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EXPERIENCE USING CAPSULE ENDOSCOPY

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Abstract

Relevance: Based on the analysis of the results of videocapsular endoscopy of 84 patients with signs of gastrointestinal pathology and the results of a pathoanatomic examination of biopsy material taken during colonoscopy of the same 84 patients (52 of them have biopsy results), the reliability, features, principles and possibilities of using capsule endoscopy as a research method for diseases of the gastrointestinal tract are determined in the article.

Aim: to determine the effectiveness of capsule endoscopy in the diagnosis of gastrointestinal disease.

Materials and methods: From 2022 to 2023 84 capsule endoscopy studies (hereinafter referred to as CE) were conducted at the Interna clinic in Almaty. Patient identification data, diagnoses, reasons for examination, and underlying disease were collected. The results of the examination were collected and analyzed, and the results of the pathoanatomical examination of the biopsy material of the same patients were studied, which were conducted by the laboratory of Pathomorphology in the conditions of the A.N. Syzganov National Scientific Center of Surgery JSC.

Results: The research material presents the diagnostic capabilities of capsule endoscopy for the detection of diseases of the gastrointestinal tract.

Conclusions: Videocapsular endoscopy is a modern, non-invasive and highly informative research method that helps solve many issues of diagnosis and choice of therapeutic tactics in diseases of the small intestine. In Kazakhstan, capsule endoscopic method has been carrying out since 2014 and due to evolving burden of bowel disease worldwide, including Kazakhstan, where the quality of research on capsule endoscopy meets international standards, we undoubtedly consider that further research is needed for its wider introduction into clinical practice.

Key words: *capsule endoscopy, biopsy, gastrointestinal tract.*

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Резюме

ОПЫТ ИСПОЛЬЗОВАНИЯ КАПСУЛЬНОЙ ЭНДОСКОПИИ

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Актуальность: Видеокапсульная эндоскопия является современным, неинвазивным и высокоинформативным методом исследования, который помогает решить многие вопросы диагностики и выбора лечебной тактики при заболеваниях тонкого кишечника. В данной статье показаны диагностические возможности применения капсульной эндоскопии для выявления заболеваний желудочно-кишечного тракта у 84 пациентов и описан клинический случай диагностики и постановки точного диагноза.

Цель работы: определение эффективности капсульной эндоскопии в диагностике заболевании ЖКТ.

Материалы и методы: С 2022г. по 2023г. В Interna clinic в Алматы было проведено 84 исследовании капсульной эндоскопии (далее КЭ). Собирались идентификационные данные пациентов, диагнозы, причины обследования, основное заболевание. Результаты КЭ были собраны и проанализированы, а также были изучены результаты патологоанатомического исследования биологического материала этих же пациентов, которые были проведены в лаборатории патоморфологии в условиях АО «Национальный научный центр хирургии им. А.Н. Сызганова».

Результаты: В исследовательском материале представлены диагностические возможности капсульной эндоскопии для выявления заболевании желудочно-кишечного тракта.

Выводы: Качество исследования капсульной эндоскопии соответствует мировым стандартам, но, несомненно, необходимы дальнейшие исследования для более широкого внедрения ее в клиническую практику. В Казахстане капсульный эндоскопический метод применяется с 2014 года, и в связи с растущим распространением заболеваний кишечника во всем мире, включая Казахстан, где качество исследований в области капсульной эндоскопии соответствует международным стандартам, мы, несомненно, считаем, что необходимы дальнейшие исследования для его более широкого внедрения в клиническую практику

***Ключевые слова**: капсульная эндоскопия, биопсия, желудочно-кишечный тракт.*

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Түйіндеме

КАПСУЛАЛЫҚ ЭНДОСКОПИЯНЫ ҚОЛДАНУ ТӘЖІРИБЕСІ

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Өзектілігі: Мақалада асқазан-ішек жолдарының патологиясының белгілері бар 84 пациенттің бейнекапсулалық эндоскопия нәтижелерін және осы 84 пациенттің колоноскопиясы кезінде алынған биопсиялық материалды патологиялық-анатомиялық зерттеу нәтижелерін талдау негізінде (оның 52-сінде биопсия нәтижелері бар) асқазан-ішек жолдарының ауруларында зерттеу әдісі ретінде капсулалық эндоскопияны қолданудың сенімділігі, ерекшеліктері, принциптері мен мүмкіндіктері анықталды.

