Long-term results of subtotal colectomy with cecorectal anastomosis for isolated colonic inertia

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Abstract

AIM: To evaluate the results of sub total colectomy with cecorectal anastomosis (STC-CRA) for isolated colonic inertia (CI).

METHODS: Fourteen patients (mean age 57.5 ± 16.5 year) underwent surgery for isolated CI between January 1986 and December 2002. The mean frequency of bowel motions with the aid of laxatives was 1.2 ± 0.6 per week. All subjects underwent colonoscopy, anorectal manometry, cinedefaecography and colonic transit time (CTT). CI was defined as diffuse markers delay on CTT without evidence of pelvic floor dysfunction. All patients underwent STC-CRA. Long-term follow-up was obtained prospectively by clinical visits between October 2005 and February 2006 at a mean of 10.5 ± 3.6 years (range 5-16 years) during which we considered the number of stool emissions, the presence of abdominal pain or digitations, the use of pain killers, laxatives and/or fibers. Patients were also asked if they were satisfied with the surgery.

RESULTS: There was no postoperative mortality. Postoperative complications occurred in 21.4% (3/14). At the end of follow-up, bowel frequency was significantly ($P < 0.05$) increased to a mean of 4.8 ± 7.5 per day (range 1-30). One patient reported disabling diarrhea. Two patients used laxatives less than three times per month without complaining of what they called constipation. Overall, 78.5% of patients would have chosen surgery again if necessary.

CONCLUSION: STC-CRA is feasible and safe in patients

with CI achieving 79% of success at a mean follow-up of 10.5 years. A prospective controlled evaluation is warranted to verify the advantages of this surgical approach in patients with CI.

INTRODUCTION

Constipation is a common problem, with an estimated prevalence of 2%-20%[1,2]. It is one of the more presenting complaints to both general practitioners and gastroenterologists, and carries a significant economic impact. In the vast majority of patients with constipation, restoration of bowel habits is achieved by dietary fiber supplements or the use of laxatives.

Severe lifestyle-altering chronic constipation is indeed rare and the surgical treatment of slow transit constipation concerns approximately 10% of patients after the failure of an aggressive and prolonged trial of laxatives, fibers and prokinetics[3]. Before referral for surgical treatment, an eventual contribution of pelvic floor dysfunction to constipation must be carefully diagnosed[4,5]. Indeed, it was shown that patients with slow transit constipation without outlet delay are the best responders to surgical treatment[6].

The standard surgical procedure for severe constipation is subtotal colectomy with ileorectal anastomosis (STC-IA)[7-9]. However, STC-IA leads to small bowel obstruction, in 8% to 50% of cases with a relaparotomy rate ranging from 0% to 14% (for review see[3]). Furthermore, in recent studies, STC-IA also resulted in intractable diarrhoea in 6% to 17% of patients with a disabling modification of stool consistency in approximately 30% of patients 8 years after surgery[6]. Recurrent constipation requiring laxatives has been reported to occur in 27% of cases[10]. Subtotal abdominal colectomy with cecorectal anastomosis (STC-CRA) is an alternative procedure that has, for instance, received little attention. However, STC-CRA offers the

theoretical advantage of retaining the ileocecal valve to enhance absorption of water within the terminal ileum, thus diminishing diarrhea. Sarli and colleagues have shown favorable short-term results of this surgical technique in a carefully selected series of patients with colonic inertia (CI)[11]. In the present study we report the long-term results of STC-CRA in a cohort 14 patients with isolated CI.

MATERIALS AND METHODS

Selection of patients

Between January 1986 and December 2002, 14 patients with isolated chronic idiopathic slow transit constipation were operated upon using STC-CRA. All complained of severe, long lasting and disabling constipation that strongly impaired their quality of life. None of them was capable of having a bowel movement without the chronic use and/or association of laxatives, prokinetics and fibers. Preoperative investigations included full history and clinical expertise with inspection and digital examination, colonoscopy, barium enema, anorectal manometry, cinedefaecography, and colonic transit time (CTT) study to exclude an organic cause and confirm the diagnosis of colonic inertia. Patients with the irritable bowel syndrome, rectal outlet obstruction, organic or secondary constipation, megacolon, megarectum, volvulus, prolapse, colonic pseudo-obstruction, tumors, and polyps were excluded. All patients had an anatomically normal colon on colonoscopy or barium enema. All patients were considered for a surgical treatment of constipation using STC-CRA procedure. Long-term follow-up was performed by regular visits. The study was performed according to the declaration of Helsinky and patients gave written informed consent.

