

# Redo-surgery by transanal colonic pull-through for failed anastomosis associated with chronic pelvic sepsis or rectovaginal fistula

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## Abstract

**Purpose** Redo-surgery with new colorectal (CRA) or coloanal (CAA) anastomosis for failed previous CRA or CAA is exposed to failure and recurrent leakage, especially in case of rectovaginal fistula (RVF) or chronic pelvic sepsis (CPS). In these two situations, transanal colonic pull-through and delayed coloanal anastomosis (DCAA) could be an alternative to avoid definitive stoma. This study aimed to assess results of such redo-surgery with DCAA for failed CRA or CAA with CPS and/or RVF.

**Methods** All patients who underwent DCAA for failed CRA or CAA with CPS and/or RVF were reviewed. Success was defined as a patient without any stoma at the end of follow-up. Long-term functional results were assessed using the low anterior resection syndrome (LARS) score.

**Results** 24 DCAA were performed after failed CRA or CAA with CPS ( $n=15$ ) or RVF ( $n=9$ ). Sixteen (67 %) patients had a diverting stoma at the time ( $n=5$ ) or performed during DCAA ( $n=11$ ). After a mean follow-up of  $29\pm 19$  months, success rate was 79 % (19/24): 5 patients had a permanent stoma because of recurrent sepsis ( $n=2$ ), anastomotic stricture ( $n=1$ ), or poor functional outcomes ( $n=2$ ). Functional outcomes were satisfactory (no or minor LARS) in 82 % of the successful patients.

**Conclusion** In case of failed CRA or CAA with CPS or RVF, DCAA was associated with a 79 % success rate. It could therefore be proposed as an alternative to standard redo-

CRA or CAA when the risk of recurrent sepsis and failure with subsequent definitive stoma is thought to be high.

**Keywords** Delayed coloanal anastomosis · Chronic pelvic sepsis · Rectovaginal fistula · Rectal cancer

## Introduction

Advances in rectal cancer surgery, including double stapling technique with colorectal anastomosis (CRA), manual coloanal anastomosis (CAA) with or without intersphincteric resection [1], and the need for only 1 cm margin below the tumor [2] allows today to propose a sphincter-saving surgery in more than 90 % of the patients with rectal cancer in our department [3].

However, despite routine use of a defunctioning stoma after CRA or CAA [4], patients remain exposed to anastomotic leakage (AL) in 13 % [5] to 28 % [6] of the cases. If AL persists chronically, patient is exposed to definitive stoma, even if an aggressive policy of redo-surgery with new CRA or CAA is proposed [7, 8]. We, and others, have suggested that redo-surgery can avoid definitive stoma in 69 to 80 % of the patients [9–12]. However, in these studies, redo-surgery was proposed mainly for chronic leakage with or without stricture, but without chronic pelvic sepsis or rectovaginal fistula (RVF).

In these two particular situations, redo-surgery with new CRA or CAA is theoretically feasible but can expose the patient to recurrent leakage, which can lead to ultimate failure, because of the proximity between the pelvic sepsis or the RVF and the new anastomosis. For this reason, since 2007 in our department, we proposed as a redo-procedure in case of failed CRA or CAA with chronic pelvic sepsis or RVF an alternative operation: a transanal colonic pull-through with delayed CAA (DCAA). This technique was initially described by Turnbull

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et al. for the surgical management of Hirschsprung's disease in children [13, 14] and was later adapted by Cutait et al. for the management of rectal cancer in adults [15]. A 6–8-cm colonic stump is left in place transanally for 8 to 10 days before cutting the stump during a second procedure when a new CAA is fashioned. This 2-step technique, avoiding initial CAA at the time of redo-surgery, could theoretically expose to a lower risk of failure than a standard redo-CRA or CAA.

The present study aimed to assess the outcomes of DCAA for the surgical management of failed CRA or CAA with chronic pelvic sepsis and/or RVF, after sphincter-saving rectal resection.

## Patients and methods

### Study population and outcome measures

All patients who underwent a redo-surgery with DCAA for failed low CRA or CAA with associated chronic pelvic sepsis and/or RVF between June 2007 and December 2013 were identified from our prospective single-center institutional review board-approved database [16] and included in the present study. Chronic pelvic sepsis was defined as any pelvic abscess or fistula tract persistent 6 months after primary low CRA or CAA. Patients with anastomotic stenosis without persistent abscess, fistula tract, or RVF were previously published [11] and excluded from the present study.