Мақсаты: асқазан-ішек ауруларын диагностикалауда капсулалық эндоскопияның тиімділігін анықтау**.**

Материалдар мен әдістер: 2022 жылдан 2023 жылға дейін Алматыдағы Interna clinic-те капсулалық эндоскопияға (бұдан әрі-КЭ) 84 зерттеу жүргізілді. Пациенттердің сәйкестендіру деректері, диагноздары, тексеру себептері, негізгі ауру жиналды. Еэ нәтижелері жиналды және талданды, сондай-ақ ұлттық ғылыми хирургия орталығы АҚ жағдайында патоморфология зертханалары жүргізген осы пациенттердің биопсиялық материалын патологиялық-анатомиялық зерттеу нәтижелері зерттелді. А. Н. Сызғанова.

Нәтижелер: Зерттеу материалы асқазан-ішек жолдарының ауруларын анықтау үшін капсулалық эндоскопияның диагностикалық мүмкіндіктерін ұсынады.

Қорытындылар: Видеокапсулалық эндоскопия-бұл қазіргі заманғы, инвазивті емес және өте ақпараттандырылған зерттеу әдісі, ол көптеген диагностикалық мәселелерді шешуге және аш ішек ауруларында емдеу тактикасын таңдауға көмектеседі. Капсулалық эндоскопияны зерттеудің сапасы әлемдік стандарттарға сәйкес келеді, бірақ оны клиникалық тәжірибеге кеңінен енгізу үшін қосымша зерттеулер қажет.

Түйінді сөздер: капсулды эндоскопия, биопсия, асқазан- ішек жүйесі.

Дәйексөз үшін:

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Relevance

Capsule endoscopy is currently widely used as a method of diagnosing diseases of the small intestine. It is considered a minimally invasive method of diagnosing inflammatory and tumor diseases of the gastrointestinal tract.

This study can be used as a screening method for detecting gastrointestinal cancer, as well as in patients who either refused colonoscopy or it is contraindicated for one reason or another. It is mainly used to identify the cause of gastrointestinal blood loss or bleeding, for example, ulcers, tumors or vascular malformations of the small intestine, to determine the degree of damage to the small intestine. (Figure 1,2).

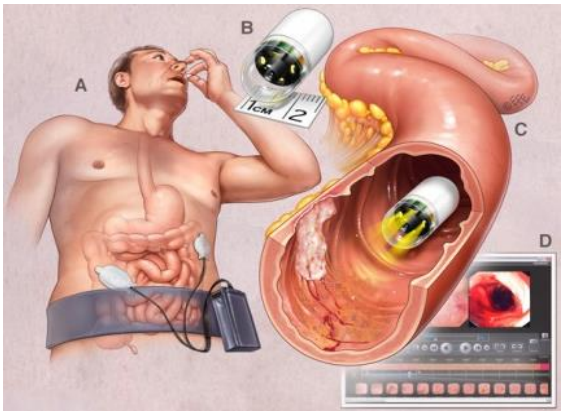


Figure 1. Process of the capsule endoscopic examination

Figure 2. "MicroCam" endoscopic capsule which is used for the examination process.

Materials and methods:

From 2022 to 2023 84 capsule endoscopy studies were conducted at the «Interna clinic» in Almaty. Experienced gastroenterologists and endoscopists selected patients who were in need to diagnose diseases of the small intestine, according to methodological recommendations.

This project was implemented as follows: All capsule endoscopies were performed on an outpatient basis at the Interna clinic. After carrying out explanatory work on the examination and tests, all patients signed an informed consent and proceeded an examination. The patient followed a non-slag diet, excluded from the diet for 3 days (drugs that can stain the mucous membrane and contents of the intestine, products containing small seeds: grains, nuts, grapes, poppy seeds; milk, beetroot, borscht, greens); On the day of preparation, they drank only transparent liquids (transparent broth, green tea, still water) during the day in unlimited quantities. Next step patients depleted their intestines with preparations based on Polyethylene glycol (PEG) and electrolytes. On the day of installation of the capsule endoscopy receiver, the patient swallowed the capsule on his own, and 24 hours later handed over the capsule endoscopy receiver to the doctor. After receiving the images from the patient, they were encrypted. Separation from the dome of the caecum to the ileum, assessment of the visible area and detection of damage were performed using an artificial intelligence algorithm, and the analyzed images were evaluated and confirmed by an endoscopist and gastroenterologist. Also, out of 84 patients, 52 patients underwent colonoscopy with biopsy and were compared with the results of capsule endoscopy.

