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CLINICAL OUTCOMES OF TWO-STAGE DELAYED COLO-ANAL ANASTOMOSIS: A LITERATURE REVIEW

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ABSTRACT

Delayed anastomosis after rectal surgery was first described by Turnbull and Cutait for Hirschprung's disease, Chagas disease, and rectal cancer. The main objective of this technique is to reduce the risk of anastomotic fistula (AL), thanks to the adhesions that are created between the lowered colon and the anal canal between the first and second operative stages. This technique has seen a revival of interest in recent years, visible in the high number of publications in the last decade. Actual indications for delayed colo-anal anastomosis (DCA) are low rectal cancer and challenging situations in rectal surgery, mainly failed colorectal or colo- anal anastomosis. The rate of pelvic septic complications (anastomotic fistula and pelvic abscess) varies between 0 and 35.3%, with most studies reporting low rates. The rate of salvage ostomy creation in the postoperative period varied from 0 to 18.7%. Mortality was NUL in the majority of studies. The rate of poor functional results varied from 0 to 38.5% and functional outcomes appear to improve over time. Few studies compared DCA to one-stage colo-anal anastomosis, with contradictory resulats. These results should be taken with caution because of the low level of available evidence. The ongoing randomized trials, comparing DCA with one-stage colo-anal anastomosis, will define the place of DCA in rectal surgery.

Keywords: Rectal neoplasms, Delayed colo-anal anastomosis, Anastomotic fistula

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INTRODUCTION

Delayed anastomosis after rectal surgery was first described by Turnbull and Cutait for Hirschprung's disease, Chagas disease, and cancer of the upper rectum and sigmoid [1,2]. It was then described in surgery for cancer of the lower rectum [3] and lately as a rescue technique in difficult colorectal surgery situations [4]. The principle of this technique is to perform the colo-anal anastomosis in two operative stages. The first stage, after rectal resection, 5 to 10 cm of the colon is externalized transanally and is kept outside. The second stage, which is carried out a few days later, the exteriorized colon is sectioned, then the anastomosis is fashioned [5,6].

The main objective of this technique is to reduce the risk of anastomotic fistula (AL), thanks to the adhesions that are created between the lowered colon and the anal canal between the first and second operative stages [1, 2]. The other advantage is to avoid the use of a protective ileostomy, given the low theoretical risk of occurrence of anastomotic fistula [6,

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7]. The initial reported results were promising with respect to the reduction of pelvic septic complications, but the functional results were mixed [6, 8].
This technique was popular during the 70s and 80s of the last century, then was gradually abandoned, probably by the widespread use of mechanical circular staplers and colonic pouch construction techniques, which greatly improved the functional results after rectal surgery [9]. Nevertheless, the rate of anastomotic fistulas in coloanal anastomosis remains high, and is associated with significant morbidity and mortality and poor long-term functional and oncological results [10–12].
As a result, this technique has seen a revival of interest in recent years, visible in the high number of publications in the last decade [13,14]. The objective of this article is to make a review of the literature synthesizing the main recent results of this technique, essentially morbidity, mortality and functional results.

INDICATIONS

The principle of delayed anastomosis was first described separately by Cutait and Turnbull for the surgical treatment of Hirschprung's disease, Chagas disease and cancer of the upper rectum and sigmoid [1, 2]. In the technique described by Cutait [1], the rectum was eversed transanally, and the colon was exteriorized through the rectum. A delayed colorectal anastomosis was performed 7-10 days later.
For rectal cancer, with the increasing adoption of sphincter preservation, the indications of this technique have widened to cancers of the middle then of the lower rectum, with lower colorectal anastomosis [6, 7, 15]. Currently, the majority of authors reserve this technique for cancers of the lower rectum, with the creation a delayed colo-anal anastomosis [5, 13, 16, 17].
Recently, the indications for delayed colo-anal anastomosis (DCA) were extended to more challenging colorectal surgery cases, mainly the complications of failed colorectal or colo-anal anastomosis. DCA was applied in case of chronic pelvic sepsis, recto-vaginal fistula (RVF), colo-vesical fistula, colonic ischemia, and recto-urinary fistula [4, 17–19]. Finally, DCA was also used for complicated Crohn disease, complex perianal fistula, diverticulitis and pelvic injury [9].

SURGICAL TECHNIQUE

We will mainly report the technique as described by Baulieux [3, 20] for cancer of the lower rectum. The variations of the technique proposed by other authors will be specified in the text if necessary.
The surgery is done in two stages. During the first operative stage, rectal or colonic resection is performed and the colon is externalized by the trans-anal route. During the second operating stage, the excess colon is cut and the anastomosis is made.

