

# ENDOSCOPIC TREATMENT FOR EARLY COLORECTAL CANCER

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## ABSTRACT

**Relevance:** In recent years, significant breakthroughs have occurred in the endoscopic treatment of cancerous and precancerous lesions of the gastrointestinal tract. Endoscopic mucosal resection (EMR) is a simple and effective method of treating most benign gastrointestinal tract lesions. However, with the introduction of endoscopic submucosal dissection (ESD) and full-thickness endoscopic resection (EFTR), the volume of lesions subject to endoscopic treatment has significantly expanded even in the colon. Currently, these methods are regularly used not only for the treatment of benign tumors but also for complex resection of early stages of colorectal cancer. For the first time in Kazakhstan, the presented article analyzed the cases of endoscopic removal of epithelial formations of the large intestine performed at an oncological clinic from 2020 to 2023.

**The aim was to** evaluate endoscopic treatment of early colorectal cancer.

**Methods:** The article presents a retrospective analysis of 68 cases of endoscopic removal of epithelial formations of the colon performed from 2020 to 2023 at the Center of Expert Endoscopy and Interventional Radiology of the National Scientific Cancer Center (Astana, Kazakhstan).

**Results:** In 2020-2023, 68 endoscopic extractions of colon tumors were performed, including 25 outpatient and 43 inpatient manipulations. Out of 43 inpatient cases, endoscopic dissection in the submucosal layer was performed in 9 cases, and endoscopic mucosal resection of tumors of the large intestine was performed in 34 cases. Morphologically, we found hyperplastic polyps in 11 cases, lipomas in 2 cases, tubulovillous adenomas with mild dysplasia – 43 cases, tubulovillous adenomas with severe dysplasia – 11 cases, carcinoma in situ – 3 cases, and adenocarcinoma with invasion – 3 cases.

**Conclusion:** When detecting benign neoplasms with dysplasia and early colorectal cancer, minimally invasive technologies (EMR, ESD, EFTR) should be the first preferred treatment method and only if they cannot be performed and there is a high risk of invasion into the underlying layers, and therefore, if endoscopic treatment is not radical, clinicians should choose surgical radical treatment. Patients should be informed about the availability of the latest methods of local treatment in the Republic through funding via the Compulsory Medical Insurance Fund (CMIF).

**Keywords:** early colorectal cancer, endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD), full-thickness endoscopic resection (EFTR), Lateral spreading tumor (LST).

**Introduction:** In recent decades, endoluminal operative endoscopy has developed rapidly abroad and in Kazakhstan. The leading endoscopic centers are being set up in Astana and Almaty. In this vein, the latest methods of endoscopic treatment of precancerous and cancerous lesions of the gastrointestinal tract (GI) at early stages, such as endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD), and full-thickness endoscopic resection (EFTR), have become widely available for treatment of benign neoplasms and early forms of gastrointestinal cancer of citizens of the Republic of Kazakhstan.

Compared to endoscopic treatment and surgical treatment, the advantages of the first are apparent, for example, the lower cost and shorter hospital stay. Besides, endoscopic resection almost always allows radical resection en bloc, which is very important and should be considered an indicator of quality [1].

EMR is a method of endoscopic mucosal resection using a diathermic loop. The lesion is trapped in the loop and excised under the mucosal surface during the loop closure. The main advantage of this technique is, first of all, its minimally invasive nature: general anesthesia is not required, postoperative morbidity is low (bleeding

occurs in about 5% of cases with lesions above 20 mm), and the operative time is relatively short (the literature reports an average operation time of about 15 minutes). The main shortcoming is the low en bloc resection rate for large lesions. The en bloc resection rate is about 84% for lesions below 20 mm and 50% – for lesions above 20 mm. Therefore, this method is contraindicated in intestinal lesions above 20 mm in diameter (Figure 1).

In ESD, a modified needle knife dissects the lesions through the submucosa. This endoscopic method appeared 15 years ago to perform epy complex resection of laterally spreading tumors (LST) of the gastrointestinal tract. The technique consists of marking the edge of the lesion about 5 mm proximal with an electric knife, followed by submucosal injection. An electric knife makes an incision around the circumference to create a flap that gradually lifts to dissect the submucosal space (Figure 2).

