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Review Article

Deloyers Procedure: A Viable Salvage Technique for Extensive Colorectal Resections

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ABSTRACT

The Deloyers procedure (DP) is a valuable but underutilized technique that may serve as an alternative to total colectomy, enabling restoration of bowel continuity after extensive left-sided colonic resections. The procedure is technically demanding, requiring mobilization of the right colon and counterclockwise rotation by 180° to achieve a tension-free colorectal or coloanal anastomosis. The Deloyers procedure maintains the bowel's absorptive capacity and leads to superior functional results, such as improved stool consistency. This narrative review aims to popularize the Deloyers procedure among the surgical fraternity by examining its historical background, clinical indications, surgical technique, potential complications, and functional outcomes.

Key words: Deloyers procedure, extended left hemicolectomy, anastomosis, colonic derotation, colon transposition, colectomy

INTRODUCTION

Deloyers procedure (DP), also known as colonic derotation or right colon transposition, is a surgical technique used to restore bowel continuity by creating a tension-free anastomosis (surgical connection) between the right colon and the rectum after extended resections of the left and transverse colon. [1–3] It is an effective alternative to total colectomy with ileorectal anastomosis, as it preserves more bowel length and the ileocecal valve, leading to generally satisfactory functional outcomes. [4]

Their technique remains underused, with limited data on long-term outcomes, and there is inadequate awareness among practicing surgeons. [2] Therefore, the objective of the present review is to provide insight into this procedure to general and colorectal surgery practitioners and students.

METHODS

A comprehensive search of PubMed and Google Scholar was conducted in October 2025 using the key terms "Deloyers procedure," "colonic derotation," and "right colon transposition" to draft this narrative review. To ensure a thorough evaluation of the historical background, indications, surgical technique, and outcomes, the following methodology was employed.

Inclusion Criteria

Peer-reviewed case reports, case series, and original research articles in the English language were included.

Exclusion Criteria

Articles where the primary focus was on standard total colectomy without derotation or else were in languages other than English were excluded.

Screening Process

Relevant articles were initially screened by title and abstract, followed by a full-text evaluation to confirm their relevance.

Time Frame

No specific time frame was defined for the literature search to allow for a complete historical perspective, spanning from the procedure's introduction in 1964 to recent data from 2025.

HISTORICAL BACKGROUND

DP was first presented by a Belgian surgeon, Lucien Deloyers, in 1964. [1] In Deloyers' initial series, this procedure was performed on 11 patients ranging in age from 17 to 44 years and suffering from ulcerative colitis, dolichocolon, megacolon, and polyposis coli. The procedure has since been reported in the peer-reviewed literature as a viable salvage procedure in cases requiring extensive colonic resection, and over the years, several modifications have been presented.

The DP was first described in 1964 by Belgian surgeon Lucien Deloyers. In his seminal series, Deloyers applied the technique to 11 patients, aged 17 to 44 years, who presented with diverse pathologies including ulcerative colitis, dolichocolon, megacolon, and polyposis coli. [1] While originally conceived for these conditions, the procedure has since evolved into a versatile salvage maneuver for any clinical scenario requiring an extended colonic resection where traditional anastomosis is not feasible.

Over the subsequent decades, the technique has undergone several refinements. Recent modifications, ranging from the transition to minimally invasive (laparoscopic and robotic) approaches to the integration of intraoperative perfusion monitoring, have reinforced its status as a reliable alternative to total colectomy, allowing for the preservation of the right colon and ileocecal valve across a broader range of indications. [2–8]

INDICATIONS

The DP is primarily indicated when restoration of intestinal continuity is required after an extended left-sided colonic resection and a conventional colorectal or coloanal anastomosis cannot be achieved without tension. [2] The most common indications (**Table 1**) are as follows.

Elective Adult Indications

Malignancy: Extensive left-sided colorectal cancer requiring transverse colon excision, or multiple synchronous or metachronous colorectal cancers.