Assessment of constipation and diagnosis of colonic inertia

Clinical data included age, gender, past medical (emphasis was placed on metabolic and psychiatric disorders) and surgical history and treatments. Pertinent data regarding constipation included age at onset, presence of a recognizable precipitating event, number of bowel movements, stool consistency, presence of soiling, bloating, nausea, vomiting, abdominal, rectal or anal pain, use of laxatives (including enemas and fibers), pain killers and anorectal digitations. We appreciated the patients'perspectives focusing on what they called constipation and general well being. The number of bowel movements and stool consistency were evaluated through the daily completion of a symptom diary during four weeks. Patients were also asked for urological, gynecologic (e.g. regularity of menstrual cycle, age of menopause, history of prolonged labor) and sexual difficulties.

For CTT measure 20 radiopaque markers were ingested in a capsule before breakfast, and a plain abdominal X-ray was taken on the third and fifth day. Laxatives and enemas were discontinued during this period. Delayed CTT was defined as the presence of at least 16 markers scattered diffusely throughout the colon on the fifth day after ingestion.

All the individuals were submitted to both cinede-faecography and anorectal manometry, with special emphasis to the paradoxical puborectalis contraction. The anorectal manometry apparatus consisted of a pneumo-hydrolic perfusion system, which perfused distilled water in the left lateral position. Recordings included pressure at rest and during voluntary contraction (amplitude and duration), rectoanal inhibitory (RAIR) and excitatory reflexes, and threshold of urge sensation, maximum tolerable volume. A provoked expulsion test was performed with 50 mL air-inflated balloon in conjunction with anorectal manometry to screen for major dysfunctions of evacuation. A diagnosis of anismus was based on the findings of both digital examination and anorectal manometry. In each patient, short segment Hirschprung's disease was excluded with a positive RAIR.

The cinedefecating proctogram visualized the anatomy of the rectum and canal anal both at rest and during straining, and completed the pelvic floor assessment including sigmoidocele, rectocele, intussusception, and paradoxical puborectalis contraction. Failure of the anorectal angle to open during defecation and the degree of pelvic floor descent during defecation were both used to demonstrate anismus or conversely a descending perineum syndrome.

Colonic inertia was defined as follows: (1) two or fewer stools per week with one or more of the following complaints: disabling abdominal pain, bloating, nausea and/or vomiting, difficulty in evacuation; (2) delayed CTT and absence of paradoxical puborectalis contraction on anorectal manometry and cinedefecography; (3) no evidence of an absent or equivocal RAIR evoking adult's Hirschprung's disease on anorectal manometry.

Operative technique

All patients underwent bowel preparation with 4 liters of polyethyleneglycol (PEG®, B/Braum, Medical S.A. B.P. 331 F-92107 Boulogne Cedex, France) the day before surgery. They also received one or more enemas on the evening before surgery. Single-dose ceftriaxone sodium (1 g) and metronidazole (1 g), diluted in 125 mg saline solution infused for 15 min, were administered to all patients intravenously at anaesthetic induction. Laparotomy was made through a midline incision, and the wound was protected by a plastic ring drape. The whole colon was mobilized from right to left; and the vascular pedicles to the colon were divided close to the bowel after having carefully identified the ileocolic vessels, which were preserved. The rectum was transected below the level of the sacral promontory and the head of the circular stapler was introduced into the rectal stump. Appendectomy was also performed. The caecum was mobilized enough to be brought into the pelvis with no rotation. The stapler was introduced into the ascending colon, and an antiperistaltic caecorectostomy was made between the base of the caecum and the rectal stump. The ascending colon was transected a few centimeters above the ileocecal junction with a linear stapler. No drain was left at the end of the procedure.