Data collection included patient characteristics (gender, age, body mass index (BMI), and American Society of Anesthesiologists (ASA) score), primary procedure characteristics (diagnosis, neoadjuvant radiotherapy, type of anastomosis performed, use of temporary diverting stoma), delay between the primary procedure and the DCAA, DCAA characteristics (associated procedure, use of temporary stoma, and intraoperative complications), and outcomes. Postoperative morbidity was graded according to the Clavien-Dindo classification [17] and defined as any postoperative complication during the hospital stay or within 30 days.

Success of DCAA was defined as a successful restoration of continuity without recurrent chronic sepsis or RVF. Follow-up was performed every 3 months and included a clinical examination and a CT scan. At the end of follow-up, an assessment of the functional results was performed in successful patients using the low anterior resection syndrome (LARS) score using a face-to-face questionnaire, as recently published for low anastomosis after total mesorectal excision [18, 19].

### Surgical procedure

#### *First stage*

With the patient placed in modified Lloyd-Davies position, an abdominal open approach was first used. A pelvic dissection

was performed down to the level of the levator ani muscles, as close as possible to the colonic wall, in order to avoid any ureteral lesion or presacral bleeding. During this dissection, any pelvic abscess or cavity encountered was incised and drained without cavity resection. Any abnormal pelvic fibrotic scarring was incised and reduced to avoid any congestion-related ischemia of the future exteriorized colon segment. After complete liberation, the remaining left colon was checked for adequate length to ensure a tension-free anastomosis. Several maneuvers could be performed in patients with insufficient colonic length: (1) complete mobilization of the splenic flexure (if not performed during the primary surgery); (2) section of the inferior mesenteric pedicle at its origin (if not performed during the primary surgery); (3) section of the middle colic vessels; and (4) a right colon-to-rectal anastomosis (Deloyer maneuver), comprising right colon complete mobilization and anticlockwise rotation while only preserving the ileocolic pedicle [20]. A transanal incision was then performed at the level of dentate line, or just below the previously performed anastomosis, without any submucosal injection. The pelvic dissection was then carried out in the intersphincteric plane, up to the level of the dissection performed during the abdominal approach. The colon was then pulled through the anal canal using a Babcock clamp, with the mesocolon facing the posterior part of the pelvis. The exteriorized colon was then sectioned, leaving a 6 to 8 cm of colonic stump. The stump was sutured anteriorly between the colon and the anal canal using four absorbable stitches at the level of the future anastomosis (i.e., on the dentate line). The pull-through segment was then wrapped in gauze, to allow maturation. A transabdominal pelvic suction drain without postoperative lavage was always left in place.

Postoperatively, the exteriorized colonic segment was checked daily for congestive ischemia. In the absence of recurrent pelvic sepsis (diagnosed either because of pus in the pelvic drainage or during a CT scan examination), the second stage was performed approximately on postoperative day 8. In cases of recurrent pelvic sepsis, the second stage was delayed in order to allow complete control of the sepsis, using antibiotics and/or CT-guided percutaneous drainage if needed.

#### *Second stage*

Under general anesthesia, with the patient placed in lithotomy position, the gauze wraps were removed and the absorbable sutures unraveled. The adhesences obtained during the maturation phase, between the exteriorized colonic segment and the anal canal, were carefully respected. The colonic stump was amputated at the level of the dentate line, and a manual coloanal anastomosis was performed using multiple absorbable stitches (Vicryl, 4/0, Ethicon, Cincinnati, OH, USA).

## Statistical analysis

Quantitative data were reported as mean  $\pm$  standard deviation (range). Qualitative data were reported as number of patients (percentage of patients). All analyses were performed using the Statistical Package for the Social Sciences (SPSS) for Mac OSX software (version 22.0, Chicago, Illinois, USA).

