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What is the functional result of a delayed colo-anal anastomosis in redo rectal surgery?

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Abstract

Background - Delayed colo-anal anastomosis (DCAA) may be used in patients with complex rectal conditions, such as chronic pelvic sepsis, low recto-vaginal and recto-vesical fistula, however, limited data is available. The aim is to report the morbidity and functional results of DCAA in redo rectal surgery.

Methods – All patients undergoing DCAA between January 2014 and August 2017 were retrospectively included. Success was defined as a functional anastomosis without stoma, evaluated using LARS and GIQLI functional assessment tools.

Results – Of the 72 redo pelvic surgeries, 29 (40.3%) DCAA were performed over a 4 year period. Indications for redo resection were chronic pelvic sepsis (n=13, 44.8%), recto-vaginal fistula (n=11, 37.9%) and recto-vesical fistula (n=5, 17.2%). Mean interval period between the two procedures was 14 ± 3 days (8-21). Global major morbidity (Clavien-Dindo 3 or 4) was seen in 6 patients (20.7%). Stoma closure was feasible for 22 (75.9%) patients after a median period of 78 days (IQR: 61-98). Six months success-rate was 79.3%. Mean LARS was 28.8 ± 10.2 (3-41) (minor LARS) for 18 patients with no stoma at the end of follow-up. LARS score was significantly better with a follow-up >2 years (23.3 ± 12.2 vs. 32.3 ± 7.9), $p=0.074$. Mean GIQLI score was 79.2 ± 14.3 (48-98).

Conclusions – Trans-anal colonic pull-through with delayed anastomosis for redo-surgery in complex pelvic situations had low morbidity and avoided a permanent stoma in three out of four patients with an acceptable quality of life.

INTRODUCTION

While new advances in the management of rectal cancer, such as organ preservation [1, 2] have gained recognition in recent years, total mesorectal excision (TME) with colo-anal anastomosis (CAA) still remains the gold standard treatment for invasive mid/low rectal cancer. [3, 4] However, this procedure is associated with high permanent stoma rates along with significant morbidity mainly due to anastomotic leakage (up to 17%) that can lead to chronic pelvic sepsis and low colo-vaginal and colo-vesical fistulas. [5] These complications lead to worse functional and oncologic outcomes by increasing the rate of local recurrences and can delay adjuvant treatment. In such difficult situations where permanent stomas decrease patients' quality of life, therapeutic options include conservative surgery or redo CAA surgery are performed however, these approaches are not without risk.

Redo-surgery with delayed colo-anal anastomosis (DCAA, or Babcock procedure) is an alternative to standard CAA and may help in reducing the rate of permanent stoma. The aim of DCAA is to delay the formation of an anastomosis in the index surgery in order to reduce the associated anastomotic complications. Cutait and Turbull first described this surgical technique consisting of a colonic trans-anal pull-through with secondary anastomosis in 1961 to treat Hirschsprung disease. [6] Afterwards, Cutait introduced DCAA in rectal cancer surgery in order to reduce the rate of anastomotic leakage and avoid the need for a temporary diverting stoma. Nowadays this two-step technique is usually used in highly complex pelvic redo-surgery. However, data on success, morbidity and functional outcomes is lacking in the scientific literature.

The aim of this study was to evaluate the role of DCAA in rectal cancer surgery and assess its success, associated morbidity, functional outcomes and quality of life for patients.

METHODS

Study population

All consecutive patients operated in our institution between January 2014 and August 2017 for redo pelvic surgery with trans-anal pull-through and DCAA were retrospectively included. Data including demographic details (age, gender, body mass index (BMI), American Society of Anesthesiologists (ASA) score), reason for surgery, primary disease, medical and surgical history, operative details, were reported in a dedicated anonymized database. Patients requiring redo-surgery with primary CAA were excluded from comparison as the indication for this type of surgery was significantly different to DCAA.

