



Retroileal colorectal anastomosis after left-sided or transverse colectomy for advanced serous carcinoma of the ovary or uterus

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ABSTRACT

The ability to achieve complete or optimal cytoreduction in advanced or recurrent ovarian and uterine cancer is a well-established prognostic factor. Colonic resections are commonly required to achieve minimal or no residual disease. When multiple colonic resections are required there is a corresponding difficulty in obtaining sufficient colonic mobility to create tension-free anastomoses for restoration of gastrointestinal continuity; specifically, when a left hemicolectomy or a transverse colectomy is required in addition to a rectosigmoid resection, it may be difficult to achieve a tension-free colorectal anastomosis. We describe the use of retroileal routing of the colon to address this scenario in the context of gynecologic cancer debulking surgery. We report four cases in which the surgeon encountered limited colonic mobility after performing either a left hemicolectomy or a transverse colonic resection in addition to a rectosigmoid resection. In using a retroileal path to perform the colorectal anastomosis, we were able to achieve well-perfused and tension-free anastomoses. Complete gross resection was achieved in all four cases, with acceptable rates of perioperative complications.

1. Introduction

Complete or optimal cytoreduction is a well-established prognostic factor in advanced or recurrent ovarian and uterine cancer (Bristow et al., 2002; Barlin et al., 2010; Hoskins et al., 1994). In order to achieve complete cytoreduction, bowel resection—most commonly, colonic resection—is often required (Chi et al., 2004). Rectosigmoid resections are most frequently performed, given the proximity of the rectosigmoid to the primary site of disease (Peiretti et al., 2012; Hoffman et al., 2005; Hoffman and Zervose, 2008). The additional need for a left hemicolectomy is less common, but may still be necessary in some cases (Hoffman and Zervose, 2008). However, when a left hemicolectomy is performed in the setting of a rectosigmoid resection, it may be difficult to achieve a tension-free anastomosis. This is common when there is extensive involvement of the rectosigmoid requiring resection of a portion of the distal descending colon as well; or when there is additional disease in the left upper quadrant, requiring left colonic resection; or if there is metastatic involvement of the left colon. Additionally, if

there is a lesion on the transverse colon requiring resection, in the setting of a rectosigmoid lesion, some surgeons favor an en bloc resection at the level of the transverse lesion—rather than performing two separate colonic excisions, which could create significant tension at the level of the colorectal anastomosis.

In these scenarios there is a risk of limited colonic mobility. Nevertheless, it is crucial that the colorectal anastomosis remains tension-free, to diminish the risk of anastomotic leaks. When a left colon resection is performed the proximal transverse colon is often resected and, despite full mobilization of the splenic flexure and release of the mesentery, there is often significant difficulty in obtaining well-perfused colon to reach the pelvis for a tension-free anastomosis. These obstacles are also encountered during complicated sigmoid colectomies requiring an anastomosis between the colon and rectum. One technique that addresses this difficulty is a retroileal routing of the colon.

Rombeau et al. were the first to describe this technique in 1978. They investigated a series of 302 resections of the descending colon with colorectal anastomoses, all performed by Rupert B. Turnbull. Of these,

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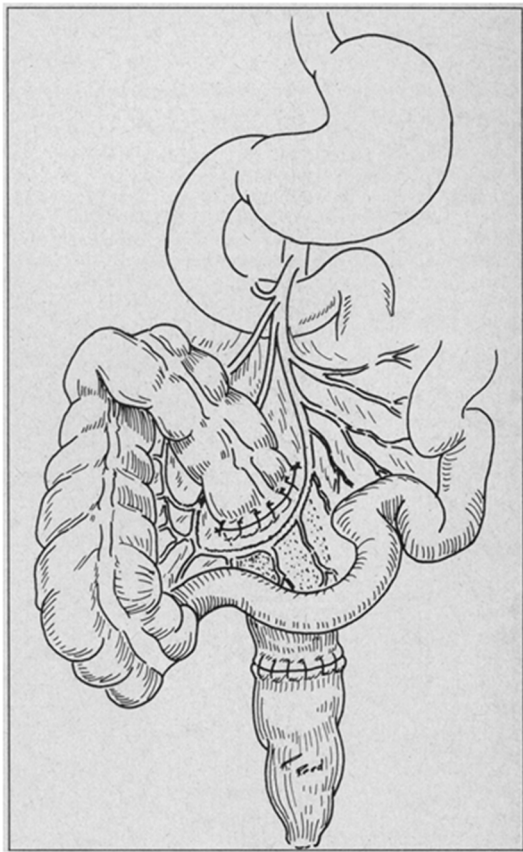


Fig. 1. Completed retroileal colorectal anastomosis. Note mesenteric-to-bowel sutures to prevent internal herniation of small intestine. (From Rombeau JL, Collins JP, Turnbull RB Jr. Left-sided colectomy with retroileal colorectal anastomosis. Arch Surg 1978; 113(8): 1004–1005. Used by permission).

