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THE CLINICAL ANALYSIS OF ENDOSCOPIC TREATMENT IN GASTROINTESTINAL POLYPS

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ABSTRACT

To comparatively analyze the endoscopic treatment of gastrointestinal polyps and explore the impact factors of hemorrhage after endoscopic treatment. To choose 150 patients with gastrointestinal polyps from January 2019 year to December 2021 year. According to endoscopic treatment, there were cold snare polypectomy (CSP), endoscopic mucosal resection (EMR), and endoscopic submucosal dissection (ESD). To analyze the complication among different endoscopic treatments and the impact factors of hemorrhage after endoscopic treatment. There were no significant differences in the characteristics of each treatment group. CSP and EMR have been used primarily in patients with proliferative and inflammatory polyps. However, using EMR and ESD, patients were mainly assessed for tubular adenoma, villous adenoma, and low-grade intraepithelial neoplasia. Subsequently, the ESD was mainly applied in patients with high-grade intraepithelial neoplasia. The risks of infection and bleeding in the EMR and ESD methods were higher than in the CSP method. The impact factors of hemorrhage after endoscopic treatments included therapeutic method, the diameter of polyps, smoking, and drinking. The main endoscopic treatments of gastrointestinal polyps included CSP, EMR, and ESD. The risks of infection and bleeding of EMR and ESD methods were increased. The impact factors of hemorrhage after endoscopic treatments included therapeutic method, the diameter of polyps, smoking, and drinking.

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Introduction

In recent years, with the development of endoscopic diagnosis and treatment technology. Endoscopic treatment of gastrointestinal polyps is increasing day by day. It usually includes endoscopic argon plasma coagulation, cold snare polypectomy, endoscopic mucosal resection, endoscopic submucosal dissection, and other minimally invasive treatments. Gastrointestinal polyps are caused mostly by gastrointestinal mucosal inflammation stimulation caused by local hyperplasia and hypertrophy caused by mucosal uplift lesions. Most of the patients have no obvious discomfort symptoms and feelings. It is usually not easily discovered. A small number of patients have conscious upper abdominal discomfort, defecation habits changes, stool trait changes such as mucinous stool, hematochezia, and increased defecation times. Gastrointestinal polyps have a certain cancer tendency. Therefore, it attracts the attention of clinicians and patients. The possibility of carcinogenesis of digestive tract polyps is closely related to the pathological type of polyp.

According to the criteria of the Morson classification, gastrointestinal polyps are divided into two categories, including tumor polyps and nontumor polyps [1]. Early resection is required for the pathological types of villous adenoma, tubular adenoma, and mixed adenoma. Pathpathological types of adenomatous polyps have a high risk of carcinogenesis and are precancerous lesions. Studies have shown that [2] the cancerous rate of adenoma-type polyps with a diameter below 1cm is about 1%- 3%. The carcinrate of adenomatoid polyps between 1cm and 2cm is approximately 10%. The cancer rate of adenomas with tumors above 2cm in diameter reached more than 40%. Hence, endoscopic examination and the application of various staining methods make many early digestive tract cancers and precancerous lesions discovered by clinical check. Most of the early lesions of the digestive tract can be treated by endoscopic mucosal resection. Surgery is not generally required. Endoscopic mucosal resection has a relatively good treatment effect on early tumors and precancerous lesions located in the mucosa [3]. For larger lesions above 2cm in diameter, endoscopic submucosal dissection is an endoscopic treatment method for the one-time complete resection of relatively large gastrointestinal mucosal and submucosal lesions. Endoscopic submucosal dissection

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has the advantages of less trauma, not changing the structure of the digestive tract, less risk, high postoperative quality of life, and rapid recovery. This paper retrospectively analyzed the clinical efficacy of different endoscopic treatments for polyposis bulge lesions and analyzed the relevant influencing factors.