Surgical technique

The description of the principle of redo-surgery with DCAA has been published previously. [7]

First stage

The first step consisted of complete mobilization of the colon in order to have sufficient tension free colonic length to reach several centimeters below the anal verge. The second step consisted in exteriorization of the colon and suture of the fistula in cases of recto-vaginal fistula. The exteriorized colonic segment was wrapped with gauze and its viability was inspected daily.

Second stage

The second stage consisted of resecting the exteriorized colon while carefully preserving the adhesions created between the anal canal and the colonic segment. A straight handsewn colo-anal anastomosis was performed following this.

Stoma closure:

Stoma closure was planned 3 months after DCAA. A CT-scan with water soluble contrast through the ileostomy was performed to verify the integrity of the anastomosis.

Study end points

Primary end point was a successful surgery at six months. Secondary end points included: 1) morbidity after 30 post-operative days, 2) mortality after 30 post-operative days, 3) successful surgery at three months, 4) functional results and 5) quality of life at the end of follow-up.

Definitions

Successful surgery was defined as a functional anastomosis without any diverting stoma. Morbidity included all post-operative complications during the hospital stay and was graded according to Clavien-Dindo classification. [8] Details on complications classification are available as supporting information. Physical examinations were then performed at 3 and 6 months. At the end of follow-up, the functional results were collected by phone interview in the group of patients without a stoma using the LARS score. [9] The GIQLI (GastroIntestinal Quality of Life Index) score is ranked from 0-144.

Statistical analysis

Quantitative data were expressed as median (interquartile range) or mean \pm standard deviation (range). Qualitative data were expressed as number of patients and percentage. A p-value <0.05 was considered as significant. Statistical analysis was performed using JMP 9 software (Cary, NC, USA).

RESULTS

Population (Table 1)

Between January 2014 and August 2017, 29 patients underwent a redo pelvic surgery with DCAA. The indication for DCAA was chronic pelvic sepsis in 13 patients (44.8%) and colo-vaginal fistula in 11 patients (37.9%). The colo-vesical fistulas appeared after prostatectomy (n=3, 10.3%), brachytherapy (n=1; 3.4%) and low anterior resection of the rectum (n=1; 3.4%). The median interval between primary surgery and DCAA was 18.4 months (IQR: 9.1 - 71.3).

Prior to redo-surgery, most patients (19 patients, 65.5%) had a diverting loop ileostomy. Sixteen patients (55.2%) had previously undergone two or more pelvic procedures. The details of the initial management leading to the formation of a DCAA are given in Supplementary Table 2.

Surgical procedures (Table 2)

First procedure

Mean operative time was 226 ± 66 (120-400) minutes. Severe bleeding requiring intra-operative blood transfusion occurred for 6 (20.7%) patients. Additional procedures to facilitate a tension-free anastomosis were required in 11 (37.9%) patients. At the end of the first procedure, 26 (89.6%) patients had a diverting stoma.

Interval period

Post-operative complications occurred in 14 (48.3%) patients prior to the second stage procedure, including 6 (20.7%) major complications (Clavien-Dindo 3 or 4). Re-operation was required in 2 patients (6.9%) for necrosis of the colonic stump: one had a new colonic pull-through while the other had a total colectomy with ileal pouch anal anastomosis. A CT guided drainage of a pelvic abscess was necessary for one patient (3.4%).

Second procedure

The second procedure was performed after a mean delay of 14 ± 3 days (8-21), with no interval difference between sepsis, colo-vaginal fistula or colo-vesical fistula. During one procedure, a trans-anal drain was placed to treat a small posterior anastomotic leakage and was removed after five days of irrigation.

Post-operative period

After the second procedure, 2 patients (6.9%) were readmitted in the department within 30 days of discharge for anastomotic leakage and pelvic abscess.