FIRST STAGE

The intervention begins with the abdominal approach. Two important elements have to be performed: sufficient colonic mobilization allowing a tensionless lowering of the colon towards the perineum, and a pelvic dissection up to the levator- ani plane to facilitate the perineal approach.
If it is rectal cancer, surgery can be done by laparoscopy or laparotomy. In both cases, the patient is installed in the modified Lloyd-Davis position. The mesenteric artery is controlled at its origin and the mesenteric vein is controlled at the lower edge of the pancreas, to facilitate the lowering of the colon towards the perineum. The splenic angle is detached and the left half of the transverse colon is mobilized. Then, the rectum is dissected circumferentially, in the plane of the fascia recti, to the level of the levator-ani muscles. In case of iterative surgery for complication of rectal surgery (rectovaginal fistula; perineal sepsis ...), the intervention is more challenging and it is often necessary to mobilize the transverse colon or the right colon more widely to allow a sufficient lowering of the colon to the perineum. To this end, specific lowering maneuvers may be necessary, such as the trans-mesenteric or Deloyers maneuvers [4, 21].
Then, the surgeon proceeds to the perineal approach. The exposure is facilitated by a Lone-Star type retractor or equivalent. The injection of saline serum with adrenaline under the mucosa is advised to facilitate mucosectomy. An incision of the rectal mucosa is made with cautery, above the pectineal line. The rectum is closed with sutures and the dissection continues to join the abdominal dissection plane. Once the rectum is completely released, the surgical specimen is externalized transanally. If the rectum is too large compared to the pelvis, the extraction through the abdominal incision to avoid an opening of

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the intestine. After the colonic section, 5 to 10 cm of the colon is left outside. Sutures between the anal canal and the colonic seromuscular are made to avoid colonic retraction and are left long, as guides to facilitate the second operating stage. The exteriorized colon is sutured on the inner side of the thigh to avoid any discomfort to the patient during the waiting period [22]. A pelvic suction drain, externalized by the abdomen is reported by most authors. The colon is protected by a dressing soaked in paraffin and it is inspected daily to check its viability.

SECOND STAGE

It can be performed between the fifth and the fourteenth postoperative day [17, 20, 23] . The patient is installed in the modified Lloyd-Davis position, under spinal-anesthesia or general anesthesia. Several variants have been described. Baulieux et al. [20] performs the anastomosis at the level of the pectineal line. Kirwan and then Bianco proposed to perform the anastomosis higher than the pectineal line. For this, the adhesions between the lowered colon and the anal canal are released a high colo-anal anastomosis is made by interrupted sutures [6,23]. Other authors have insisted on respecting the adhesions which have been created between the colon and the anal canal. They propose a colonic section at the level of the anal margin, and the colo-anal anastomosis is made by resorbable interrupted sutures.

MORBIDITY-MORTALITY

The main theoretical advantage of delayed anastomosis is to reduce the rate of anastomotic fistulas (AF) after rectal resection [1]. Initial results for delayed colorectal anastomosis showed a lower rate of AF for delayed anastomosis compared to one-stage anastomosis [1, 8].
For delayed coloanal anastomosis, some studies have reported the rates of AF and pelvic abscess (without AF) separately while others have reported them together. For the sake of consistency, we will report the overall rate of pelvic septic complications, including AF and pelvic abscesses. **Table I** summarizes the morbidity results in the literature. The rate of pelvic septic complications varies between 0 and 35.3% (Table 1). It should be noted that three out of 14 studies reported no pelvic septic complications [16, 19, 24]. Few studies compared the rate of septic complications between DCA and one-stage coloanal anastomosis with contradictory results. Zanguie et al. reported a lower rate for DCA (12.3% vs. 24.9%)[25]. In contrast, Prete et al. reported a higher rate in the DCA group (18.7% vs. 0) [26]

JMSR
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Table I: Characteristics of studies and morbidity results