Materials and Methods

General Information About 150 patients with gastrointestinal polypoid bulge lesions was found in our hospital from January 2019year to December 2021 year. Among them, 78 were male, and 72 were female, aged 20-76 years. All patients signed their informed consent before surgery. Among them are CSP 45, EMR 75, and ESD 30 cases. The collected data were divided into an endoscopic cold polypectomy group, an EMR group, and an ESD group according to the treatment method. Polyp size was divided into four groups according to the microscopic evaluation [4]: 0.3-0.5cm,0.6-0.9cm, 1.0-1.9cm, <2cm; Polyp form according to Yamata classification: the start of type I bulge is relatively smooth, and the boundary is unclear; the starting boundary of type II bulge is clear but without obvious pedic; the start site of type III bulge is small and formed with polyps; the starting site of type IV bulge is narrow, and the formation of long pedicis changed. Pathological types: inflammatory polyps, hyperplastic polyps, adenomatous polyps (tubular, villous, villous tubular), low-grade neoplasia, and high-grade neoplasia.
Indications for cold snare polypectomy [5, 6]: It is a safe and effective method for endoscopic resection of small polyps (smaller than 10 mm in size), but the technique is an ideal indication for sessile polyps of 4 ~ 6 mm in size. Compared with electric cutting, CSP has no potential perforation risk. The round protuberant polyp of 10 ~ 13 mm in size was suitable for CSP.
Indications for endoscopic mucosal resection [7, 8]: Flat benign gastrointestinal bulge lesions, usually in diameter less than 2cm; endoscopic ultrasound shows that the bulge lesion is limited to the mucosal layer, the pathology suggests precancerous lesions such as low-grade neoplasia; Complete endoscopic resection of flat lesions such as IIa (flat bulge), IIc (flat depression) and a part of Is (unbulge) can be considered, and mucosal bulge lesions greater than 2cm can be performed by submucosal injection through Endoscopic Piecemeal Mucosal Resection. Studies have shown that [9] Endoscopic Piecemeal Mucosal Resection is effective for large Is and IIa lesions and lateral developmental neoplastic lesions of the large intestine.
Indications for endoscopic submucosal dissection [10, 11]: Benign bulge lesion of the gastrointestinal tract, a lesion greater than 2cm in diameter. Endoscopic ultrasound showed elevated lesion involvement of the submucosa, and the pathology suggested changes in precancerous lesions such as high-grade neoplasia. ESD is generally suitable for larger bulge lesions with greater than 2cm in diameter, nongranular LST or high dysplasia, superficial infiltration of suspicious lesion mucosa, or other endoscopic methods that cannot remove the lesion intact. Guidelines recommend a diameter greater than 2cm, complete endoscopic resection of lesions, lift sign negative gastrointestinal adenoma, part of early cancer, no prominent myometrial or serosa layer infiltration, no distant metastasis, EMR residue greater than 10cm diameter, or recurrence EMR treatment is difficult, multiple endoscopic biopsies cannot be clear cancer low rectal lesions can be used ESD treatment [12].
Contraindication: Those who cannot cooperate or tolerate endoscopy. For patients with a high risk of anesthesia, taking anticoagulant medication or antiplatelet medication was not stopped for one week. Severe cardiorespiratory and renal insufficiency. Coagulation disorders.
Methods for Routine preoperative examination. Blood routine, liver and kidney function, blood glucose, coagulation function, electrocardiogram, and other examinations. Contraindications for each endoscopy and treatment were excluded. Preoperative fasting was performed for 8 hours. Intestinal therapy patients underwent bowel preparation.

Apparatus
The Olympus company GIF-H260 or Q260 gastroenteroscopy, needle knife, transparent cap, KNIFE, hemostasis, forceps, and ERBE ICC200 were used. In early gastrointestinal cancer cases, endoscopic ultrasound or CT was used to understand the size, site, depth of invasion, and presence of lymph node metastasis. When the diameter was less than 2cm, the pathology suggested gastrointestinal polyps or low-grade neoplasia, using endoscopic mucosal resection; When the diameter was greater than 2cm, the pathology suggested low-grade, high-grade or local neoplasia, the endoscopic submucosal dissection was performed.

CSP Method [13]
The Polyp is usually placed below the endoscopic field of view. After assessing the size of the polyp, the snare is placed 2 mm from the outer edge of the polyp, and the Tube Sheath is extended to form an angle with the snare. No need to connect the power supply; the trap will be removed from a polyp which close the trap to remove the polyp.