Stoma reversal and outcomes

The median time of follow-up was 22 months (IQR: 13-30). Among the 26 patients who had a stoma, 22 (75.9%) had a reversal after a median of 78 days (IQR: 61-98). For 4 patients (13.8%), stoma closure was not feasible due to recurrence of two colo-vaginal fistulas, one pelvic sepsis, and one local progression of prostatic cancer. Among the eleven patients operated for recto-vaginal fistula, 2 (6.9%) had early recurrences with no stoma reversal, while 1 (3.4%) had a late recurrence after stoma reversal (no stoma was needed). The success rate of DCAA for colo-vaginal fistula was 72.7%.

Among the 13 patients operated for chronic pelvic sepsis, there was one early recurrence and one late recurrence after stoma closure. The 3 patients with no stoma after DCAA did not experience failure of DCAA and had no stoma at the end of the follow up. The success rate of the procedure for chronic pelvic sepsis was 84.6%. Two patients (6.9%) died at the end of the follow-up. Six months overall success rates was 79.3%. Details of outcomes are given in figure S1.

Functional results

Of the 23 patients without a stoma, LARS was assessed on 18 patients (78.3%) while a GILQLI score was obtained on 16 patients (69.6%) at the end of follow up. Mean LARS was 28.8 ± 10.2 (3-41) after a mean follow-up of 23.9 months. Five patients (27.8%) had no LARS (score 0-20), 2 patients (11.1%) had minor LARS (score 21-29), and 11 patients (61.1%) had major LARS (score 30-42) (details are given in table S1). LARS score was significantly better with a follow-up >2 years (23.3 ± 12.2 vs. 32.3 ± 7.9), $p=0.074$. No patient had a permanent stoma created for poor functional results. Mean GIQLI score for 16 patients was 79.2 ± 14.3 (48-98).

DISCUSSION

This retrospective study included 29 consecutive DCAA procedures for chronic pelvic sepsis, colo-vaginal and colo-vesical fistulas, reporting an overall success of 75.9% after a mean follow-up of 22 months (IQR: 13-30). The rate of permanent stoma at the end of the follow-up was 10.3%.

Although progress has been made in the treatment of rectal cancer, significant morbidity still remains including anastomotic leakage, fistula and stenosis along with colo-vaginal or colo-vesical fistula, especially

following pelvic radiotherapy. The creation of a diverting stoma limits the severity and incidence of these complications, [10] although reported anastomotic fistula rate is 13-28%. [5, 11] Ultimately, 10 to 20% will succumb to definitive stoma after rectal cancer surgery. Indeed, in Lelong's series of 72 colo-anal hand-sewn anastomosis for low rectal adenocarcinoma, about 91% of patients were free from stoma at the end of the study. [12] In Dulk's largest series of 924 patients, 19% of stomas were never reversed. [13]

The management of these complications after rectal surgery is complex. [14] In case of failure of mildly morbid procedures, the last option remains redo-surgery, such as new colo-anal anastomosis or DCAA. Outcomes of DCAA as a primary rectal surgery for cancer [15, 16] have been previously reported, however, the success of DCAA for redo rectal surgery remains unknown. Hallet et al. review of DCAA for primary surgery encountered fistula rates of <7%, with functional results comparable to primary colo-anal anastomosis (CAA). [17] Two prospective studies comparing DCAA and primary CAA showed a significant decrease in pelvic fistula and abscess rates in the DCAA group. [17-19] However, even if DCAA leads to a decreased fistula rate, it is not recommended as first-line treatment since functional results after primary colo-anal anastomosis with colonic J-pouch or side to end anastomosis are significantly superior.

