Deloyers Technique for Restoration of Bowel Continuity Following Extended Left Hemicolectomy: A Comprehensive Analysis of 97 Cases and Literature Review

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BACKGROUND: Deloyers technique addresses challenges in restoring bowel continuity after extended left hemicolectomies. Despite being first described in 1958, the technique remains underused, with limited data on long-term outcomes.

OBJECTIVE: To evaluate the indications of surgical and functional outcomes of the Deloyers technique and review existing literature.

DESIGN: Using a prospectively maintained database, patient demographics and perioperative data were collected. A telephone interview was conducted to assess bowel function, and statistical analysis identified factors affecting bowel function.

SETTINGS: Single tertiary care center.

PATIENTS: Patients who underwent the Deloyers technique from January 1995 to February 2023.

RESULTS: A total of 97 patients were included. The most common indications were colorectal cancer (50.5%) and diverticular disease (21.6%). In 53.6% of cases, Deloyers technique was performed at reoperations, and in 70.1% of cases, a diverting loop ileostomy was created. Early surgical complications occurred in 7.2% of patients, including 5 anastomotic leaks, 1 colonic conduit ischemia, and 1 small-bowel obstruction. Late complications occurred in 8.2% of cases, including 6 anastomotic strictures and 2 chronic leaks. There was no perioperative mortality. A total of 40 patients were interviewed and reported an average of 3.5 bowel movements per day and 0.5 at night; 17.5% of patients used bowel stoppers and 52.5% of patients reported that their bowel function did not impact their quality of life. Previous radiotherapy and anastomosis <8 cm from the anal verge were associated with having 4 or more bowel movements per day ($p < 0.01$).

MAIN OUTCOME MEASURES: Postoperative morbidity and bowel function.

LIMITATIONS: Retrospective analysis of a heterogeneous group of patients with different pathologies and indications for surgery.

CONCLUSIONS: Deloyers technique is a safe and effective alternative for restoring bowel continuity after extended left hemicolectomy. Postoperative functional results are generally satisfactory, with more favorable outcomes noted in patients with higher anastomoses and those who have not undergone prior pelvic radiotherapy. See **Video Abstract**.

TÉCNICA DE DELOYERS PARA LA RECONSTRUCCIÓN DE LA CONTINUIDAD INTESTINAL TRAS HEMICOLECTOMÍA IZQUIERDA AMPLIADA: ANÁLISIS EXHAUSTIVO DE 97 CASOS Y REVISIÓN BIBLIOGRÁFICA

ANTECEDENTES: La técnica de Deloyers aborda los retos que plantea la reconstrucción de la continuidad intestinal

tras hemicolectomías izquierdas ampliadas. A pesar de haber sido descrita inicialmente en 1958, la técnica sigue siendo poco utilizada, con datos limitados sobre sus resultados a largo plazo.

OBJETIVO: Evaluar las indicaciones y los resultados tanto quirúrgicos como funcionales de la técnica de Deloyers y revisar la bibliografía existente.

DISEÑO: Gracias a una base de datos mantenida de forma prospectiva, se recopiló información demográfica y perioperatoria de los pacientes. Se realizó una entrevista telefónica para evaluar la función intestinal y el análisis estadístico identificó los factores que afectaban a la función intestinal.

ENTORNO: Un único centro de atención terciaria.

PACIENTES: Aquellos sometidos a técnica de Deloyers entre enero de 1995 y febrero de 2023.

RESULTADOS: Se incluyó a un total de 97 pacientes. Las indicaciones más frecuentes fueron cáncer colorrectal (50,5%) y enfermedad diverticular (21,6%). En el 53,6% de los casos se realizó DT en las reoperaciones y en el 70,1% se creó una ileostomía de protección. Se encontraron complicaciones quirúrgicas tempranas en 7,2% de los pacientes, incluidas cinco fugas anastomóticas, una isquemia segmentaria de colon y una obstrucción del intestino delgado. Se describen complicaciones tardías en 8,2% de los pacientes, entre ellas 6 estenosis anastomóticas y 2 fugas crónicas. No hubo mortalidad perioperatoria. Se entrevistó a un total de 40 pacientes, que declararon una media de 3,5 deposiciones al día y 0,5 por la noche; el 17,5% utilizó tapones intestinales y el 52,5% de los pacientes declaró que su función intestinal no repercutía en su calidad de vida. La radioterapia previa y la anastomosis a menos de ocho cm del borde anal fueron asociadas con la evacuación de cuatro o más deposiciones al día ($p < 0,01$).