Patient identification data, diagnosis, reasons for examination, underlying disease and the result of capsule endoscopy examination and biopsy results were collected. The results of capsule endoscopy, such as the passage time through the stomach, duodenum, small intestine and colon, as well as the delay or complications of capsule endoscopy in the small intestine, were collected and studied. The results of the pathomorphological examination of the biopsy material of the same patients, which were performed in the laboratory of pathomorphology in conditions of the A.N. Syzganov National Scientific Center of Surgery, were considered.

Results:

Among 84 patients, the average age of all patients was 41.3 years, min: 9 years, max: 77 years.

The number of female patients is 51, the average age was 44.4 years min: 18 years, max: 77 years, the number of male patients is 33, the average age was 36.6 years, min: 9 years, max:62 years. According to the results of capsule endoscopy: Crohn's disease – 41(48,8%), ulcerative colitis – 8 (9,5%), celiac disease - 9 (10,7%), others - 26 (31%).

Table 1.

Results of the actual study divided by gender, symptoms and diagnosed diseases.

The gender	
Man	51(60,7)
Women	33(39,3)
Symptoms	
Abdominal pain	36(42,8%)
Chronic diarrhea	33(39,3%)
Weight Loss	4(4,7%)
Gastrointestinal bleeding	3(3,6%)
Constipation	2(2,4)
Anemia	6(7,2)
Nosology	
Crohn's disease	41(48,8%)
Ulcerative colitis	8(9,5%)
Celiac disease	9(10,7%)
Enteritis	15(17,8%)
Focal colitis	7(8,3%)
Erosive colitis	2(2,3%)
Polyp	2(2,3%)

According to the results of the pathoanatomic examination of the biopsy material (Chart 1), there are 52 patients in total. The number of male patients is 20, of which ulcerative colitis – 1 (5%), Crohn's disease – 6 (30%), celiac disease-3 (15%), others- 10 (50%).

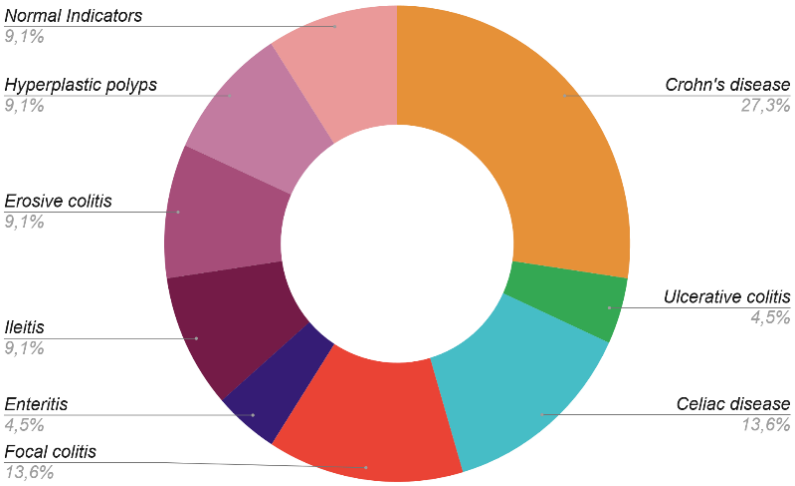


Figure 1. Process of the capsule endoscopic examination.

The total number of patients with biopsy results is 52.
Men – 20. Of these:

- UC – 1;
- CD – 6;
- Celiac disease – 10;
- Others – 10:

1. Focal colitis – 3 (13.6%)
2. Enteritis – 1 (4.5%)
3. Ileitis – 2 (9.1%)
4. Erosive colitis – 2 (9.1%)
5. Hyperplastic polyps – 2 (9.1%)
6. Normal Indicators – 2 (9.1%)

Figure 2. "MicroCam" endoscopic capsule which is used for the examination process.

Chart 1. The results of the histological examination in male group of patients.

