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2026 Volume 11, Issue 2
Advances in Precision Medicine
ISSN: 2424-9106 (Online)
ISSN: 2424-8592 (Print)

The Application Effect and Clinical Significance of Endoscopic Submucosal Dissection in Early Gastrointestinal Tumors

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Abstract: Objective: To analyze the effect and clinical significance of endoscopic submucosal dissection in early gastrointestinal tumors. Methods: 74 patients with early-stage digestive tract tumors were selected for data analysis in our hospital from January to December 2024. They were divided into groups using a random number table, with 37 patients in each group. The experimental group was treated with endoscopic submucosal dissection, and the control group was treated with endoscopic submucosal resection. The data between the groups were compared. Results: Compared with the control group, the experimental group had significantly higher en bloc resection rate and complete resection rate, significantly less intraoperative bleeding, significantly shorter hospitalization time, and significantly lower recurrence rate, but the operation time was significantly longer, $P<0.05$. Comparing the incidence of complications between the two groups, $P>0.05$. Conclusion: The effect of endoscopic submucosal dissection in early-stage gastrointestinal tumors is ideal. The en bloc resection rate and complete resection rate of patients are significantly higher, the intraoperative blood loss is significantly less, the hospitalization time is significantly shorter, and the recurrence rate is significantly lower. It is worthy of clinical application and promotion.

Keywords: Endoscopic submucosal dissection; early stage; gastrointestinal tumors; application effect; clinical significance

Online publication: February 26, 2026

1. Introduction

Malignant tumors with high incidence in the world include digestive tract tumors, such as esophageal cancer, gastric cancer, colorectal cancer, etc. The incidence rate is very high, and the incidence group is younger. Clinical studies have found that the symptoms of early-stage gastrointestinal tumors are insidious and easy to be ignored, but effective treatment is provided to patients in a timely manner, the cure rate is significantly improved, and the 5-year survival rate is high. Therefore, clinical practice must analyze efficient and safe treatment methods for patients with early-stage digestive tract tumors[1], improve patient prognosis, and reduce patient mortality. In the past, endoscopic submucosal resection was used clinically to treat patients with early-stage gastrointestinal tumors. Although the patient's lesions can be resected, it is difficult to perform en bloc and complete resection when dealing with complex lesions or large-area lesions, and it is easy for the disease to relapse due to residual lesions[2]. Moreover, patients have a large amount of intraoperative bleeding and require a long time to recover. With the rapid development of endoscopic minimally invasive technology

in clinical practice, endoscopic submucosal dissection is gradually used to accurately peel off the patient's diseased mucosal layer under endoscopic guidance, resect the patient's lesions en bloc, and preserve the normal structure and function of the patient's digestive tract to the maximum extent[3]. Clinical studies on endoscopic submucosal dissection have the advantages of less trauma, faster recovery, and fewer complications. Therefore, this study recommends its use for minimally invasive treatment of early-stage digestive tract tumors. This study selected 74 patients to analyze the effect and clinical significance of endoscopic submucosal dissection in early-stage gastrointestinal tumors.

2. Materials and methods

2.1. Information

From January to December 2024, 74 patients with early-stage digestive tract tumors were selected for data analysis in our hospital. They were divided into groups using random number tables, with 37 patients in each group. The experimental group was 20/17 male and female, aged 44-78 (56.36 ± 8.54) years old, and the control group was 21/16 male and female, aged 45-75 (56.34 ± 8.51) years old. Comparing the two sets of data, $P > 0.05$ was obtained.

Inclusion criteria: confirmed by endoscopy and pathological biopsy, cancer localized to the mucosa or submucosa; clear consciousness; informed consent.

Exclusion criteria: combined with severe liver and kidney insufficiency, coagulation dysfunction, cardiovascular and cerebrovascular diseases, etc.; history of endoscopic surgery, abdominal surgery; combined with mental illness, cognitive impairment; pregnant or lactating; allergic to surgical drugs; lost to follow-up or dropped out midway.

2.2. Method

The control group underwent endoscopic submucosal resection, lying on their backs, Lugol solution staining was performed, a snare and a transparent plastic cap were installed at the end of the endoscopic lens, negative pressure suction was performed, lesions were removed and bleeding was stopped, hemostatic drugs were sprayed on the wound, and they were fasted for 24 hours after the operation. Patients were treated with routine drugs.

The experimental group applied endoscopic submucosal dissection, lying on their backs, and performed Lugol solution staining. The lesions were injected with a mixed solution (epinephrine, glycerol-fructose, and normal saline) at multiple points, 2 ml each. The lesions were lifted to separate the muscle layer and mucosa, and the hook knife was used to peel off the protruding mucosa along the marked points. Drugs were injected at the same time to perform hemostatic treatment. After the peeling was completed, the wound was carefully inspected, electrocoagulated to stop bleeding, and hemostatic drugs were sprayed on the wound. They fasted for 24 hours after the operation, and the patient was treated with antibiotics.