MEDIDAS DE RESULTADOS PRINCIPALES: Morbilidad postoperatoria y función intestinal.

LIMITACIONES: Análisis retrospectivo de un grupo heterogéneo de pacientes con diferentes patologías e indicaciones quirúrgicas.

CONCLUSIÓN: La técnica de Deloyers es una alternativa segura y eficaz para restaurar la continuidad intestinal tras una hemicolectomía izquierda ampliada. Los resultados funcionales postoperatorios son generalmente satisfactorios, observándose resultados más favorables en pacientes con anastomosis más altas y en aquellos que no han recibido radioterapia pélvica previa. *(Traducción— Dr. Xavier Delgadillo)*

Segmental resections of the sigmoid and left colon are common procedures worldwide. Bowel continuity is typically restored through complete mobilization of the splenic flexure and high ligation of the inferior mesenteric vein. However, after extended left hemicolectomy, a shortened remaining transverse colon and excessive tension in the colonic mesentery may preclude a safe anastomosis due to length. To overcome these difficulties, a limited number of strategies are available, including a transverse colostomy, retroileal tunneling of the transverse colon, total abdominal colectomy with ileorectal anastomosis, or counterclockwise rotation of the right colon. Each of these procedures has advantages and drawbacks, and the experienced surgeon should be knowledgeable about these alternatives to restore bowel continuity.

In 1958, the Belgian surgeon Lucien Deloyers described the technique for anastomosing the right colon to the rectum, which requires high ligation of the middle colic vessels and counterclockwise rotation of the colon along the ileocolic pedicle in the sagittal plane.[1] Despite >60 years since its original description, many surgeons are unfamiliar with this technique, and data regarding surgical outcomes and long-term bowel function are scarce. Understanding the technical details, indications, and outcomes can improve its reproducibility and potentially avoid unnecessary stomas. This study aims to analyze patients who underwent the Deloyers technique (DT) at a single institution, examining its indications and surgical and functional results, and compile a comprehensive review of the existing literature.

MATERIALS AND METHODS

Patients who underwent DT from January 1995 to February 2023 were identified from a prospectively maintained database at the Colorectal Department at the Cleveland Clinic, Ohio. Operative notes were reviewed for the accuracy of the surgical procedure. Patients who underwent DT for indications other than extended left hemicolectomy were excluded.

Patient demographics, perioperative data, and postoperative complications were reviewed. The distance of the anastomosis from the anal verge was retrieved from operative notes. A low anastomosis was classified as being ≤8 cm from the anal verge for statistical analysis. This measurement was selected because of its practicality and reliability because it corresponds to the reach of a digital rectal examination and was consistently recorded in intraoperative documentation and during postoperative follow-up appointments. The early postoperative period was defined as within 30 days of surgery or until hospital discharge if there was a longer hospitalization.

1. How many bowel movements did you have daily during the last week?

2. How many bowel movements do you usually have during the night?

3. Do you use stool stoppers regularly?

4. Do you have the impression that your bowel situation limits your quality of life?

5. If you felt the urge to move your bowel, could you wait 5 min?

6. What about 10 min?

FIGURE 1. Bowel questionnaire administered to patients over the telephone.

Patients were interviewed over the telephone using a questionnaire assessing their bowel function, its impact on quality of life, and use of bowel stoppers (Fig. 1). A concise questionnaire was used, in accordance with the requirements of our Institutional Review Board. All interviews were conducted with a minimum follow-up period of 6 months after restoration of bowel continuity. The Fisher exact test was used to evaluate potential risk factors affecting bowel function, specifically focusing on more or fewer than 4 bowel movements per day. A p value of <0.05 was considered significant.

This study was approved by the Cleveland Clinic Institutional Review Board and is registered under the number 23-732.