Compared to other endoscopic techniques, the ESD requires the longest time for surgery (70 to 130 minutes) and sedatives. With lesions above 20 mm, the reported complication rate is about 10% (complications mainly include bleeding and perforation). The en bloc resection rate ranges from 86% to 90%, and the R0 resection rate is 72% to 80% [2].



Figure 1 – EMR stages of endoscopic mucosal resection

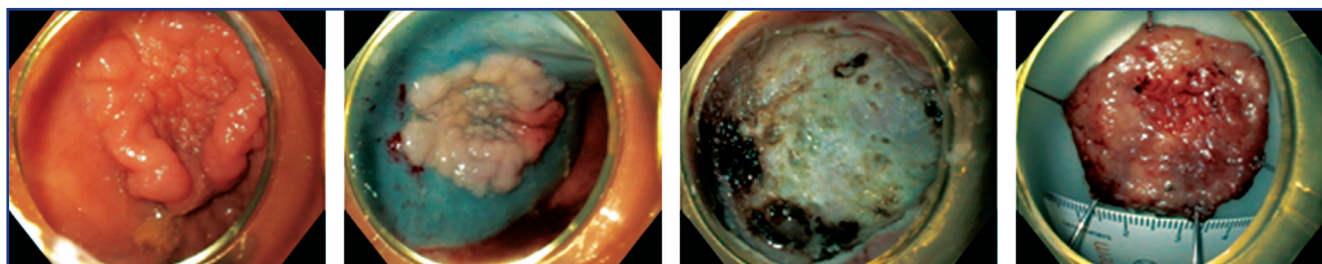


Figure 2 – Stages of endoscopic dissection in the submucosal layer

With the introduction of the EFTR method, there was a significant breakthrough in the endoscopic treatment of gastrointestinal neoplasms. In the review article of Schmidt et al., the classic indications for EFTR have been described and included the “repeated resection” of T1 carcinomas, curative treatment of early colorectal lesions, and resection of polyps of complex anatomical location. When early colorectal cancer is misdiagnosed as a benign adenoma and then classically removed using partial EMR, the R-status or depth of submucosal invasion might be impossible to determine. In this case, EFTR becomes a valuable tool for obtaining a full-size sample of the resection site, expanding the diagnostic arsenal [1].

Full-thickness endoscopic resection starts with marking the formation with an electric knife 0.5-0.8 cm away from the formation boundaries. Then, the formation is extracted from the surrounding mucosa with a vacuum suction unit into the endoscope cap with a clamp. After that, the endoscopist uses a screw on the endoscope handle to pull off the clamp. The clamp cuts off the formation with the base and the underlying stroma and clips the removal site tightly. Then, a mechanical suture is performed at the full-thickness resection site. The preliminary marking of the mucosa around the formation allows the endoscopist and morphologist to assess the removal’s radicality and the resection margins’ cleanliness (Figure 3).

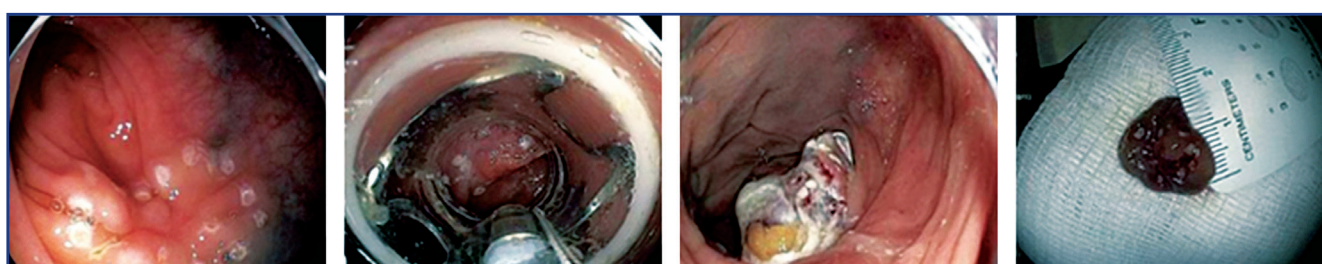


Figure 3 – Stages of endoscopic full-thickness resection (EFTR)

In the case of correctly diagnosed early colorectal cancer, EFTR leads to complete (R0) resection of the neoplasm, including the underlying muscle tissue, and allows for an accurate histological assessment of the depth of submucosal invasion [3]. For the first time in Kazakhstan, the presented article analyzed the cases of endoscopic removal of epithelial formations of the large intestine performed at an oncological clinic from 2020 to 2023.

