



Expanding the Frontier of Minimally Invasive Surgery: Single-Port Robotic Right Colectomy for an Adenomatous Polyp

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Abstract

Large or lateral-spreading colorectal adenomas may be unsuitable for complete endoscopic resection, requiring surgical management. Advances in minimally invasive surgery have led to the development of single-port robotic platforms designed to minimize abdominal wall trauma while maintaining surgical precision. A 62-year-old female was found on screening colonoscopy to have a large lateral-spreading adenomatous lesion of the ascending colon that was not amenable to endoscopic removal. She underwent a single-port robotic-assisted right colectomy through a periumbilical incision. The procedure was completed without complications, with minimal blood loss and rapid postoperative recovery. Final pathology demonstrated a benign serrated adenomatous lesion with negative margins. Single-port robotic-assisted right colectomy represents a safe and feasible option for carefully selected patients with benign or premalignant colonic lesions. This approach may offer advantages in postoperative recovery, pain control, and cosmetic outcomes.

Introduction

Colorectal adenomas are commonly identified during routine screening colonoscopy and represent a key opportunity for colorectal cancer prevention. Tubular adenomas are the most frequently encountered subtype and arise through the well-described adenoma-carcinoma sequence, a gradual process driven by cumulative genetic alterations that may ultimately progress to invasive colorectal cancer if left untreated [1,2]. While most adenomas can be safely and effectively removed endoscopically, larger lesions with lateral-spreading morphology or extensive mucosal involvement present technical challenges that limit complete endoscopic resection and increase the risk of residual disease or recurrence [3]. In such cases, surgical resection remains the most reliable approach to achieve definitive excision and accurate histopathologic assessment.

Advances in minimally invasive colorectal surgery have increasingly focused on reducing operative trauma while preserving surgical precision and oncologic integrity. Multi-port laparoscopic and robotic colectomies are now well established and have demonstrated outcomes comparable to open surgery, with additional benefits including reduced postoperative pain, shorter hospital stays, and faster functional recovery. However, these techniques still require multiple abdominal incisions, each contributing to cumulative abdominal wall trauma, postoperative discomfort, and visible scarring [4].

Single-port robotic surgery represents a further evolution of minimally invasive colorectal techniques. By consolidating the camera and working instruments through a single incision, most often concealed within the umbilicus, this approach aims to minimize abdominal wall disruption while maintaining the enhanced visualization, dexterity, and precision afforded by robotic platforms. Emerging evidence suggests that single-port robotic colectomy achieves comparable resection margins and lymph node yields to multi-port approaches, with potential advantages including reduced postoperative pain, earlier return of bowel function, shorter hospital stays, and improved cosmetic satisfaction [5-8]. Despite these advantages, single-port robotic colectomy remains technically demanding and requires appropriate patient selection and surgical expertise.

Case Presentation

A 62-year-old female was referred for surgical evaluation after a screening colonoscopy revealed a lateral-spreading tubular adenoma of the ascending colon. The lesion demonstrated broad

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mucosal extension with root involvement in multiple areas, making it unsuitable for complete endoscopic removal. The patient denied changes in her bowel habits, abdominal pain, or weight loss. Her past medical history included breast cancer treated with lumpectomy and Hashimoto's thyroiditis, well-controlled on levothyroxine. She had no significant family history of colorectal cancer or polyposis syndromes.

Given the size and morphology of the lesion, the decision was made to proceed with a single-port robotic-assisted right colectomy. This approach was chosen to achieve complete resection while minimizing surgical trauma, facilitating rapid postoperative recovery, and optimizing cosmetic appearance. Under general anesthesia, a 2.5 cm periumbilical incision was made, and using the da Vinci robotic system, a singular site introduced access to a camera and three multi-jointed robotic instruments. The patient was positioned supine with the right side elevated and the operating table in slight Trendelenburg. Following docking of the robotic system, the right colon was mobilized and the ileocolic vessels were ligated and divided with excellent visualization and precision. The specimen, including the terminal ileum, cecum, and ascending colon were extracted through the same one incision. The gross pathological examination of the right colectomy specimen revealed a sessile serrated lesion of the ascending colon. Resection margins were negative for dysplasia or carcinoma.