Surgical Technique

To perform DT, the right colon must be fully mobilized from its retroperitoneal attachments. The next step is to perform high ligation of the middle colic vessels, which ensures that the colon can be adequately mobilized from the mesenteric root and rotated to the pelvis without compromising its blood supply. After vascular ligation, the colon is transected near the hepatic flexure. Adequate vascularization should be assessed at this point, as the remaining right colon is perfused solely through the ileocolic artery and the marginal artery of Drummond. This can be achieved either by testing the marginal arcade for pulsatile blood flow or with indocyanine green (ICG) fluorescence angiography. Once good perfusion is confirmed, the colon is prepared for anastomosis. Some surgeons also perform an appendectomy at this stage to avoid future diagnostic challenges given the appendix's final location in the right upper quadrant. The next step is to rotate the right colon along the ileocolic pedicle in the sagittal plane, allowing it to reach the pelvis. This step is crucial because improper rotation may lead to twisting of the ileocolic pedicle and ischemia of the colonic conduit. The technique is illustrated in Figures 2 and 3.

RESULTS

During the study period, a total of 99 patients underwent DT. Two patients were excluded from the analysis because DT was performed to restore bowel continuity after esophagectomy requiring a colonic conduit and not after extended left hemicolectomy. Demographics, indications, and perioperative results are summarized in Table 1. The most common indications for DT were colorectal cancer (50.5%) and diverticular disease (21.6%). In 53.6% of cases, DT was performed during reoperations, and a diverting ileostomy was created in 68 patients (70.1%). The marginal arcade was assessed for pulsatile blood flow in all patients. In addition, 3 patients underwent ICG fluorescence angiography to confirm adequate vascularization.

Early surgical complications occurred in 7.2% of patients, including 5 anastomotic leaks, 1 colonic conduit ischemia, and 1 bowel obstruction due to parastomal hernia. Management included transanal drainage, resection with end ileostomy, redo DT with Turnbull-Cutait procedure, and exploratory laparotomy. Late complications occurred in 8.2%, including 6 anastomotic strictures and 2 chronic leaks, which were managed with transanal dilations, resections with end ileostomy, and needle-knife stricturotomy. There were no perioperative deaths. Of the 68 diverting loop ileostomies, 9 patients (13.2%) could not undergo stoma reversal: 6 died before reversal, 2 required permanent end ileostomy, and 1 had an early cancer recurrence. One patient is awaiting stoma reversal due to adjuvant chemotherapy.

Out of 97 patients, 35 died during the follow-up period. Among the remaining 62 patients, 40 (64.5%) were interviewed regarding their bowel function after an average follow-up of 82.2 months. Nonparticipation in the study was due to the following reasons: we could not contact the patient (n = 18), the patient had a current ileostomy (n = 2), or the patient opted out voluntarily (n = 2). Overall, patients had an average of 3.5 bowel movements per day and 0.5 at night; 17.5% of patients used bowel stoppers regularly and 52.5% of patients reported that their bowel function did not impact their quality of life. Most patients could defer a bowel movement for >5 minutes (75%) and 10 minutes (62.5%) (Table 2). Univariate analysis revealed that previous pelvic radiotherapy (p = 0.002) and anastomosis <8 cm from the anal verge (p = 0.003) were associated with having more than 4 bowel movements per day. Multivariate analysis was not feasible because of the limited sample size.
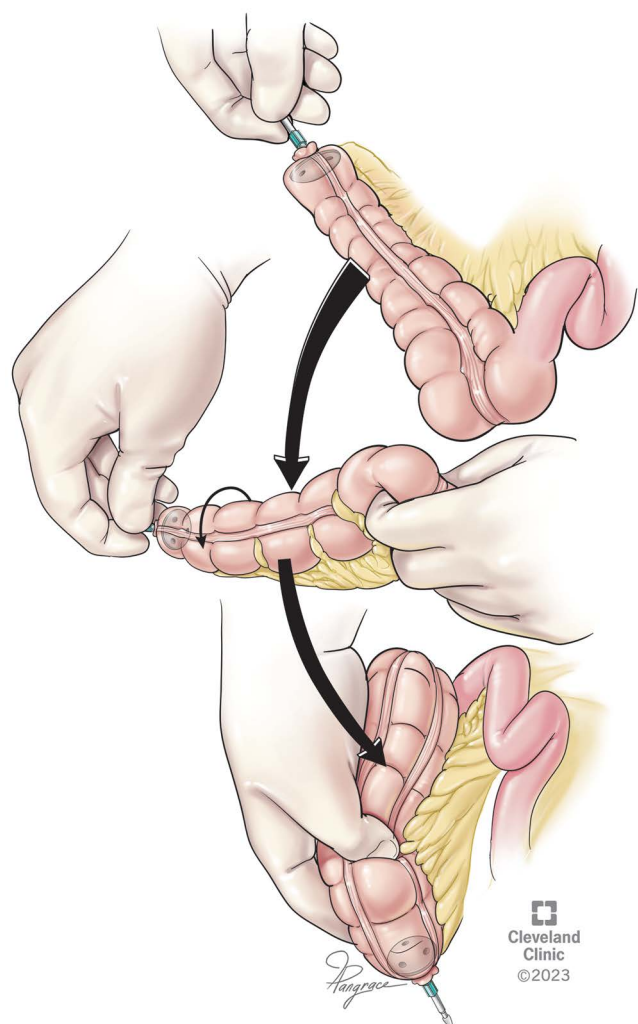
FIGURE 2. Schematic illustration showing the fully mobilized right colon being rotated along the sagittal plane toward the pelvis, as described by Deloyers. Used with permission from the Cleveland Clinic Foundation.