EMR Method [14]
1. The lesion was raised through 1: 10000 adrenaline saline submucosal injection. 2. Raised diseased mucosa with a snap trap was cut by high-frequency electrocoagulation. 3. Treat wound: if there is bleeding, spray, hemostatic drugs such as norepinephrine, saline, and thrombin, thermal biopsy clamp for electrocoagulation, hemostasis, and titanium clamped the wound.

ESD Method [15]
Staining: To show the boundary of the lesion with Median (methylene blue) staining. Mark: Electrocoagulation mark at 0.5cm from the edge of the lesion. Submucosal injection: with a mixture of adrenaline and 0.9% sodium chloride, 2ml per point, the

injection can be repeated until the lesion is significantly raised. If the lesion invades the submucosa, if the lift is not obvious after injection, ESD is stopped, and open surgery is recommended. If the mucosal lift is obvious, the lateral margin of the lesion is opened: the mucosa is marked with the Hook knife or IT knife. Stripping lesion: the mucosal layer and submucosa are cut along the lateral edge of the lesion, gradually stripping the lesion, and an appropriate additional submucosal injection is added to make the lesion fully lifted, and the wound is washed to keep the stripped vision clear. Wound treatment: thermal biopsy, forceps, and APC are used to provide hemostasis where blood vessels in the wound are exposed, and large exposed blood vessels need to be clamped for hemostasis. Sample treatment: the resected diseased tissue specimen was evenly fixed on the plate with pins, fixed with 10% formaldehyde, and sent for pathological examination.

Postoperative management: After the operation, fasting, hemostasis, fluid rehydration support, and other treatments were given to observe the presence of bleeding, perforation, and infection complications such as abdominal pain and bloody stool. The pathological examination determined the nature of the lesion, and the wound healing was reviewed in February and June. For patients with high-grade neoplasia, the postoperative review is required in January, February, and June.

Statistical treatment: Analyzed by SPSS19.0 software, quantitative data were expressed as mean ± standard deviation, and qualitative data were tested by chi-square test with a statistical significance of $P < 0.05$.

Results and Discussion

Patient Characteristics

Among the 150 patients with gastrointestinal polyps, 78 were male and 72 women, including 25 patients with hypertension, 8 with diabetes, 32 smokers, and 28 drinkers. There was no significant difference in the characteristics of each treatment group. The preoperative pathological features were 42 hyperplastic polyps, 28 inflammatory polyps, 45 tubular adenomas, 10 villous adenomas, 20 low-grade intraepithelial neoplasia, and 5 high-grade intraepithelial neoplasia. Different treatment methods were used for different pathological features among different treatment groups. CSP and EMR were mainly used for hyperplastic and inflammatory polyps, EMR and ESD were mainly used for low-grade intraepithelial neoplasia, tubular adenoma, and low-grade intraepithelial neoplasia, and ESD was mainly used for high-grade intraepithelial neoplasia.

Table 1. Patient characteristics

	Method	CSP,	EMR,	ESD,	χ^2	P value
Sex	Male	25	40	13	1.184	0.553
	Female	20	35	17		
Complication	hypertension	8	8	9	0.330	0.848
	diabetes	3	3	2		
Smoking history	yes	15	19	12	2.383	0.304
	no	30	56	18		
Drinking history	yes	7	13	8	1.639	0.441
	no	38	62	22		
Preoperative pathological features	Hyperplastic polyp	20	17	0	59.337	0.000
	Inflammatory polyp	15	11	0		
	Tubular adenoma	5	23	22		
	Villous adenoma	2	6	4		
	low-grade intraepithelial neoplasia	0	12	8		
	high-grade intraepithelial neoplasia	0	2	3		

The complications of CSP, EMR, and ESD were compared.

In terms of postoperative complications, none of the three treatments had perforation complications. In terms of bleeding and infection complications, the risk of bleeding and infection was significantly higher in the EMR and ESD groups than in the CSP group.