Inflammatory: Severe diverticular disease requiring extensive left colic resection

***Vascular and technical salvage*:** Ischemia of the mobilized colon following inferior mesenteric artery ligation, or reversal

Table 1: Summary of clinical studies and case reports on the Deloyers procedure (2020–2025).

Series	Year	Number of cases/ gender	Age (years)	Indications	Postoperative complications	Bowel movements per day
Cipriani et al. [19]	2025	1/F	1	Hirschsprung disease	None	1
Song and Lee [20]	2025	1/F	79	Cancer of the transverse colon extending into the stomach wall	Perisplenic collection	N
Ceylan [5]	2024	1/F	22	Abdominal firearm injury	None	2
Arevalo-Guerra and Obando-Rodallega [7]	2023	1/F	60	Hartman reversal	None	N
Di Saverio et al. [14]	2022	1/F	67	Extended left colectomy for proximal descending colon cancer	None	N
Dux et al. [21]	2021	3/ 2M1F	71 (mean)	a) Diverticulitis, b) Synchronous colon cancer, c) Hartmann reversal	Surgical site infection	5
Lin [22]	2021	1/M	70	Synchronous colon cancer	None	N
Choi et al. [23]	2020	6/3M3F	74 (mean)	a) Sigmoid colon cancer with left colon ischemic colitis, b) left colon necrotizing ischemic colitis, c) rectosigmoid cancer	Paralytic ileus, acute urinary retention	2–3
Okamoto et al. [11]	2020	1/M	50	Synchronous colon cancer	None	N
Chen et al. [24]	2020	4/2M2F	60 (mean)	a) Recurrent colon cancer, b) Extended left colectomy, c) Previous rectal surgery, d) Intraoperative left colon ischemia after IMA ligation.	Intraoperative presacral bleeding, surgical site infection	N

N: not reported; IMA, inferior mesenteric artery; IMA, inferior mesenteric artery.

of Hartmann's procedure when the remaining colon is insufficient for a standard anastomosis.

Pediatric Indications

In the pediatric population, the procedure has been reported for restoration of bowel continuity after wide excision of the colon for mostly congenital or genetic disorders, including:

- Long-segment Hirschsprung's Disease
- Dolichocolon
- Polyposis coli.

Emergent

While the DP is predominantly elective, its utility in acute settings has been demonstrated in cases of extensive abdominal trauma. For instance, a 2024 report described the successful use of the technique in a 22-year-old female following a firearm injury that necessitated an extended colon resection. [5] The procedure facilitated a restorative approach rather than a permanent stoma, with the patient achieving an uneventful recovery and maintaining a frequency of two bowel movements per day at the 6-month follow-up. No anastomotic strictures were detected during subsequent colonoscopy.

SURGICAL-TECHNIQUE

The DP is traditionally performed via open surgery; however, recent literature confirms that laparoscopic and robot-assisted approaches are feasible and safe for trained surgical teams. [6–10] The procedure is technically demanding and requires meticulous execution to ensure conduit viability.

Mobilization and Preparation

Small bowel mobilization: The entire right colon and the small bowel mesentery must be completely mobilized up to the level of the duodenum. [5–10]

Vascular management: The right and middle colic vessels are sectioned to allow for adequate mobility. [5–10] In partial DPs, the middle colic vessels are preserved to enhance vascular safety.

Pedicle preservation: Crucially, the ileocolic pedicle must be retained to maintain the primary blood supply to the colonic conduit.

Appendectomy: While the original technique retained the appendix, performing a prophylactic appendectomy (ligated or stapled) is now widely recommended to avoid future diagnostic confusion due to the organ's new ectopic, subhepatic position. [5–8]

Colonic Derotation and Anastomosis

Rotation: The remaining colon is rotated 180° counter-clockwise around the axis of the ileocolic pedicle.