DISCUSSION

Subtotal colectomy with cecorectal anastomosis (cecoproctostomy) has been described since the early 1950s, primarily for carcinomas of the large bowel, polyposis, and diverticulitis.[2] The surgical technique involved removing all colonic segments except the cecum, which was then rotated along the coronal plane for a cecorectal anastomosis. Rosi et al[3] explained that "the cecum is swung over to the midline while it is being rotated in a counterclockwise manner. This is a continuation of the counterclockwise rotation the cecum undergoes in embryonic development and prevents twisting of its mesentery."[3]

In 1958, the Belgian surgeon Lucien Deloyers described the current technique preserving the cecum and the right colon up to the hepatic flexure, followed by counterclockwise rotation along the sagittal plane, allowing for an isoperistaltic anastomosis between the right colon to
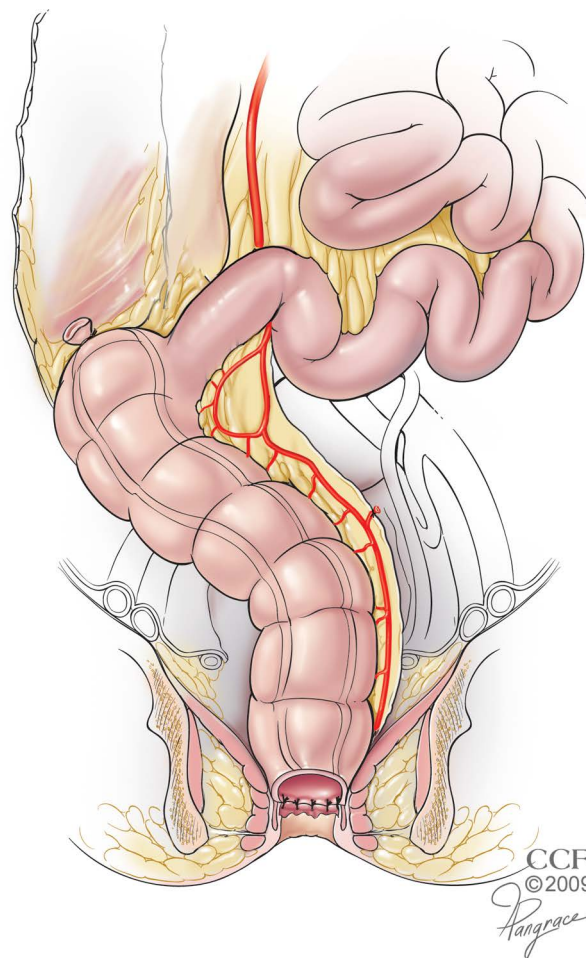
FIGURE 3. Final anatomy of a coloanal anastomosis after Deloyers technique, illustrating the perfusion of the right colon through the ileocolic artery and marginal artery of Drummond. Used with permission from the Cleveland Clinic Foundation.