Author	n	Diagnosis	Salvage Ostomy	Pelvic sepsis	Reoperation	Death
Zanguie 2018	49	Cancer	NP	6 (12.3%)	NP	NP
Jarry 2011	100	Cancer	7	10 (10%)	14 (14%)	3 (3%
Facy 2009	17	Cancer	2 (11.8%)	2 (11.8%)	3 (17.6%)	1 (5.8%)
Baulieux 2004	46	Cancer	1 (2.2%)	2 (4.3%)	1 (2.2%)	0
Sage 2018	85	Cancer	NA	30 (36.3%)	9 (10.6%)	2 (2.3%)
Barugola 2018	9	Cancer	NA	2 (22.2%)	0	0
Xiong 2016	72	Cancer	0	2 (2.8%)	0	0
Bianco 2016	8	Cancer	0	0	0	0
Maggiori 2015	24	Failed anastomosis	NA	3 (12.5%)	4 (16.7%)	0
Hallet 2014	7	Failed anastomosis	1 (14.3%)	1 (14.3%)	1 (14.3%)	0
Pujahari 2014	8	Cancer	0	0	0	1 (12.5%)
Prete 2013	16	Cancer	3 (18.7%)	3 (18.7%)	3 (18.7%)	0
Fixot 2013	2	Recto-urinary fistula	NA	0	0	0
Biondo 2012	13	Cancer / Failed anastomosis	1 (7.7%)	2 (15.4%)	5 (38.5%)	0
Kirwan 1978	84	Cancer	0	6 (7.1%)	1 (1.2%)	0
Remzi 2009	76	Cancer / Complicated cases	NP	2 (3%)	NP	0

NA: Not applicable / NP: Non reported

The rate of reinterventions varies between 0 and 38.5% [4–6, 9, 17–19, 24, 25, 27–31]. The main causes are pelvic septic complications and necrosis of the lowered colon. These complications often required the creation of a salvage ostomy which can be temporary or permanent. In patients who did not have an ostomy, the rate of salvage ostomy creation in the postoperative period varied from 0 to 18.7% [13,14,16,26].

Mortality was NUL in the majority of studies. Only one Indian study reported a rate of 12.5%, corresponding to a death in a series of 12 patients [24]. In the long term, the rate of permanent ostomies varied from 0 to 25%. The main definitive stoma causes were pelvic septic complications and anal incontinence. The rate of definitive ostomy was higher in series including complex situations [4,9,18]. Remzy et al. who reported the highest failure rate of 25% from DCA included in 58% complex situations [9], while Maggiori et al. who reported a final ostomy rate of 21%, included only patients with failed colorectal or colo-anal anastomosis [4].

JMSR
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FUNCTIONAL RESULTS

The functional results are difficult to assess because the evaluation methods were different in the literature with contradictory results. **Table II** presents the results of the main studies in the literature. The rate of poor functional results varied from 0 to 38.5%

Table II: Functional results in the litterature

Author	Mean follow-up	Evaluation method	Poor functional results
Kirwan 1979	At least 12 months	Custum questionnaire	15/29 (38.5%)*
Jarry 2011	At least 24 months	Wexner score	25/94 (27%)*
Facy 2009	35.3 months	Wexner score	0/16*
Maggiori 2015	29 months	LARS score	3/17 (18%)
Zanguie 2019	At least 12 months	Wexner score	17/59 (29%)*

* Wexner score > 10 / LARS: Low Anterior Resection Syndrome

Zanguie et al. reported a median 1-year Wexner score of 6.4, with 29% of patients having poor results (score > 10)[25]. In the largest series in the litterature (100 patients with low rectal cancer), the rate of poor functional outcomes according to Wexner score was 27% [27]. Maggiori et al. who included only failed colorectal or colo-anale anastomosis cases, reported an 18% rate of poor functional outcomes [4].

Functional outcomes appear to improve over time. Olagne et al. showed that poor functional outcomes (Wexner score> 10) decreased from 73% at one month to 0% at 60 months [3]. Similarly, Jarry et al. showed a decrease of poor functional outcomes, from 55% in the first year, to 27% after 24 months [27].

Remzi et al. compared the functional results between ACAD and direct coloanal anastomosis. The Wexner score was not statistically different between the two techniques (10.6 vs. 12.2. P = 0.09). There was also no difference for each question of the Wexner score [9].

CONCLUSION

Delayed colo-anal anastomosis is a feasible technique with acceptable morbidity and mortality. In particular, the pelvic septic complications seem to be lower compared to the one-stage colo-anal anastomosis. The functional results are acceptable, with a significant improvement over time, and would not be different from the one-stage colo-anal anastomosis. However, these conclusions are to be taken with caution because of the low level of available evidence. Randomized trials, comparing DCA with one-stage colo-anal anastomosis, will define the place of DCA in rectal surgery [22].

CONFLICT OF INTERESTS:

Authors declare no conflict of interest.

SOURCE OF FUNDING:

None

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ISSN: 2351-8200
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