11 patients underwent retroileal colorectal anastomosis with post-operative functional bowel, with only one case of a small bowel obstruction that resolved with conservative management (Rombeau et al., 1978). Since then there have been additional case series in the colorectal literature describing this technique. Most recently Blank et al. reported performing a retroileal anastomosis via hand-assisted laparoscopy (Blank et al., 2020). Here we report the first case series in the gynecologic oncology literature on the use of retroileal routing for a colorectal anastomosis.

2. Materials and methods

This study represents a collaborative effort between Memorial Sloan Kettering Cancer Center (New York, New York, USA) and Centro Clínico Champalimaud (Lisbon, Portugal). It was approved by the Institutional Review Board at MSKCC. Four cases were identified in which retroileal routing for a colorectal anastomosis was performed during primary debulking surgery for ovarian or uterine cancer. Data was extracted from electronic medical records and patient charts. Patient demographics were collected, including age, body mass index (BMI), and comorbidities (diabetes, hypertension, current steroid use, diverticular disease, and history of smoking). Additional intraoperative and post-operative assessments were collected, including preoperative albumin, all bowel procedures performed, insertion of an ileostomy, estimated blood loss (EBL), presence of complete gross resection (CGR), days until return of bowel function, complications, length of hospital stay (LOS), and follow-up from day of surgery.

Table 1
Patient demographics, intraoperative and postoperative characteristics and measures.

Case No.	Age at surgery (years)	BMI at surgery (kg/m ²)	Comorbidities	Disease	NACT	Pre-op albumin (g/dL)	Bowel Procedure	Ileostomy	EBL (mL)	CGR	Return of bowel function (days)	Complications	LOS (days)	Follow up
1	75	24.7	HTN, HL, Former smoker, Diverticulitis	Undifferentiated uterine carcinoma	No	4.5	Left hemicolectomy and LAR	No	500	Yes	2	None	6	8 mos AWD
2	44	25.6	None	HGSOC	No	3.8	Left hemicolectomy and LAR	No	650	Yes	5	None	8	8 mos NED
3	60	27	None	HGSOC	Yes (6C)	3.9	Modified posterior extenteration, transverse colon segmental resection	Yes	700	Yes	3	None	7	4 mos NED
4	72	24.1	Hx of DVT (Xarelto)	Serous endometrial carcinoma	Yes (3C)	3.9	Left hemicolectomy and LAR	Yes	900	Yes	3	None	9	2 mos DOD

HGSOC, high grade serous ovarian cancer; NACT, neoadjuvant chemotherapy; CGR, complete gross resection; LOS, length of stay; LAR, low anterior resection; AWD, alive with disease; NED; no evidence of disease; DOD, dead of disease.