the rectum or the anus.[1] Deloyers subsequently reported favorable outcomes in 11 patients with various conditions. These cases showed good surgical and functional results, with patients experiencing 1 to 3 bowel movements per day and no instances of leakage or reoperation.[4] Despite these promising results, only a few studies regarding DT were published over the following decades, mostly focusing on children with Hirschsprung disease[5] and slow transit constipation.[6]

In current practice, DT has been largely abandoned for the treatment of constipation, polyposis, or ulcerative colitis, and it is mostly used after chronic anastomotic complications or ischemia of the left colonic conduit detected intraoperatively. To our knowledge, the present study represents the largest series evaluating the surgical results of DT to date. Prior literature comprising case series and retrospective cohort studies in adults is summarized in Table 3.[4,6–17]

Restoring bowel continuity after an extended left hemicolectomy is a challenging situation, and the experienced

TABLE 1. Demographics, indications, and perioperative results (N = 97)

Variable	n (%)
Age, y, mean ± SD	58.8 ± 14
Female	47 (48.5)
BMI, mean ± SD	27.9 ± 6.1
ASA score	
I	0 (0)
II	30 (30.9)
III	61 (62.9)
IV	6 (6.2)
Initial diagnosis	
Colorectal cancer	49 (50.5)
Diverticular disease	21 (21.6)
Ischemic colitis	9 (9.3)
Crohn's colitis	8 (8.2)
Chronic constipation	4 (4.1)
Noncolorectal cancer	3 (3.1)
Sigmoid volvulus	1 (1)
Trauma	1 (1)
Arterial malformation	1 (1)
Previous pelvic radiotherapy	12 (12.4)
Timing of DT	
Index operation	45 (46.4)
Reoperative surgery	52 (53.6)
Access	
Open	80 (82.5)
Laparoscopic	16 (16.5)
Robotic	1 (1)
Type of anastomosis	
Double stapled	83 (85.6)
Handsewn coloanal	10 (10.3)
Turnbull-Cutait	3 (3.1)
Handsewn colorectal	1 (1)
Distance of the anastomosis from the anal verge	
>8 cm	63 (64.9)
≤8 cm	34 (35.1)
Diverting ileostomy	68 (70.1)
Appendectomy	27 (27.8)
Perioperative surgical complications	7 (7.2)
Anastomotic leak	5 (5.2)
Colonic conduit ischemia	1 (1)
Bowel obstruction due to parastomal hernia	1 (1)
Management of early complications	7 (7.2)
Transanal drainage of anastomotic leak	4 (4.1)
Redo DT with Turnbull-Cutait procedure	1 (1)
Resection of ischemic conduit with end ileostomy	1 (1)
Laparotomy and correction of parastomal hernia	1 (1)
Hospital stay, d	9.1 ± 5.4
Perioperative mortality	0 (0)
Late complications	
Anastomotic stricture	6 (6.2)
Chronic leak	2 (2.1)
Management of late complications	
Serial anastomotic dilation	5 (5.2)
Resection of colonic conduit and end ileostomy	2 (2.1)
Needle-knife stricturotomy	1 (1)
Follow-up, mo	82.2 ± 62.4

Data are presented as n (%) unless otherwise indicated.
DT = Deloyers technique.

TABLE 2. Long-term bowel function results of interviewed patients (N = 40)

Variable	n (%)
Average number of daily bowel movements	
≤2	15 (37.5)
2–4	17 (42.5)
≥4	8 (20)
mean ± SD	3.5 ± 3.1
Average number of bowel movements occurring at night	
0	24 (60)
1–2	13 (32.5)
>2	3 (7.5)
mean ± SD	0.5 ± 0.9
Routine use of bowel stoppers	7 (17.5)
No effect on quality of life due to bowel function	21 (52.5)
Able to defer a bowel movement for 5 min	30 (75)
Able to defer a bowel movement for 10 min	25 (62.5)

Data are presented as n (%) unless otherwise indicated.