The total operative time was 165 minutes and was completed without complications and with a minimal estimated blood loss of less than 50 mL. The patient recovered well, experiencing only mild postoperative discomfort managed with non-opioid analgesia. She tolerated liquids within hours of surgery, ambulated the same day, and was discharged after 24 hours of observation. During her brief hospitalization, she maintained stable vitals and a net urine output of 360 mL. At a follow-up visit two weeks later, the patient reported minimal pain, rapid return to normal activity, and satisfaction with the single hidden umbilical scar.

Discussion

Tubular adenomas are the most common subtype of colorectal adenomatous polyps, accounting for approximately 70% to 85% of all adenomas detected during colonoscopy [1]. These lesions arise from dysplastic proliferation of glandular epithelium and are considered precancerous within the adenoma–carcinoma sequence, a stepwise progression driven by mutations in APC, KRAS, and TP53 [2]. The risk of malignant transformation correlates with adenoma size greater than 1 cm, villous architecture, and degree of dysplasia [2]. While smaller tubular adenomas can typically be removed endoscopically, large or lateral-spreading variants are more difficult to resect and are associated with higher recurrence rates or risk of submucosal invasion [3]. Surgical resection is therefore often indicated to ensure complete excision and accurate pathological evaluation.

Over the past decade, minimally invasive colectomy has evolved from conventional laparoscopy to multi-port robotic approaches and, more recently, to single-port robotic platforms designed to further reduce abdominal wall trauma [4]. A systematic review and meta-analysis comparing single-incision laparoscopic surgery with conventional multi-port laparoscopic surgery for colorectal cancer

demonstrated shorter incision length, reduced postoperative pain, faster recovery, and improved cosmetic satisfaction with single-incision techniques [5]. Additional studies have shown that single-port robotic colectomy achieves comparable lymph node yield and margin status to multi-port approaches, with reduced postoperative analgesic use and faster return of bowel function despite longer operative times [6-8].

Despite these promising findings, single-port robotic surgery presents technical challenges, including limited working space and a steep learning curve, particularly in patients with obesity, dense adhesions, or bulky tumors [7]. In the present case, careful patient selection allowed the benefits of single-port robotic surgery to be realized, resulting in minimal postoperative pain, rapid ambulation, early dietary tolerance, and discharge within 24 hours—outcomes consistent with existing literature [6-8].

Conclusion

This case highlights the use of a single-port technique in robotic-assisted right colectomy and supports its role as a safe and feasible surgical option for selected patients with colonic lesions that are not amenable to endoscopic resection. In this patient, the single-port approach achieved complete resection with negative margins, minimal blood loss, and an uncomplicated postoperative course marked by rapid recovery. Although patient selection and surgeon experience remain important considerations, single-port robotic surgery represents a significant advancement in minimally invasive colorectal surgery by further reducing abdominal wall trauma while maintaining surgical outcomes. Additional studies and case series are needed to further define the role of this technique, evaluate outcomes across a broader range of pathologies, and compare its efficacy to conventional multi-port approaches.

References

1. Corley DA, Levin TR, Doubeni CA, Zhao WK, Lee JK, Zauber AG, et al. Adenoma detection rate and risk of colorectal cancer and death. *N Engl J Med.* 2014;370(14):2539-46.
2. Leggett B, Whitehall V. Role of the serrated pathway in colorectal cancer pathogenesis. *Gastroenterology.* 2010;138(6):2088-100.
3. Leslie A, Carey FA, Pratt NR, Steele RJ. The colorectal adenoma–carcinoma sequence. *Br J Surg.* 2021;108(8):632-44.
4. Lynch A, Zarate PC, Messaris E. Single-site laparoscopic colorectal surgery: past, present, and future. *Ann Laparosc Endosc Surg.* 2025;10:1-10.
5. Yuan Y, Jian J, Jing H, Yan R, You F, Fu X, et al. Single-incision vs conventional laparoscopic surgery for colorectal cancer: an update of a systematic review and meta-analysis. *Front Surg.* 2021;8:704986.
6. Kim HS, Oh BY, Chung SS, Ryung-Ah L, Noh GT. Short-term outcomes of single-incision robotic colectomy versus conventional multi-port laparoscopic colectomy for colon cancer. *J Robot Surg.* 2023;17(5):2351-9.
7. Choi MS, Yun SH, Lee SC, Shin JK, Park YA, Huh J, et al. Learning curve for single-port robot-assisted colectomy. *Ann Coloproctol.* 2022;38:456-64.
8. Kim HJ, Lee KY, Park JS. Comparison of the efficacy and safety of single-port versus multi-port robotic colectomy for colon cancer. *Surgery.* 2024;176:1023-32.