in Japan, and the mean complication rate was found to be 8.4%.[19] Other groups have not found any major complications.[9,12,13] We did not use incisions with an electroscalpel as other authors do, this technique has shown a decrease in complications due to perforation, facilitates dilation and seems to decrease recurrences.[20] However, the use of pre-dilation incisions continues to be a subject of controversy and there are currently no multicentric studies that support their routine use.

Only one recent study has analysed quality of life in patients with anastomotic stenosis treated by dilation using the Gastrointestinal Quality of Life Index[5] (GIQLI). Long term results seen, with frequent abdominal discomfort that alters quality of life and that the authors relate to the calibre obtained after dilation (anastomosis ≥ 13 mm diameter). However, without the objectivity of some type of score, our experience is not the same, after a long follow-up period, due to the nature of the disease.

Anastomotic stenoses after rectal cancer surgery are frequent (7.05%), they cause clinical symptoms in more than 50% of cases and are a cause of morbidity in the medium and long term that is not considered. Endoscopic hydrostatic dilation is an effective technique, successful in more than 88% of cases and safe, with low morbidity (3.8%).

Conflict of interests

The authors state that they have no conflict of interests.

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