stomas can have a big impact on patient satisfaction and quality of life and may not be necessary in this scenario. Previous studies have highlighted the importance of avoiding a definitive stoma, which ranks among the top priorities for patients undergoing colorectal surgery.[18] Another option is to create a retroileal window in the mesentery, which was originally described by Toupet et al[19] as an incision in the mesentery to the left of the superior mesenteric artery and was later modified as an incision between the ileocolic artery and the superior mesenteric artery,[20] so that the distal transverse colon can be tunneled down to the pelvis through the mesenteric defect. This relatively simple technique has the advantage of avoiding sacrificing additional large bowel up to the hepatic flexure, which is necessary to perform DT, but it does not solve the issue of a short transverse colon with excessive tension in the mesentery. It is most useful to overcome the small bowel if it is preventing the distal transverse colon from reaching the pelvis. Also, special care should be taken when creating the defect in the mesentery. If the window is excessively large, there is a risk of internal hernias, and if it is too narrow, it may constrict blood flow, leading to strangulation and ischemia of the bowel.

Opting for a total abdominal colectomy with ileorectal anastomosis might appear as the most straightforward approach, given that it is a relatively routine procedure performed by both colorectal and general surgeons. However, this operation involves removing the right colon and the ileocecal valve, which play crucial roles in water absorption and slowing down colonic transit time. You et al[21] demonstrated that patients who had undergone extensive colonic resections had worse results compared to segmental resections in terms of bowel function and quality of life, even after long-term adaptation. Carpinteyro-Espin et al[16] compared 16 patients post-DT with 32 post–total abdominal colectomy with ileorectal anastomosis (TAC-IRA) and

surgeon should be familiar with alternative techniques that will allow the colon to reach the pelvis. Although an end colostomy may be the simplest solution, unplanned

Author	Year	N	Leak rate	Defunctioning stoma	Appen-dectomy	Bowel move-ments per day[a]	Use of bowel stoppers
Deloyers[4]	1964	11	0	0	NR	1–3	NR
Costalat et al[6]	1997	12	0	0	NR	1.2	25%[b]
Shariff et al[7]	2011	3	0	0	100%	2–3	NR
Manceau et al[8]	2012	48	0	65%	0	3	23%
Dumont et al[9]	2013	29	3.4%	31%	NR	NR	NR
Kontovounisios et al[10]	2014	14	0	64.3%	100%	2.1	NR
Sciuto et al[11]	2016	10	10%	10%	NR	2.5	NR
Salgado-Nesme et al[12]	2017	16	0	32%	100%	4	25%
Choi et al[13]	2020	6	0	0	NR	2.5	16.7%
Chen et al[14]	2020	4	0	75%	100%	5	NR
Dux et al[15]	2021	3	0	0	100%	5	NR
Carpinteyro-Espín et al[16]	2022	16	0	31.3%	NR	3.5	15.4%
Dalmau et al[17]	2023	10	20%	0	100%	NR	NR
Sobrado et al	2025	97	5.2%	70.1%	27.8%	3.5	17.5%

TABLE 3. Review of the literature on Deloyers technique

NR = not reported.
[a]Average or range.
[b]Required laxatives.

found that the former group had fewer bowel movements, tenesmus, and use of loperamide. DT also achieved better results in physical pain and general health than TAC-IRA patients.[16] Furthermore, it is crucial to note that patients with a previous low anterior resection are also unsuitable for ileorectal anastomosis. In our series, 35.1% had anastomoses <8 cm from the anal verge and would likely require a completion proctectomy with IPAA, which also carries important implications for bowel function.[22]

There is a range of indications for extended left hemicolectomy. In this series, colorectal cancer and diverticular disease together accounted for more than 70% of cases, which is consistent with other studies evaluating DT.[8,9,11] Less frequent indications were ischemic and Crohn's colitis, both capable of involving the entire left colon, thus compromising the pelvic reach of the residual colonic conduit. Historically, DT was also used to treat chronic constipation, as seen in 4 patients in this study, although this indication has largely been abandoned. Importantly, DT was used in 53.6% of cases during reoperative surgeries, primarily for addressing chronic anastomotic issues and in the context of Hartmann's reversal, with most patients being categorized as ASA III, which indicates a higher operative risk. When DT was used in primary surgeries, it was primarily chosen for cases involving distal transverse or synchronous colon cancer or when vascularization of the colonic conduit was insufficient after ligation of the inferior mesenteric artery. The added complexity of reoperative surgery and the patient profile might have contributed to the observed high incidence of diverting ileostomies in our study (70.1%), which, according to the literature, exhibits a wide variation, ranging from 10% to 75%.[11,14] Lefevre et al[23] evaluated redo colorectal and coloanal anastomosis and reported that in nearly 20% of patients, it was unsuccessful, highlighting the surgical