**Materials and Methods:** The article presents a retrospective analysis of 68 cases of endoscopic removal of epithelial formations of the colon performed from 2020 to 2023 at the Center of Expert Endoscopy and Inter-

tional Radiology of the National Scientific Cancer Center (Astana, Kazakhstan).

**Results:** In 2020-2023, 68 outpatient and inpatient endoscopic extractions of large intestine neoplasms were performed in the endoscopy department.

The patients were divided into two groups by gender: 36 males and 32 females. The patients were divided into five groups by age according to the WHO characteristics. Among males, most patients were 60 to 74 years (29.4%), fewer were 45-59 years (17.6%), and the smallest number were aged 18 to 44 (2.9%) or 75 to 90 (2.9%). Among females, most patients (39.8%) were aged 45 to 74, and fewer were 18 to 44 years old (5.9%) or 75 to 90 years old (1.5%) (Table 1).

**Table 1 – Sex and age characteristics of patients**

Sex	Age				
	18-44 years	45-59 years	60-74 years	75-90 years	90+
Male, abs. (%)	2 (2.9%)	12 (17.6%)	20 (29.4%)	2 (2.9%)	-
Female, abs. (%)	4 (5.9%)	8 (11.8%)	19 (28%)	1 (1.5%)	-

Endoscopic mucosal resection of neoplasms was the method of choice for lesions up to 20 mm in size, in the presence of a broad basis or a pedicle, and with no visual signs of malignancy. In all outpatients and inpatients, endoscopic mucosal resection was performed using hydro-lifting with sterile gelofusine stained with sterile indigo carmine since preliminary hydro-lifting allows the radical removal of the tumor. In the presence of neoplasms in the proximal colon (cecum, ascending, transverse colon), neoplasms were removed under general sedation to reduce the discomfort for the patient. In the localization of neoplasms in the distal parts of the large intestine (descending, sigmoid, rectum), EMR was performed without sedation. The removed neoplasms ranged from 1.0 to 5.0 cm in size and had a long or short pedicle. Morphological examination of the removed substrate was performed in all cases of EMR neoplasms of the large intestine. The following lesions were morphologically confirmed: hyperplastic polyps – 6, lipomas – 2, tubulovillous adenoma with mild dysplasia – 42, tubulovillous adenoma with severe dysplasia – 6, carcinoma *in situ* – 1 and adenocarcinoma with invasion to a muscular plate of the

mucous membrane – 1, which has been assessed as the radical resection R0.

Endoscopic dissection in the submucosal layer was performed for radical endoscopic removal of masses exceeding 20 mm, as well as in severe dysplasia and suspected malignancy (according to the classification of the superficial and vascular pattern JNET2B and JNET3). Dissection was performed only in hospital settings and under general sedation, with a mandatory insufflation of the intestinal lumen with carbon dioxide. In ESD and EMR, pre-lifting was performed with sterile gelofusine stained with sterile indigo carmine. The dissection was made with a Finemedix Q-type dissection knife in the Spray 35Wt and Force 40Wt coagulation modes. All neoplasms were removed en bloc. The tumor boundaries after resection were marked for subsequent morphological verification of the resection margins' cleanliness in case of tumor invasion. In nine cases of endoscopic dissection in the submucosal layer, the following lesions were revealed: tubulovillous adenoma with severe dysplasia – 5, carcinoma *in situ* – 2, and adenocarcinoma with muscle invasion that required further surgical resection of the bowel to ensure radical treatment – 2 (Table 2).