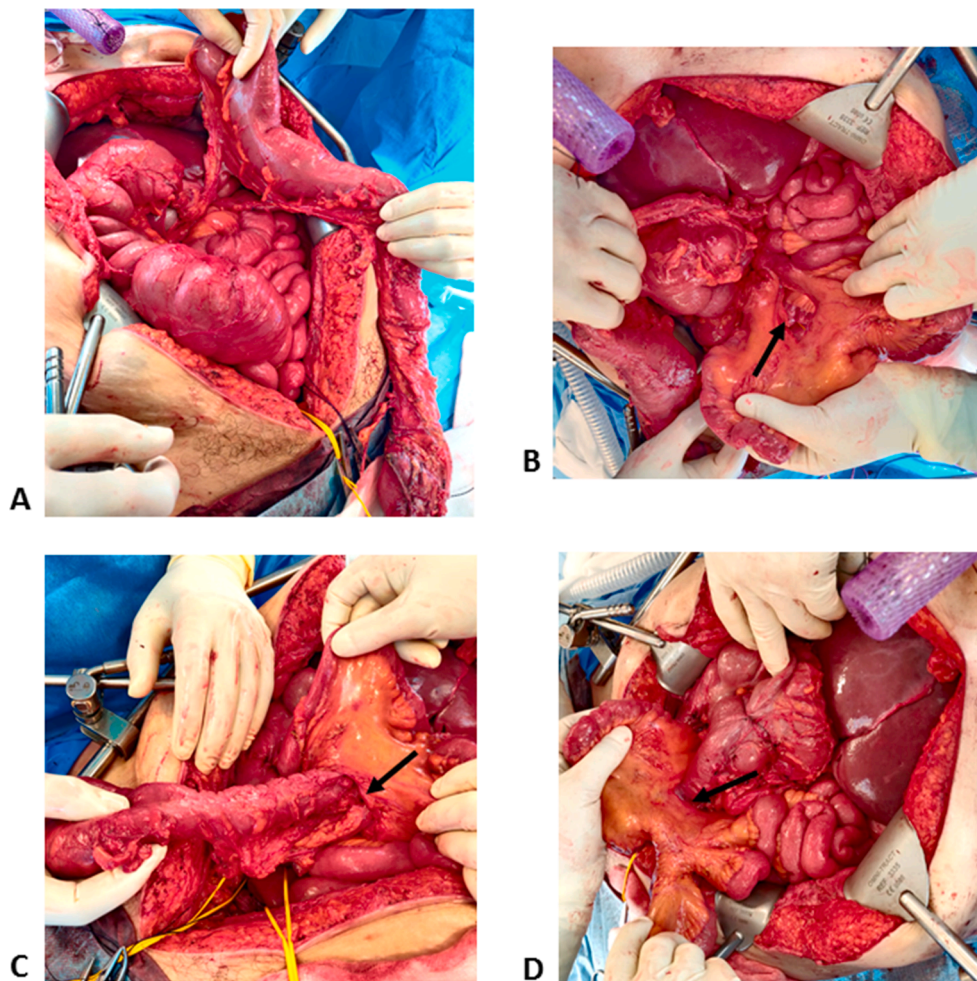


Fig. 2. Case No. 3. The use of retroileal colorectal anastomosis after posterior exenteration and transverse colon segmental resection A) transection of the transverse colon and mobilization of the descending colon B) window created in the ileal mesentery C) the colon is passed through the window D) final image from above after colorectal anastomosis. ©Centro Clínico Champalimaud 2020.

3. Technique

The rectosigmoid resection is performed in addition to other necessary colonic resections. If there is insufficient length of remaining transverse colon after a left hemicolectomy, or if the colon has been

shortened (as in the setting of a segmental transverse colon resection) and a standard tension-free anastomosis cannot be performed, then the retroileal approach is an option. A “window” is created in the terminal part of the ileal mesentery. An avascular space should be identified, such as that between the superior mesenteric vessels on the left and the

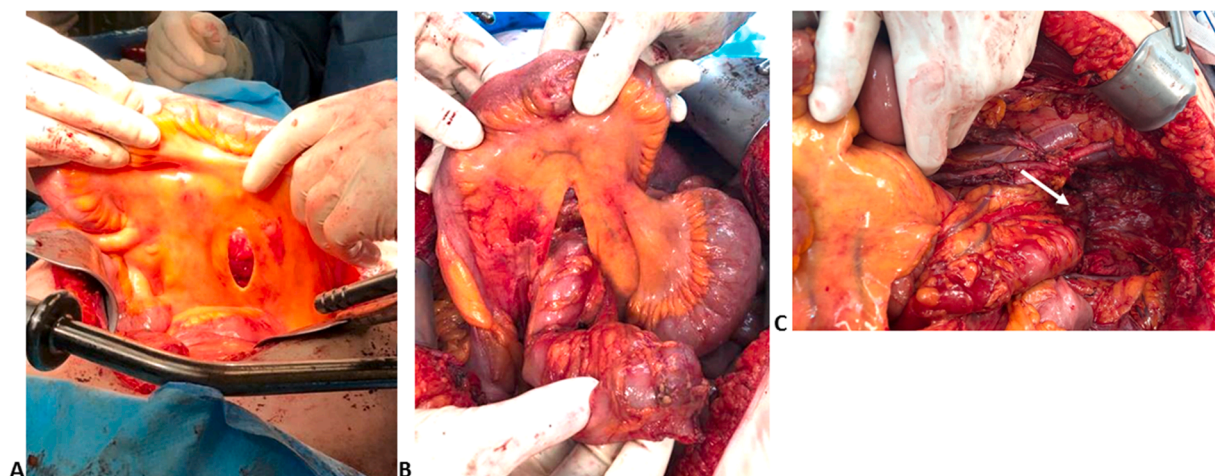


Fig. 3. Case No.4. Retroileal anastomosis after left hemicolectomy and low anterior resection. A) Window in an avascular portion of the ileal mesentery B) the colon is passed through the window (C) the colorectal anastomosis is performed. ©Centro Clínico Champalimaud 2020.

ileocolic vessel on the right, or between the ileocolic vessels and the last ileal branch. The size of the window should approximate the width of the colon that will traverse through, in order to avoid entrapment of small intestine, or a volvulus. The terminal ileum is then placed anterior to the pulled-down colon in a curtain-like manner. This allows the proximal colon conduit to be placed through the fenestration and reach the rectum in a tension-free fashion. This maneuver also allows the middle colic vessels to be preserved in most cases. The colorectal anastomosis is then performed as per the surgeon's technical preference and should appear tension-free, given the additional mobility acquired with this technique (Fig. 1).