Follow-up assessment

Long-term follow-up was obtained prospectively by clinical visits planned between October 2005 and February

2006 with independent researchers who were not involved in the preoperative management of patients. Before the visit, subjects had to complete the 4-weeks daily diary to evaluate the number of stool emissions per day and stool consistency. During the visit, all preoperative data (e.g. symptoms and treatments) pertaining to digestive, urological or gynecological tract were analyzed alongside with overall health and degree of satisfaction after surgery. In particular, we considered the number of stool emissions, the presence of abdominal pain or digitations, the use of pain killers, laxatives and/or fibers. Patients were also asked if they would have chosen surgery again if necessary. The long-term outcomes were to evaluate the number of stool emissions as well as stool consistency, the need for digitations, the use of laxatives, painkillers, the requirement of fibers in diet, the presence of abdominal pain and the overall satisfaction with surgery.

Statistical analysis

Data are given as percentage and mean ± SD. Comparisons of quantitative variables were performed using non-parametric Mann-Withney U test. The χ^2 square was used to compare qualitative variables. A $P < 0.05$ was considered significant.

RESULTS

Preoperative characteristics of patients

All patients were females with a mean age of 57.5 (range 24-72) years. Eight patients (57.1%) had psychiatric disorders such as anxiety or depression, necessitating psychotropic drugs. No formal contraindication for surgery was found at psychiatric evaluation. One patient underwent psychotherapy for one year before being considered for surgery. Two patients had a non-insulin-dependent diabetes mellitus and one had hypothyroidism. Urinary symptoms were present in ten patients (71.4%), with urinary incontinence being the most frequent complaint.

Eight patients (57.1%) reported a lifelong history of constipation, and in the remaining the mean duration of symptoms was more than 10 yr. A precipitating factor was identified in seven patients (50%). The mean frequency of bowel movements with the aid of laxatives, enemas or digitations was 1.2 ± 0.6 per week (range 4-30 d). All patients' complained of abdominal pain and bloating. Digitations were used by 71.4% of patients. Eight patients had a total of 12 abdominal operations. The most common operation was hysterectomy (50%); four patients had a left colectomy for "chronic constipation"; and two patients had a previous small bowel obstruction necessitating surgery. Three patients had rectocele repair, and one had haemorrhoidectomy (Milligan and Morgan's procedure). Four patients (28.5%) needed pain killers. Five patients (35.7%) regularly used a high fibers rich dietary regimen. All patients reported their symptoms as having a major interference with their work or life activities.

Transit study revealed diffuse marker delay in all patients. Anorectal manometry confirmed the presence of a RAIR in all patients. Neither anorectal manometry nor CD revealed Hirshprung disease. One patient had a small anterior rectocele (4 cm) that emptied completely during evacuation. A diagnosis of isolated CI was done confirmed in all patients.

Postoperative complications

Ten patients (71.4%) were operated with the open technique, and the remaining 29.9% were operated with the laparoscopic technique. There was no peroperative or postoperative mortality. Postoperative complication rate was 21.4%. One patient had a hemothorax following venous central line insertion, requiring drainage; one patient had an intrabdominal collection that was successfully treated with CT-guided percutaneous drainage; one more patient underwent relaparotomy for bleeding with hypothensive shock on postoperative day two. All complications were recorded in patients operated by laparotomy.

Follow-up

Bowel habit: All patients were alive in 2006 and invited to the clinic after they completed the 4-weeks daily symptom diary evaluating stool frequency and consistency. Patients were assessed at a mean of 10.5 (range 5-16) yr after surgery. Table 1 summarizes individual clinical data regarding long-term clinical outcomes. As compared with preoperative bowel habit, the bowel frequency was significantly ($P < 0.05$) increased to a mean of 4.8 ± 7.5 per d (range 1-30). The stool consistency was soft in 11 patient (78.5%) and liquid in three (21.4%). Overall 11 patients (78.5%) reported perfect continence, two patients (14.2%) had less than one episode of soiling (incontinence) per week. One patient with preexisting psychiatric disorder developed disabling diarrhoea (30 bowel movements), accompanied with bloating and incontinence, and refused any further treatment.