The total number of female patients with biopsy results is 32. Of these:

- **UC – 6;**
- **CD – 13;**
- **Celiac disease – 3;**
- **Others – 10:**

1. **Focal colitis – 4 (11.4%)**
2. **Enteritis – 1 (2.9%)**
3. **Ileitis – 4 (11.8%)**
4. **Lymphocytic ileitis – 1 (2.9%)**
5. **Lymphangiectasia of the small intestine – 1 (2.9%)**
6. **Normal Indicators – 2 (5.9%)**

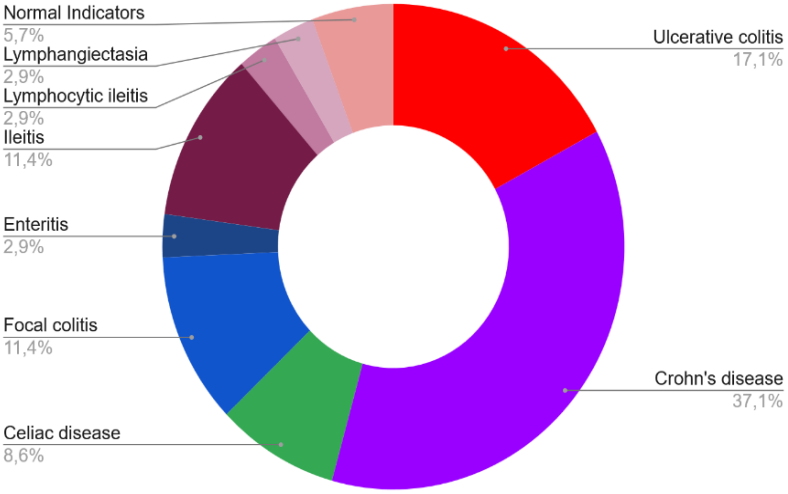


Chart 2. The results of the histological examination in female group of patients.

The number of female patients is 32 (Chart 2). Of these, ulcerative colitis – 6 (18,8), Crohn's disease – 13 (40,6%), celiac disease – 3 (9,4%), others- 10 (31,3%).

Thus, when comparing the results of the capsule endoscopy and the results of the biopsy in 49 cases, the conclusions were similar, which corresponds to 94.2%. In 1 case, an incomplete capsule endoscopy study, where morphologically celiac disease was confirmed - 2%, in 1 case, the patient was observed with ulcerative colitis disease, with capsule endoscopy, normal small intestine parameters, morphology corresponded to Crohn's disease - 2%, in 1 case, the patient was observed with Crohn's disease disease, with capsule endoscopy, normal small intestine parameters, morphology corresponded to ulcerative colitis - 2%.

Clinical Case

Patient V., 37 years old, complained of nausea, lack of appetite, dry mouth, bloating, weakness. The disease debuted in 2020 with intoxication syndrome, fever, abdominal pain. She was hospitalized at her place of residence. Then she received inpatient treatment at the Taldykorgan regional hospital, therapy was performed with steroids, with further improvement in her condition, then a diagnosis of Celiac disease was made during the examination. The patient is on a gluten-free diet. This deterioration has been observed since September 2021, in the form of dyspeptic phenomena, fever. According to the colonoscopy, there is no pathology. According to the EGDS, celiac disease. Crohn's disease of the small intestine, diffuse atrophic gastritis. Celiac disease, atypical form, resistant type, morphological stage March 3b. Results of MR enterography: duodenitis, jejunitis, upper mesenteric artery syndrome is not excluded. Against the background of activity, systemic steroids were started in summer of 2022. 27.08.2022 was started induction with Ustekinumab, 21.11.2022 – the second dose. It is known from the anamnesis that the patient has no bad habits, heredity for IBD does not exacerbate, from concomitant diseases: mild asthma, secondary generalized osteoporosis. Vitamin D deficiency. The patient's height is 168 cm, weight is 50 kg. BMI = 17.7 kg/cm2. She underwent an examination in November 2022.

According to the EGDS data from 2022: Celiac disease. Erosive bulboadenitis. Crohn's disease of the small intestine. Antral subatrophic gastritis.

According to colonoscopy data from 2022: Crohn's disease of the small intestine. Internal hemorrhoids.

According to histology data from 2022: The morphological picture corresponds to M.N. Marsh III b celiac disease: pronounced atrophy of the villi of the small intestine.

According to capsule endoscopy data from 2022: scallopiness, mosaicism of the mucous membrane and micronodularity in the proximal part of the small intestine. Diffuse villous edema was observed throughout the small intestine, except for the terminal ileum. Focal ulceration was noted in the middle part of the small intestine.

Diagnosis: Crohn's disease of the small intestine, minimal activity. Biological therapy with Ustekinumab since 08.27.2022. Celiac disease, resistant type, severe. Morphological stage of Marsh 3 b. (Figure 3-6).