## Results

### Population

From June 2007 to December 2013, 24 patients underwent a redo-surgery with DCAA for failed CRA or CAA with associated chronic pelvic sepsis ( $n=15$ ) or RVF ( $n=9$ ). Patients' characteristics are detailed in Table 1. The primary procedure was a proctectomy in all cases performed for rectal cancer ( $n=20$ , 83 %), pelvic endometriosis ( $n=2$ , 8 %), Crohn's disease ( $n=1$ , 4 %), and trauma ( $n=1$ , 4 %) leading to a failed stapled low CRA in 13 patients (54 %) or manual CAA in 11 patients (46 %). Mean delay between the primary surgery and the DCAA was  $22\pm 15$  (7–59) months. The majority of the patients ( $n=17$ , 71 %) had a history of pelvic radiotherapy, performed in a neoadjuvant setting for the primary rectal cancer in 16 patients (67 %) or for a previous prostate cancer ( $n=1$ , 4 %). In only 4 patients, all previous procedures were performed through a laparoscopic approach and 9 patients (38 %) had a history of 2 or more previous open procedures.

### Surgical procedures and short-term outcomes

All redo-surgeries with transanal colonic pull-through and delayed coloanal anastomosis were performed through an open approach. Mean operative time was  $239\pm 48$  (120–400) minutes. Severe intraoperative bleeding requiring an intraoperative blood transfusion occurred in 2 patients (8 %). A Deloyer maneuver (to get enough length of colon for the anastomosis) was required in 3 patients (13 %) in order to ensure a tension-free and safe colonic pull-through. A pelvic suction drain was left in place in all cases. Finally, 16 patients (67 %) had a diverting stoma protecting the DCAA, performed either during the redo-surgery with DCAA ( $n=5$ , 21 %) or during a previous procedure ( $n=11$ , 46 %).

Postoperative mortality was nil. Postoperative complications occurred in 13 patients (54 %), including 8 (33 %) minor complications (graded 1 or 2 according to the Clavien-Dindo's classification) and 5 (21 %) major complications (graded 3 or more). Major complications included pelvic abscess drained under CT guidance ( $n=3$ , 13 %) and incarcerated parastomal hernia with small bowel necrosis ( $n=1$ , 4 %), which required a re-laparotomy.

**Table 1** Characteristics of 24 patients who underwent a transanal colonic pull-through with delayed coloanal anastomosis for failed colorectal or coloanal anastomosis with chronic pelvic sepsis or rectovaginal fistula

	DCAA $n=24$
Gender	
Female	11 (46) <sup>a</sup>
Male	13 (54)
Age	$58\pm 15$ (25–77) <sup>b</sup>
Body mass index	$24\pm 4$ (14–32)
ASA score	
1–2	17 (71)
3–4	7 (29)
Primary diagnosis	
Rectal cancer	20 (83)
Pelvic endometriosis	2 (8)
Crohn's disease	1 (4)
Trauma	1 (4)
Failed primary anastomosis	
Stapled colorectal	13 (54)
Manual coloanal	11 (46)
History of pelvic radiotherapy	
Yes	17 (71)
No	7 (29)
Number of previous open procedures	
<2	15 (42)
$\geq 2$	9 (38)
Indication for DCAA	
Leakage with chronic pelvic sepsis	15 (64)
Rectovaginal fistula	9 (38)

DCAA delayed coloanal anastomosis, ASA American Society of Anesthesiologists

<sup>a</sup>Number of cases (percent of cases)

<sup>b</sup>Mean $\pm$ standard deviation

The second stage (i.e., section of the colonic stump and coloanal anastomosis) was performed 8 to 10 days after the first stage in 21 patients (88 %). This second stage was delayed in 3 patients because of pelvic sepsis recurrence and performed on postoperative day 37, 46, and 96, respectively. In these three patients, pelvic sepsis recurrence was treated using CT-guided drainage and antibiotics in all cases and the second stage was performed after sepsis resolution.

### Stoma reversal and long-term results

Long-term results are detailed in Fig. 1. A second DCAA was performed in 1 patient, 22 months after the first DCAA, because of recurrent pelvic sepsis during follow-up. After a mean follow-up of  $29\pm 19$  months (4–82), success was obtained in 19/24 (79 %) patients. Five patients (21 %) required a