**Table 2 – Morphological types of removed neoplasms**

Treatment type	Morphology					
	Hyperplastic polyp	Lipoma	Tubulovillous adenoma with mild dysplasia	Tubulovillous adenoma with severe dysplasia	Carcinoma <i>in situ</i>	Adenocarcinoma with invasion
EMR	6	2	42	6	1	1
ESD	-	-	-	5	2	2
EFTR	-	-	-	-	1	-

EFTR is an expensive procedure in terms of the cost of medical accessories. Therefore, this procedure was performed in the department once on a patient primarily diagnosed with rectal carcinoid. The removed mass was 1.2 cm in size, corresponding to the full-thickness resection device cap size.

**Discussion:** In a bowel lesion, the tumor characteristics (spread, biopsy histology, fossae pattern, and the NICE, JNET, or Kudo classification) should be assessed.

If non-invasive surgery is planned, the local staging with echo-endoscopy provides the highest accuracy, and if non-invasiveness is confirmed, the local excision is indicated. Due to the relatively low relation between the preoperative and postoperative stages, the en bloc and R0 removals are essential to reduce further operations for oncological reasons. Endoscopic en bloc mucosal resection may be performed for tumors below 2 cm in diameter with no signs of malignancy. Otherwise, ESD is recommended, which can be an acceptable alternative in special-

ized centers with extensive experience in endoscopic manipulations [4].

A final histological assessment allows the discovery of tumors that require further surgical intervention based on their local stage and characteristics. In early colorectal cancer with the invasion into the submucosal layer up to 1 mm of (up to T1sm1), the local excision may be adequate from the oncological point of view. Other risk factors for developing lymph node metastases, such as tumor differentiation, tumor budding, and lymphovascular invasion, should be considered when determining patients who require radical surgery [5].

**Conclusion:** In benign neoplasms with dysplasia and early colorectal cancer, minimally invasive technologies (EMR, ESD, EFTR) should be the first method of choice. Only if these manipulations are not impossible and there is a high risk of invasion into the underlying layers, and therefore endoscopic treatment is not radical, clinicians should choose surgical radical treatment. However, minimally invasive endoscopic inter-



ventions require using additional equipment (carbon dioxide insufflator, water jet pump) and a wide range of disposable supplies (dissection knives, injectors, clippers, etc.). Besides, the doctor-endoscopist must be skilled in dissections, so it is relevant to establish several expert endoscopic centers in the country. Finally, since colorectal cancer screening programs have increased the number of early detected colorectal cancer cases, oncologists, surgeons, gastroenterologists, and, most importantly, patients should be informed about the availability in the country of the latest methods of local treatment financed from the Compulsory Medical Insurance Fund (CMIF).

#### References:

1. Ebigo A., Probst A., Messmann H. Endoscopic treatment of early colorectal cancer – just a competition with surgery? // *Innov.*

*Surg. Sci.* – 2017. – Vol. 3(1). – P. 39-46. <https://doi.org/10.1515/iss-2017-0037>

2. Tanaka S., Kashida H., Saito Y., Yahagi N., Yamano H., Saito S., Hisabe T., Yao T., Watanabe M., Yoshida M., Saitoh Y., Tsuruta O., Sugihara K.-i., Igarashi M., Toyonaga T., Ajioka Y., Kusunoki M., Koike K., Fujimoto K., Tajiri H. Japan Gastroenterological Endoscopy Society guidelines for colorectal endoscopic submucosal dissection/ endoscopic mucosal resection // *Dig. Endosc.* – 2020. – Vol. 32(2). – P. 219-239. <https://doi.org/10.1111/den.13545>

3. Ahmed N., Bechara R. Endoscopic submucosal dissection and JNET classification for colorectal neoplasia: A North American academic center experience // *DEN Open.* – 2023. – Vol. 4(1). – Art. no. e322. <https://doi.org/10.1002/deo2.322>

4. Joo H.J., Seok J.U., Kim B.C., Lee D.E., Kim B., Han K.S., Hong C.W., Sohn D.K., Lee D.W., Park S.C., Chang H.J., Oh J.H. Effects of prior endoscopic resection on recurrence in patients with T1 colorectal cancer who underwent radical surgery // *Int. J. Colorectal Dis.* – 2023. – Vol. 38(1). – Art. no. 167. <https://doi.org/10.1007/s00384-023-04448-z>