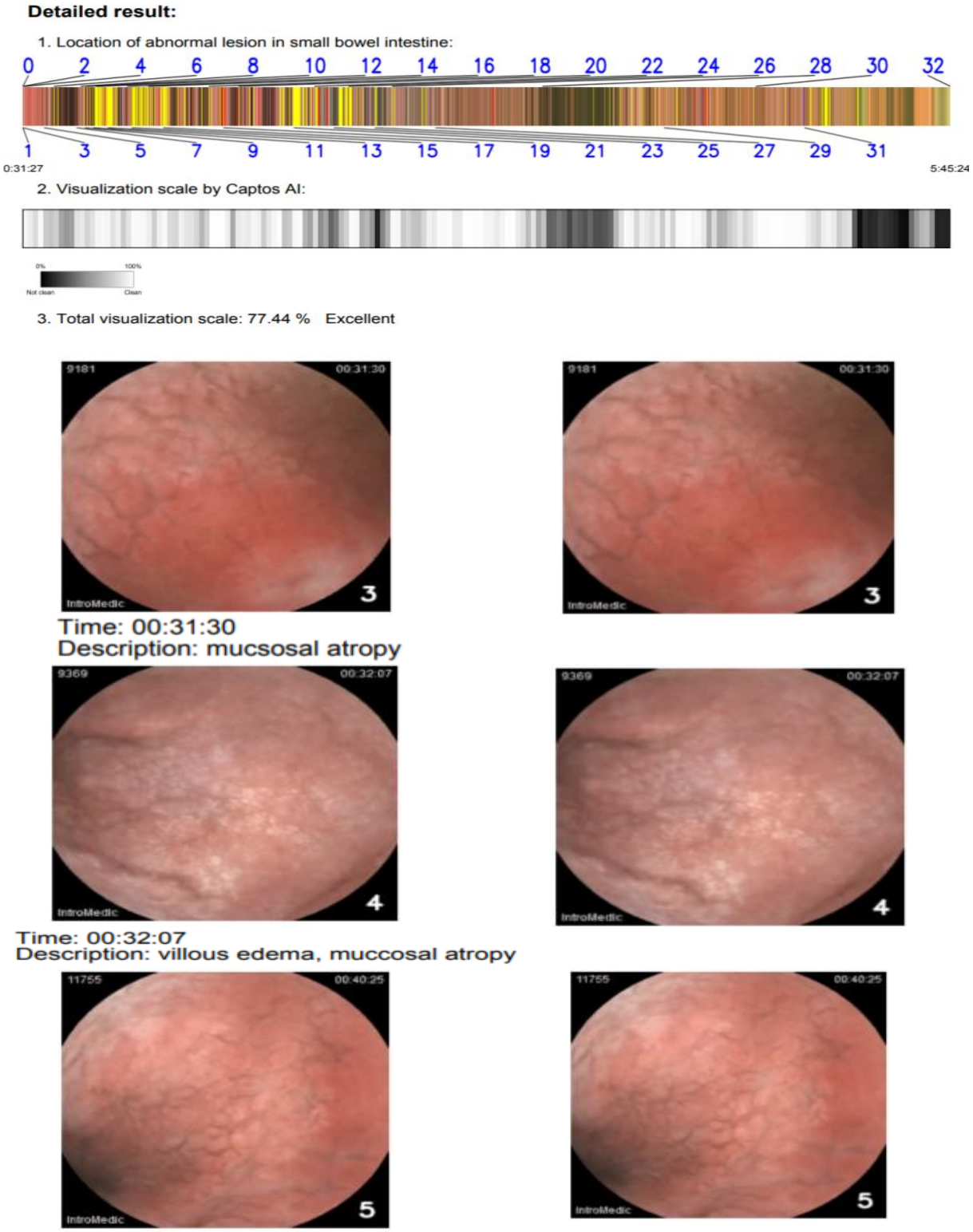
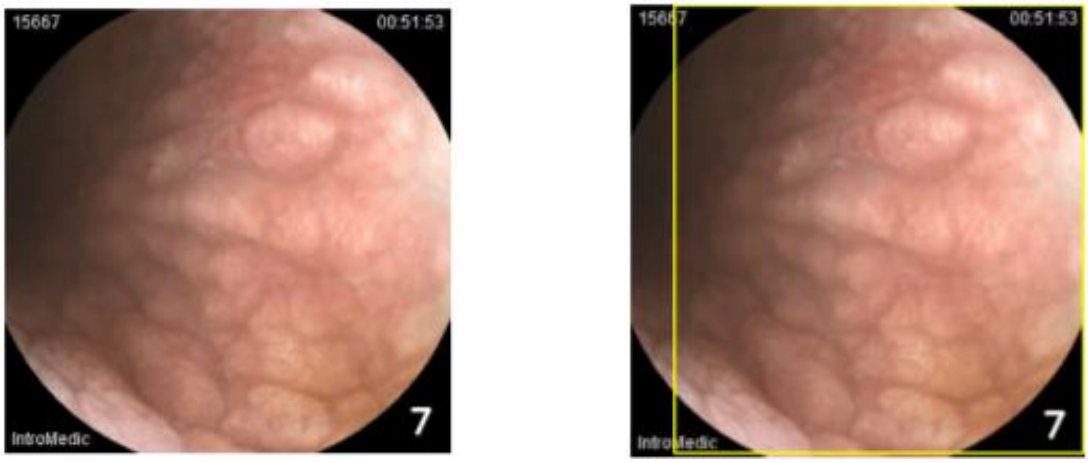
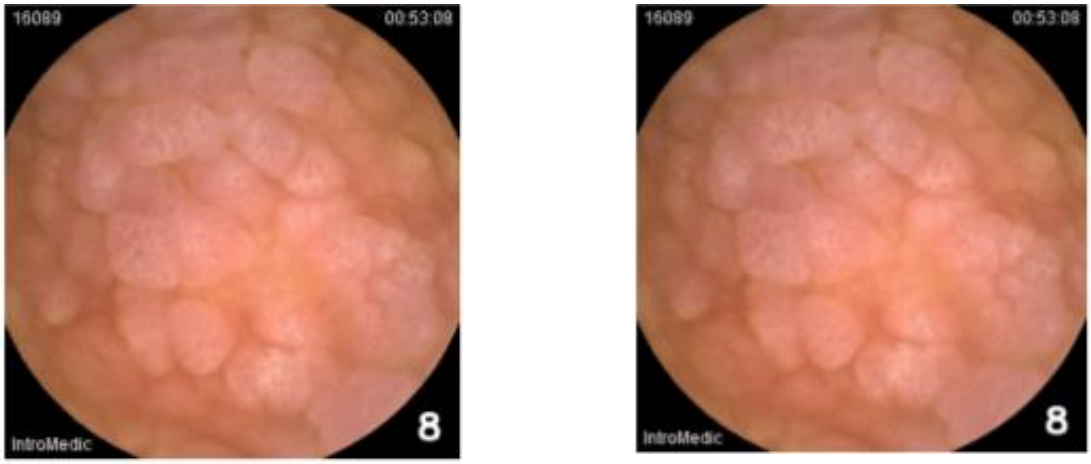