2.3. Observation indicators

(1) Compare the en bloc resection rate and complete resection rate between the two groups (the pathological results of both vertical and horizontal resection margins are negative).

(2) Compare the intraoperative blood loss, operation time, and hospitalization time between the two groups.

(3) Compare the complication rates between the two groups.

(4) Compare the recurrence rates of the two groups. Follow-up for 1 year.

2.4. Statistical analysis

Use statistical SPSS 28.0 software to complete data calculations. Use $\bar{x} \pm S$ to describe measurement data, t test, and % to describe count data. χ^2 test. If $P < 0.05$, the data comparison is statistically significant.

3. Results

Compared with the control group, the experimental group had significantly higher en bloc resection rate and complete resection rate, significantly less intraoperative blood loss, significantly shorter hospital stay, and significantly lower recurrence rate, but the operation time was significantly longer. The data comparison between the groups was statistically significant, $P < 0.05$. Comparing the incidence of complications between the two groups, $P > 0.05$.

Table 1. Comparison of en bloc resection rate and complete resection rate (%) between the two groups

Group	En bloc resection rate	Complete resection rate
Experimental group (n = 37)	36(97.30)	34(91.89)
Control group (n = 37)	28(75.68)	24(64.86)
$\chi 2$	7.4000	7.9741
P	< 0.05	< 0.05

Table 2. Comparison of intraoperative blood loss, operation time, and hospitalization time between the two groups

Group	Intraoperative blood loss (ml)	Operation time (min)	Length of stay (d)
Experimental group (n = 37)	57.58 ± 11.33	54.91 ± 8.74	6.36 ± 1.08
Control group (n = 37)	76.57 ± 12.54	35.61 ± 5.15	8.97 ± 1.36
t	6.8349	11.5726	9.1417
P	< 0.05	< 0.05	< 0.05

Table 3. Comparison of complication rates between the two groups (%)

Group	Postoperative bleeding	Intraoperative perforation	Postoperative abdominal discomfort	Total
Experimental group (n = 37)	1(2.70)	2(5.41)	4(10.81)	7(18.92)
Control group (n = 37)	3(8.11)	1(2.70)	2(5.41)	6(16.22)
$\chi 2$	-	-	-	0.0933
P	-	-	-	< 0.05

Table 4. Comparison of recurrence rates between the two groups (%)

Group	Recurrence rate
Experimental group (n = 37)	1(2.70)
Control group (n = 37)	7(18.92)
$\chi 2$	5.0455
P	< 0.05

3. Discussion

Digestive tract tumors are a major public health problem. Early lesions create a critical window period for patient treatment. Scientifically selecting treatment options for patients can significantly improve the patient's resection effect, postoperative recovery, and long-term prognosis. The endoscopic submucosal resection used to treat patients' conditions in the past has restricted the treatment effect[4]. Therefore, endoscopic submucosal dissection is recommended because it can be accurately dissected and resected en bloc. This study selected 74 patients to analyze the effect and clinical significance of endoscopic submucosal dissection in early-stage gastrointestinal tumors. The results are analyzed as follows:

The results of this study show that the en bloc resection rate of endoscopic submucosal dissection in the experimental group was 97.30%, and the complete resection rate was 91.89%, which was significantly higher than that in the control group. The reason for the analysis results: endoscopic submucosal dissection was performed on the patient. Before the operation, a mixture of epinephrine, glycerofructose and normal saline was injected into the patient's lesion at multiple points. The liquid can effectively lift the patient's lesion tissue and fully separate the mucosa layer and muscle layer. This operation can provide the patient with a clear vision for subsequent surgery. The Hook knife can be used along the marked points to perform precise dissection for the patient[5]. The operation method can be flexibly adjusted according to the patient's lesion shape and scope, and the en bloc resection rate can be significantly improved. Analysis shows that the reason why the experimental group significantly improved the complete resection rate is because endoscopic submucosal dissection can accurately control the vertical and horizontal resection margins, reduce inflammation at the resection margin, and significantly reduce the probability of residual lesions in patients[6]. The core indicator used clinically in evaluating the treatment effect of early-stage gastrointestinal tumors is the completeness of resection. En bloc and complete resection of the patient's lesions can maximize their removal and the patient can obtain a good prognosis. This situation also highlights the high value of endoscopic submucosal dissection in clinical applications to improve the effectiveness of treatment.

The intraoperative blood loss of the experimental group (57.58 ± 11.33) ml was significantly less than that of the control group, and the operation time and hospitalization time were also shorter than those of the control group. Analyze the reasons for the above results: when endoscopic submucosal dissection is used, electrocoagulation can be performed on the patient in real time to stop bleeding, and the patient can cooperate with the patient to carry out detailed inspection of the postoperative wound and spray hemostatic drugs, which can effectively control the patient's intraoperative bleeding and reduce the patient's intraoperative bleeding. Although the operation time of endoscopic submucosal dissection is longer than that of endoscopic submucosal resection, the reason for this result is that precise dissection and complete resection can ensure accurate patient treatment and is not a problem of insufficient operating efficiency. More importantly, the application of endoscopic submucosal dissection for patients has smaller trauma, can more completely remove the patient's lesions, reduces the difficulty of postoperative wound repair, accelerates the recovery of the patient's gastrointestinal function[7], and shortens the hospitalization time, which is in line with the core needs of patients for clinical minimally invasive treatment.