Anatomical realignment: Following rotation, the cecum is positioned in the subhepatic space with its anterior surface facing the retroperitoneum. The posterior surface of the right mesocolon becomes anterior, lying within the right paracolic gutter. [10]

Perfusion assessment: Traditionally, vascular perfusion is assessed by inspecting pulsatile flow; however, indocyanine green fluorescence is increasingly used for objective confirmation of conduit viability. [11]

Tension-free anastomosis: This maneuver provides sufficient length to reach the rectum or anus for a tension-free anastomosis. [8–10]

Anastomotic protection: In many cases (approximately 70%), a diverting loop ileostomy is created to protect the anastomosis during the initial healing phase. [2]

APPENDECTOMY DURING DP

In the original version of DP (**Figure 1**), the appendix was retained, as the procedure preserves the cecum and the ileocolic artery. Many contemporary surgeons still follow the same scheme. [8, 9, 12–14] However, lately, appendectomy has gained greater acceptance. [5] The primary reason is the altered anatomy resulting from the procedure, wherein the appendix acquires an ectopic position, and if the patient were to develop appendicitis in the future, the pain may be present in the right upper quadrant instead of the right iliac fossa, resulting in potential diagnostic delay. Additionally, accessing an inflamed appendix in the subhepatic space can be technically challenging later on.

The appendectomy is usually carried out before the colon's rotation and the final anastomosis, but after the right colon has been fully mobilized and the vascular pedicles (right

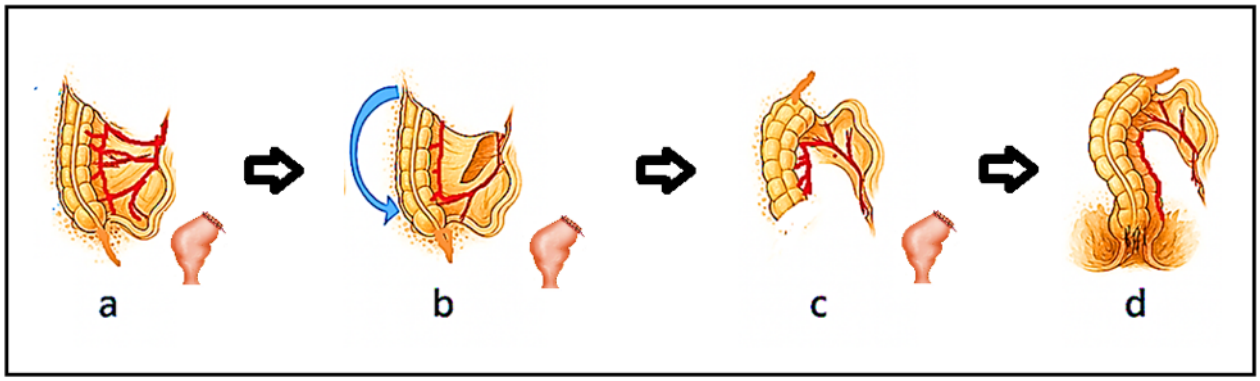

Figure 1: Schematic diagram of the Deloyers procedure. (a) Complete mobilization of the right colon. (b–c) 180° counter-clockwise rotation along the axis of the ileocolic vascular pedicle. (d) Final tension-free ileorectal anastomosis with the cecum positioned in the subhepatic space.

and middle colic vessels) have been divided. Standard appendectomy methods (ligated or stapled) are employed. The ample blood supply at the base of the cecum ensures that the appendiceal stump heals efficiently since the ileocolic artery is maintained to supply the conduit.

OUTCOMES

The DP is generally considered safe and effective. [5–15]

Low Anastomotic Leak Rate

Anastomotic leakage is a key concern in colorectal surgery. In the comprehensive analysis of 97 cases and literature review, Sobrado detected early or late leak in only 7 (7.2%) cases. [2] This leak rate compares favorably with reported leak rates following ileorectal anastomosis in similar clinical settings.

Good Functional Results

Long-term bowel function is generally satisfactory, with many patients reporting solid stool consistency and three to four daily bowel movements. This is better than the functional results that ileorectal anastomosis frequently produces.