Figure 3. Signs of Celiac disease as mucosal atrophy in small intestine.



Time: 00:51:53
Description: scalloping, mosaic pattern, and micronodularity



Time: 00:53:08
Description: scalloping, mosaic pattern, and micronodularity

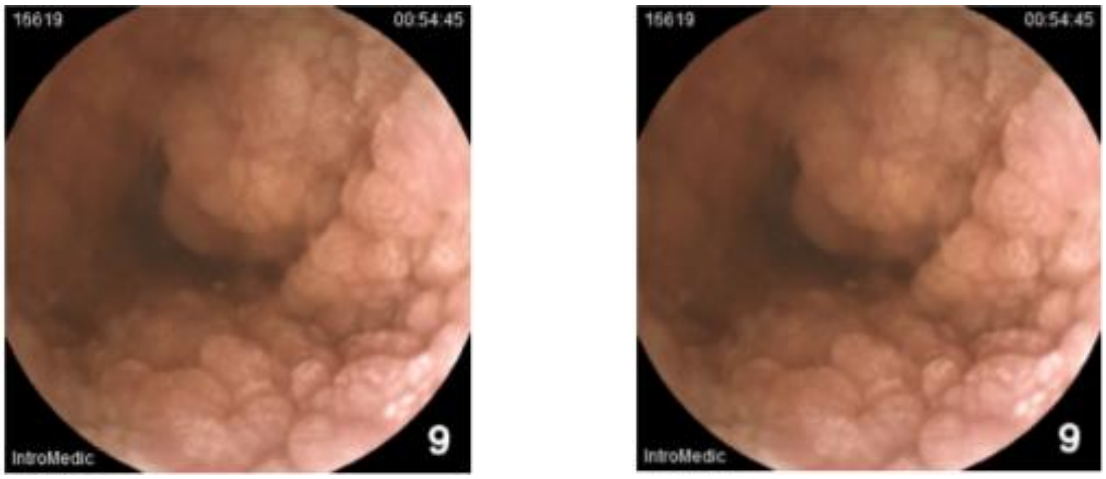


Figure 4. Alterations of the mucous membrane in the proximal part of the small intestine.