Seven patients (50%) had less than one episode per week of mild abdominal pain with bloating. Two patients (14.2%) used laxatives less than three times per month. One patient (7.1%) with a stenosis of the anal canal after surgery for hemorrhoids used enemas twice per week. None required digitation. Three patients (21.4%) reported new symptoms including difficult evacuation in two and rectal pain in one. Anti-diarrhea agents were utilized by three patients (21.4%) less than three times per month. None required the addition of fibers or other dietary changes.

Self-reported satisfaction: Eleven patients (78.5%) would have chosen surgery again if necessary, whereas 3 patients (21.4%) were not satisfied with the results of surgery, considering their situation as unchanged (2 patients) or worse (1 patient).

DISCUSSION

In this study, we have shown that STC-CRA resulted in a 78.5% rate of success in 14 patients with colonic inertia after a long-term follow-up. Postoperative complications occurred in 21.4% of patients operated by laparotomy and there was no mortality. Secondary morbidity was acceptable, mainly mild abdominal pain, without any significant recurrence of constipation and no re-intervention for this condition.

Table 1 Individual data of long-term clinical outcomes for 14 patients operated by subtotal colectomy with cecorectal anastomosis for colonic inertia

Pts	Follow-up (yr)	Bowel movements		Abdominal pain		Laxatives		Digitations		Pain killers		Fibers	
		$P < 0.05$		$P = 0.002$		$P = 0.001$		$P = 0.0001$		$P = 0.03$		$P = 0.01$	
		Before (per week)	After (per day)	Before	After	Before	After	Before	After	Before	After	Before	After
1	5	0.2	9.2	Yes	No	Yes	No	Yes	No	No	No	Yes	No
2	8	1.2	2.2	Yes	No	Yes	No	Yes	No	No	No	Yes	No
3	12	1.5	2	Yes	No	Yes	No	Yes	No	No	No	No	No
4	9	0.2	1.2	Yes	No	Yes	No	Yes	No	No	No	No	No
5	13	2	2	Yes	Yes	Yes	No	No	No	No	No	No	No
6	5	0.5	1.6	Yes	Yes	Yes	No	Yes	No	No	No	No	No
7	15	1.2	2	Yes	No	Yes	No	No	No	No	No	No	No
8	14	1.2	2.5	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
9	8	1.2	30	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
10	6	0.5	2.5	Yes	No	Yes	No	Yes	No	Yes	No	No	No
11	13	2	1.7	Yes	Yes	Yes	Yes	No	No	Yes	No	No	No
12	16	1.7	6	Yes	No	Yes	No	Yes	No	No	No	Yes	No
13	12	1.7	2	Yes	Yes	Yes	No	Yes	No	No	No	No	No
14	11	1.7	2.3	Yes	Yes	Yes	No	No	No	No	No	No	No

Pts: patients. Bowel movements are mean numbers obtained from a 30-d diary. *P* values given in the second line are statistical comparisons between outcome measured before and after surgery. Quantitative and qualitative variables are compared using Mann-Withney *U* test and χ^2 square respectively.

STC-IA has been proposed as a treatment of choice of CI when well documented and assuming the failure of a prolonged trial of laxatives, prokinetics or fibers. However, a recent review[12] has pointed out that this procedure may be less than satisfactory in consideration of the large variations of success rates ranging from 39% to 100%, the considerable morbidity (mainly occlusion), and the recurrence of constipation leading to a re-intervention rate of 14%. Thaler and colleagues underscored that quality of life is significantly reduced after STC-IA mostly because of abdominal pain[13].

With the introduction of methods that enable the evaluation of pelvic floor dysfunction, it has become of crucial importance to divide patients with severe constipation into those with CI and those with a predominant altered pelvic floor function. Indeed, there is growing acceptance that the presence of outlet obstruction[14], alterations in rectal sensitivity[15] or megarectum[16] associated with slow transit constipation are predictive of a low rate of success of surgical treatment. Knowles *et al*[12] have observed higher functional results of STC-IA when CTT, anorectal manometry and cinedefaecography were systematically performed. In the present prospective study, a thorough preoperative physiologic evaluation permitted the selection of patients with CI and without outlet delay as candidates to STC-CRA. However, as in other studies, our series was associated with persistent abdominal pain in 50% of patients, even if of mild intensity. Although the causes of persistent pain still remain unresolved, it can be cautiously speculated that the undiagnosed existence of abnormal upper GI motility may play a role[17,18]. Further studies are required to ascertain this hypothesis.

