



Comparison between Endoloop-Assisted Endoscopic Resection and Endoscopic Submucosal Dissection for Large Pedunculated Polyps

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J Digest Endosc 2024;15:211–215.

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Abstract

Background Endoscopic resection of large pedunculated colorectal polyps with a thick stalk is technically difficult. Endoloop-assisted endoscopic resection and endoscopic submucosal dissection have been confirmed to be effective and safe, respectively. Here, we compared the efficacy and safety of these two different methods.

Methods In total, 124 patients with large pedunculated polyps treated by endoloop-assisted endoscopic resection (group B) or endoscopic mucosal resection (group A) were enrolled in the study.

Results There were two cases of immediate postpolypectomy bleeding and one case of delayed postpolypectomy bleeding in group A, while there were four cases of immediate postpolypectomy bleeding and 0 case of delayed postpolypectomy bleeding in group B. There was no significant difference in postpolypectomy bleeding between the two groups ($p = 0.68$ and 1.0). The mean operation time in group A was 29.31 ± 5.64 minutes, which was significantly longer than that in group B ($p < 0.001$). The mean hospitalization time in group A was 7.14 ± 1.1 days, but in group B it was 5.98 ± 1.18 days ($p < 0.001$). In addition, the number of clips used in group A was 5.58 ± 1.3 , which was also more than that in group B ($p < 0.001$).

Conclusions Endoloop-assisted endoscopic resection is effective and safe for the removal of large pedunculated polyps, while endoscopic submucosal dissection may be an alternative option for difficult areas with poor visibility or polyps with large or lobulated head.

Keywords

- ▶ endoloop-assisted endoscopic resection
- ▶ endoscopic submucosal dissection
- ▶ large pedunculated polyps

Introduction

In the past few decades, colonoscopic polypectomy has become an effective tool for preventing colorectal cancer,^{1,2} and most polyps can be removed under colonoscopy instead of surgery. In total, 76 to 90% reduction in incidence of colon cancer and 53% reduction in cancer-related mortality are attributed to colon polypectomy.^{1,3} However, complications

including bleeding, perforation, and postpolypectomy coagulation syndrome can be observed during this procedure.^{4–7}

According to some research, postpolypectomy bleeding (PPB) is the most common complications of colonoscopic polypectomy, with an incidence ranging from 0.3 to 6.1%.⁸ The incidence of PPB after resection of large pedunculated polyps can reach up to 15% due to the large feeding vessels traversing the stalk.^{9–12} Therefore, several preventive

article published online
November 6, 2024

DOI <https://doi.org/10.1055/s-0044-1792131>.
ISSN 0976-5042.

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methods including injection adrenaline or epinephrine to the stalk as well as application of endoloop or hemoclip have been developed.^{13–16} Effective comparisons between these preventive methods have been carried out. Kouklakis et al found that endoloop and hemoclip were more effective than adrenaline injection alone in preventing bleeding complication.¹¹ The application of a prophylactic clip was as effective and safe as an endoloop in the prevention of PPB.¹⁶ However, the use of endoloop is technically more difficulty than hemoclip application, especially in the left colon.^{15,16} Underwater endoloop-assisted endoscopic resection was performed to solve this difficult problem, but this method still needs further research to verify its effectiveness and safety.¹⁷ Besides, endoscopic submucosal dissection (ESD) has also been proven to be safe and effective for resection of large pedunculated polyps.¹⁸ However, there has been no study evaluating the effectiveness and safety of endoloop-assisted endoscopic resection and ESD. The aim of the present study was to compare the effectiveness and safety of endoloop-assisted endoscopic resection and ESD in patients with large pedunculated colorectal polyps.

Patients and Methods

Patients

This study was a single-center retrospective study in Jiangsu Province Hospital of Traditional Chinese Medicine. We retrospectively analyzed 124 patients with large pedunculated polyp (≥ 15 mm in head diameter, ≥ 5 mm in stalk diameter, and ≥ 5 mm in stalk length) treated at our digestive endoscopy center from 2014 to 2024 year. One hundred and twenty-four patients were divided into two groups: group A received ESD (62 cases) and group B received endoloop-assisted endoscopic resection (62 cases).

Ethics Statement

This study was approved by the Ethics Committee of Affiliated Hospital of Nanjing University of Chinese Medicine, Nanjing, China, and written informed consent was obtained from all participants.