Table 2. Complications of CSP, EMR, and ESD

Characteristics		CSP,	EMR,	ESD,	χ^2	P value
Bleeding	Yes	3	16	12	12.239	0.002
	No	42	59	18		
Infection	Yes	2	12	8	7.315	0.026
	No	43	63	22		

…None of the three treatments had perforation complications

Analysis of Risk Factors of Complicated Hemorrhage

By chi-square test, the main influencing factors of postoperative bleeding were treatment, polyp diameter, smoking, and alcohol consumption. EMR and ESD methods had a higher bleeding risk than CSP methods; patients with 1 cm were more likely to relapse, indicating that the risk of bleeding increased with the increase in polyp diameter, and the risk of bleeding increased significantly in patients who smoked and drank alcohol.

Table 3. Risk factors of complicated hemorrhage

Item		Bleeding,	No bleeding	χ^2	P value
Sex	Male	18	60	0.576	0.448
	Female	13	59		
Hypertension	Yes	8	17	2.350	0.125
	No	23	102		
Diabetes	Yes	3	5	1.461	0.227
	No	28	114		
Smoking	Yes	15	17	17.042	0.000
	No	16	102		
Drinking	Yes	12	16	10339	0.001
	No	19	103		
Location	Fundus of stomach	8	18	5.479	0.360
	Body of stomach	12	15		
	Angle of stomach	15	12		
	Antrum of stomach	8	18		
	Colon	7	15		
	Rectum	8	14		
Diameter size	0.3-0.5cm	3	26	9.842	0.020
	0.6-0.9cm	5	37		
	1.0-1.9cm	12	31		
	>2.0cm	13	23		
Postoperative pathology	Hyperplastic polyp	12	30	4.017	0.856
	Inflammatory polyp	10	18		
	Tubular adenoma	12	29		
	Villous adenoma	2	3		
	Low-grade neoplasia	3	10		
	High-grade neoplasia	2	2		
	Adenocarcinoma	3	2		
	Neuroendocrinetumor	2	3		
	Stromal tumor	3	4		
Methods	CSP	5	40	10.246	0.006
	EMR	18	57		
	ESD	13	17		

A gastrointestinal polyp is a common disease of the digestive system. Usually refers to the gastrointestinal mucosal protuberance, vegetation formation, or tumor that can occur in single or multiple or in multiple locations. Most of these diseases are precancerous lesions. The carcinogenic rate of gastrointestinal polyps is different in different pathological types, so it is necessary to resect them surgically.

Cold snare polypectomy is a safe and effective method for the endoscopic resection of small polyps (smaller than 10 mm in size), but the technique is an ideal indication for sessile polyps of 4 ~ 6 mm in size. Compared with electric cutting, CSP has no potential perforation risk [16]. Endoscopic mucosal resection is a minimally invasive endoscopic treatment for gastrointestinal polyps. By submucosal injection, the polyp lesion was lifted, separating the mucosal layer and the mucosal myometrial from the polyp tissue, giving the lesional tissue raised with a snare trap and giving a high-frequency electrocoagulation procedure. Endoscopic submucosal dissection (ESD) for large polyps and broad base polyps has certain

therapeutic advantages; ESD with resection diameter greater than 2cm, large polyps, wide base polyps, confined to the mucosal layer of early cancer, tubular adenoma or villous adenoma with high complete resection rate, complete pathological data, embodies the superiority of endoscopic minimally invasive treatment. In the three treatment groups of cold snare polypectomy, endoscopic mucosal resection, and endoscopic submucosal dissection, there were no significant differences in sex or comorbidities such as hypertension and diabetes, smoking, and alcohol consumption. The pathological characteristics of gastrointestinal polyps were different among the three groups. Hyperplastic polyps and inflammatory polyps tended to be treated by cold snare polypectomy. Tubular adenomas, villous adenomas, and low-grade intraepithelial neoplasia tended to be treated by endoscopic cold resection according to the size of the polyps, endoscopic submucosal resections (EMR) were used to treat polyps with a diameter of less than 2 cm, and endoscopic submucosal dissection was used to treat high-grade intraepithelial neoplasia with a diameter greater than 2cm [17].