Few authors have evaluated the success of this technique in redo-surgery, with studies including very small series of DCAA. [7, 20, 21] Only Maggiori et al. in 2014 reported a retrospective series of 24 DCAA in redo-surgery for chronic pelvic sepsis or colo-vaginal fistula over a seven-year period. [22] Their success rate was similar to the results reported in the present study, and similar to success rate after redo-surgery with immediate anastomosis which is around 75 to 80%. [7]

The morbidity in the present study was low, with only 21% of patients experiencing severe complications (Clavien-Dindo III or IV), similar to Maggiori et al. study (severe complications, 21%). [22]

Our study reported a large number of colo-vaginal fistulas (37.9%). Corte et al. [23] described a large series of 286 procedures, of which, 11 were treated with DCAA. Successful treatment of colo-vaginal fistula was seen in 91% treated with DCAA making it an effective surgical approach. Moreover, Corte et al. showed that an interval from primary surgery to fistula treatment of <9 months and management in a tertiary specialized center were factors associated with successful redo surgery. The lower success rate encountered in the present study may be due to an increase in the interval to colo-vaginal fistula management (median delay of 44 months). Furthermore, 4/11 (36.4%) patients had one or more procedure(s) in a non-specialized center prior to transfer for definitive DCAA treatment.

Recto-vesical fistula is a possible complication of radical prostatectomy with incidence ranging from 0.5% to 9%. [24] Spontaneous healing of fistulas is rare, with trans-anal repair techniques having high failure rates. The present series included five cases of recto-vesical fistula, with DCAA being successful in all five patients. This procedure could be an alternative and successful option in the management of these chronic fistulas.

Functional outcome results of DCAA are limited in the current literature. Functional results can be altered due to irradiation, multiple redo-surgeries, fibrosis, and the difficulty of creating a colonic J pouch which is known to reduce poor functional outcomes. In the Maggiori series, 18% of patients had major LARS, with 2 patients having a definitive stoma due to poor functional results. In the present study, the functional results were poor: 11/18 patients (61%) had major LARS score at the end of the follow-up, similar to the functional results evaluated 14 years after pre-operative short course radiotherapy and standard TME in the Chen et al series. [25] Functional assessment in the present study occurred within the first 24 months of surgery which may account for the high rate of LARS encountered. In the present series, mean LARS in the subgroup of patients with an interval of <2 years from intervention was major, whereas minor LARS was seen in the subgroup with an interval of >2 years. Few studies evaluate the natural evolution of the digestive symptoms and LARS score, although, there is probably gradual improvement in the digestive function, continence and urgency that extends after two years of surgery. Moreover, quality of life does not seem to be altered compared to quality of life after standard TME. Indeed, mean GIQLI scores were better than the score in Theodoropoulos series evaluating GIQLI after TME standard. [26] Moreover, no patient had a definitive stoma for poor functional results. The results of our study were quite similar to those of the study of Maggiori et al. In addition, we reported a few cases of rectouretral fistulas, with success of DCAA. The functional scores showed that although LARS was not very good, patients' quality of life seemed to be equivalent of patients with coloanal anastomosis for rectal cancer.

Several limitations are seen in the present study. Firstly, this is a retrospective study, with a small cohort of patients. This is, however the largest study that show DCAA as a safe and successful procedure for treatment chronic anastomotic fistulas and colo-vaginal fistulas, avoiding permanent stoma in 3 out of 4 cases.

CONCLUSION

The feasibility, outcomes and morbidity of delayed colo-anal anastomosis for redo pelvic surgery are not well known. The present study showed that trans-anal pull-through with DCAA in redo pelvic surgery is associated

with a high success rate and low morbidity. This procedure avoids permanent stoma in 3 out of 4 patients. While quality of life was more than acceptable, functional results were altered but seem to improve with time. Two years after surgery, functional results and quality of life are quite similar to those after standard TME.

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Supportive information Details

- Details on surgical technique
- Definitions of pelvic sepsis, ileus, fistula recurrence
- Details on LARS and GIQLI scores
- Details on preoperative management of patients (with Table)
- Details on stoma management and LARS sub-scores.
- Table S1. Occurrence for each symptom component of the Low Anterior Resection Score (LARS) for 18 patients with no stoma
- Table S2. Initial management of complication after initial surgical procedure.
- Figure S1. Surgical outcomes of patients who underwent a delayed colo-anal anastomosis for redo rectal surgery.

