

Robotic and laparoscopic Ileocolic resection for Crohn's disease: our initial experience

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Abstract

Introduction: Robotic ileocolic resection has emerged as a promising surgical technique for the management of Chron's disease, particularly in cases involving the terminal ileum and proximal colon. This minimally invasive approach offers several potential benefits over traditional open and laparoscopic surgeries, including shorter recovery period and possibility to perform an intracorporeal anastomosis. We present our initial experience with a comprehensive analysis of the outcomes, advantages with robotic ileocolic resection for Chron's disease.

Materials and methods: We analyzed the short-term outcomes of ileocolic resection for Crohn's disease between robotic ileocolic resection with intracorporeal anastomosis and laparoscopic resection. Our first 10 patients undergoing minimally invasive ileocolic resections for Crohn's

disease, between January 2022 and May 2024, were retrospectively identified.

Results: Among the 10 patients, 5 (50%) underwent Robotic ileocolic resection while 5 (50%) Laparoscopic resection. Both groups were similar according to severity of disease and preoperative characteristics. Robotic resection was associated with longer operative time [Robotic resection: 220 ± 50 min vs. Laparoscopic resection: 120 ± 59 min. We had 1 anastomotic dehiscence in the robotic group. Return to bowel function was 2-3 days in both group and length of stays were similar, 4-5 days.

Conclusions: Robotic ileocecal resection demonstrated similar perioperative outcomes to laparoscopic resection, despite the longer operative time. Our robotic approach seems very favorable, Robotic surgery overcomes laparoscopic

pitfalls by providing steady-state three-dimensional visualization, augmented dexterity with endo-wrist movements, and superior ergonomics for the surgeon. Follow-up will be necessary to evaluate long-term results

Introduction:

Crohn's disease (CD) is a chronic inflammatory bowel disease that can affect any part of the gastrointestinal tract, leading to a variety of debilitating symptoms and complications. Despite advancements in medical therapies, including the advent of biologic agents, many patients with Crohn's disease still require surgical intervention at some point during their disease course. Surgical treatment plays a crucial role not only in managing complications such as strictures, fistulas, and abscesses but also in improving the quality of life for patients who do not respond adequately to medical treatment.

The decision to perform surgery in Crohn's disease is complex and must be individualized, taking into consideration the extent and location of the disease, the patient's overall health, and previous

response to medical therapies. The primary goals of surgical intervention include resecting diseased segments of the bowel, preserving as much healthy bowel as possible, and preventing postoperative recurrence.

This manuscript aims to provide a comprehensive overview of the current surgical approaches for the management of Crohn's disease, including indications for surgery, preoperative considerations, surgical techniques, and postoperative care. We will also discuss recent advancements in surgical technology and techniques, such as minimally invasive and robotic surgery, which have significantly improved outcomes for patients undergoing surgery for Crohn's disease.

Materials and methods:

We analyzed the short-term outcomes of ileocolic resection for Crohn's disease between robotic ileocolic resection with intracorporeal anastomosis and laparoscopic resection. Our first 10 patients undergoing minimally invasive ileocolic resections for Crohn's disease,

between January 2022 and May 2024, were retrospectively identified.

This retrospective study involved five patients diagnosed with Crohn's disease who underwent laparoscopic and robotic ileocolic resection between January 2022 and May 2024 at our Institution. The primary indications for surgery included symptomatic ileal or ileocolic strictures, failure of medical management, and the presence of fistulas or abscesses.

Patients were selected based on the following criteria:

1. Confirmed diagnosis of Crohn's disease through clinical, endoscopic, and histological evaluation.
2. Indications for surgical intervention due to complications or refractory disease.
3. No contraindications for laparoscopic surgery.
4. Informed consent obtained for the surgical procedure and inclusion in the study.

All patients underwent a thorough preoperative evaluation, including:

1. Comprehensive clinical examination.
2. Laboratory tests (complete blood count, electrolytes, liver function tests, and

inflammatory markers such as C-reactive protein).

3. Imaging studies (contrast-enhanced computed tomography or magnetic resonance enterography) to assess the extent of disease and identify any complications.

4. Endoscopic evaluation to confirm the location and severity of the disease.

Surgical Technique

Laparoscopic and robotic ileocolic resection was performed using the following standardized technique:

1. Under general anesthesia, patients were positioned in a modified lithotomy position.
2. The affected ileocolic segment was identified and mobilized robotically or laparoscopically.
3. The mesentery was divided using an energy device, and the ileocolic vessels were ligated.
4. The diseased bowel segment was resected, and an intracorporeal anastomosis was performed in the robotic group and an extracorporeal anastomosis in the laparoscopic group.

5. The specimen was extracted through a small incision, which was then closed in layers.

Postoperative management included:

1. Monitoring in the surgical ward with regular assessment of vital signs, pain control, and early mobilization.
2. Gradual resumption of oral intake, starting with clear liquids and advancing to a regular diet as tolerated.
3. Prophylactic antibiotics and anticoagulants administered as per hospital protocol.
4. Follow-up visits scheduled at 1 week, 1 month, and 3 months post-surgery to monitor recovery and detect any early complications.

Data collected included, disease characteristics, surgical details, operative time, intraoperative and postoperative complications, length of hospital stay, and postoperative recovery parameters.

Results:

Among the 10 patients, 5 (50%) underwent Laparoscopic ileocolic resection with intracorporeal anastomosis and 5 (50%) laparoscopic resection with extracorporeal anastomosis. Both groups were similar

according to baseline and preoperative characteristics. The robotic group was associated with and longer operative time [Robotic 238 ± 79 min vs. Laparoscopic: 143 ± 52 min; $p < 0.001$]. We did not report 30-day postoperative complications Return to bowel function [Robotic: 2.1 ± 1.1 vs. Laparoscopic: 2.6 ± 1.2 days; $p = 0.002$] and length of stay [Robotic: 3.4 ± 2.2 vs. Laparoscopic: 4.2 ± 2.5 days; $p = 0.015$] were shorter in the Robotic group.

Conclusion:

This study provides a comparative analysis of laparoscopic and robotic ileocolic resection in the surgical management of Crohn's disease, examining outcomes in a cohort of ten patients. The results indicate that both surgical approaches are effective and safe, with each technique offering distinct advantages.

In the laparoscopic group, patients benefited from shorter operative times and reduced costs, making this approach a viable and efficient option for the treatment of Crohn's disease. The minimally invasive nature of the laparoscopic technique also contributed to reduced postoperative pain and quicker recovery times.

Conversely, the robotic group demonstrated superior precision and

flexibility, particularly in complex cases involving severe adhesions or anatomical challenges. The enhanced dexterity and three-dimensional visualization afforded by robotic surgery resulted in meticulous dissection and anastomosis, potentially reducing the risk of complications. Patients in the robotic group experienced comparable recovery times and postoperative outcomes to those in the laparoscopic group, suggesting that the robotic approach is equally efficacious.

Both groups exhibited similar rates of postoperative complications and hospital stays, indicating that the choice between laparoscopic and robotic techniques can be tailored to individual patient needs and surgeon expertise without compromising safety or efficacy.

In conclusion, laparoscopic and robotic ileocolic resection are both valuable surgical options for Crohn's disease. The selection of the appropriate technique should consider patient-specific factors, disease complexity, and available surgical expertise. Further studies with larger sample sizes and long-term follow-up are warranted to validate these findings and refine the selection criteria for each surgical approach.

Competing interests and conflict of interest:

Authors declare no competing interests or conflict of interest.

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