challenges associated with these procedures. We contend that DT per se is not an indication for a diverting stoma; rather, other elements such as the proximity of the anastomosis to the anal verge, prior pelvic radiotherapy, and specific patient factors such as malnutrition, smoking, and steroid use should be considered, all of which have been previously associated with higher leak rates.[24]

Perioperative morbidity was relatively low, and early surgical complications occurred in 7.2% of patients, including 5 anastomotic leaks, all in patients with low anastomoses and previous pelvic radiotherapy. Most leaks were managed effectively with transanal drainage. However, 1 patient experienced clinical deterioration due to pelvic sepsis and required reoperation for a redo DT combined with a Turnbull-Cutait procedure. Another patient needed conduit resection and end ileostomy due to colonic conduit ischemia. Importantly, there was no perioperative mortality. Late complications occurred in 8.3% of patients and included anastomotic strictures and chronic leaks, which were mostly managed conservatively with serial dilations and needle-knife stricturotomy. Two patients ultimately required colonic conduit resection and end ileostomy. Manceau et al,[8] within their cohort of 48 patients who underwent DT, did not notice any case of anastomotic leak, and only 1 patient developed an anastomotic stricture after prolonged follow-up. In the literature, the rates of pelvic sepsis after colorectal anastomosis are highly variable but may occur in up to 15% of patients.[24]

In general, the most important intraoperative factors contributing to a good anastomosis are the absence of tension and good vascularization. Tension is rarely a problem with DT because after proper rotation of the right colon, it can easily be brought down to the anal canal. Blood supply, however, may be an issue. Because

the technique requires high ligation of the middle colic vessels, the remaining blood supply to the right colon is limited to the ileocolic artery and the right marginal artery of Drummond. Special care should be taken to avoid leaving too much of the transverse colon, which could result in insufficient vascularization and consequently could be more prone to ischemia. Also, improper rotation of the colon, either in a clockwise manner or along the coronal plane, may cause twisting of the ileocolic pedicle and necrosis of the conduit. Testing the marginal arcade for pulsatile blood flow and more recently ICG fluorescence are both useful alternatives to confirm adequate vascularization.[25,26] ICG has the potential advantage of assessing colonic perfusion after the colon has been rotated, ensuring there is no twist of the ileocolic pedicle. Interestingly, despite concerns regarding ischemia and necrosis of the right colon in the early postoperative period, this feared complication is very rarely reported in the literature. To our knowledge, only Mulsow et al[27] reported this finding in a letter to the editor in 2 of 80 patients, although their cohort was never formally published. In our series, 1 elderly patient with clinical comorbidities developed necrosis of the colonic conduit after a right colon-to-anus handsewn anastomosis and was reoperated in the early postoperative period with resection and end ileostomy. Although rare, surgeons should be aware of this complication and ideally assess and ensure good vascularization of the colon also after rotation.