Little is known about the efficacy of STC-CRA in patients with CI. It was suggested that STC-CRA might lead to poor results due to dilatation of the cecum and recurrence of constipation[19]. However, Sarli *et al*[11] have recently shown favorable short-term results of STC-CRA in a carefully selected series of patients with CI. The theoretical rationale for STC-CRA is that the sparing of the ileo-caecal valve and the constitution of a physiologic reservoir, allowing the presence of colonic flora and the production of short chain fatty acids, may favour a normal stool consistency, normal absorption of water and electrolytes and also the prevention of renal and gallbladder lithiasis. In the present study, we have shown that the success rate of STC-CRA in CI achieved 79% at a mean follow-up of 10.5 yr after surgery. When compared to previous studies that investigated STC-IA for CI[6-8,15,17,18,20-28], the slightly lower rate of success (79% *vs* 88% to 100%) recorded in the present study must be tempered by the longer follow-up (10.5 yr *vs* 1 to 8.9 yr), the absence of postoperative complications related to the laparoscopic technique, the low postoperative morbidity, and the absence of recurrent disabling constipation. Indeed, the mean number of bowel motions was significantly increased in all patients after surgery, being disabling in only one, and none complained during the follow-up of what they called constipation. Although our data suggest that STC-CRA is associated with relief of constipation in a majority of carefully selected patients with CI, the extent of abdominal pain/distension or emptying difficulties has been reported with large variations among studies from 17%-55% and 21%-51% respectively[29,30], suggesting that prospective controlled trial are required to precise morbidity and to compare between operative techniques. Taken together, we believe that STC-CRA is an effective technique to treat constipation in patients with isolated CI with a success rate that appears similar to that of the STC-IA procedure.

In the present study, a careful selection of patients was performed regarding the diagnosis of both constipation and CI. Acknowledging that the definition of constipation is answerable only imperfectly, we have taken into account the opinion of our patients in the definition of constipation in both the selection and follow-up. Therefore, we do not think that the absence of an objective evaluation of the quality of life weakens the

verbally expression of the well being of our patients at the end of the study.

There is mounting evidence that psychological factors play a role in constipation. Nevertheless, it was shown that a history of psychiatric disease should not exclude patients from surgery, because the vast majority of patients with a psychiatric history still felt they were significantly improved following the surgical procedure[31]. In the present study, we had a special emphasis in the psychiatric evaluation of our patients, 8 of them showing depression, anxiety or hypochondriasis. Nevertheless, the success rate of surgery was high probably because the moderate severity of psychiatric illness in this selected series. Since the role of psychological factors on constipation is still unclear, a careful psychiatric evaluation should be included in the design of future studies aimed at evaluating surgical procedures for severe constipation.

The use of laparoscopy to perform subtotal colectomy with ileorectal anastomosis has been reported as feasible and safe[32]. Thus laparoscopic techniques have been subsequently applied to the clinical problem of CI[33-35] and we have recently showed that STC-CRA may be performed laparoscopically with minimal postoperative morbidity[36]. In the current study, although we did not see any difference in long-term outcome of laparoscopic STC-CRA compared to the open technique, all 4 patients who underwent STC-CRA under laparoscopy were free of postoperative complications suggesting that laparoscopy STC-CRA may be a procedure of choice when technically feasible.

In conclusion, this study shows that STC-CRA is a feasible and safe procedure for patients with isolated CI achieving 79% of success after a long-term follow-up of 10.5 years of mean. The morbidity of this technique was related mainly to mild abdominal pain without recurrence of significant constipation. Further controlled studies are required to precise both morbidity and efficacy of STC-CRA in patients with CI.

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