4. Results

In the four cases reported herein, the median age was 66 years (range, 44–75 years) and BMI was 25.15 kg/m² (range, 24.1–27 kg/m²). Two of the surgeries were performed in patients with uterine carcinoma, and two in patients with ovarian carcinoma. Additionally, half of the cases received neoadjuvant chemotherapy (Table 1). The median pre-operative albumin level was 3.9 g/dL (range, 3.8–4.5 g/dL). In three cases—Cases 1, 2 and 4—a left hemicolectomy was performed in addition to a low anterior resection (LAR), secondary to tumor involvement. In Case No. 1, in addition to a 5 cm mass involving the sigmoid colon, there was extensive diverticular disease throughout the colon, most prominently along the descending and sigmoid colon. Therefore, in order to safely reapproximate the colon, a left hemicolectomy was performed in addition to a LAR. In Case No. 3, a left hemicolectomy was not performed; however, a segmental transverse colon resection was performed as well as a modified posterior exenteration. After fully mobilizing the left colon, the surgeon was unable to obtain a reassuring tension-free anastomosis, and the decision was made to perform retroileal routing of the colon. (Fig. 2).

In all four cases a CGR was achieved. An ileostomy was created in two of the cases secondary to the surgeon's usual practice and not because of concern regarding the tension or integrity of the anastomosis. Median EBL was 675 mL (range, 500–900 mL). Postoperatively there was a median of 3 days (range, 2–5 days) until return of bowel function. LOS was 7.5 days (range, 6–9 days). There were no anastomotic leaks. There was one death secondary to progression of disease (Table 1, Fig. 3). Both patients undergoing primary debulking surgery started adjuvant chemotherapy between 6 and 7 weeks postoperatively. In Case No. 3, the patient had received 6 cycles of neoadjuvant chemotherapy and was started on niraparib 4 weeks postoperatively.

5. Discussion

Segmental colectomies are a well-established procedure in the setting of surgical cytoreduction for ovarian or uterine malignancy. While rectosigmoid resections are most commonly performed, sometimes there is a need for concurrent additional colonic resections that might compromise the integrity of the colorectal anastomosis. In this scenario, a surgeon has several options. These include aborting the surgery; creating a permanent end colostomy; performing a total colectomy with ileorectal anastomosis; mobilizing the right colon for a Deloyers procedure; or, as we describe, completing a retroileal anastomosis.

In the setting of advanced uterine or ovarian carcinoma, bowel resections may enable complete or optimal cytoreduction and thereby improve overall survival (Hoskins et al., 1994; Chi et al., 2004; Eisenkop et al., 2003). Therefore, the surgeon should be familiar with, and have technical proficiency in, the options described above. The creation of a permanent end colostomy is not ideal, as this has been associated with inferior health-related quality of life impacting mental health, body image, and physical function (Näsvall et al., 2017). A total colectomy is feasible and safe; however, it should be limited to cases with extensive colonic tumor involvement requiring more than three anastomoses, or

when the colonic mesenteries of the ascending, transverse, and descending colon are involved by tumor (Song, 2009). There remain two surgical techniques that can address this scenario.

In 2004, David Silver reported using the Deloyers procedure to achieve a low ascending coloproctostomy, in the setting of extended left colon resections during ovarian or uterine cancer cytoreductive surgery (Silver, 2004; Silver and Zgheib, 2009). When performing this technique, the sigmoid, descending, transverse and distal portion of the ascending colon are excised. The remaining ascending colon is mobilized on the ileocolic artery pedicle and rotated counterclockwise into the pelvis to achieve a tension-free colorectal anastomosis (Deloyers, 1964). However, this requires more extensive colonic resection compared with the retroileal technique.

Here we have presented a series of four cases in which the retroileal technique was used to achieve CGR during extensive cytoreductive surgery for gynecologic malignancy. The lack of postoperative complications and acceptable time interval to return of bowel function suggests this is a safe technique in the setting of surgical cytoreduction for ovarian or uterine cancer. This study is limited by the small number of cases and resulting lack of comparison to other surgical techniques. However, we have described an additional tool available in the surgical armamentarium for gynecologic oncology. We hope this will contribute to the ongoing effort to achieve CGR and optimal cytoreduction in patients with advanced uterine or ovarian serous carcinoma.

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CRedit authorship contribution statement

Lea A. Moukarzel: Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing - review & editing. **Joao Casanova:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing - review & editing. **José Filipe Cunha:** Formal analysis, Writing – original draft, Writing - review & editing. **Philip B. Paty:** Formal analysis, Writing - review & editing. **Emmanouil P. Pappou:** Formal analysis, Writing - review & editing. **Elizabeth Jewell:** Formal analysis, Writing - review & editing. **Dennis S. Chi:** Conceptualization, Supervision, Data curation, Formal analysis, Writing - review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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