Endoloop-Assisted Endoscopic Resection and ESD Procedure

All procedures were performed by experienced doctors from our center. The compositions of an endoloop system include an operating part and an attached loop. The loop is retracted inside the plastic sheath for insertion through the accessory channel of the colonoscope before operation. The polyp was adjusted to the six o'clock position on the screen by manipulating the colonoscope. After the loop had been extended and applied at the base of the stalk, it was tightened around the stalk by sliding the stopper. After the color of the polyp head changed to dark red, the loop was detached from the operating part. Then, we used a diathermic snare to sever the stalk of the polyp above the tightened loop by electrosurgical coagulation current (**Fig. 1**).

ESD was performed by experienced endoscopists in our center. After injecting 0.01% adrenaline melamine injection, a mucosal flap was created at the anal side by a DualKnife (KD-650L; Olympus) with a VIO 300D high-frequency generator (ERBE, Tübingen, Germany), following which the dissection proceeded to the center of the polyp. Finally, the circumferential mucosal incision was completed, and the submucosal dissection was accomplished. Endoscopic hemostasis was achieved with the tip of the DualKnife. When hemostasis could not be achieved with the DualKnife alone, hemostatic forceps were used (**Fig. 2**).

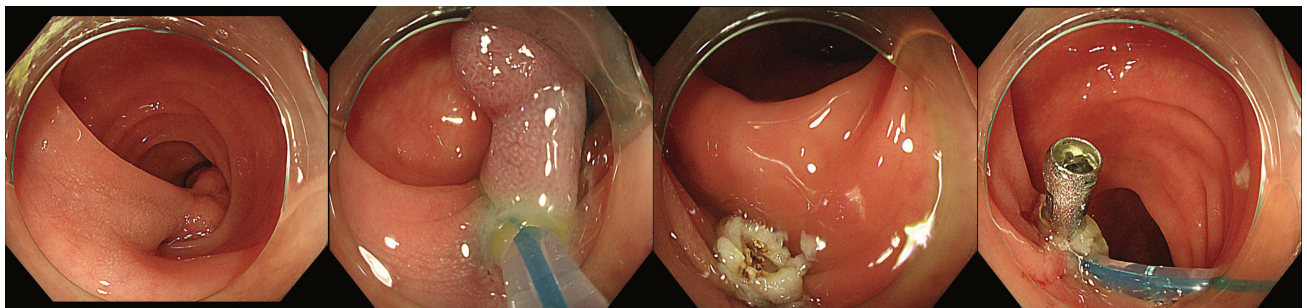


Fig. 1 The procedure of endoloop-assisted endoscopic resection.

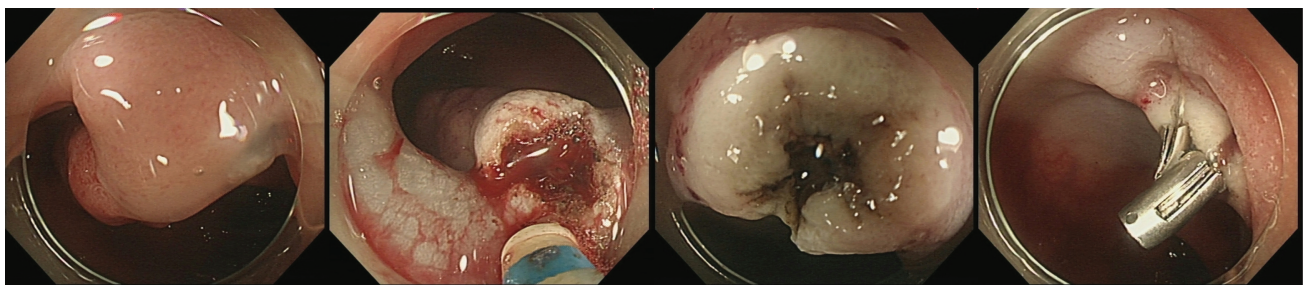


Fig. 2 The procedure of endoscopic submucosal dissection.

Study Outcomes

The primary endpoint of the study was the rate of PPB in each group. PPB included both immediate PPB (IPPB) and delayed PPB (DPPB). IPPB was defined as intraprocedural hemorrhage occurring immediately after polyp resection. Hemostatic techniques were chosen based on the physician's experience and preference. DPPB was defined as occurring when hematochezia or melena was observed after a colonoscopic procedure within 30 days. The secondary outcome included operation time, hospitalization time, and the number of clips used.

Statistical Analysis

SPSS software version 19.0 was used for statistical analysis (SPSS Inc., Chicago, Illinois, United States). Continuous data were compared by unpaired Student's *t*-test. The categorical variables were tested using corrected chi-squared or two-tailed Fisher's exact tests. A *p*-value of ≤ 0.05 was considered statistically significant.

Results

- The baseline characteristic of the two groups: The baseline characteristic included sex, age, location, mean size of the polyp head, and histopathology. There was no significant differences in baseline characteristics between two the groups (► **Table 1**).
- The incidence of IPPB and DPPB in the two groups: Two patients in group A experienced IPPB and one experienced DPPB, while four patients in group B experienced IPPB and no case of DPPB (► **Table 2**).