high rates of failure and septic recurrence, ranging from 50 to 66 % [24, 25]. In patients for whom all conservative treatments have been attempted and failed, abdominal redo-surgery should be considered. Few studies have focused on the outcomes of such abdominal redo-surgery for failed CRA or CAA anastomosis [9–12]. Their results highlighted a satisfactory feasibility with acceptable success rates, ranging from 70 % [11] to 100 % [10], despite a high postoperative morbidity, ranging from 19 % [10] to 55 % [11]. However, the majority of the patients included in these studies were operated on for anastomotic stricture and only few patients presented chronic pelvic sepsis and/or RVF, which are associated with a high risk of leakage after redo-anastomosis. This last point has been highlighted by two studies from the same center [10, 12], which reported a redo-surgery success rate of 100 % in cases of CRA or CAA stricture without pelvic sepsis [10] and a rate of 79 % in a heterogeneous population mixing both CRA or CAA stricture and pelvic chronic sepsis [12]. This is especially true for patients with rectovaginal fistula because of the proximity of the newly performed digestive anastomosis and the vaginal defect reparation. In the present study, we chose to focus on these very high-risk patients, excluding patients with anastomotic stricture without chronic sepsis, for which we, and others, have demonstrated the benefits of redo-surgery [9–12].

In this setting, transanal colonic pull-through with delayed coloanal anastomosis (DCAA) technique might be an appropriate approach. Indeed, its concept lies in a 2-step anastomosis, limiting the risk of anastomotic leakage. DCAA has been initially described as soon as 1961 [13, 14], but the large majority of the literature focusing on its outcomes has been published after 2000 [26–29]. The large majority of the published studies have reported outcomes of DCAA for rectal neoplasia primary surgical management with satisfactory results [26–29]. To date, only one study published by Remzi et al. have reported results of DCAA for various “complex anorectal conditions”, including 23 patients with failed CRA or CAA associated to persistent leakage or structure in 10 or a postoperative RVF in 13 [29]. In this last study, the authors compared the outcomes of DCAA to those of standard CAA and reported a significantly decreased anastomotic leak rate in the DCAA group (3 vs. 7 %, respectively), supporting the hypothesis of its improved results. This minimized risk of anastomotic leakage after DCAA led to an overall success rate of 75 %. However, specific success rate in case of RVF or chronic pelvic sepsis was not reported. We showed here a 79 % success rate after DCAA for selected high-risk patients with failed CRA or CAA but with associated chronic pelvic sepsis or RVF. This might be regarded as a satisfactory result, given the complexity and the high risk of recurrence of those specific patients.

The majority of the patients included in the present study had a diverting stoma, either performed during the DCAA or during a previous procedure. This is conflicting with the concept of DCAA, which was initially described as a way to avoid the diverting stoma after rectal surgery [27, 28]. However, as most of the included patients in the present study had numerous previous surgical attempts to cure their chronic pelvic sepsis, and given the risk of septic recurrence in this situation, we advocate to minimize as much as possible the risk of recurrent anastomotic leakage. Indeed, diverting stoma has been demonstrated not only to mitigate the consequences of a leak but also to decrease the leakage rate after rectal surgery [4]. As such, and as we previously published, most of our redo-anastomosis for failed CRA or CAA are performed under the protection of a diverting stoma [11]. Furthermore, the results of the present study supports this strategy, as the rate of failure leading to definitive stoma was only 2/16 in diverted patients as compared to 3/8 in non-diverted ones, although this result did not reach the statistical significance. We therefore believe that a diverted stoma might reduce the rate of failure in this situation.

One of the main concerns regarding DCAA is related to the impossibility of fashioning a colonic J-pouch or a side-to-end anastomosis, as the colonic stump concept implies a straight anastomosis. Indeed, J-pouch has been demonstrated to significantly improve functional results after TME in a meta-analysis published in 2008, as compared to straight anastomosis [30]. Side-to-end anastomosis is associated with comparable functional long-term outcomes as J-pouch and therefore provides an easier way for reconstruction after rectal surgery [31]. This potential drawback on the functional result explains why we do not advocate DCAA as a good option for primary rectal cancer surgical management. On the other hand, the results of the present study highlighted acceptable functional results, as the large majority of the successful patients (82 %) had an acceptable functional result with no or minor low anterior resection syndrome. This might be regarded as highly satisfactory results, given that several studies have suggested a negative effect of pelvic sepsis on functional results after CRA or CAA as a cause of fibrosis contributing to poor anorectal function [32–34]. Patients should, however, be warned of potential difficulties regarding postoperative anal function, as 3 successful patients had a major low anterior resection syndrome and 1 patient had a definitive because of a poor functional result.

In conclusion, DCAA for failed CRA or CAA with associated pelvic sepsis or RVF is associated a high success rate, with acceptable long-term functional results. It should be regarded as an intervention of choice in the surgical management of these complex patients.

**Conflict of interest** None

**Financial disclosure** None

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