Preservation of Quality of Life

It contributes to maintaining quality of life (QOL) by protecting the ileocecal valve and more of the colon's absorptive capacity. In the study by Sobrado, 52% of patients felt that their QOL improved after the DP. [2]

COMPLICATIONS

While safe, the procedure carries potential risks inherent to major surgery. The procedure is technically demanding and requires experienced colorectal surgeons to execute meticulously. The complications mentioned in the literature (**Table 1**) include colonic conduit ischemia, surgical site infection, anastomotic leak, paralytic ileus, acute urinary retention, strictures, and intraoperative bleeding. [2, 3]

Law and Lo have reported a rare case of rectal prolapse in a 28-year-old patient who had undergone DP at the age of 2 years for Hirschsprung's disease. [15] The patient refused surgical intervention for 11 years for fear of sexual dysfunction, and was operated on at the age of 39 years. Peroperatively, an isoperistaltic colorectal anastomosis was found at the peritoneal reflection, and the right colon was found to be rotated and freely mobile with a long mesentery. It was determined that the patient's rectal prolapse was an anal protrusion of this colorectal anastomotic intussusception, consistent with a previous Deloyers surgery.

COMPARATIVE STUDIES

The functional results following DP and the extended right colectomy with an ileo-sigmoid anastomosis were examined by Schabl et al. [16] Their study aimed to determine whether preservation of the ileocecal valve in Deloyers' procedure makes any significant difference. They concluded that patients who had Deloyers' operation had similar morbidity, function, and QOL to those who had an extended right hemicolectomy, and that there was no mortality. The two groups had two and three bowel movements, respectively. The group that underwent an extensive right hemicolectomy had a 4% mortality rate.

Schabl et al. also compared the safety and functional outcomes of DP and the retroileal window technique (RIWT) in a retrospective cohort analysis. [17] Complications, bowel function as reported by the patient, and QOL as measured by validated questionnaires were the primary outcomes. The study concluded that after the extended left hemicolectomy, tension-free anastomosis can be achieved safely and effectively with RIWT as well as Deloyers' procedure. The procedure to be adopted should be based on intraoperative findings and the surgeon's experience due to the similar rates of complications and functional outcomes.

A 2023 study by Carpinteyro-Espín et al. demonstrated that by preserving the right colon and ileocecal valve, patients experienced significantly fewer daily bowel movements ($P = 0.01$) and reduced instances of tenesmus compared to ileorectal anastomosis cohorts. [18] Furthermore, DP patients reported significantly better QOL scores in categories of physical pain and general health, establishing the procedure not just as a technical salvage option, but as a preferred restorative strategy for long-term patient well-being.

BRIEF REVIEW OF RECENT LITERATURE

A chronological summary of the DP literature (2020–2025) is presented in **Table 1**, highlighting patient profiles, surgical indications, and postoperative functional recovery.

CONCLUSIONS

The DP remains a feasible and safe technique for achieving a tension-free colorectal anastomosis following extensive left colonic resections. The procedure provides superior functional outcomes and a measurably improved QOL for carefully selected patients by preserving the right colon and the ileocecal valve. However, its successful execution is technically demanding and requires meticulous implementation by experienced colorectal surgeons.

There is a clear need to popularize this technique within the surgical fraternity to ensure its benefits reach the appropriate patient populations. Greater awareness and formal training in the DP may expand reconstructive options, potentially reducing the rate of total colectomies. In the future, the integration of minimally invasive approaches and objective perfusion assessments, such as indocyanine green guidance, will further refine the safety and reliability of this valuable salvage technique.

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The author would like to acknowledge the use of digital drawing software and online AI tools in the creation and refinement of (**Figure 1**). These tools were utilized specifically to enhance the color, sharpness, and anatomical clarity of the original manual sketches to ensure the technical steps of the colonic derotation are accurately represented for the reader.

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CONFLICTS OF INTEREST

None.

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