Functional results after colorectal resections are always a concern. In our study, among patients surveyed, 80% experienced fewer than 4 bowel movements daily, 17.5% regularly used loperamide, and the majority (62.5%) could defer a bowel movement for >10 minutes. Interestingly, despite these relatively positive outcomes regarding bowel function, 47.5% of participants felt that their bowel function adversely affected their quality of life. This perception could be attributed to various factors. Adverse outcomes have been linked to low anastomoses, prior pelvic radiotherapy, and repeat surgery due to failed initial anastomosis.[28,29] One-third of the patients in this study had low anastomoses, 12.4% had undergone previous pelvic radiotherapy, and 8.2% were diagnosed with Crohn's disease colitis, all of which can chronically impact bowel function. Univariate analysis revealed that low anastomosis and prior pelvic radiotherapy correlated with having more than 4 bowel movements per day, aligning with existing literature on the subject.[28,29] However, due to the limited sample size, conducting a multivariate analysis was not feasible. Limited studies have examined bowel function outcomes post-DT. Based on the existing literature, patients commonly experience 1 to 3 bowel movements per day, with approximately 1 in 5 requiring loperamide for symptom management, as detailed in Table 3. In comparison, studies on ileorectal anastomosis indicate an
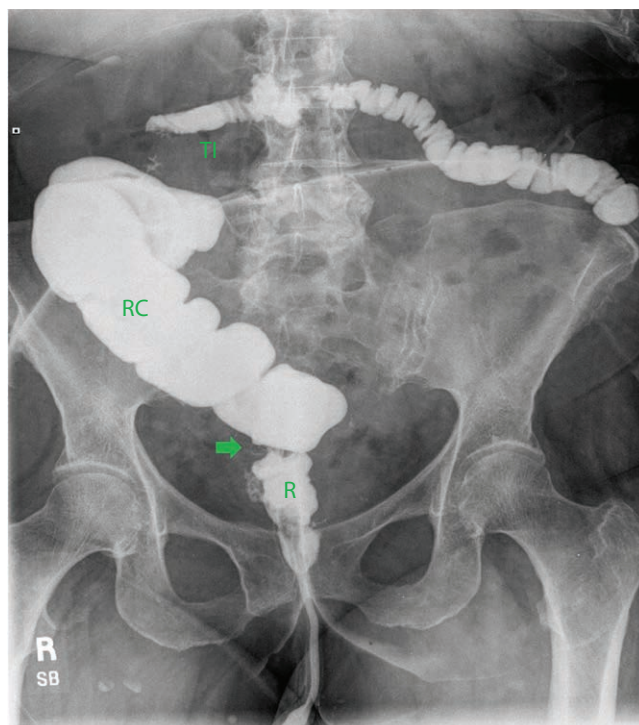
FIGURE 4.   Contrast enema showing the final anatomy after Deloyers technique. The arrow points to the colorectal anastomosis. R = rectum; RC = right colon; TI = terminal ileum.

average of 5 bowel movements per day.[21,30] The removal of the remaining right colon and ileocecal valve, compared to DT, is likely to result in higher bowel frequency, as demonstrated by other authors.[16] However, an ileorectal anastomosis remains a feasible option when compromised blood flow to the right colon is noticed after the ligation of the middle colic artery, provided the rectum remains intact.

A debated aspect of DT involves appendix removal. Traditional teaching suggests that the appendix should be excised because of its repositioning to the right upper quadrant (Fig. 4), potentially complicating the diagnosis of appendicitis at a later stage. In our series, appendectomies were performed in only 27.8% of cases. Although this study did not specifically aim to address appendicitis post-DT, we observed no instances of it during our follow-up period. Given the advancements in diagnostic imaging, especially with CT, and the progress in minimally invasive surgical techniques, the necessity of removing the appendix in the context of DT may be less critical than previously considered.

There are a few limitations that should be noted. This single-institution cohort study encompassed patients who were treated over >25 years. Throughout this long period, perioperative management and technology have evolved, potentially influencing postoperative results. The patient group is heterogeneous, with different pathologies and surgical indications, limiting the interpretations of long-term results. Outcomes after DT can vary based on

primary pathology, the distance of the anastomosis from the anal verge, and pelvic radiotherapy, which should be considered when counseling patients regarding bowel function. In addition, although a more comprehensive and validated questionnaire could have yielded more information, we opted for a concise questionnaire to encourage patient participation and capture the outcomes of a heterogeneous cohort of patients. Despite these limitations, this is the largest series to date to report surgical outcomes and bowel function after DT, providing important insights for surgeons tasked with restoring bowel continuity when the residual colon does not reach the pelvis using conventional techniques.

CONCLUSIONS

DT is a safe and effective alternative for restoring bowel continuity after extended left hemicolectomy with low morbidity and mortality. Postoperative functional results are generally satisfactory, with particularly favorable outcomes noted in patients with higher anastomoses and those who have not undergone prior pelvic radiotherapy. This technique should be part of colorectal surgeons' armamentariums to enable restoration of bowel continuity in complex situations.

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