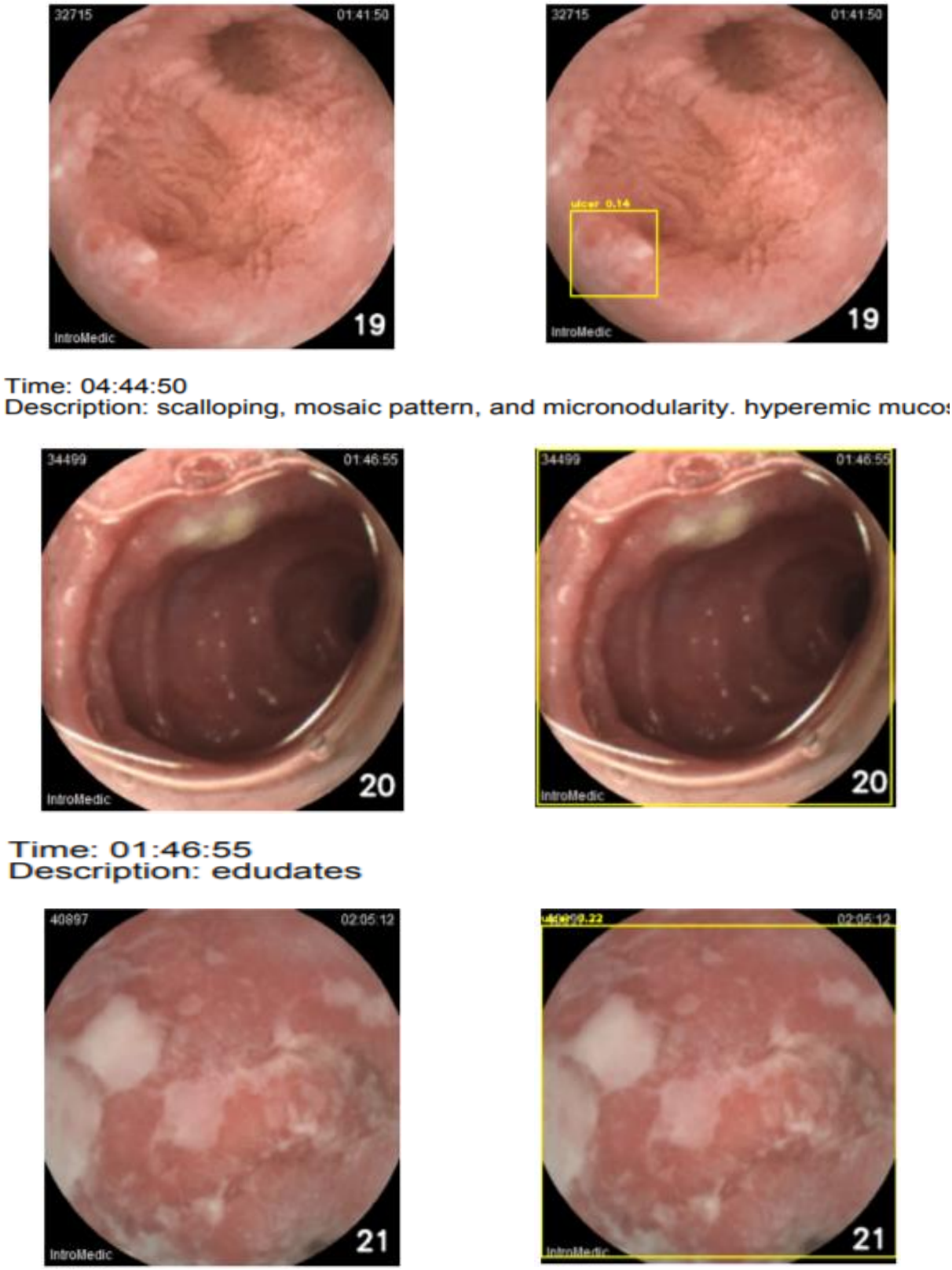


Figure 5. Signs of inflammatory process in small intestine.