- The operation time, hospitalization time, and number of clips used in the two groups: The operation time and hospitalization time in group A were all significantly shorter than those in group B. The number of clips used in group A was less than that used in group B (► **Table 3**).

Discussion

To our knowledge, this study is the first trial to investigate the difference between ESD and endoloop-assisted endoscopic resection. Our study compared the efficacy of ESD versus endoloop-assisted endoscopic resection in preventing IPPB, DPPB, operation time, hospitalization time, and the number of clips used in large, pedunculated colonic polyps. The outcomes show that there is no significant difference in the efficacy of preventing IPPB and DPPB. However, the operation time and hospitalization time in group A were all significantly shorter than those in group B. The number of clips used in group A was less than that in group B.

Colonic adenomatous polyp is a precancerous disease of the colon that can transform into cancer through genetic and epigenetic pathways (adenoma–carcinoma sequence).¹⁹ Endoscopic polypectomy, a gold standard in removing polyps, reduces the need for surgery and has been shown to be effective in preventing the development of colorectal cancer.¹ However, the method used for endoscopic polypectomy depends rather on the experience of the endoscopist and there are some inevitable complications.

PPB is the most common adverse event of colonoscopic polypectomy. The higher incidence of IPPB and DPPB in large pedunculated colonic polyps is attributed to the

Table 1 The baseline characteristic of two groups

	Group A	Group B	<i>p</i> -value
Sex			
Male	43	52	0.057
Female	19	10	
Age (y), mean \pm standard deviation (SD)	59.85 \pm 11.73	56.08 \pm 13.80	0.103
Location			
Rectum	4	1	0.807
Sigmoid colon	37	42	
Descending colon	4	6	
Transverse colon	11	7	
Ascending colon	6	6	
Size of the head (cm), mean \pm SD	2.40 \pm 0.55	2.30 \pm 0.53	0.268
Histopathology			
Hyperplastic polyp	1	2	0.051
Inflammatory polyp	1	0	
Juvenile polyp	2	4	
Low-grade intraepithelial neoplasia (LGIN)	12	25	
High-grade intraepithelial neoplasia (HGIN)	46	31	

Table 2 The incidence of IPPB and DPPB in two groups

	Group A	Group B	p-value		Group A	Group B	p-value
IPPB (+)	2	4	0.68	DPPB (+)	1	0	1.0
IPPB (-)	60	58		DPPB (-)	61	62	

Abbreviations: DPPB, delayed postpolypectomy bleeding; IPPB, immediate postpolypectomy bleeding.

Table 3 The operation time, hospitalization time, and number of clips used in two groups

	Group A	Group B	p-value
Operation time (min)	29.31 ± 5.64	23.87 ± 3.97	<0.001
Hospitalization time (d)	7.14 ± 1.1	5.98 ± 1.18	<0.001
Number of clips	5.58 ± 1.3	2.37 ± 0.71	<0.001

presence of a large blood vessel within the stalk.²⁰ To reduce PPB of large pedunculated polyps, mechanical prevention and injection therapy have been performed and research has indicated that injection therapy is inferior to mechanical prevention.¹¹ Besides, the effectiveness of hemoclip only in preventing PPB is not inferior to the combination of hemoclip and injection treatments,²¹ indicating that PPB can be effectively prevented by mechanical prevention alone. ESD technology has matured and can provide a clear field of vision. Recently, colorectal ESD has been accepted as an effective and safe procedure.^{18,22} In this study, we compared the efficacy and safety of endoloop-assisted endoscopic resection and ESD for large pedunculated polyps. The results indicated that there was no significant difference in the efficacy of preventing IPPB and DPPB. However, the operation time and hospitalization time in group A were all significantly shorter than those in group B. The number of clips used in group A was less than that in group B. However, for difficult areas with poor visibility such as splenic curvature and a large polyp head or lobulated polyp head, ESD can serve as an alternative solution to provide effective and safe treatment for patients.

There are some limitations to the study. The retrospective design of the study may present selection bias, but all patients were treated by experienced Chinese endoscopists and none of the patients required surgical treatment due to serious adverse events within the established indications.

In conclusion, our study showed that there was no difference between endoloop-assisted endoscopic resection and ESD in preventing the incidence of IPPB and DPPB. Although the operation time and hospitalization time were shorter and the number of clips used was less in endoloop-assisted endoscopic resection, ESD can be an effective and safe alternative for difficult areas with poor visibility or polyps with large or lobulated heads.

Funding

None.

Conflict of Interest

None declared.

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