5. Knoblauch M., Kühn F., von Ehrlich-Treuenstätt V., Werner J., Renz B.W. Diagnostic and Therapeutic Management of Early Colorectal Cancer // *Visc. Med.* – 2023. – Vol. 39(1). – P. 10-16. <https://doi.org/10.1159/000526633>

## АНДАТПА

### ЕРТЕ КОЛОРЕКТАЛЬДЫ ҚАТЕРЛІ ІСІККЕ АРНАЛҒАН ЭНДОСКОПИЯЛЫҚ ЕМДЕУ

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**Өзектілігі:** соңғы жылдары асқазан-ішек жолдарының қатерлі ісігі мен қатерлі ісікке дейінгі зақымдануларын эндоскопиялық емдеуде айтарлықтай жетістіктер болды. Эндоскопиялық шырышты резекция (EMR) - асқазан-ішек жолдарының қатерсіз зақымдануларының көпшілігін емдеудің қарапайым және тиімді әдісі. Алайда эндоскопиялық субмукозальды диссекцияны (ESD) және бүкіл қалыңдықтағы эндоскопиялық резекцияны (EFTR) енгізумен эндоскопиялық емдеуге жататын зақымданулардың көлемі тіпті тоқ ішекте де айтарлықтай кеңейді. Қазіргі уақытта бұл әдістер қатерсіз өсінділерді емдеу үшін ғана емес, сонымен қатар колоректальды қатерлі ісіктің ерте кезеңдерін кешенді резекциялау үшін де үнемі қолданылады. Ұсынылған мақалада Қазақстанда алғаш рет онкологиялық клиника жағдайында 2020 жылдан 2023 жылға дейін жүргізілген тоқ ішектің эпителий түзілімдерін эндоскопиялық жоюдың емделген жағдайларына ретроспективті талдау жүргізілді.

**Зерттеудің мақсаты** – ерте колоректальды қатерлі ісікті эндоскопиялық емдеу әдістерін қолдану ерекшеліктерін бағалау.

**Әдістері:** Ұлттық ғылыми онкологиялық орталықтың (Астана, Қазақстан) сараптамалық эндоскопия және интервенциялық радиология орталығында 2020 жылдан 2023 жылға дейінгі кезеңде жүргізілген тоқ ішектің эпителий түзілімдерін эндоскопиялық жоюдың 68 жағдайына ретроспективті талдау жүргізілді.

**Нәтижелері:** 2020-2023 ж.ж. кезеңінде тоқ ішектің неоплазмаларын 68 эндоскопиялық алып тастау жүргізілді, оның ішінде 25 пациентке және стационарлық жағдайда 43 пациентке амбулаториялық негізде. 43 стационарлық жағдайдың 9-9 субмукозды қабатта эндоскопиялық диссекция және 34 жағдайда тоқ ішек ісіктерінің эндоскопиялық мукозрезекциясы жүргізілді. Морфологиялық құрылымы бойынша барлық саннан гиперпластикалық полиптер 11 жағдайда, 2 жағдайда липома, 43 жағдайда жеңіл дисплазия дәрежесі бар тубуло-Вилла аденомалары, 11 жағдайда ауыр дисплазия дәрежесі бар тубуло-Вилла аденомалары, 3 жағдайда *carcinoma in situ* және 3 жағдайда инвазиясы бар аденокарцинома болды.

**Қорытынды:** Дисплазиямен және ерте колоректальды қатерлі ісікпен қатерсіз өсінділерді анықтаған кезде, емдеудің бірінші таңдауы әдісі аз инвазивті технологиялар (EMR, ESD, EFTR) болуы керек және оларды орындау мүмкін болмаған кезде және олардың астындағы қабаттарға ену қаупі жоғары болған кезде ғана, сондықтан эндоскопиялық емдеудің радикалдылығы болмаған кезде дәрігерлер хирургиялық радикалды емдеуді таңдауы керек. Пациенттер міндетті медициналық сақтандыру қорының (ММСК) қаржыландыру желісі бойынша республикада жергілікті емдеудің жаңа әдістемелерінің қолжетімділігі туралы хабардар болуға тиіс.