In this study, the comparison of the incidence rates of complications between the two groups is as follows: the total incidence rate of the experimental group was 18.92%, and that of the control group was 16.22%. They were mainly postoperative bleeding, intraoperative perforation, and postoperative abdominal discomfort. The overall incidence rate was low. The results confirmed that the safety of endoscopic submucosal dissection and endoscopic submucosal resection was relatively high. Clinical practice has shown that endoscopic submucosal dissection is a delicate operation. Submucosal injection to lift the lesion can effectively prevent patients from excessive muscle layer damage and reduce the risk of perforation. Real-time electrocoagulation for hemostasis and standardized use of antibiotics after surgery can significantly reduce the incidence of postoperative bleeding and infection. Endoscopic submucosal resection already has a complete complication prevention and control system, so Based on the comparison of the complication rates between the two groups in this study, there is no significant difference. This result can effectively eliminate clinical concerns about the safety of the new technology of endoscopic submucosal dissection. If the operating specifications are strictly followed and preoperative assessment and postoperative intervention are carried out, it can not only ensure the ideal therapeutic effect of endoscopic

submucosal dissection[8], but also not significantly increase the patient's risk of complications. At the same time, the complications that occurred in this study were all mild to moderate, and all recovered after symptomatic treatment. This result confirms the high safety of endoscopic minimally invasive treatment for early-stage gastrointestinal tumors.

The 1-year follow-up results of this study showed that the recurrence rate of the experimental group was 2.70%, which was significantly lower than that of the control group. The reasons for the analysis results were: residual lesions related to tumor recurrence, low en bloc resection rate and complete resection rate in the control group, residual microscopic lesions in some patients, changes in the body's immune status after surgery, etc. Factors that interfere with the disease are prone to disease recurrence. The experimental group achieved en bloc and complete resection of the lesion, which can fundamentally eliminate the remaining hidden dangers and significantly reduce the risk of recurrence. The results of this study fully prove that endoscopic submucosal dissection can significantly improve the long-term treatment effect of patients with early-stage digestive tract tumors. Clinical studies have shown that patients with early-stage gastrointestinal tumors have a low recurrence rate and a high 5-year survival rate. The pain and economic burden of re-treatment after surgery will be significantly reduced, and the risk of tumor progression to intermediate and advanced stages will be significantly reduced. Therefore, the long-term quality of life of the experimental group will be significantly improved.

The conduct of this study provides important practical and evidence-based support for the clinical treatment of early digestive tract tumors. The current development direction of medical technology is minimally invasive and precise. In this case, endoscopic submucosal dissection is clinically recommended to treat patients with early-stage gastrointestinal tumors. The comprehensive advantages are high resection completeness, low intraoperative bleeding, fast postoperative recovery, low recurrence rate, and good safety for patients in clinical applications. This surgical method is suitable for patients with early-stage esophageal cancer, gastric cancer, and colorectal cancer with large lesions and complex locations. It can achieve ideal therapeutic effects, safe treatment, and high patient acceptance.

Analyzing from the perspective of subject development and public health, the clinical application of endoscopic submucosal dissection in the treatment of early-stage gastrointestinal tumors has significantly improved the therapeutic effect, promoting the discipline of gastrointestinal endoscopy to become more refined and standardized. In this case, endoscopists must have a high operational level, because the gastrointestinal endoscopy center needs to strengthen technology construction and talent training, thereby significantly improving the overall level of minimally invasive treatment of digestive diseases. At the same time, endoscopic submucosal dissection can preserve the normal structure and function of the patient's digestive tract to the maximum extent, which is consistent with the "people-oriented" treatment concept of modern medicine. The patient's treatment experience and postoperative quality of life are significantly improved. At the public health level, when endoscopic submucosal dissection is widely used in clinical practice, the cure rate of early gastrointestinal tumors is effectively increased, the mortality rate is reduced, and the consumption of medical resources by patients due to tumor progression will be significantly reduced, reducing the medical burden on society and improving the early diagnosis and treatment of gastrointestinal tumors.

In summary, the application of endoscopic submucosal dissection in early-stage gastrointestinal tumors has ideal results. The en bloc resection rate and complete resection rate of patients are significantly higher, the intraoperative blood loss is significantly less, the hospitalization time is significantly shorter, and the recurrence rate is significantly lower. It is worthy of clinical application and promotion.

About the author

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Disclosure statement

The author declares no conflict of interest.

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