Patients characteristics	N=29 (%)
Female	15 (51.7)
Mean age at redo surgery	55.9 ± 14.3 (13.8 - 73.3)
Mean BMI	23.7 ± 4.3 (16.2 - 36.2)
> 25	11 (37.9)
< 18	1 (3.4)
ASA score	
1	13 (44.8)
2	12 (41.4)
3 - 4	4 (13.8)
History of pelvic surgery	
Gynecological surgery	4 (13.8)
Vascular by-pass	5 (17.2)
Prostatectomy	3 (10.3)
Re-implantation with uretero-neocystostomy	1 (3.4)
Medical history	
Smoking	17 (58.6)
High blood pressure	21 (72.4)
Diabetes	3 (10.3)
Anticoagulant therapy	5 (17.2)
Antiplatelet therapy	5 (17.2)
History of pelvic irradiation	14 (48.3)
Primary diagnosis and treatments	
Rectal cancer	21 (72.4)
Colorectal anastomosis	6 (20.7)
Side-to-end anastomosis	6 (20.7)
Colonic J-pouch anastomosis	9 (31.0)
Prostatectomy for cancer	3 (10.3)
Hirschsprung's disease	2 (6.8)
Duhamel procedure	1 (3.4)
Soave procedure	1 (3.4)
Colorectal anastomosis for Pelvic endometriosis	1 (3.4)
Colorectal anastomosis for vascular malformation	1 (3.4)
Dilatation for rectal ischemic stenosis	1 (3.4)
Indication of the surgery	
Chronic pelvic sepsis	13 (44.8)
Recto-vaginal fistula	11 (37.9)
Recto-vesical fistula	5 (17.2)
Number of previous procedures	
One	11 (37.9)
Two or more	16 (55.2)
Median time between 1 st surgery and DCAA (months)	18.4 (IQR: 9.1-71.3)
Stoma before procedure	
Ileostomy	22 (75.9)
Colostomy	1 (3.4)

Abbreviations: BMI = body mass index; ASA = American Society of anesthesiologists; DCAA (Delayed coloanal anastomosis)

Table 1: Characteristics of the patients who underwent a delayed colo-anal anastomosis (DCAA).

Surgical characteristics	N=29 (100%)
<u>First procedure</u>	
Mean operative time (minutes)	226 ± 66 (120-400)
Blood transfusion during the procedure	6 (20.7)
Associated techniques used to perform anastomosis	
Deloyers procedure	
Transmesenteric passage of the colon	3 (10.3)
Epiplasty	8 (27.6)
Organ injury during the procedure	9 (31.0)
Bladder	
Small intestine	0
Ureter	4 (13.8)
Transabdominal pelvic suction	1 (3.4)
Defunctional stoma after procedure	29 (100)
None	
Ileostomy	3 (10.3)
Colostomy	25 (86.2)
	1 (3.4)
<u>Interval period</u>	
Mean interval period length (days)	14 ± 3 (8-21)
Global morbidity before second stage operative procedure	14 (48.3)
Clavien-Dindo classification	
I	2 (6.9)
II	6 (20.7)
III	4 (13.8)
IV	2 (6.9)
<u>Second procedure</u>	
Mean operative time (minutes)	32 ± 10 (20-50)
Global morbidity after second stage procedure	2 (6.9)
Clavien-Dindo classification	
I	0
II	2 (6.9)
III	0
IV	0
<u>Post-operative period</u>	
Mean hospital stay length (days)	18 ± 3 (13-25)
Mortality at 30 days	0
Re-admission rate	2 (6.9)

Abbreviations: IQR = interquartile range

Table 2. Operative characteristics for first procedure, interval period, second procedure and one-month post-operative period.