Regarding postoperative complications, there were no perforation complications in all three treatment groups. Regarding bleeding complications, there were 3 cases in the CSP group, 16 cases in the EMR group, and 12 cases in the ESD group. The bleeding risk in the EMR and ESD groups was higher than in the CSP group. Regarding infectious complications, there were two patients in the CSP group, 12 in the EMR group, and 8 in the ESD group. The risk of infection was higher in the EMR and ESD groups than in the CSP group. Therefore, the EMR and ESD groups had a significantly higher risk of bleeding and infection than the CSP group.

Postoperative bleeding is a common complication of gastrointestinal polypectomy [18]. Through the analysis of multiple risk factors of postoperative bleeding, different treatment methods, polyp diameter, smoking, and drinking are the risk factors of postoperative bleeding after gastrointestinal polypectomy, EMR and ESD methods had higher bleeding risk than the CSP method. The bleeding risk was gradually increased with the increase of polyp diameter, and the bleeding risk was also significantly increased in smoking and drinking patients. Therefore, we should control patients' smoking and drinking habits according to the diameter of gastrointestinal polyps and choose the appropriate endoscopic treatment. There were 3 cases of hemorrhage in the CSP group, 16 cases in the EMR group, and 12 cases in the ESD group. Because no electric cutting treated CSP under the endoscope, only the gastrointestinal mucosa was involved, the blood vessel content was small, and the risk of hemorrhage was small. While endoscopic treatment of EMR and ESD involves the submucosa, which contains abundant blood vessels, endoscopic EMR and ESD are associated with an increased risk of bleeding.

Gastrointestinal polyps are precancerous diseases, especially broad-based sessile polyps. Early endoscopic treatment is required if the polyps are found by endoscopic examination. Tubular adenomas, villous adenoma, intestinal metaplasia, and dysplasia are precancerous lesions, and early gastrointestinal cancers and precancerous lesions without obvious distant metastasis are the main indications for EMR or ESD [19]. EMR included EMR stripping biopsy, double-tube endoscopy, loop resection after ligation (EMRL), and transparent cap resection (EMRC) [20]. Currently, loop resection after evisceration (EMRL) and transparent cap resection (EMRC) is mainly used in our hospital. ESD is more suitable for precancerous lesions such as polyps, tubular adenomas, and villous adenomas, which are larger than 2 cm in diameter, or for early malignant lesions of the digestive tract, which are confined to the mucosal layer. However, lesions larger than 4 cm in diameter tend to have a deep local invasion, and ESD is unsuitable for patients with distant metastasis. EMR is suitable for well-differentiated and flat lesions less than 2 cm in diameter, as well as for early gastrointestinal cancer and precancerous lesions without distant metastasis.

In comparison, ESD is suitable for well-differentiated and flat lesions between 2cm and 4cm in diameter. There is no blood vessel and lymph node metastasis of gastrointestinal early cancer and precancerous lesions. For polypoid lesions less than 1cm in diameter, CSP therapy should be considered. There is no risk of perforation and less risk of bleeding [21].

Bleeding, infection and perforation are the main complications after CSP, EMR, or ESD. Complications of ESD are relatively high compared with EMR and CSP, and common complications of ESD include bleeding, perforation, abdominal pain, infection, aspiration pneumonia, etc. [22]. Bleeding in ESD occurs in 13-38% [23] and perforation in 4% [24]. The postoperative complications of CSP, EMR, and ESD were influenced by many factors.

The incidence of bleeding and infection after CSP was 6.7% and 4.4%, respectively; the incidence of bleeding and infection after EMR was 21.3% and 16%, respectively; the incidence of bleeding and infection after ESD was 40% and 26.7%, respectively, postoperative bleeding may be related to treatment, polyp size, smoking and alcohol consumption. According to the above factors, preoperative examination and preparation should be done to reduce the incidence of postoperative complications.

Conclusion

The main endoscopic treatments of gastrointestinal polyps included CSP, EMR, and ESD. The risks of infection and bleeding of EMR and ESD methods were increased. The impact factors of hemorrhage after endoscopic treatments included therapeutic method, the diameter of polyps, smoking, and drinking.

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