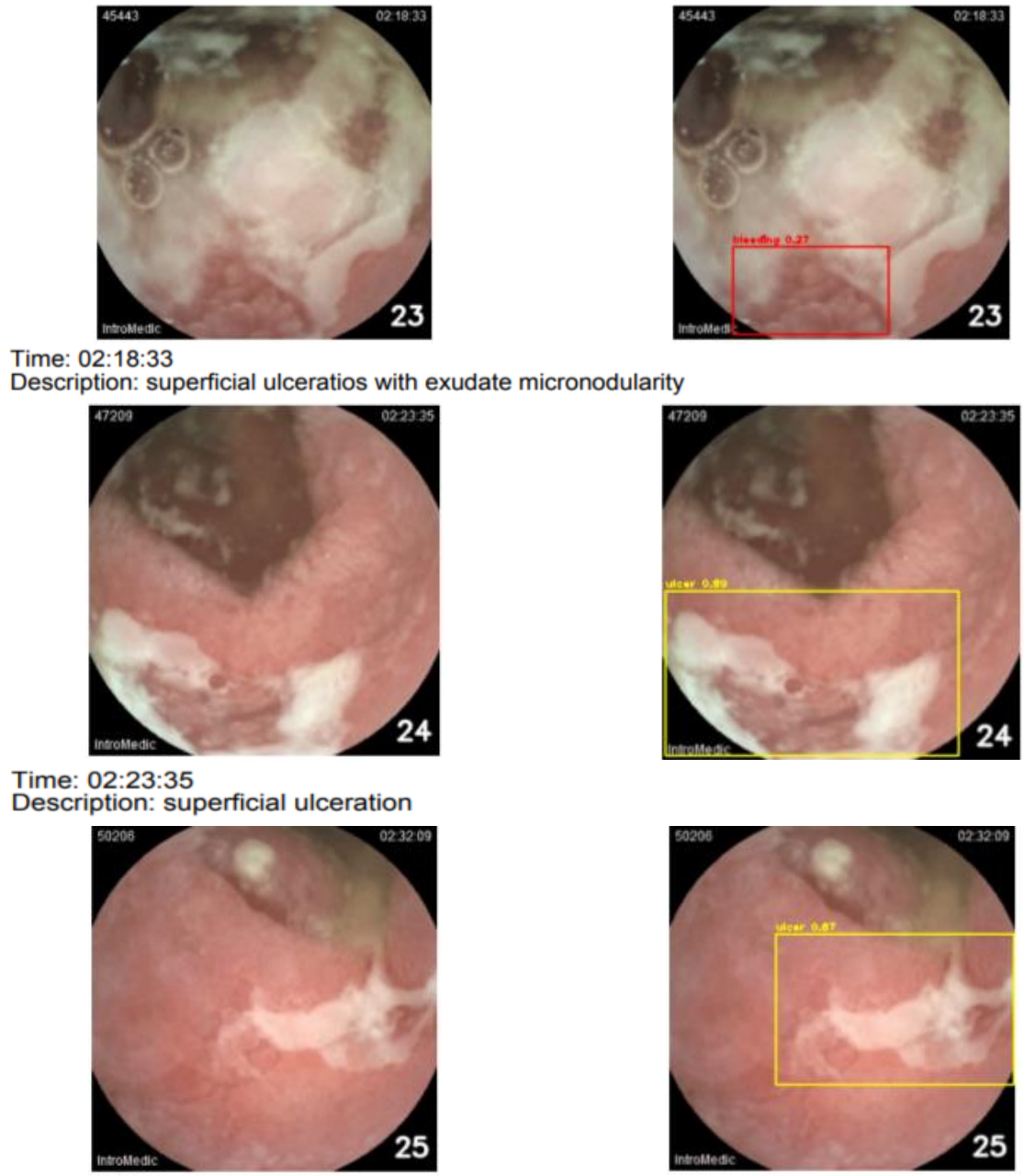


Figure 6. Ulcerative process in small intestine.

Conclusions:

Videocapsular endoscopy is a modern, non-invasive and highly informative research method that helps solve many issues of diagnosis and choice of therapeutic tactics in diseases of the small intestine. In Kazakhstan, capsule endoscopic method has been carrying out since 2014 and due to evolving burden of bowel disease worldwide, including Kazakhstan, where the quality of research on capsule endoscopy meets international standards, we undoubtedly consider that further research is needed for its wider introduction into clinical practice.

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