**Түйінді сөздер:** ерте колоректальды қатерлі ісік, эндоскопиялық шырышты резекция (EMR), эндоскопиялық субмукозальды диссекция (ESD), эндоскопиялық толық қабырғалы резекция (EFTR), бүйірлік сойылатын масса (LST).

## АННОТАЦИЯ

### ЭНДОСКОПИЧЕСКИЕ МЕТОДЫ ЛЕЧЕНИЯ РАННЕГО КОЛОРЕКТАЛЬНОГО РАКА

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**Актуальность:** В последние годы достигнуты значительные успехи в эндоскопическом лечении раковых и предраковых поражений желудочно-кишечного тракта. Эндоскопическая резекция слизистой оболочки (EMR) является простым и эффективным методом лечения большинства доброкачественных поражений желудочно-кишечного тракта. Однако внедрение эндоскопической подслизистой диссекции (ESD) и эндоскопической полностенной резекции (EFTR) значительно расширило спектр поражений, которые можно лечить эндоскопически в толстой кишке. В настоящее время эти методы регулярно используются не только для лечения доброкачественных образований, но и для комплексной резекции ранних стадий колоректального рака. В представленной статье впервые в Казахстане проведен ретроспективный анализ случаев эндоскопического удаления эпителиальных образований толстого кишечника, пролеченных в условиях онкологической клиники с 2020 г. по 2023 г.

**Цель исследования** – оценка особенностей применения методов эндоскопического лечения раннего колоректального рака.

**Методы:** Представлен ретроспективный анализ 68 случаев эндоскопического удаления эпителиальных образований толстого кишечника, проведенных в Центре экспертной эндоскопии и интервенционной радиологии Национального научного онкологического центра (Астана, Казахстан) с 2020 по 2023 годы.

**Результаты:** В 2020-2023 гг. было проведено 68 эндоскопических удалений новообразований толстого кишечника, из них амбулаторно – 25 пациентами 43 пациентам – в стационарных условиях по пакету ГОМП/ОСМС. Из 43 стационарных случаев в 9 случаях проведена эндоскопическая диссекция в подслизистом слое и в 34 случаях – эндоскопическая мукозрезекция новообразований толстого кишечника. По морфологическому строению, из всего количества гиперпластические полипы были отмечены в 11 случаях, липома – 2, тубуло-ворсинчатые аденомы с легкой степенью дисплазии – 43, тубуло-ворсинчатые аденомы с тяжелой степенью дисплазии – 11, *carcinoma in situ* – 3 случаях и аденокарцинома с инвазией – в 3 случаях.

**Заключение:** При выявлении доброкачественных новообразований с дисплазией и раннего колоректального рака первым предпочтительным методом лечения должны быть малоинвазивные технологии (EMR, ESD, EFTR) и только при невозможности их выполнения и высоком риске наличия уже инвазии в подлежащие слои, а следовательно при нерадикальности эндоскопического лечения клиницисты должны выбирать хирургическое радикальное лечение. Пациенты должны быть информированы о доступности новейших методик местного лечения в Республике по линии финансирования Фонда обязательного медицинского страхования (ФОМС).

**Ключевые слова:** ранний колоректальный рак, эндоскопическая резекция слизистой оболочки (EMR), эндоскопическая подслизистая диссекция (ESD), эндоскопическая полностенная резекция (EFTR), комплексная резекция латерально стелющихся образований (LST).

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**Transparency of the study:** Authors take full responsibility for the content of this manuscript.

**Conflict of interest:** Authors declare no conflict of interest.

**Funding:** The authors declare no funding or financing of the study.

**Authors' inputs:** contribution to the study concept – Batyrbekov K.; study design – Batyrbekov K., Galiakbarova A.; execution of the study – Galiakbarova A.; interpretation of the study – Batyrbekov K.; preparation of the manuscript – Batyrbekov K.

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